Supernatural norm enforcement: Thinking about karma and God reduces selfishness among believers[☆]

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ABSTRACT

Four experiments (total N = 3591) examined how thinking about Karma and God increases adherence to social norms that prescribe fairness in anonymous dictator games. We found that (1) thinking about Karma decreased selfishness among karmic believers across religious affiliations, including Hindus, Buddhists, Christians, and non-religious Americans; (2) thinking about God also decreased selfishness among believers in God (but not among non-believers), replicating previous findings; and (3) thinking about both karma and God shifted participants' initially-selfish offers towards fairness (the normatively prosocial response), but had no effect on already fair offers. These supernatural framing effects were obtained and replicated in high-powered, pre-registered experiments and remained robust to several methodological checks, including hypothesis guessing, game familiarity, demographic variables, between- and within-subjects designs, and variation in data exclusion criteria. These results support the role of culturally-elaborated beliefs about supernatural justice as a motivator of believer's adherence to prosocial norms.

All over the world, there is widespread belief that norm adherence is rewarded and punished by supernatural entities (Johnson, 2015; Norenzayan et al., 2016; Purzycki, 2016; Purzycki et al., 2012). Supernatural beliefs provide a culturally-supported mechanism that can encourage the adoption of particular norms (by framing certain actions as especially valued by supernatural agents) and inhibit norm violation (by positing supernatural punishment for counter-normative behavior). Subsequently, supernaturally-enforced prosocial norms can foster increased cooperation and support the long-term success of large groups of unrelated individuals (Norenzayan et al., 2016; Watts et al., 2015). In many world religions, supernatural norm enforcement takes the form of a moralizing God, and experimental reminders of this has been found to encourage prosociality among believers (Shariff, Willard, Andersen, & Norenzayan, 2016; Yilmaz & Bahçekapili, 2016). There is also growing cross-cultural evidence that commitment to such gods is associated with adherence to social norms prescribing cooperation, honesty, and generosity towards strangers (Purzycki et al., 2016; Shariff & Norenzayan, 2011).

Moralizing gods are central to many religions, but are only one instance of the world's religious diversity that could be relevant to norm adherence (Norenzayan, 2016). In major Asian religious traditions (e.g., Buddhism, Hinduism), and for many "spiritual but not religious"

Westerners, people's actions are instead regulated by karma, a putatively non-theistic supernatural force that ensures norm followers experience good outcomes and norm violators experience misfortune, either within one's current lifetime or across lifetimes (Bhangaokar & Kapadia, 2009; Callan, Ellard, & Nicol, 2006; Converse, Risen, & Carter, 2012; Pew Research Center, 2015; White, Norenzayan, & Schaller, In press). Karma provides an important test case for both the generalizability and the mechanisms underlying religiously-motivated norm adherence, yet psychological research on belief in karma remains scarce.

In four experiments, we address this gap by investigating how reminders of karma, like reminders of God, encourage prosocial norm adherence in anonymous dictator games, and we demonstrate several boundary conditions for this effect. Cultural evolutionary theories hypothesize that karma and God play similar roles in motivating prosocial behavior, which would then help explain how both karmic religions and theistic traditions have expanded and stabilized in increasingly large communities (Norenzayan et al., 2016; White, Sousa, & Prochownik, 2016). The conceptual similarities between karma and moralizing gods imply that both of these beliefs will encourage adherence to prosocial norms in economic games. We therefore hypothesized that individuals who believe that karma is real will behave

less selfishly when they are reminded of karma.

Given that karma is believed to be a moralizing, supernatural force that intervenes in human affairs, it may seem obvious that thinking about karma can foster prosociality. However, karma also provides a supernatural explanation for why people deserve the blessings and misfortune that they receive. Therefore, it is conceivable that karma could be used to rationalize selfish behavior: Endowments in economic games could be viewed as deserved karmic rewards, thereby justifying selfishness. Karma may operate as a system-justifying belief (Cotterill, Sidanius, Bhardwaj, & Kumar, 2014), rather than a motivator of norm adherence. The present experiments allowed us to test this alternative hypothesis.

1. Theory-relevant moderators and individual differences

Priming religious concepts has been found to increase prosociality in many experimental studies. In a series of meta-analyses, the religious priming effect was consistent with evidentiary value in p-curves and robust to at least one technique that corrected for publication bias (Shariff, Willard, Andersen, & Norenzayan, 2016). However, meta-analyses are no substitute for high-powered replications (Nelson, Simmons, & Simonsohn, 2018; van Elk et al., 2015) and there have been notable replication failures (e.g., Billingsley, Gomes, & McCullough, 2018; Gomes & McCullough, 2015), making the efficacy of religious priming an ongoing debate.

Several studies have also found that individual differences in belief in a punitive god predicts greater prosociality, while a benevolent god, if anything, encourages less prosocial behavior (DeBono, Shariff, Poole, & Muraven, 2017; Purzycki et al., 2016; Shariff & Norenzayan, 2011; Shariff & Rhemtulla, 2012; Watts et al., 2015). However, we expect individual differences to be only weakly predictive or unassociated with behavioral measures of prosociality when supernatural beliefs are not salient (Kelly, Kramer, & Shariff, 2019). Prosocial behavior can be influenced by many considerations unrelated to supernatural belief, including the need to keep money to provide for oneself, the desire to help another person, and personal norms governing behavior towards strangers. Within a single population there is also likely to be variability in prosocial behavior but high cultural consensus about the traits of God and karma, limiting our ability to predict behavior from this restricted range (this limitation addressed by cross cultural studies; e.g., Lang et al., in press; Purzycki et al., 2016; Watts et al., 2015). We therefore expect that level of belief will be weakly or unassociated with generosity in general, but that situational reminders of karma and God will lead believers to be more prosocial.

2. The experimental paradigm

In high-powered, pre-registered experiments, we investigated how explicitly thinking about karma or God affected giving in a multi-trial dictator game. Participants first played dictator games without any supernatural reminders, then were explicitly asked to think about karma or God and play several more dictator games. We adapted and modified the experimental paradigm from Ginges, Sheikh, Atran, and Argo (2016), who asked participants to make moral decisions from their own perspective and from God's perspective, thus providing a within-subjects measure of how thinking about God affects moral judgments.

These reminders of karma and God provide an experimental manipulation that departs from traditional priming techniques in which the prime is subliminal, implicit, or presented as unrelated to the decision task. Instead, our procedure is more consistent with experimental paradigms that explicitly reframe the meaning of the decision task, to see how task behavior is shifted according to different norms in different contexts. For example, cooperation decreases when a Prisoner's Dilemma is labelled the "Wall Street Game" rather than the "Community Game" (Liberman, Samuels, & Ross, 2004, see also Cronk, 2007; Pillutla & Chen, 1999). The supernatural framing procedure

therefore cannot speak to debates about the evidentiary value of implicit religious priming effects (see Gomes & McCullough, 2015; Shariff et al., 2016; van Elk et al., 2015), but it does experimentally investigate how thinking about karma and God affects normative behavior. This paradigm also allowed us to test several theoretically-relevant moderators of the supernatural framing effect, something that has been difficult to do with previous paradigms.

3. Overview of hypotheses and experiments

First, we hypothesized that baseline levels of generosity will moderate the effect of supernatural framing. If thoughts of karma and God discourage normatively-dubious behavior, then they should decrease selfishness (i.e., keeping all the money), but not affect individuals who are already behaving normatively (i.e., who divide the money in half), a previously-hypothesized but untested prediction (Norenzayan et al., 2016; Shariff & Norenzayan, 2015; Willard, Shariff, & Norenzayan, 2016). In American (Klein & Epley, 2014) and cross-cultural samples (Klein, Grossmann, Uskul, Kraus, & Epley, 2015), fair behavior is judged more favorably than selfishness, but ultra-prosocial behavior is perceived no more favorably than fairness, and we hypothesize that God and karma are believed to have similarly-asymmetric social preferences.

Second, we hypothesized that supernatural framing would only increase prosociality among believers, while effects would be attenuated or absent for participants who explicitly reject the existence of God and karma. A recent meta-analysis found no reliable evidence that religious priming increased prosociality among non-believers (Shariff et al., 2016). If religious priming affected behavior by simply priming prosocial norms, then religious priming should not depend on belief, because both believers and non-believers hold similar concepts about the association between prosociality and God, karma, and religion (Gervais, 2013; White & Norenzayan, 2019). However, if concern about supernatural judgment is a key component, then supernatural reminders should only affect participants who actually believe that God or karma is real and relevant to their lives. In addition, we explored whether supernatural framing effects were stronger when generosity was more central to karma/God's moral concerns, and when karma/God was viewed as more punitive.

Finally, we investigated the generalizability of supernatural framing effects among participants with diverse religious backgrounds, including Hindus (who believe in both karma and God as distinct supernatural forces, Fuller, 2004), Buddhists (who prototypically believe in karma but not God), and nonreligious Westerners (who may or may not believe in God, and may believe in karma despite not learning this belief from their religious communities or family members). This diverse sampling addressed religious identity signaling as an alternative explanation for our results. According to this perspective, thinking about karma or God might remind participants about their religious identity, and prompt believers to signal their religious identities by acting prosocially. If this were the case, then karma and God should affect behavior most strongly for participants who associate karma/God with their religious affiliation. In contrast, if it is the supernatural beliefs themselves and not religious identities that motivate prosociality, then reminders of karma would be expected to affect the behavior of both believers associated with karma-centered religions (e.g., Hindus) and karma believers unaffiliated with these religious traditions (e.g., Christian and non-religious Americans).

Experiment 1 provided an initial test of whether thinking about karma and God both decrease selfishness among Americans who expressed belief in karma and God. Experiment 2 extended these effects to a different population of believers with different cultural histories of belief in karma and God: Hindus, Buddhists, and Christians. Experiment 3 compared believers and nonbelievers. In all three experiments we investigated whether the hypothesized effect is moderated by the generosity of baseline offers and participants' views of supernatural

benevolence and punitiveness. In Experiment 4, we replicated these effects in a between-subjects design. We report how we determined sample sizes, disclose all data exclusions, manipulations, and measures (in the article and in the accompanying Supplementary Materials), and make all data publicly available.[1]

4. Experiment 1

Experiment 1 investigated whether individuals who believe in karma give away more money when thinking about karma in a repeated dictator game (DG) paradigm. Additionally, we investigated whether individuals who believe in God give away more money when thinking about God. We also included a control (or neutral) condition, to assess whether participants' behavior changed over the course of repeated dictator games without supernatural framing. Finally, we investigated whether individual differences in belief predicted baseline giving or moderated the effect of supernatural framing.

5. Methods

Before conducting this study, all methods, hypotheses, and analysis plans were pre-registered on the Open Science Framework (OSF), and can be accessed at https://osf.io/trnx7/.

5.1. Participants

We recruited American participants who expressed belief in God or karma from Amazon's Mechanical Turk (MTurk), in December 2016, in return for a small monetary payment (recruitment materials did not mention God, karma, or religion). Before any data analyses, we conducted a power analysis based on the estimated effect of religious priming on prosociality among believers, corrected for publication bias ($d = 0.28$), according to a recent meta-analysis (Shariff et al., 2016; Willard, Shariff, & Norenzayan, 2016). This indicated that a minimum sample size of 136 was required to detect a within-subjects effect with > 0.90 power. We recruited a sample of 250 participants per condition to account for the possibility of lower-than-expected effect sizes. A sensitivity power analysis indicated that this sample size had 80% power to detect an effect size as small as $d = 0.18$ in a two-tailed paired-samples t-test or to detect small correlations ($r = 0.18$) between variables of interest.

Given that previous studies have not found reliable religious priming effects among non-believers (Shariff et al., 2016), for this study we only recruited participants who expressed explicit belief in God or karma. As specified in the preregistration, we excluded from participating any individuals who said that they did not believe in God and/or karma (i.e., scored at or below scale midpoint) in a prescreening survey ($n = 507$) or who reported non-belief at a later point in the survey ($n = 55$). As preregistered, we also excluded individuals who failed an attention check question ($n = 4$) and those who were directed to the full-length survey, but failed to complete it, thus providing insufficient data to test for hypothesized moderators: 27 did not complete the DG questions, and 177 answered the DG questions but did not complete the entire survey (rate of attrition did not significantly differ across conditions, $N_{God} = 54$, $N_{Karma} = 53$, $N_{Neutral} = 70$, $\chi^2 (2) = 3.09$, $p = .21$). Primary findings remain unchanged when these excluded participants were included in the total sample (see Supplemental Material). See Table 1 for demographic details of the final sample of participants ($N = 754$, after exclusions).

Participants were randomly assigned to three conditions: Karma, God, and Neutral. As mentioned, however, we were not interested in the effect of priming on non-believers for this study. As a result, the Karma condition excluded Karma non-believers, the God condition

excluded God non-believers, and the neutral condition excluded those who did not believe in either entity. This assignment resulted in demographic differences across conditions, with the Karma framing condition ($n = 250$) including more non-religious (Agnostic, Atheist, and unaffiliated) and fewer Christian participants, and more Karma believers and less God believers, than participants in the God framing condition ($n = 254$; consistent with previously-documented demographic correlates of Karma belief in North America, White et al., in press). Participants in the Neutral condition ($n = 250$) fell in between these two extremes. Note that these demographic differences cannot explain the within-subjects supernatural framing effect, because each participant served as his or her own control.

5.2. Materials and procedure

5.2.1. Prescreening survey

After providing informed consent, participants completed a brief demographic questionnaire that included questions about age, gender, ethnicity, religious affiliation, political orientation, and nationality. Embedded in this were questions that assessed whether participants believe in the existence of karma ("Karma is a force that influences the events that happen in my life") and believe in the existence of God ("I believe that god exists") on a 9-point Likert scale ($1 = $ *strongly disagree*, $5 = $ *neither agree nor disagree*, $9 = $ *strongly agree*).

5.2.2. Supernatural framing and repeated dictator game

All participants who completed the prescreening survey received a small base payment, and participants directed to the full-length survey were also given the opportunity to receive a bonus payment determined by their dictator game responses. The dictator game is a common measure of prosociality that is also a valid predictor of cooperation in other real life situations (Benz & Meier, 2008; Franzen & Pointner, 2013; Peysakhovich, Nowak, & Rand, 2014, although see also Galizzi & Navarro-Martinez, 2018), and is widely used to study religious priming effects (e.g., Ahmed, 2009; Shariff & Norenzayan, 2007; Tan, 2006; Xygalatas, 2013).

Participants divided money between themselves and another anonymous participant in a 6-trial repeated dictator game task, depicted in Fig. 1. For three trials (pre-framing), participants were instructed, without any mention of God or karma, to "indicate the amount of money that you want to take and keep for yourself, and the remainder will be given to another participant." The identity of the recipient (e.g., Participant A, Participant B, and Participant C) and the amount of money ($0.30, $0.40, or $0.50) varied across each trial, and presentation order was randomized. Although the amount of money was modest, it allowed participants to possibly double their earnings. Participants were told that "After you complete this study, ONE of these decisions will be randomly selected, and you will be paid the amount of money that you chose to keep in that decision," to make each individual decision meaningful and to deter any multi-trial response strategy (this payment for a subset of responses has been found to produce similar results as paying for every response, Charness, Gneezy, & Halladay, 2016).

Participants next completed three more DG trials (post-framing), in which participants in the God framing and Karma framing conditions were instructed to "make your decisions based on what your belief in God [your belief in the law of karma] would lead you to do." Participants in the Neutral framing condition received the same non-supernatural instructions as before. We again varied the amount of money and recipient identity, and participants were reminded that they would only be paid for one decision. The money was real and was actually allocated according to participants' decisions. We converted participants' responses into scores indicating the proportion of money given away in each trial. In mixed-effects models, we predicted the proportion of money given away in each of the six trials. To summarize the results, we also created composite scores for the mean proportion of

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[1] All data relevant to these analyses is available at https://osf.io/32x5t/.

Table 1
Demographic characteristics of participants in each experiment, after exclusions.

|	Experiment 1			Experiment 2			Experiment 3		Experiment 4	
N	754			607			986		1244	
Source	MTurk			Qualtrics Panels			MTurk		Qualtrics Panels	
Gender	67% female			62% female			42% female		61% female	
Age M (SD)	37.47 (12.47)			47.24 (14.72)			35.42 (11.66)		45.79	
Ethnicity										
Caucasian	79%			42%			73%		80%	
Asian	5%			49%			12%		6%	
Other	16%			9%			15%		14%	
Framing condition	God (believers)	Karma (believers)	Neutral	God (Christians)	Karma (Hindus)	Karma (Buddhists)	God	Karma	Karma	Neutral
Religion										
Christian	81%	58%	70%	100%	–	–	49%	46%	66%	64%
Non-religious	12%	30%	24%	–	–	–	42%	43%	24%	25%
Hindu	0%	1%	1%	–	100%	–	1%	1%	1%	1%
Buddhist	2%	4%	1%	–	–	100%	2%	1%	1%	1%
Other	5%	7%	4%	–	–	–	6%	9%	8%	9%
Belief in God M (SD)	8.34 (0.97)	6.56 (2.72)	7.22 (2.38)	8.00 (1.93)	7.58 (2.04)	5.36 (2.54)	5.54 (3.30)	5.56 (3.17)	6.84 (2.26)	6.62 (2.41)
Belief in Karma M (SD)	4.60 (1.61)	5.78 (1.19)	4.90 (1.62)	4.54 (1.41)	6.47 (1.43)	6.27 (1.34)	4.10 (1.79)	4.17 (1.74)	4.80 (1.58)	4.70 (1.62)
Social exposure to belief M (SD)	5.28 (1.17)	3.81 (1.26)	–	5.37 (1.15)	4.91 (1.16)	4.15 (1.35)	–	–	3.30 (1.50)	2.77 (1.50)
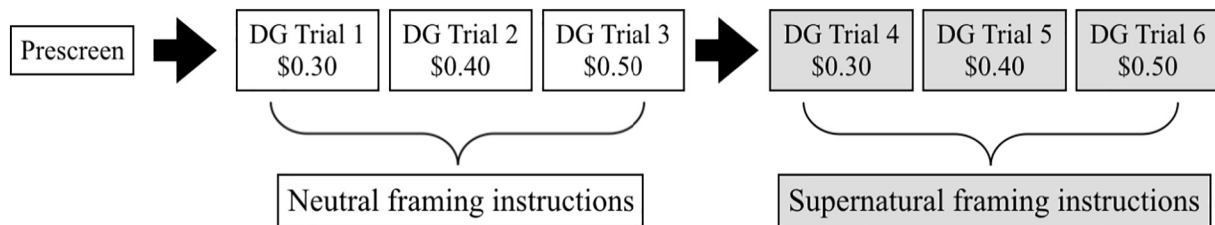
Fig. 1. Repeated dictator game procedure.

money given away in the first three trials (pre-framing giving, $\alpha = 0.94$) and in the final three trials (post-framing giving, $\alpha = 0.95$).

After completing the six DG trials, participants described the strategy used to make their DG decisions ("What were you thinking about, when you decided how much money to keep for yourself? What approach did you use to make that decision?"), reported whether they had "previously participated in other studies like this one, that involved exchanging money with strangers or other anonymous participants in the study," and reported their perception of the purpose and hypotheses of this experiment ("What do you think was the purpose of this study? What results do you think we expected to find?"). Analyses accounting for these questions do not meaningfully change our pattern of experimental effects (see Supplementary Materials).

5.2.3. Religious beliefs and demographics

Participants next reported various aspects of their supernatural belief and religious commitment. Participants reported their view of God/karma as benevolent ("Loving," "Forgiving," and "Compassionate," $\alpha = 0.92$) and punitive ("Punishing," "Vengeful," "Fearsome," $\alpha = 0.81$). Belief in karma was assessed a second time through a previously-validated measure of karmic belief (White et al., In press), that assesses participants' agreement that people's actions have morally-congruent consequences, both within one life and across lives (e.g., "When people are met with misfortune, they have brought it upon themselves by behavior in a past life," $\alpha = 0.91$). Embedded in this karma questionnaire was one attention check question ("Please select 'Disagree' as your answer to this question") that was used to exclude inattentive participants from this experiment.

Participants also completed several open-ended questions about God and karma (depending on their assignment to God or Karma framing conditions). Of relevance, participants were asked to list five actions "that would lead to good consequences because of god [karma]," and five actions that would lead to bad consequences, thus providing a spontaneously-generated list of actions that elicit supernatural rewards and punishments. These free list responses were coded according to a scheme developed by the first author and applied by a second independent research assistant (both while blind to experimental condition and the remainder of the data). This coding grouped responses into categories of semantically-similar words, and below we focus on whether participants listed items from a broadly-defined generosity category (including giving, generosity, charity, or helpfulness) as something with supernatural rewards, or items from a broadly-defined greed category (including selfishness, greed, or unhelpfulness) as something with supernatural punishments. Responses were coded as 1 if mentioned and 0 if never mentioned in the free list. Raters agreed on the classification of responses into these categories in 93% of the cases, and discrepancies were resolved through discussion.[2] This open-ended data was collected to answer exploratory questions somewhat separate from the experimental supernatural framing effect, therefore these variables were not collected consistently across all datasets and analyses concerning these variables should be considered exploratory.

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[2] Analyses that use other methods of quantifying the free list responses are available in the supplementary material. Other exploratory variables not discussed here are described in the pre-registration documents.

Finally, participants also described several elements of their religious background, including nine items,[3] adapted from Lanman and Buhrmester (2016), that assessed the extent to which participants had learned about karma/God from other people, including from religious sources (e.g., "I heard about God [karma] while attending religious services or meetings"), from friends and family members (e.g., "When I was a child, my family taught me to believe in God [karma]") and from observing the actions of other people (e.g., "I saw people make personal sacrifices, because of God [karma]"). The mean of these items provided a composite score of participants' social exposure to credible displays of belief (Karma $\alpha = 0.79$, God $\alpha = 0.85$).

6. Results and discussion

6.1. Confirmatory analyses: supernatural framing manipulation

In the Neutral condition, participants did not significantly change their pattern of giving between the first three trials and the final three trials of the dictator game, Cohen's $d = -0.05$, 95% CI [−0.23, 0.12], t (249) = 0.86, $p = .39$ (see Fig. 2), nor did giving change according to the trial number, $F(1, 249) = 0.53$, $p = .47$, or as a function of the money available in a given trial, $F(1, 249) = 0.75$, $p = .39$. This uniformity indicates that this repeated DG paradigm is an appropriate method to study the within-subjects effect of supernatural framing, without any general order effects across trials.

We used mixed-effects models[4] to assess whether thinking about God and karma increased giving compared to participants' baseline levels of generosity. As pre-registered, this analysis focused on participants in the God and Karma conditions only (pre-frame giving did not differ from giving in the neutral condition). We predicted DG giving across all six trials from the presence of supernatural frame (0 = pre-framing, 1 = post-framing), the type of frame (0 = God, 1 = Karma), the interaction between frame presence and type of frame. We also included random intercepts and random effects of framing, nested within participant, to account for the nesting of trials within participants and variability in how supernatural framing affected participants based on their initial generosity. The estimates produced by this model indicate the change in the proportion of money given away due to each of the predictors (i.e., unstandardized effect sizes). We also report standardized effect sizes (Cohen's d) and t-tests of the focal comparisons throughout the results, to allow easy comparison with previous studies.

As can be seen in Figs. 2 and 3, results supported the primary hypothesis: Participants were more generous when thinking about karma, $b = 0.11$, 95% CI [0.085, 0.136], $d = 0.56$ [0.38, 0.74], $t(249) = 8.86$, $p < .001$, or God, $b = 0.087$ [0.062, 0.112], $d = 0.42$ [0.24, 0.59], t (253) = 6.63, $p < .001$, than they were before thinking about these concepts. Giving was not significantly different in the God and Karma conditions, $b = -0.008$ [−0.049, 0.031], $p = .67$, nor was there any interaction between condition and framing, $b = 0.023$ [−0.014, 0.057], $p = .21$. The pattern of giving can also be seen in the distribution of giving (Fig. 3), where fewer participants kept the money after supernatural framing.

Additional between-subjects analyses that compared post-frame giving across conditions further demonstrated that participants
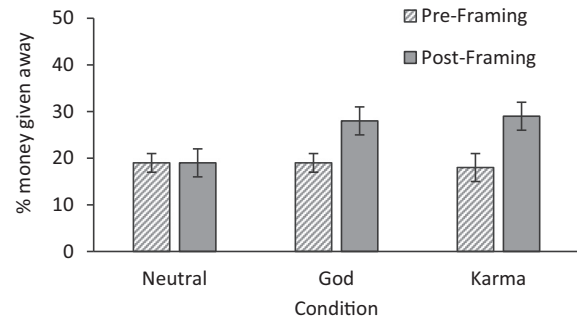
Fig. 2. Mean proportion of money given away in Experiment 1, before and after supernatural framing. Error bars indicate 95% confidence intervals around the mean.

thinking about God gave away significantly more money than participants who received neutrally-framed instructions, $d = 0.37$, 95% CI [0.19, 0.54], $t(483.53) = 4.13$, $p < .001$, and Karma framing resulted in greater giving than did neutral framing, $d = 0.47$ [0.29, 0.65], t (497.04) = 5.23, $p < .001$, while God and Karma framing did not lead to significantly different levels of giving, $d = -0.06$ [0.12, 0.23], t (490.53) = 0.63, $p = .53$. We also investigated several alternative models (presented in the Supplementary Materials), and the supernatural framing effect remained the strongest predictor of giving when controlling for the amount of money distributed in each trial (pre- vs. post-frame effect: $b = 0.081$, $p < .001$), or controlling for participants' perceptions about the purpose of the experiment (including hypothesis-guessing) and their familiarity with DG tasks (frame effect: $b = 0.056$, $p = .008$). None of these factors were significant moderators. The pattern of results also remained unchanged if we included all participants who provided DG responses (including those excluded based on pre-registered criteria), indicating that the results were robust to data exclusion criteria.

We next investigated whether participants' baseline levels of generosity moderated the effect of supernatural framing on giving. As hypothesized, there was a negative association between participants' pre-frame giving and their change in giving (i.e., post-frame minus pre-frame giving) after supernatural framing, $r = -.26$, 95% CI [−.33, −.19], $p < .001$. As can be seen in Fig. 4, we found that participants who were initially selfish (i.e., gave nothing away) became more generous after thinking about karma ($M_{change} = 0.16$ [0.13, 0.21]) or God ($M_{change} = 0.11$ [0.07, 0.16]), while participants who were initially fair (i.e., divided the money exactly in half) did not change their strategy, but remained fair after thinking about karma ($M_{change} = 0.0001$ [−0.02, 0.01]) or God ($M_{change} = 0.02$ [−0.002, 0.06]). Rather than increasing giving among all participants (which was possible, since giving away 50% does not actually reflect the ceiling on the scale), supernatural framing encouraged adherence to the normative (i.e., modal) prosocial response by increasing giving among initially-selfish participants and not affecting the behavior of initially-fair participants.

7. Exploratory analyses: beliefs about God and karma

We used mixed-effects models to explore whether individual differences in beliefs about God and karma predicted DG giving or moderated the supernatural framing effect. We conducted separate analyses for each potential moderator and each framing condition. As can be seen in Table 2, there was a small, marginally-significant association between belief in God and greater baseline giving (Model 1a), but belief in God did not significantly moderate the God frame effect. Belief in karma did not predict giving or moderate framing effects (Model 2a). In this sample the supernatural framing effect did not depend on participants' level of belief, which can be explained by the fact that we recruited only believers for this experiment.
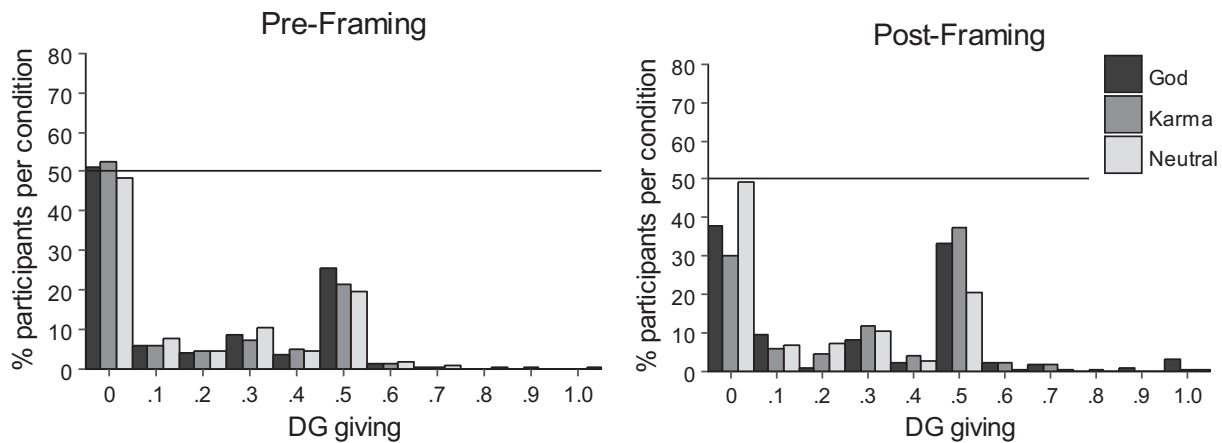
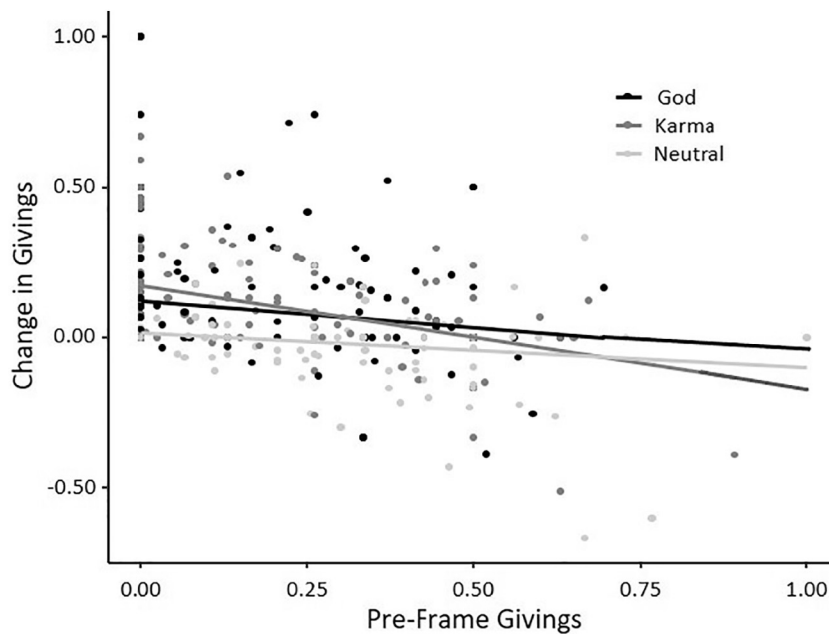**Fig. 3.** Distribution of dictator game giving in Experiment 1, before and after supernatural framing.

Fig. 4. Initial giving (pre-framing) predicting change in giving after supernatural framing in Experiment 1. Dots reflect data points for each participant, with lines summarizing this relationship within each condition.

Viewing God/karma as punitive (Models 1b and 2b) or benevolent (Models 1c and 2c) was also only weakly and non-significantly associated with giving and did not moderate the effect of either supernatural frame. It is also notable that participants tended to view God as highly benevolent ($M = 4.64$, $SD = 0.79$, on a 5-point scale) and not punitive ($M = 2.44$, $SD = 1.25$), providing evidence against the idea that belief in supernatural *punishment* is required for supernatural primes or frames to influence behavior. Views of karma's traits were less skewed towards benevolence ($M = 3.12$, $SD = 1.21$) or punitiveness ($M = 3.16$, $SD = 1.15$), but also did not significantly predict giving or moderate the framing effect. In contrast to these non-punitive trait ratings, in open-ended descriptions many participants did list greed/selfishness/unhelpfulness as something that would be punished by God (20% of God frame participants) or karma (38% of Karma frame participants). Even more participants reported that generosity would be rewarded by God (36%) or karma (78%), indicating that many participants do believe that selfishness or generosity can elicit supernatural consequences. But these ratings did not consistently predict giving. Participants who reported that karma punishes greed were slightly more likely to increase giving after framing (Model 2d), but participants who reported that God punishes greed were slightly *less* likely to

increase giving after framing (Model 1d), and reports that God or karma rewards generosity did not predict giving (Models 1e and 2e). Therefore, participants' belief in punishing supernatural forces, as indexed by trait ratings or freely generated statements that God/karma will reward and punish generosity and greed, did not clearly predict dictator game giving in this experiment.

Finally, we explored the hypothesis that the supernatural framing effect could have affected participants' responses because thinking about karma or God might have prompted believers to signal their religious identities by acting prosocially. If this were the case, then thinking about God and karma should affect behavior most strongly for participants who associate this concept with their religious affiliation. While 81% of participants in the God frame condition identified themselves as Christians (i.e., a religion associated with belief in God), most participants in the Karma frame condition reported either a religious affiliation unassociated with karma (e.g., Christianity, 58%) or reported no religious affiliation at all (atheists, agnostics and the non-religious, 30%). Further contrary to the religious signaling hypothesis, participants' history of learning about God/karma from social sources (e.g., religious sources, friends and family members) did not moderate the effect of the God frame (interaction $b = 0.004$, $p = .77$) or Karma

Table 2
Mixed-effects model predicting dictator game giving from individual differences in a variety of supernatural beliefs in Experiment 1.

God Frame Condition

	Model 1a: Belief in God		Model 1b: God is Punitive		Model 1c: God is Benevolent		Model 1d: God Punishes Greed		Model 1e: God Rewards Generosity	
	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p
Intercept	0.193 [0.165, 0.220]	< .001	0.193 [0.165, 0.220]	< .001	0.193 [0.165, 0.220]	< .001	0.198 [0.167, 0.229]	< .001	0.191 [0.157, 0.225]	< .001
Pre- vs. Post-Frame	0.087 [0.061, 0.112]	< .001	0.087 [0.061, 0.112]	< .001	0.087 [0.061, 0.112]	< .001	0.101 [0.073, 0.130]	< .001	0.078 [0.046, 0.110]	< .001
Belief	0.025 [-0.002, 0.052]	.076	0.004 [-0.023, 0.032]	.77	0.021 [-0.006, 0.049]	.13	-0.027 [-0.095, 0.041]	.44	0.005 [-0.052, 0.062]	.86
Frame*Belief	0.014 [-0.011, 0.040]	.28	-0.004 [-0.030, 0.022]	.76	0.005 [-0.021, 0.030]	.71	-0.072 [-0.136, -0.009]	.027	0.025 [-0.029, 0.078]	.36
N	254		254		254		254		254	
AICc	-1505.06		-1499.95		-1502.58		-1509.84		-1503.69	

Karma Frame Condition

	Model 2a: Belief in Karma		Model 2b: Karma is Punitive		Model 2c: Karma is Benevolent		Model 2d: Karma Punishes Greed		Model 2e: Karma Rewards Generosity	
	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p
Intercept	0.184 [0.157, 0.212]	< .001	0.185 [0.157, 0.213]	< .001	0.185 [0.157, 0.212]	< .001	0.184 [0.149, 0.219]	< .001	0.163 [0.104, 0.222]	< .001
Pre- vs. Post-Frame	0.109 [0.085, 0.134]	< .001	0.110 [0.086, 0.134]	< .001	0.110 [0.086, 0.134]	< .001	0.090 [0.060, 0.121]	< .001	0.092 [0.040, 0.144]	< .001
Belief	0.004 [-0.024, 0.031]	.79	-0.016 [-0.043, 0.012]	.27	0.027 [-0.001, 0.054]	.060	0.002 [-0.056, 0.059]	.96	0.027 [-0.040, 0.094]	.43
Frame*Belief	0.016 [-0.008, 0.040]	.20	0.003 [-0.021, 0.027]	.80	0.019 [-0.005, 0.043]	.12	0.050 [0.001, 0.100]	.048	0.022 [-0.037, 0.081]	.46
N	250		249		249		250		250	
AICc	-1602.44		-1590.39		-1599.00		-1607.70		-1605.54	

Note. Each model description specifies the particular belief included as a predictor in that model. Belief, punitiveness, and benevolence were standardized; free lists were coded as 1 if greed/generosity was mentioned at least once, and 0 if never mentioned.

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frame (interaction $b = 0.013$, $p = .28$) on giving. Additionally, participants' religiosity did not significantly moderate the effect of the God frame (interaction $B = 0.013$, $p = .33$) or Karma frame (interaction $b = -0.021$, $p = .091$, see Supplemental Materials for full models). Therefore, we found no evidence that the priming effect depended on the association between God/karma and participants' religious affiliation or group identities.

8. Experiment 2

Experiment 1 found that thinking about karma or God led to decreased selfishness among believers who initially displayed selfish behavior, compared to when believers were not thinking about supernatural forces. In Experiment 2, we sought to replicate these findings in a new sample of participants, selected based on their religious affiliation rather than their expressed supernatural beliefs. Cultural evolutionary theories of prosocial religions highlight the importance of cultural linkages between the supernatural with the moral in the scaling up of human cooperation. Belief in karma has been proposed to play an important role in regulating prosocial behavior in groups dominated by karma-centred religious traditions (e.g., Hinduism and Buddhism through Asia, Norenzayan et al., 2016; White et al., 2016). In this study we therefore investigate whether thinking about karma can increase prosocial behavior among Hindus and Buddhists. For the sake of comparison, we also recruited a sample of Christians and reminded them of God using the same procedures.

9. Methods

Before conducting this study, all methods, research questions, and analysis plans were pre-registered on OSF, and can be accessed at https://osf.io/2jyde/.

9.1. Participants

We recruited participants from the USA, in March 2017, through Qualtrics's online panels. This recruitment method allowed us to target a sample with specific religious affiliations (recruitment materials did not mention God, karma, or religion). A power analysis based on an estimated effect size of $d = 0.30$ (comparable to the effect sizes found in Experiment 1) indicated that a minimum sample size of 119 was required to detect a within-subjects effect with > 0.90 power. We increased the sample size to 200 participants per condition to account for the possibility of lower-than-expected effect sizes and to have sufficient statistical power for analyses of individual differences. A sensitivity power analysis indicated that this sample size had 80% power to detect an effect size as small as $d = 0.20$ in a two-tailed paired-samples t-test or to detect small correlations ($r = 0.20$) between variables of interest.

As specified in the pre-registration, we excluded individuals who reported a religious affiliation other than Hindu, Buddhist, or Christian in the prescreening survey ($n = 197$). As preregistered, we also excluded inattentive individuals who failed an attention check question placed within the survey ($n = 221$), took $< 1/3$ the median time to complete the survey ($n = 5$), and those who were directed to the full-length survey, but failed to complete it: 51 did not complete the DG questions, 283 answered the DG questions but did not complete the entire survey (attrition rates did not significantly differ across affiliations, $N_{Hindu} = 117$, $N_{Buddhist} = 105$, $N_{Christian} = 116$, χ^2 (2) = 0.79, $p = .68$). Primary findings remain unchanged when these excluded participants are included in the total sample (see Supplemental Material for these additional analyses).

The final sample (Table 1) of Christians ($n = 203$) were primarily Caucasian (85%) and expressed strong belief in God and low belief in karma. Hindus ($n = 200$) were primarily Asian (92%) and expressed strong belief in both God and karma. Buddhists ($n = 204$) were primarily Asian (52%) or Caucasian (37%) and expressed greater belief in

karma than belief in God.

9.2. Materials and procedure

Participants completed the same prescreening, repeated dictator game, and supernatural belief and demographic questionnaires described in Experiment 1, with two differences. First, the Neutral condition was dropped. Experiment 1 did not show any evidence of order effects and participant recruitment was much more expensive for this sample, therefore we conserved resources by dropping the neutral frame condition. Second, participants were selected and assigned to framing conditions based on their religious affiliation, rather than their level of belief. Participants who identified themselves as Hindus and Buddhists in the prescreening survey were asked to think about karma during the second phase of the dictator game, and participants who identified themselves as Christians were asked to think about God. Second, the dictator game endowments ($2.00, $3.00, or $4.00) were substantially larger than the endowments in Experiment 1, but the amount again allowed participants to approximately double their earnings from completing this survey. Patterns of giving were again very consistent across trials, before framing ($\alpha = 0.94$) and after framing ($\alpha = 0.96$). After the dictator game, participants completed various measures of beliefs, including belief in karma and God, ratings of supernatural benevolence and punitiveness, free list of actions with supernatural punishments and rewards, and exposure to social sources of belief (see pre-registration documents).

10. Results and discussion

10.1. Confirmatory analyses: supernatural framing manipulation

We used mixed-effects models to assess whether supernatural framing (0 = pre-frame, 1 = post-frame) increased giving for each religious group (dummy coded with Christians as the reference group), compared to participants' baseline levels of generosity. We included random intercepts and random effects of framing nested within participant to account for the repeated-measures design. Confirming the results of Experiment 1, participants gave more after thinking about karma or God, $b = 0.121$, 95% CI [0.085, 0.154], and this framing effect did not significantly differ across the different religious groups (Christian vs. Hindu frame effect: $b = -0.013$ [-0.066, 0.039], $p = .61$, Christian vs. Buddhist frame effect: $b = 0.040$ [-0.010, 0.092], $p = .13$). As can be seen in Fig. 5, Hindus, $d = 0.48$ [0.28, 0.68], $t(199) = 6.83$, $p < .001$, and Buddhists, $d = 0.53$ [0.33, 0.73], $t(203) = 7.56$, $p < .001$, became gave more after thinking about karma. Similarly, Christians gave more after thinking about God, $d = 0.48$ [0.28, 0.68], $t(202) = 6.86$, $p < .001$. Additionally, Buddhists were slightly more generous overall than Hindus ($b = 0.052$,
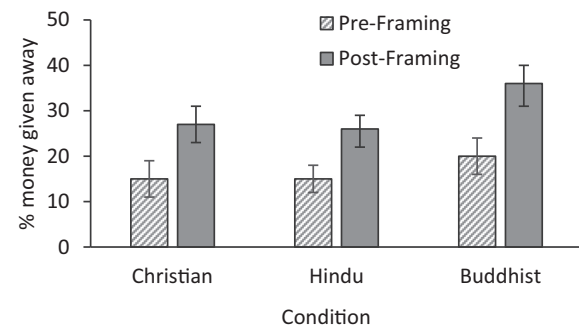
Fig. 5. Mean proportion of money given away in Experiment 2, before and after supernatural framing (God for the Christian sample, karma for the Hindu and Buddhist samples). Error bars indicate 95% confidence intervals around the mean.

$p = .040$) and Christians ($b = 0.057$, $p = .025$), an effect that exploratory analyses revealed was driven by greater giving among Buddhist converts (although the extent of self-reported learning about God/karma from religious and social sources did not moderate the framing effect in any religious group). This supernatural framing effect remained when controlling for the amount of money distributed in each trial (pre- vs. post-frame effect: $b = 0.122$, $p < .001$), or participants' perceptions about the purpose of the experiment and their familiarity with DG tasks (frame effect: $b = 0.099$, $p = .011$). Moreover, the effect held even when including all data from participants initially omitted from the final sample due to exclusion criteria (see Supplemental Material for details of these alternative analyses).

We next investigated whether baseline selfishness moderated these effects. Replicating Experiment 1, there was an overall negative association between participants' initial giving and their change in giving after framing, $r = -.26$, 95% CI $[-.34, -.19]$, $p < .001$. Participants who were initially selfish became more generous when thinking about karma (Hindus: $M_{change} = 0.14$ [0.10, 0.19]; Buddhists: $M_{change} = 0.23$ [0.17, 0.29]) or God ($M_{change} = 0.15$ [0.11, 0.20]), while those who initially exhibited the normative, modal prosocial response (i.e., fairness) did not change their strategy, but remained equally fair when thinking about karma (Hindus: $M_{change} = 0.02$ [0.00, 0.06]; Buddhists: $M_{change} = 0.02$ [-0.04, 0.09]) or God ($M_{change} = 0.04$ [-0.04, 0.13]).

10.2. Exploratory analyses: beliefs about karma and God

We used mixed-effects models to explore whether individual differences in beliefs about karma and God predicted DG giving or moderated the supernatural framing effect. As can be seen in Table 3, level of belief in karma or God was not associated with levels of giving and did not moderate the supernatural framing effect (Models 3a, 4a, and 5a). As in Experiment 1, this may be caused by the restricted range of belief that resulted from our strategy of recruiting participants from religious groups where God and karma are relevant.

In this experiment, Christians who viewed God as more benevolent and less punitive were slightly *less* generous at baseline, but *more* likely to increase their giving when thinking about God (Models 3b and 3c), lending inconsistent evidence of how supernatural benevolence and punitiveness predicts giving. There was also high consensus among Christians that God is extremely benevolent ($M = 4.76$, $SD = 0.63$ on a 5-point scale) and non-punitive ($M = 2.24$, $SD = 1.12$), indicating that belief in a punishing God is not required for supernatural framing to affect behavior. Ratings of karma's benevolence ($M_{Hindu} = 3.82$, $SD = 1.13$; $M_{Buddhist} = 3.83$, $SD = 1.16$) and punitiveness ($M_{Hindu} = 2.79$, $SD = 1.15$; $M_{Buddhist} = 2.67$, $SD = 1.27$) were less skewed, but did not significantly predict giving or moderate the framing effect for Hindus or Buddhists.

Participants were much more willing to admit that God or karma will punish selfishness/greed and reward generosity. Selfishness/greed was mentioned by 22% of Christians, 33% of Hindus, and 38% of Buddhists, and generosity was mentioned by 49% of Christians, 67% of Hindus, and 71% of Buddhists. Supernatural punishments for greed did not predict nor moderate DG giving in these samples, but supernatural rewards for generosity did. Christians (Model 3e) and Hindus (Model 4e) who listed generosity were more likely to increase giving after framing, compared to those who did not mention generosity. Among Buddhists (Model 5e), listing generosity did not moderate the framing effect, but it was associated with greater baseline giving. Overall, these results support the general lack of an association between strength of belief and giving, but these exploratory analyses offered preliminary evidence that beliefs about God/karma's willingness to reward generous behavior may predict greater giving.

11. Experiment 3

Experiments 1 and 2 found that thinking about God and karma

decreased selfishness among believers. Individual differences in supernatural belief did not moderate this effect, potentially due to the restricted range of belief in these samples: We purposefully had excluded non-believers or asked participants to think about a supernatural concept that was relevant to their religious traditions, and the effectiveness of supernatural framing did not differ between those who somewhat agree or strongly agree that God/karma exists. In Experiment 3, we recruited a sample that included both believers and non-believers, to assess whether those who explicitly deny the existence of supernatural forces are also affected by our supernatural framing manipulation. Evidence that explicit beliefs moderate the supernatural framing effect would also speak against alternative explanations for our findings. Since believers and non-believers both understand that God and karma are entities that care about prosocial human norms (White & Norenzayan, 2019), they should be similarly influenced by experimenter demand and thoughts about morality primed by these supernatural concepts. Differential patterns of behavior for believers and non-believers would undermine the alternative explanation that supernatural framing effect are attributable to experimenter demand and instead supports the explanation that the culturally-learned belief in supernatural intervention for good and bad behavior is a key component of the supernatural framing effect.

12. Methods

Before conducting this study, all methods, research questions, and analysis plans were uploaded to OSF. However, as they were not correctly registered, this document was accidentally deleted after data collection. The original and unedited copy of the intended pre-registration was re-uploaded, and can be found at https://osf.io/69b4n/. The recruitment method, analysis plan, and hypotheses are consistent with those pre-registered for Experiments 1 and 2—which were designed, registered and conducted prior to this study—with the exception that non-believers were also included in the sample for Experiment 3.

12.1. Participants

We recruited American participants from MTurk to participate in an online survey, in March 2017, and, unlike in previous studies, participants were not pre-screened for supernatural beliefs or religious affiliations; everyone interested in completing the survey was allowed to participate. Given that in Experiment 1 approximately half of interested participants were screened out for being non-believers, in Experiment 3 we doubled the sample size per condition, in order to include approximately the same number of believers per condition as in Experiment 1. We aimed to recruit 500 participants for each of the two supernatural framing conditions (1000 participants total). Similar to Experiments 1 & 2, we followed preregistered criteria by excluding participants who did not complete the survey (i.e., did not reach the end of the survey or did not provide an answer to all six DG trials, $n = 48$), or who failed an attention check question placed within the survey ($n = 15$). Furthermore, we had initially proposed excluding participants who completed the study in < 5 min, as we believed they would not be able to adequately read instructions and respond in that little time. However, the median completion time (6.5 min) was much shorter than anticipated. Therefore, this exclusion criterion was dropped. Primary analyses were not significantly changed if this criterion was kept (see Supplemental Material).

The final sample of participants ($N = 986$) was randomly assigned to either the God framing condition or the karma framing condition, regardless of belief. There was no difference across conditions in participants' belief in God or belief in karma. The God framing condition ($n = 498$) included 295 believers and 203 non-believers (according to a binary measure of belief in God). The Karma framing condition ($n = 488$) included 248 individuals high in belief and 240 individuals

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Table 3

Mixed-effects model predicting dictator game giving from individual differences in a variety of supernatural beliefs in Experiment 2.

	Christians									
	Model 3a: Belief in God		Model 3b: God is Punitive		Model 3c: God is Benevolent		Model 3d: God Punishes Greed		Model 3e: God Rewards Generosity	
	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p
Intercept	0.145 [0.113, 0.177]	< .001	0.145 [0.113, 0.177]	< .001	0.145 [0.113, 0.177]	< .001	0.142 [0.106, 0.179]	< .001	0.144 [0.099, 0.189]	< .001
Pre- vs. Post-Frame	0.121 [0.086, 0.155]	< .001	0.121 [0.086, 0.155]	< .001	0.121 [0.086, 0.155]	< .001	0.118 [0.079, 0.157]	< .001	0.074 [0.027, 0.121]	.003
Belief	-0.019 [-0.051, 0.013]	.25	0.025 [-0.007, 0.057]	.13	-0.039 [-0.071, -0.007]	.017	0.012 [-0.066, 0.091]	.76	0.002 [-0.063, 0.067]	.95
Frame*Belief	0.017 [-0.018, 0.051]	.34	-0.037 [-0.071, -0.003]	.036	0.040 [0.006, 0.074]	.022	0.010 [-0.074, 0.094]	.81	0.096 [0.028, 0.163]	.006
N	203		203		203		203		203	
AICc	-796.16		-799.93		-803.34		-798.05		-805.07	

	Hindus									
	Model 4a: Belief in Karma		Model 4b: Karma is Punitive		Model 4c: Karma is Benevolent		Model 4d: Karma Punishes Greed		Model 4e: Karma Rewards Generosity	
	B [95% CI]	P	B [95% CI]	P	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p
Intercept	0.150 [0.117, 0.182]	< .001	0.150 [0.117, 0.182]	< .001	0.150 [0.117, 0.182]	< .001	0.133 [0.094, 0.173]	< .001	0.148 [0.092, 0.205]	< .001
Pre- vs. Post-Frame	0.107 [0.077, 0.138]	< .001	0.107 [0.076, 0.138]	< .001	0.107 [0.076, 0.138]	< .001	0.112 [0.075, 0.150]	< .001	0.060 [0.007, 0.113]	.026
Belief	-0.004 [-0.037, 0.028]	.79	-0.008 [-0.041, 0.025]	.64	0.006 [-0.026, 0.039]	.71	0.050 [-0.019, 0.119]	.16	0.002 [-0.067, 0.071]	.95
Frame*Belief	0.023 [-0.008, 0.053]	.15	0.004 [-0.027, 0.034]	.82	-0.004 [-0.035, 0.026]	.78	-0.016 [-0.081, 0.050]	.64	0.071 [0.006, 0.135]	.033
N	200		200		200		200		200	
AICc	-866.04		-864.22		-864.15		-869.00		-871.89	

	Buddhists									
	Model 5a: Belief in Karma		Model 5b: Karma is Punitive		Model 5c: Karma is Benevolent		Model 5d: Karma Punishes Greed		Model 5e: Karma Rewards Generosity	
	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p	B [95% CI]	p
Intercept	0.202 [0.162, 0.241]	< .001	0.202 [0.162, 0.241]	< .001	0.202 [0.162, 0.241]	< .001	0.185 [0.135, 0.235]	< .001	0.122 [0.050, 0.195]	.001
Pre- vs. Post-Frame	0.160 [0.119, 0.202]	< .001	0.160 [0.119, 0.202]	< .001	0.160 [0.119, 0.202]	< .001	0.142 [0.089, 0.194]	< .001	0.169 [0.092, 0.247]	< .001
Belief	0.018 [-0.021, 0.058]	.37	-0.015 [-0.055, 0.024]	.45	0.000 [-0.039, 0.040]	.99	0.045 [-0.036, 0.127]	.28	0.112 [0.026, 0.198]	.012
Frame*Belief	0.012 [-0.030, 0.053]	.59	0.004 [-0.037, 0.046]	.84	0.027 [-0.015, 0.068]	.21	0.049 [-0.036, 0.135]	.26	-0.012 [-0.104, 0.079]	.79
N	204		204		204		204		204	
AICc	-546.59		-545.56		-546.79		-551.57		-554.89	

Note. Each model description specifies the particular belief included as a predictor in that model. Belief, punitiveness, and benevolence were standardized; free lists were coded as 1 if greed/generosity was mentioned at least once, and 0 if never mentioned.

low in belief (according to a median split of the belief in karma questionnaire scores). Further details of sample demographics can be found in Table 1. A sensitivity power analysis indicated that these sample sizes have 80% power to detect an interaction of $\eta_p^2 = 0.02$ (in an ANOVA) between the within-subject supernatural framing effect and between-subjects differences in supernatural belief.

12.2. Materials and procedure

Participants completed the same repeated dictator game and supernatural belief and demographic questionnaires described in Experiment 1, except that in this experiment participants were not pre-screened prior to the dictator game, and were instead randomly assigned to either God or Karma framing conditions. We also slightly altered the supernatural framing instructions to make them meaningful to both believers and non-believers, by removing the reference to "your

belief" and instead instructing participants: "Before you make these decisions, please think about God [karma]." After completing the dictator game, participants reported various aspects of their religious beliefs and other demographics, including measures of God/karma's benevolent and punitive traits (although participants did not complete the free list task in this experiment). Our analyses below focus on two measures of belief: a continuous measure of belief in God (1 item, "I believe that god exists," 1 = *Strongly Disagree* to 9 = *Strongly Agree*) and a continuous composite measure of belief in karma (16-item scale, α = 0.94, White et al., In press). All materials are described in the pre-registration documents.
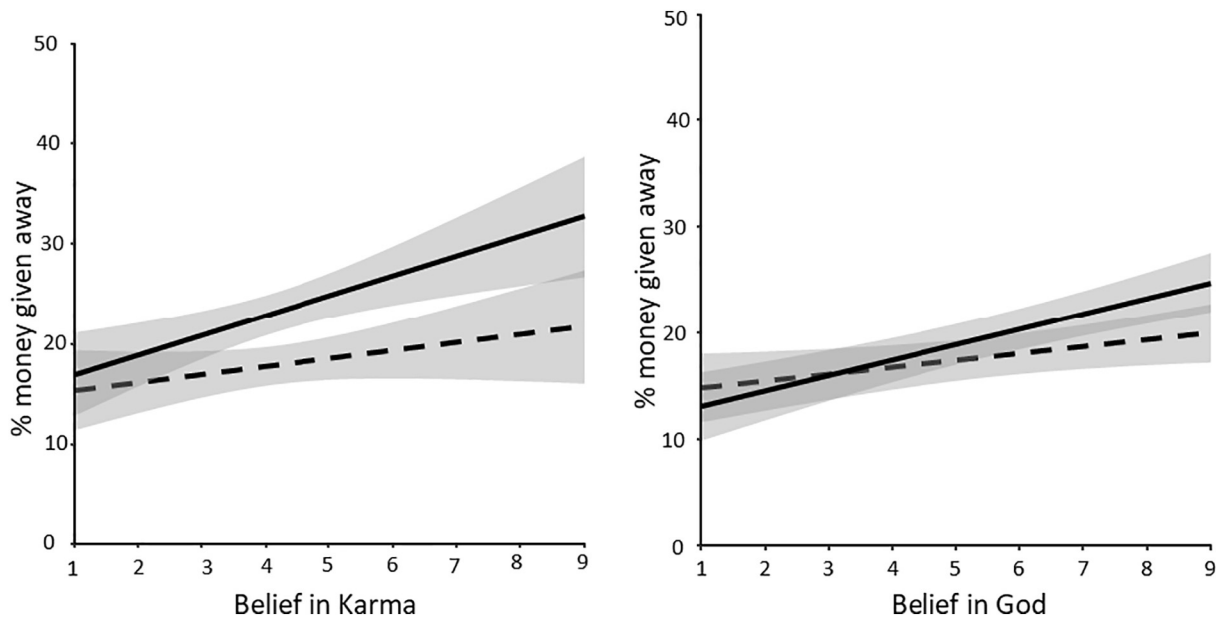
Fig. 6. Proportion of money given away in Experiment 3, before (dashed line) and after (solid line) reminders of karma (left) and God (right), with 95% confidence bands.

13. Results and discussion

13.1. Confirmatory analyses: supernatural framing manipulation

We used the same mixed-effect modeling strategy as in Experiments 1 and 2, but also included a continuous measure of belief in God or karma (standardized within each belief type) as possible moderator. A model including all possible interactions revealed no main effect of condition, $b = -0.006$, 95% CI $[-0.034, 0.026]$, $p = .68$, and a small association between level of belief and baseline giving in this sample, $b = 0.025$ $[0.004, 0.047]$, $p = .017$, which did not differ by condition, interaction $b = -0.004$ $[-0.035, 0.026]$, $p = .77$. There was also a small overall framing effect, $b = 0.022$ $[0.007, 0.037]$, $p = .003$, which did differ by condition such that karma caused greater increases in giving than God, $b = 0.039$ $[0.019, 0.060]$, $p < .001$; and the predicted interaction between level of belief and the supernatural framing effect, $b = 0.033$ $[0.018, 0.048]$, $p < .001$, which did not significantly differ between the God and karma framing conditions, $b = -0.012$ $[-0.033, 0.008]$, $p = .26$. The nature of this interaction is displayed in Fig. 6. Replicating the results of Experiments 1 and 2, those who believe in karma gave more when thinking about karma, although as predicted this increase in giving was greater for believers, $d = 0.46$, 95% CI $[0.28, 0.64]$, $t(233) = 7.04$, $p < .001$, than for non-believers, $d = 0.26$, 95% CI $[0.08, 0.43]$, $t(253) = 4.13$, $p < .001$. As can be seen in Fig. 6, the Karma framing effect was virtually nonexistent for those who strongly deny the existence of karma. Additionally, those who believe in God gave more when thinking about God, $d = 0.26$, 95% CI $[0.10, 0.42]$, $t(294) = 4.46$, $p < .001$, but as predicted, non-believers did not. In fact, they gave slightly less when thinking about God, $d = -0.15$, 95% CI $[-0.34, 0.05]$, $t(203) = -2.10$, $p = .037$.

This interaction between belief and framing also remained when controlling for the amount of money distributed in each trial (belief*-framing interaction: $b = 0.033$, $p < .001$), participants' view of supernatural benevolence/punitiveness (belief*framing interaction: $b = 0.030$, $p < .001$), participants' perceptions about the purpose of the experiment, and when including all data from participants initially omitted from the sample (see Supplemental Material). The interaction between belief and framing also remained when using a single-item measure of belief in karma (Karma belief*framing interaction: $b = 0.03$, $p < .001$) or a binary measure of belief in God (God

belief*framing interaction: $b = 0.05$, $p = .004$). Additionally, as in Experiment 1, the supernatural framing effect was not moderated by participants' view of God or karma's benevolence, $b = 0.005$, $p = .60$, or punitiveness, $b = -0.001$, $p = .90$. These results replicate the main supernatural framing results among believers from Experiments 1 and 2, and further demonstrate that explicit commitment to belief moderates this framing effect: The effect of thinking about God on giving disappeared and the effect of thinking about karma was greatly diminished for non-believers.

Participants' initial generosity was again a moderator for these effects. As in Experiments 1 and 2, there was an overall negative association between participants' initial giving and their change in giving after framing, $r = -.29$, 95% CI $[-.34, -.23]$, $p < .001$. The supernatural framing manipulation only affected the behavior of believers who were initially selfish (Karma frame: $M_{\text{change}} = 0.13$, 95% CI $[0.10, 0.17]$; God frame: $M_{\text{change}} = 0.09$, 95% CI $[0.06, 0.12]$), not those who were initially fair (Karma frame: $M_{\text{change}} = 0.01$, 95% CI $[-0.004, 0.03]$; God frame: $M_{\text{change}} = -0.01$, 95% CI $[-0.04, 0.02]$).

14. Experiment 4

Experiment 3 replicated the supernatural framing effect and moderation by baseline giving among a new sample of believers, but found that this effect was substantially reduced among non-believers. Experiment 4 aimed to replicate the karma framing effect and the interaction with explicit karma belief in a more traditional one-shot, between-subjects dictator game. Replicating our effects in a between-subjects design provides further confidence that results are not simply due to experimental demand effects (which ought to be diminished in a between-subjects design). We also included additional measures of beliefs about karma and beliefs about a just world, to further explore potential moderators of our experimental effects.

15. Methods

Before conducting this study, all methods, research questions, and analysis plans were uploaded to OSF: https://osf.io/m7w9t/.

15.1. Participants

We recruited participants from the USA, in February 2019, through Qualtrics's online panels. We aimed to recruit a sample of 1000 participants. According to power analyses conducted using the pwr package in R, a sample size of 596 participants would be required to have 80% power to detect a small between-condition difference ($d = 0.23$, i.e., the lower-limit of the within-subjects effect detected in Experiment 3). Additional power analyses conducted using the simr package in R (based on data from Experiments 1 and 3), indicated that a sample of 1000 participants would be required to have approximately 80% power to detect a reasonably small between-subjects interaction (i.e., $b = 0.04$) between belief in karma and condition. We followed pre-registered criteria by excluding participants who did not complete the survey ($n = 13$) or who failed an attention check question ($n = 521$). As preregistered, we also included extra participants in our sample (beyond the planned size) who completed the survey prior to data collection being terminated by Qualtrics panel managers. The final sample of participants was randomly assigned to either the Karma framing condition ($n = 629$) or a control condition ($n = 615$), regardless of belief. Further details of sample demographics can be found in Table 1.

15.2. Materials and procedure

Participants were randomly assigned to complete a single trial of the dictator game, in which they were asked to divide $2.00 between themselves and another participant, according to neutrally-framed instructions or according to instructions to "think about Karma." For analysis, responses were transformed into the proportion of money given away. (Due to the expense of participant recruitment, we did not include a God framing condition, but rather focused on the more novel karma framing effect compared to neutrally-framed instructions.)

Participants then reported their familiarity with dictator game-type tasks, provided an open-ended guess about the experimental hypothesis, and then completed the 16-item belief in karma questionnaire ($\alpha = 0.92$). After the dictator game, participants completed various measures of beliefs and demographics (see pre-registration documents), including additional questions about whether karma rewards and punishes behavior (mean of two items, $r = .72$, "Karma punishes people for their behavior," "Karma rewards people for proper behavior"), whether karma is otherwise benevolent (mean of two items, $r = .68$, "Karma is loving," "Karma is forgiving"), and karma's knowledge (mean of two items, $r = .68$, "Karma can see what people are doing, even if they are far away in a foreign country," "Karma can see into people's hearts and know their thoughts and feelings").

16. Results and discussion

16.1. Confirmatory analyses: supernatural framing manipulation

Participants asked to think about karma were more generous overall than were participants in the control condition, who were not reminded of karma, $d = 0.48$, 95% CI [0.37, 0.60], $t(1218) = 8.51$, $p < .001$. Replicating the pattern from Experiment 3, a linear regression including experimental condition, participants' level of explicit belief in karma (standardized), and their interaction, revealed that this experimental effect, $b = 0.17$ [0.13, 0.21], $p < .001$, was stronger among participants who believed in karma more, $b = 0.05$ [0.01, 0.09], $p = .010$. As depicted in Fig. 7, although there was no main effect of belief in karma, the experimental reminder of karma increased giving among participants who expressed some belief in karma, but not among those who strongly denied the existence of karma. When reminded of karma, there was a small positive association between belief and giving, $b = 0.03$ [0.002, 0.06], $p = .038$, whereas belief in karma was not significantly associated with giving in the control condition, $b = -0.02$ [−0.05, 0.006], $p = .11$. This experimental effect was robust when controlling
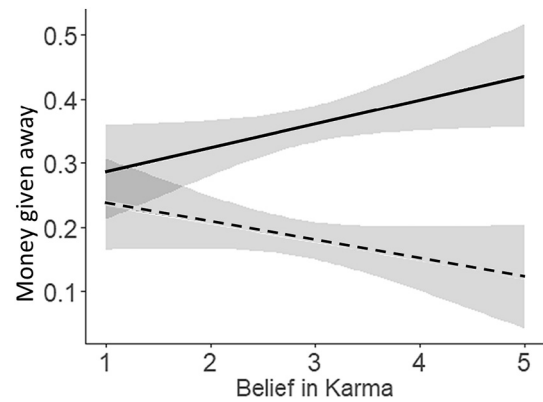

Fig. 7. Proportion of money given away in Experiment 4, when thinking about karma (solid line) and when not thinking about karma (dashed line), with 95% confidence bands.

for hypothesis guessing, which was unassociated with giving, $b = 0.00$, $p = .95$, and did not moderate the framing effect, $b = 0.01$, $p = .68$. Moreover, game familiarity was not a factor as participants overwhelmingly (94%) reported no prior exposure to economic games. It is also notable that this between-subjects experimental effect is as large as that found in the within-subjects design used in Experiments 1–3. Altogether, these factors suggest that participants' responses in each experiment are not solely driven by their acquiescence to (potential) experimental demand effects.

16.2. Exploratory analyses: alternative moderators

We further explored why belief in karma decreased selfishness, we examined several alternative individual differences as possible moderators of the supernatural framing effect. One possibility is that experimental reminders of karma simply primed ideas about justice, fairness, or reciprocity in participants. However, individual differences in belief in a just world (the expectation of fairness in secular, interpersonal contexts) did not predict giving, $b = 0.006$, 95% CI [−0.02, 0.04], $p = .71$, nor moderate the karma framing effect, $b = 0.007$ [−0.03, 0.05], $p = .74$, implying that beliefs about karma are not merely reducible to ideas about (non-supernatural) interpersonal fairness. Instead, the karma framing effect was associated with beliefs about karma's ability to reward and punish behavior: Among participants in the karma framing condition (but not in the control condition), giving was weakly but significantly correlated with belief that karma rewards good behavior, $r = .12$ [.04, .19], $p = .003$, or punishes bad behavior, $r = .09$ [.01, .16], $p = .029$. Giving was not significantly associated with other aspects of karma that are less directly moralistic, such as the view that karma is loving and forgiving, $r = .03$ [−.05, .11], $p = .43$, or that karma merely knows people's thoughts and actions, $r = .06$ [−.02, .14], $p = .13$. When giving was simultaneously regressed on belief in karma, belief in karma's reward/punishment of behavior, karma's benevolence, karma's knowledge, experimental condition, and all interactions between beliefs and condition, the sole significant moderator was karma's reward/punishment of behavior, $b_{int} = 0.063$ [0.010, 0.117], $p = .020$ (see Supplemental Materials for full models). Therefore, it is specifically belief in karma as a morally-concerned supernatural entity that predicted increased giving when thinking about karma, not mere exposure to the concept (among non-believers), belief in secular justice, or less-moralistic aspects of karma belief.

17. General discussion

Across four high-powered, pre-registered experiments, we found that both karma and God encouraged adherence to prosocial norms in

the dictator game. This effect was moderated by explicit religious belief implying that, beyond simply reminding people of fairness and generosity, supernatural beliefs provide a motivation for believers to adhere to prosocial norms. These results support the role of culturally-structured beliefs about supernatural forces in encouraging cooperation, which could have played an important role in the spread of prosocial religions around the world (Johnson, 2015; Norenzayan et al., 2016; Watts et al., 2015).[6]

These studies fill an overlooked gap in the past literature regarding belief in karma. Karma as well as God—two different moralizing supernatural concepts with somewhat distinct cultural histories—can increase prosocial behavior among believers from diverse religious backgrounds, including Christians, Hindus, Buddhists, and the non-affiliated, highlighting the diversity of routes through which supernatural beliefs can enforce normative behavior. We found little support to the idea that thoughts of karma may encourage participants to retain their endowment by rationalizing selfish behavior, at least not in the present paradigm.

We assessed the robustness of the findings by running several alternative data analysis scenarios (Steegen, Tuerlinckx, Gelman, & Vanpaemel, 2016). Varying the amount of the endowment did not change the findings, nor did controlling for game familiarity, hypothesis guessing, different data exclusion criteria, and relevant individual difference measures. The effect emerged in within- as well as between-subjects designs with comparable effect sizes, although the latter required a far larger sample size than the former. We found the same pattern of results in samples drawn from two different recruitment methods (Mechanical Turk and Qualtrics Panels). Across all samples, manipulations, and experimental designs we found similar moderately-sized effects of supernatural framing on giving among believers. These experiments also investigated three theoretically-relevant boundary conditions that have not received adequate attention in the previous psychological literature and found that the supernatural framing effect was reduced to essentially zero among participants who had behaved fairly at baseline or who strongly denied belief in karma or God.

17.1. The moderating role of baseline selfishness

One consistent moderator of the supernatural framing effect was participants' baseline selfishness vs. fairness, which previous experiments could not investigate due to the exclusive use of between-subjects designs. We tested this hypothesized interaction in a within-subjects design and found that supernatural framing had diminishing effects as baseline offers approached a fair split. In dictator games, an equal division of the money is the normative prosocial response, while giving away more than half is extremely uncommon in Western populations (Engel, 2011, also see Fig. 3). If supernatural concepts encourage prosocial norm adherence, rather than encouraging generosity per se, this implies that supernatural framing should increase giving among initially-selfish participants, and not affect the behavior of those who initially divided the money evenly. We found this pattern found across all three within-subjects experiments where baseline offers could be assessed. Importantly, this does not reflect a methodological ceiling effect in the measure (those who initially gave 50% of the endowment could have also increased their giving after supernatural framing), but instead reflects psychological adherence to normatively-prosocial dictator game behavior. This can help explain one noteworthy high-

powered replication failure of religious priming effects (Gomes & McCullough, 2015), in which the average offer in the control condition—at 45%—approached a fair split. Other explanations for differing effects (e.g., the efficacy of explicit vs. implicit primes) are also possible and are being further investigated (e.g., Billingsley et al., 2018; for further discussion see Shariff & Norenzayan, 2015).

In the current samples, supernatural framing did not turn egalitarian fairness into ultrasociality. This pattern is consistent with interpersonal evaluations that view ultra-prosocial behavior no more favorably than fair behavior (Klein et al., 2015; Klein & Epley, 2014), and is also consistent with the hypothesis that moralizing religions curtail selfish tendencies, but that this effect may be crowded out when other mechanisms that encourage prosociality are already in place (Henrich et al., 2010; Laurin, Shariff, Henrich, & Kay, 2012; Norenzayan et al., 2016). Future studies could investigate whether supernatural framing causes different shifts in behavior when the normative response is not a fair split, such as giving all of one's endowment away to a recipient who is clearly in need of help, or shifting from fairness to selfishness when interacting with an undeserving or morally suspect recipient.

17.2. The moderating role of explicit belief

A second moderator was participants' explicit beliefs about karma and God. Supernatural frames reliably increased prosocial behavior among believers (Experiments 1–4), but had weak or inconsistent effects for non-believers (Experiments 3 and 4). This is consistent with meta-analyses of the previous literature that found no reliable effect of religious reminders for nonbelievers (Shariff et al., 2016; Willard et al., 2016) and extends this finding to belief in karma. Thinking about karma had larger effects among believers than non-believers, although a small effect remained among participants who doubted (but did not strongly deny) the existence of karma, perhaps because karma (unlike God) sparked ideas of fairness, reciprocity, or evoked the intuition that prosocial behavior will ultimately be rewarded in future success (documented previously among American children and adults, Banerjee & Bloom, 2017; Converse et al., 2012). Despite a lack of explicit belief in karma as a supernatural force, reminders of karma could have increased giving through acquiescence to these intuitions (Risen, 2016). However, the stronger effect among karma believers demonstrated that our results cannot be fully explained by acquiescence to a shared intuition or simply primed ideas about fairness, which both believers and non-believers associate with karma (White & Norenzayan, 2019). Moreover, belief in a just world, unlike belief in karma, did not moderate the effect of karmic reminders on dictator-game giving. The belief that karma or God is real and willing to intervene in one's life appears to play an important role in incentivizing normative prosocial behavior in our experiments.

17.3. The role of supernatural punishment and benevolence

Several theories have pointed to the important role of supernatural punishment in encouraging prosociality (e.g., Johnson, 2015; Norenzayan et al., 2016; Watts et al., 2015). However, in these experiments we found no evidence that belief in supernatural punitiveness was required for (or enhanced) the effectiveness of supernatural framing. God was described by most participants as extremely benevolent and non-punitive, but thinking about God still decreased selfishness in these samples. Karma's punitiveness also did not moderate the Karma framing effects in Experiments 1–3.[7] If anything, our data supports a possible association between giving and belief in

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[6] Due to participant payment through quasi-random matching with other participants in Experiments 1 and 2, we were also able to test whether Karma had real effects in our experiments. We found no evidence of karmic payback: participants who were more generous did not receive more money in return ($bs = -0.17$ to 0.04, $ps > .06$), although our experiments were in no way designed to answer that particular question (for an alternative perspective of karma's veracity, see Allen, Edwards, & McCullough, 2015).

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[7] The only case in which belief in supernatural punishment predicted greater giving at conventional levels of significance was among Experiment 1 participants who free listed that Karma would punish greed ($p = .048$) – an effect that we caution against overinterpreting.

supernatural benevolence. There was an overall positive association between ratings of God/karma's benevolence and baseline generosity in Experiments 1 and 3. In Experiment 2, Christians who viewed God as more benevolent or who reported that God rewards generosity showed larger God framing effects, and free listing that karma rewards generosity was associated with greater baseline giving among Buddhists and a larger framing effect among Hindus. Our data therefore provides preliminary (albeit inconsistent) evidence that supernatural framing effects are associated with benevolent and rewarding views of supernatural forces.

Experiment 4 more directly investigated belief that karma is rewarding and punishing by simply asking participants whether karma rewards good behavior and punishes bad behaviour. Here, the belief that karma is rewarding and punishing did indeed predict greater giving and moderated the karma framing effect. This inconsistency with earlier studies suggests divergence between ratings of a supernatural entity's moral concern and ratings of their personality traits. In general, participants were much more willing to admit that supernatural forces punish immorality than to admit that supernatural forces are mean and vengeful.

There are several other methodological reasons why our results may be inconsistent with previous studies of supernatural punishment. Past research has found supernatural punitiveness to be associated with reduced cheating and criminal behavior (DeBono, Shariff, Poole, & Muraven, 2016; Purzycki et al., 2016, 2017; Shariff & Norenzayan, 2011; Shariff & Rhemtulla, 2012), but in the dictator game[8] keeping money for oneself does not obviously involve cheating. DG selfishness merely involves prioritizing one's own self-interest over that of a stranger, and unlike cheating (which is rarely normative), self-benefiting preferences can be justified in many circumstances. Sharing might be perceived as nice, but not obligatory, which perhaps explains why giving is encouraged by the belief in benevolent and rewarding supernatural forces. Our results are more consistent with recent work showing that supernatural benevolence can inspire prosocial behavior like volunteerism (Johnson, Cohen, & Okun, 2016; Johnson, Li, & Cohen, 2015).

Another explanation is that supernatural punitiveness beliefs were restricted in our American samples. Strong evidence supporting the role of supernatural punitiveness comes from research employing diverse cross-cultural samples, including foragers, pastoralists, and agriculturalists with a much wider range of beliefs in supernatural punishment, omniscience, and moral concern (e.g., Lang et al., in press; Purzycki et al., 2016). The present research was conducted with American participants with limited variability in the content of their beliefs. Despite having diverse religious backgrounds, this still represents a thin slice of extant human diversity, and generalizing these results to broader samples is an important direction for future research (Henrich, Heine, & Norenzayan, 2010; Norenzayan, 2016; Simons, Shoda, & Lindsay, 2017).

Our experiments therefore provide inconclusive evidence of which mechanisms underlie the supernatural framing effect. It is notable that the one factor shared by the supernatural framing effects found in these experiments—found for God and karma; Christians, Hindus, Buddhists, and the non-religious; but not for non-believers—was belief in morally-concerned supernatural forces who respond to human behavior. We also found that belief in supernatural rewards had small effects in our samples. In the face of potential threats and misfortune in an uncertain world, believers may engage in prosocial behavior not out of the fear of punishment but to increase the likelihood of future good fortune (e.g., Converse et al., 2012), which can still be interpreted as a reward/

punishment contingency that incentivizes prosociality. Further research is needed regarding what mechanism supports supernatural framing effects, and whether mechanisms differ between God and karma or between members of different religious groups.

17.4. Religious identity signaling and demand characteristics

These results speak against two alternative explanations for our findings. First, supernatural framing may have increased prosociality as a way for participants to signal their religious identity. However, this hypothesis cannot explain why thinking about karma led to similar effects even when karma was not associated with participants' self-expressed religious affiliation: Christian and non-religious participants who claimed to believe in karma responded to supernatural framing as much as Hindu and Buddhist participants. Exploratory analyses further indicated that participants who learned about God or karma from social sources (e.g., religion, family members) or who were more religious, and therefore were more likely to associate God/karma with their social identity, were no more affected by supernatural framing.

Second, the experimenter demand account argues that when participants were asked to think of karma or God, they sought to guess the experimenter's hypothesis, and participants thereby changed their behavior in line with their perception that the experimenters expected generosity. This alternative explanation first predicts that effects depend more on the experimenter rather than on participant characteristics, implying that all participants would be expected to give money away when supernatural framing is present, regardless of their explicit religious belief. However, non-believers were not reliably affected by our manipulation. Additionally, experimenter demand implies that the experimental effect should be reduced to non-significance after controlling for hypothesis guessing, since experimenter demand cannot have an effect unless participants know what the experimenter expects or wants from them. In contrast, the effect of supernatural framing remained robust after controlling for hypothesis guessing. Finally, experimenter demand effects should be stronger in within-subjects designs, where the difference between experimental conditions is more readily apparent to participants, and weaker in between-subjects designs, but the supernatural framing effects were of similar magnitude in both cases (Experiment 3 vs. Experiment 4), implying that experimenter demand was not the driving factor.

17.5. Limitations, constraints on generalizability, and future directions

There are several limitations to these experiments. Our samples, despite their religious diversity, were all Americans, limiting our ability to generalize these results to other religious populations of Hindus, Buddhists, and Christians until the proper cross-cultural research is conducted (Henrich, Ensminger, et al., 2010; Norenzayan, 2016; Simons et al., 2017). A second limitation of this procedure is that it does not capture many additional important aspects of religion in daily life, such as sacred values (Atran & Ginges, 2012) and extreme rituals (Xygalatas et al., 2013), which are psychologically potent and may exert powerful influences on behavior. These continue to be important questions, that cannot be addressed using our supernatural framing manipulation.

18. Conclusion

Our manipulation reflects an ecologically meaningful aspect of thinking and behavior in religious life: Believers are often overtly reminded about the desires of God or about Karmic consequences in everyday religious life, such as in collective prayers in a church, "what would Jesus do" campaigns, repeated prostrations and other Buddhist rituals, extreme rituals in Hindu festivals, and the call to prayer in Muslim communities (e.g., Aveyard, 2014; Rand et al., 2014; *What would Jesus do?: The rise of a slogan,* 2011; Xygalatas, 2013). In many

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[8] Exploratory analyses of free list responses indicated that the belief that God/Karma will reward honesty or punish dishonesty/cheating did not predict dictator game giving or moderate the supernatural framing effect in Experiments 1 or 2.

ways, religious traditions explicitly remind adherents about morally-concerned supernatural forces. An important path for future psychological research is to investigate a broader selection of the world's cultural and religious diversity (Norenzayan, 2016), which reveals a range of ways in which cultural concepts about supernatural forces are intertwined beliefs about social norms, and thereby encourage normative behavior among believers.

Open practices

Prior to data collection, all materials, hypotheses, and analysis plans were pre-registered on the Open Science Framework (OSF) (Experiment 1: https://osf.io/trnx7/, Experiment 2: https://osf.io/2jyde/, Experiment 3: https://osf.io/69b4n/, Experiment 4: https://osf.io/m7w9t/.

All data relevant to analyses described in these studies is available at https://osf.io/32x5t/.

Appendix A. Supplementary materials

Supplementary materials to this article can be found online at https://doi.org/10.1016/j.jesp.2019.03.008.

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