

Religion Replenishes Self-Control

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Abstract

Researchers have proposed that the emergence of religion was a cultural adaptation necessary for promoting self-control. Self-control, in turn, may serve as a psychological pillar supporting a myriad of adaptive psychological and behavioral tendencies. If this proposal is true, then subtle reminders of religious concepts should result in higher levels of self-control. In a series of four experiments, we consistently found that when religious themes were made implicitly salient, people exercised greater self-control, which, in turn, augmented their ability to make decisions in a number of behavioral domains that are theoretically relevant to both major religions and humans' evolutionary success. Furthermore, when self-control resources were minimized, making it difficult for people to exercise restraint on future unrelated self-control tasks, we found that implicit reminders of religious concepts refueled people's ability to exercise self-control. Moreover, compared with morality- or death-related concepts, religion had a unique influence on self-control.

Keywords

self-control, religion

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Most mainstream religious doctrines emphasize self-control through the idea that people must suppress certain thoughts and behaviors to align themselves with a particular set of religious standards (Baumeister & Exline, 1999, 2000; Geyer & Baumeister, 2005; McCullough & Willoughby, 2009). Indeed, it has been proposed that religion is a cultural adaptation that has enhanced group and individual fitness in the course of human evolution by promoting a myriad of socially beneficial behaviors (Baumeister, Bauer, & Lloyd, 2010; Henrich & Henrich, 2006; Norenzayan & Shariff, 2008). Although this hypothesis is insightful, it has yet to receive direct experimental support. If religion does function as a means of cultivating self-control, then even subtle reminders of religious concepts should result in higher levels of self-control. In this article, we report a series of experiments in which we directly tested this hypothesis.

Emergence of Religion

Religion is typically associated with a belief in supernatural agents, such as gods and spirits, who presumably play an important role in coordinating worldly events (McCullough & Willoughby, 2009; Norenzayan & Shariff, 2008). In addition, religion has been described as a *moralizing compass* that regulates psychological and behavioral tendencies by rewarding actions that benefit the group and punishing those that are contrary to the common good (Baumeister et al., 2010). Thus, religion encompasses concepts of morality, but also conjures thoughts of the supernatural.

Several accounts have been offered to explain the possible origins of religion. For example, some authors have argued that human beings invented religion out of an innate desire to make sense of random or natural phenomena (Barrett, 2004). Citing a lack of evidence for this anthropomorphic view, others have offered more testable social-cognitive explanations for religion (Culotta, 2009). For example, in a study supporting the similar idea that religious concepts, such as the concept that God exists, can serve basic psychological needs to perceive the social world as an orderly and predictable place, Kay, Moscovitch, and Laurin (2010) found that exposure to random or uncertain events increases religious conviction. Other authors have focused on the prosocial aspect of religion, arguing that religion facilitates prosocial attitudes and actions that help lubricate the bonds of society (Norenzayan & Shariff, 2008). That is, as a result of transitioning from small hunter-gatherer cultures to large-scale agrarian ones (Bar-Yosef, 1998), modern humans' ancestors had to become more concerned with how to encourage cooperation and tolerance among anonymous strangers, prevent freeloading, and restrain community members from, for example, looting reserves of grain between harvests (McCullough & Carter, 2011). Religion and the belief in a moralizing God appear to be an adaptation to these evolutionary challenges.

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Thus, societies with larger populations, which likely experience greater threat of freeloading because of greater anonymity among community members, have a greater prevalence of moralizing and omniscient gods (Roes & Raymond, 2003). This relationship is likely due to religions' ability to make reputational concerns salient; in turn, this salience may result in increased trust and decreased freeloading among like-minded, but not necessarily related, people in larger, more anonymous groups. In a study supporting a relationship between religiosity and social cooperation, Shariff and Norenzayan (2007) found that after being implicitly primed with religious beliefs, participants were more likely to share money with an anonymous partner even though they had the opportunity to keep it all. Whereas Shariff and Norenzayan argued that there is a direct link between religious beliefs and prosocial behavior, we believe that their data actually support a different hypothesis: Religion enhances self-control, which, in turn, promotes prosocial behavior.

Religion and Self-Control

Self-control is the capacity to suppress personally desirable behaviors (e.g., taking a nap) or impulses (e.g., lashing out in anger at other people) to bring behaviors in line with more socially acceptable goals and standards (e.g., helping with the harvest). Baumeister and Exline (2000) argued that religion is a culturally evolved mechanism that promotes self-control. More specifically, religion can "provide a solution to the self-regulation dilemmas inherent in cultural life; it helps people to control selfish impulses that might harm group interests, to subordinate short-term temptations to long-term goals, to strengthen inner restraints" (Baumeister et al., 2010, p. 67). Consequently, religion may facilitate self-control, and self-control, in turn, may play a crucial role in supporting behaviors and tendencies that confer evolutionary fitness to individuals or groups. In other words, self-control subsumes prosocial behavior, such as that demonstrated by the participants in Shariff and Norenzayan's (2007) study, because acting unselfishly or in a socially cooperative manner necessitates exerting self-control.

To date, work in this area has largely been theoretical or involved correlational designs, so that the important issue of causality has been unaddressed. For example, McCullough and Willoughby (2009) found that five of six longitudinal studies demonstrated positive, albeit weak, associations between personality traits related to self-control and subsequent increases in religiosity. The experimental work showing a link between religion and self-control has often involved indirect tests of this relationship. First, Fishbach, Friedman, and Kruglanski (2003, Study 2) found that subconscious priming of vice-related words (i.e., words related to temptations) facilitated participants' ability to recognize religious words, but that priming religious concepts interfered with participants' ability to recognize sin-related words. Although those authors dismissed the possibility that a hierarchical semantic

relationship was the cause of the asymmetrical effects they found, they did not attempt to empirically rule it out or pit it against an explanation based on self-control. Indeed, self-control was not measured or manipulated directly, and thus that study provides only indirect and inconclusive evidence for a link between religion and self-control.

Second, Inzlicht and Tullett (2010) reported mixed evidence for a relationship between religious beliefs and executive control. These researchers found no difference in response latencies on incongruent Stroop trials between participants who had reaffirmed their religious beliefs and those who had not, although the affirmation group did make fewer errors (Study 1). In sum, the research supporting a link between religion and self-control has failed to provide consistent experimental evidence for a causal link between these two constructs. The goal of the present research was to test the hypothesis that these two constructs are causally related.

Overview of the Present Research

In four experiments, we experimentally investigated the causal role of religion in promoting self-control, by systematically testing the effect of implicit religious primes on self-control. Following well-established paradigms in the self-control literature (see Ryan & Deci, 2008, and Vohs & Baumeister, 2011), we examined behaviors that are theoretically relevant to evolutionary success and that, at the same time, require substantial self-control: enduring discomfort, delaying gratification, exerting patience, and refraining from impulsive responses. If religiosity increases self-control, as suggested by Baumeister and his colleagues (e.g., Baumeister & Exline, 2000; Geyer & Baumeister, 2005), then making religious concepts salient in people's minds should temporarily activate their inclination toward exercising self-control (Bargh & Chartrand, 1999).

To activate god-related concepts in participants without their conscious awareness, in all four studies we used an implicit-priming procedure previously employed by Shariff and Norenzayan (2007). This task required participants to unscramble each of 10 five-word sentences by dropping an irrelevant word. Half of the sentences contained neutral words only, whereas the remaining sentences contained one religious-prime word.

Results for suspicion probes that we used after each study affirmed the findings of previous research, which has suggested that implicit-priming procedures evoke very little conscious awareness of the primed material (Bargh & Chartrand, 1999; Fazio & Olson, 2003). Participants who were suspicious of the primed material or who guessed the hypotheses of the study were excluded from our analyses ($n = 2$ in Study 1, $n = 2$ in Study 2, $n = 0$ in Study 3, and $n = 1$ in Study 4).

Finally, to avoid experimental biases, we did not ask participants specifically about their religiousness (cf. Randolph-Seng & Nielsen, 2007). But when we examined data on participants' self-reported religiosity that we had collected

during prescreening at the beginning of the year, we found that the majority considered themselves to be moderately religious ($M = 2.69$, $SD = 0.96$; scale from 1, *strongly disagree*, to 4, *strongly agree*) and tried to “carry [their] religious or spiritual beliefs over into [their] other dealings in life” ($M = 2.96$, $SD = 0.93$; scale from 1, *strongly disagree*, to 4, *strongly agree*). Participants’ religiosity did not significantly interact with other variables in any of our studies. Participants in our studies reported that they were Catholic (30.0%), agnostic (22.8%), Protestant (18.0%), atheist (11.2%), Jewish (4.5%), Buddhist (3.4%), Hindu (1.5%), Muslim (1.1%), and “other” (7.1%); religious affiliation was unknown for 0.4% of the sample.¹ The distribution of religious affiliations was similar across conditions in each study, and the pattern of results did not vary with religious affiliation in any of the studies. Moreover, results for religious and nonreligious participants showed the same pattern. Accordingly, religiosity and religious affiliation are not discussed further in this article.

Study 1: Enduring Discomfort

Method

Participants in Study 1 (mean age = 18.70 years, $SD = 2.66$ years; 20.83% males, 79.17% females) were recruited from an introductory psychology class and took part in two ostensibly unrelated experiments. First, they were randomly assigned to either the religious-prime condition ($n = 23$) or the neutral-prime condition ($n = 25$). The priming task (Shariff & Norenzayan, 2007) required participants to unscramble each of 10 five-word sentences by dropping an irrelevant word. In the religious-prime condition, 5 of the 10 sentences contained five neutral words, and the remaining 5 contained four neutral words and one religious-prime word, such as *God*, *spirit*, or *divine*, in each sentence. In the neutral-prime condition, all 10 sentences contained five neutral words, and none of the words in a given sentence pertained to a shared construct. For example, in the neutral-prime condition, the scrambled sentence “sky the seamless blue is” could be unscrambled into “the sky is blue,” and in the religious-prime condition, the scrambled sentence “dessert divine was for the” could be unscrambled into “the dessert was divine.” Before starting this task, participants were told that there were no incorrect answers, but that each (unscrambled) sentence should make logical sense. Participants were also asked to reflect on each sentence to ensure that it was grammatically correct, before moving on to the next one.

After completing the scrambled-sentences task, all participants were directed to a table that held 20 small cups, each of which contained 1 oz of a mixture of orange juice and vinegar (cf. Vohs et al., 2008). Participants were told that for this second experiment, an investigation of motivation, each cup contained a mixture that most people find unsavory, that all the mixtures were identical, that we would pay participants a nickel for each ounce they drank, and that they could stop at any time. After the experimenter left the room, participants

were given unlimited time to drink as many of the cups as they liked. Once finished, participants summoned the experimenter back into the room, and the experimenter then recorded the number of ounces each participant had drunk. This number was our measure of self-control, with greater consumption representing greater exertion of self-control. Then, participants completed the previously mentioned measure of suspicion, in which we asked if they found anything out of the ordinary regarding the tasks. Finally, participants were compensated with either partial course credit or \$5, were fully debriefed, and were thanked for their time.²

Results and discussion

Participants in the religious-prime condition drank more of the unsavory juice ($M = 7.57$ oz, $SD = 7.24$) than did participants in the neutral-prime condition ($M = 3.96$ oz, $SD = 3.60$), $t(46) = 2.21$, $p = .03$, $d = 0.63$. Therefore, when religious concepts were salient, participants exercised greater self-control by enduring longer at an unpleasant task.

Study 2: Delayed Gratification

In Study 2, we attempted to replicate the effect of religious primes on self-control that we found in Study 1, using a different dependent variable that also reflects self-control: delayed gratification.

Method

In Study 2, we randomly assigned student participants (mean age = 18.20 years, $SD = 1.15$ years; 23.73% males, 76.27% females) to complete either the religious-prime task ($n = 28$) or the neutral-prime task ($n = 32$) used in Study 1. After they completed the task, all participants were led to believe that the study was over. They were surprised by being told that the laboratory was able to offer monetary compensation in addition to the partial course credit they had just received. Participants learned that they could either return to the lab any time the next day to pick up \$5 or return there any time 1 week later to pick up \$6. Because this paradigm has been widely employed as a standard measure of delayed gratification (i.e., the ability to resist temptation in exchange for a larger reward more distant in time; e.g., Metcalfe & Mischel, 1999; Vohs et al., 2008), we used it as our index of self-control in this study. A decision to come back the next week for \$6 represented greater exertion of self-control than did a decision to return the next day for \$5.

Results and discussion

A greater percentage of participants in the religious-prime condition (60.7%) than in the neutral-prime condition (34.4%) decided to wait and receive the larger amount of money, $\chi^2(1, N = 60) = 4.16$, $p = .04$. Thus, implicit reminders of religious

concepts led participants to delay gratification (exert self-control) and receive a modestly larger reward for their efforts.

Study 3: Persistence With and Without Ego Depletion

According to the literature on self-control, self-control requires mental resources, which are limited in capacity and can be fatigued, much as a muscle can be (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007). When mental resources are temporarily depleted, self-control is impaired; as a result, performance in subsequent activities that require self-control decreases. This psychological process is termed *ego depletion* (Baumeister, Heatherton, & Tice, 1994; see Baumeister et al., 2007, for a review). If religion evolved as a means to promote greater self-control among community members, then after initial levels of self-control have been depleted, reminding people of religious concepts should “refuel” their self-control resources.³ That is, priming religion-related concepts should result in greater exertion of self-control in performing a subsequent unrelated task that requires self-control. We tested this hypothesis in Study 3.

Method

On arriving at the lab, all participants (mean age = 18.80 years, $SD = 1.47$ years; 65.06% males, 34.94% females) read a passage given to them on a piece of paper and typed it into a laptop computer. Depending on the condition to which they were randomly assigned, participants were instructed either to type the passage and omit each *e*, *s*, and space (ego-depletion condition) or to simply type the passage (control condition). This letter-skipping manipulation has been shown to temporarily deplete mental resources and impair performance in subsequent tasks (Baumeister et al., 1998; Muraven, Shmueli, & Burkley, 2006). Additionally, to further tax mental resources, we had participants in the ego-depletion condition listen to loud music while completing this task.

Following the typing task, participants in the ego-depletion condition were randomly assigned to complete either the religious-prime task ($n = 20$) or the neutral-prime task ($n = 19$) used in Study 1; all participants in the control condition were assigned to the neutral-prime task ($n = 21$). Therefore, this study included one experimental condition and two control conditions—one with and one without the initial ego-depletion task—to examine the replenishing effect of religion on self-control.

Next, we asked participants to solve a set of geometric puzzles that were, in fact, impossible (Quinn, Brandon, & Copeland, 1996). We made clear to participants that they should try their best to solve the puzzles although they could choose to stop at any time. Participants were told that they had unlimited time to complete this task. However, any participant still working after 30 min was interrupted by the experimenter, and the participant’s time was capped at 30 min ($n = 3$). The amount of time participants dedicated to the puzzles before giving up (or the amount of 30 min if they did not give up) was the quantitative measure of their self-control. Greater persistence on the puzzle task represented greater exertion of self-control.

Results and discussion

The ego-depletion manipulation was successful. As shown in Figure 1, among participants who received a neutral prime, persistence on the puzzle task was significantly lower for those whose self-control resources had been depleted ($M = 696$ s) than for those whose resources had not been depleted ($M = 1,003$ s), $t(57) = 2.06$, $p = .04$, $d = 0.66$. As hypothesized, priming religious concepts seemed to refuel the self-control of participants whose self-control resources had been depleted by the typing task; they persisted at the puzzle task substantially longer ($M = 1,186$ s) than did their depleted counterparts who had received the neutral (nonreligious) prime ($M = 696$ s), $t(57) = 3.26$, $p = .002$, $d = 1.21$. Also, participants whose self-control resources had been depleted and who received religious primes did not

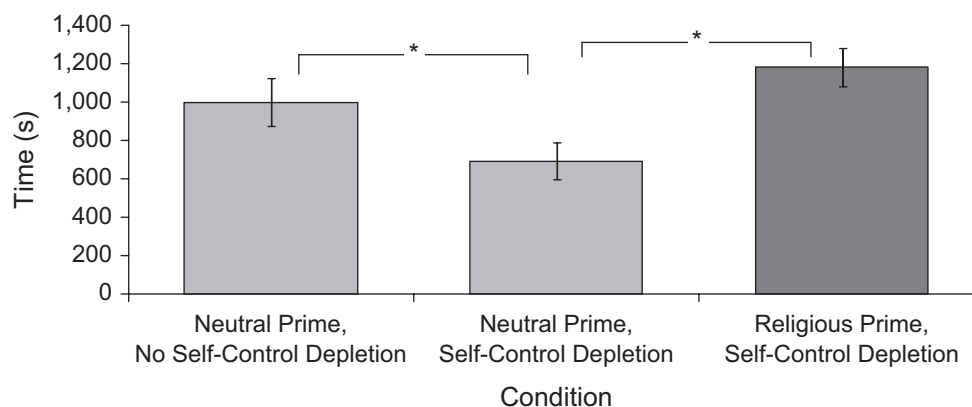


Fig. 1. Mean time during which Study 3 participants persisted at the puzzle task as a function of condition. Error bars represent standard errors. Asterisks indicate significant differences between conditions ($*p < .05$).

differ from participants whose self-control resources had not been depleted and who received neutral primes ($p > .27$). Altogether, this study offers strong and direct evidence for the replenishing effect of religious concepts on self-control.

Study 4: Ruling Out Alternative Explanations

In Studies 1 through 3, we consistently found that the religious-prime condition encouraged greater self-control than did the neutral-prime condition. Specifically, we consistently found that priming religious concepts produced positive influences on participants' endurance of discomfort, delay of gratification, and persistence at a task. However, these behaviors could have been caused by other confounding constructs coactivated by the religion prime, such as morality concepts or death-related concerns. For example, religious words in the priming task might have somehow evoked moral thoughts among participants, and such thoughts might explain why participants in the religious-prime condition exerted more effort in self-regulatory tasks, such as consuming more of the unpleasant drink, than did participants in the neutral-prime condition. Although these possibilities are unlikely, we nonetheless decided to rule them out.

Therefore, Study 4 examined whether activating religious concepts would increase self-control on a particular impulse task, the Stroop task, which does not have moral implications. Previous research has shown that self-control is required to perform well on the Stroop task: Specifically, faster response times represent greater exertions of self-control (e.g., Baumeister et al., 2007).

To compare the effects of priming religion-related concepts on Stroop performance with the effects of priming morality- and death-related concepts, we created two additional conditions for the scrambled-sentences task. In the morality-prime condition, each religious scrambled sentence was replaced by a sentence containing a word that invokes moral virtue (e.g., *righteous*, *virtue*, or *moral*). In the death-prime condition, each religious scrambled sentence was replaced by a sentence containing a word that connotes a sense of death (e.g., *extinct*, *grave*, or *deadly*). We selected morality primes that should induce virtuous behavior, but not thoughts of supernatural beings or religious ideology, and death primes that should activate the concept of death but not necessarily that of religion.

Method

The priming manipulation was the same as in Study 1, except that instead of using the two priming conditions of Study 1, we randomly assigned participants (mean age = 18.37 years, $SD = 1.21$ years; 17.53% males, 82.47% females) to four priming conditions: neutral prime ($n = 24$), religious prime ($n = 25$), morality prime ($n = 28$), and death prime ($n = 20$). Also, we presented the scrambled-sentences task under the guise that it was unrelated to the next task.

After finishing the scrambled-sentences task, participants moved on to the Stroop task. Using individual computers with microphones that enabled us to capture reaction times, participants read the task instructions and completed two practice trials. This preparation was immediately followed by the experimental trials to minimize the possibility of learning to suppress incorrect responses (Cohen, Dunbar, & McClelland, 1990). The Stroop task requires participants to name the color in which a word referring to a color is displayed rather than to read the word itself (e.g., the correct response to an incongruent trial in which the word *blue* is written in red is "red," not "blue"). We ran 80 experimental trials (65 incongruent, 15 congruent). Reaction times were trimmed at a maximum of 5 s to remove outliers, and then were log-transformed to normalize the data; normalized average reaction times served as our measure of self-control. Shorter reaction times in this study represented greater exertion of self-control (i.e., greater suppression of the impulse to read the words).⁴

Results and discussion

As predicted, participants in the religious-prime condition exercised significantly more restraint (i.e., had faster reaction times) than did participants in the neutral- and death-prime conditions, $t(93) > 2.03$, $ps < .045$, $ds > 0.45$, and reaction times in the latter two conditions were not significantly different from each other, $t(93) = 0.07$, $p > .94$ (see Fig. 2). Reaction time in the morality-prime condition was not significantly different from reaction time in any of the other conditions, $t(93) < 1.22$, $ps > .23$. Thus, activating religious concepts promoted self-control to a greater degree than did activating neutral or death-related concepts. Although the mean reaction time in the morality-prime condition was higher than that in the religious-prime condition, the difference was not significant. Still, the mean reaction time in the morality-prime condition did not differ from that in the neutral-prime condition, so we cannot statistically conclude that exposure to moral words promoted self-control, whereas we can infer that exposure to religious words promoted self-control.

General Discussion

Researchers have proposed that religion is an organized cultural belief system that regulates self-control, which in turn facilitates behaviors or tendencies that are adaptive for the evolution of large-scale societies (Geyer & Baumeister, 2005; McCullough & Willoughby, 2009). Although this proposition appeared to be sound, before the present research it had not received direct experimental support. We have presented the first direct causal evidence in support of the contention that religion encourages self-control. Across four experiments with a variety of behavioral measures, we consistently found that people exercised greater self-control when religious themes were implicitly activated than when such themes were not activated. Specifically, priming religious concepts facilitated

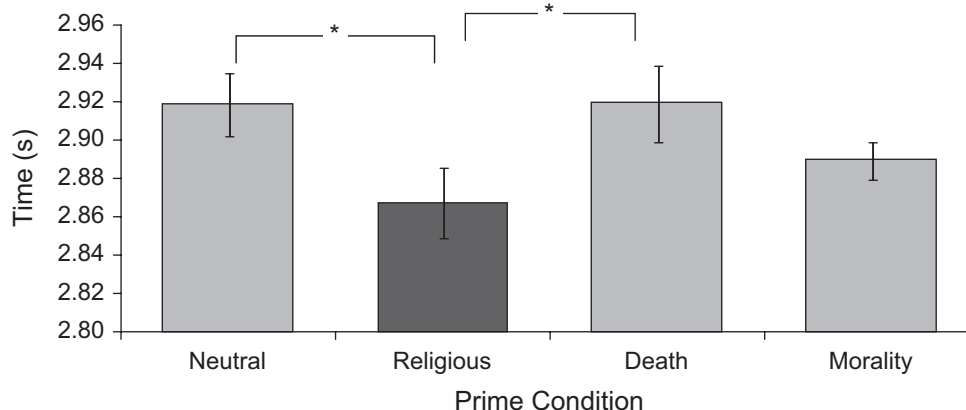


Fig. 2. Mean reaction time on the Stroop task as a function of priming condition in Study 4. Error bars represent standard errors. Asterisks indicate significant differences between conditions ($*p < .05$).

people's ability to endure negative experiences in a number of behavioral domains that are arguably central to both major religions and human evolution.

After addressing the issue of causality, we were able to go a step further and show that religious beliefs refuel self-control resources. This novel finding is important because it supports the idea that invoking religious beliefs may provide important psychological "nutrients" necessary for a variety of socially beneficial behaviors. Most important is that these effects could not be explained by the activation of death-related concepts, although the implicit activation of morality may have some similar effects. The fact that Stroop performance in the morality-prime condition was not significantly different from performance in the religious-prime condition was unexpected. According to our data (see Study 4), the role of moral concepts in the relationship between religious concepts and self-control is unclear. Thus, we suggest that there are two possible routes for the influence of religious concepts on behavior: First, religion may influence self-control directly, and self-control in turn may influence moral choices and behavior. This possibility would be consistent with previous research suggesting that religion can influence self-regulation vis-à-vis principled goal selection (see McCullough & Willoughby, 2009, Proposition 2). Second, our data cannot rule out the possibility that religion enhances morality, which in turn promotes self-control. So, we encourage future researchers to further explore the influences of moral concepts on thoughts and behaviors. Future researchers may also explore whether implicit concepts of morality function differently when self-control resources are depleted and when they are not.

In addition, the possible mechanisms by which religion improves self-control are worthy of speculation. For example, an obvious possibility is that religion may encourage self-monitoring (see McCullough & Willoughby, 2009, Proposition 3) by making salient the belief in an ever-watchful God (Norenzayan & Shariff, 2008). Similarly, concerns with supernatural punishment may also explain why religious concepts increase self-control. This possibility is consistent with Shariff

and Norenzayan's (2011) work, in which participants were less likely to cheat in a game when they were primed with the concept of an angry, punishing God than when they were primed with the concept of a loving and forgiving God. One might argue that bringing the possibility of the punishing aspects of God to participants' attention increased their self-control, which discouraged them from cheating. Another possibility, aligned with previous results obtained using secular primes (cf. Shariff & Norenzayan, 2007), is that religious concepts may make reputational concerns salient and that such salience in turn promotes greater self-monitoring. We believe that the possibilities outlined here are only a few of the potential mechanisms. A closer look at these potential mechanisms (as well as others) will be an important task for future researchers.

Notably, our results are robust to the influence of religiosity, as 34% of our sample described themselves as either atheist or agnostic. The inclusion of nonreligious participants should only have dampened the effect of religiousness on self-control, as they would have been less apt than religious participants to be primed by religion-related concepts. Therefore, considering the equal representation of these individuals across conditions in each of our studies, we can confidently conclude that the observed effects were not due to the ease with which highly religious participants can be primed. Future researchers may wish to examine the effects of secular primes on self-control (cf. Shariff & Norenzayan, 2007).

The experiments reported here synthesize two important ideas: The first is that self-control is the central psychological pillar that makes adaptive behaviors possible (Baumeister & Exline, 2000; McCullough & Carter, 2011; McCullough & Willoughby, 2009). The second is that religion serves as an effective cultural mechanism for regulating self-control, a mechanism that allowed human ancestors to make evolutionarily adaptive decisions despite harsh environmental challenges (Baumeister et al., 2010; Henrich & Henrich, 2006; McCullough & Willoughby, 2009). Thus, ancestral societies may have culturally selected religious beliefs for their ability to promote self-control, which in turn is associated with a

myriad of positive behaviors, ultimately facilitating social interactions and cooperation among increasingly larger numbers of people who are not biologically related.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Notes

1. The distribution of religious affiliations was similar to the distributions that other researchers have found in different Canadian university samples (e.g., Inzlicht & Tullett, 2010).
2. Additional details on the experimental methods and results are available from the corresponding author.
3. We use such terms as “replenish” and “refuel” to metaphorically describe the ability of salient religious concepts to restore self-control resources to their initial levels after their depletion.
4. The pattern of findings was similar to the pattern reported here when we did not trim or normalize the data, when we analyzed data from incongruent trials only, and when we analyzed reaction time differences (subtracting reaction times on incongruent trials from reaction times on congruent trials).

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