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The Sex Premium in Religiously Motivated Moral Judgment

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LH coordinated the study, participated in the design of the study, carried out the lab and online data collection for Experiments 1-5, and drafted the manuscript; TM participated in the design of the study, carried out online data collection for Experiment 6, carried out the statistical analyses, and critically revised the manuscript; EP participated in the design of the study and critically revised the statistical analyses and manuscript; EC participated in the design of the study and critically revised the statistical analyses and manuscript; MM

conceived of the study, participated in the design of the study, and critically revised the manuscript. All authors gave final approval for publication and agree to be held accountable for the work performed therein.

Interested readers may access each unique data set, the research materials and protocols, and the analytic methods and code online via a publicly accessible, permanent link to Open Science Framework (https://osf.io/egcaj). Interested readers may also access the preregistration (Experiment 6) online via the publicly accessible, permanent link to Open Science Framework (https://osf.io/egcaj) or directly at (https://osf.io/fp8ny).

Conference Presentations

McCauley, T., Hone, L.S.E., & McCullough, M. (2019, February). Sex premium in religiously motivated moral judgment. In M. E. McCullough (Chair), *What in God's Name Are We Priming?* Symposium conducted at the 20th annual meeting of the Society for Personality and Social Psychology, Portland, OR.

Hone, L.S.E., McCullough, M.E., Carter, E.C., Pedersen, E.J. (2014, February). Religious beliefs: Comparing reproductive religiosity theory and religious prosociality theory. In J. Burnette & C. Hoyt (Chairs), *Mindsets Matter: The Power of Beliefs for Everyday Life*. Symposium conducted at the 15th annual meeting of the Society for Personality and Social Psychology, Austin, TX.

Hone, L.S.E., Carter, E.C., Pedersen, E.J., & McCullough, M.E. (2013, July). Religious cognition increases endorsements of sexual (but not cooperative) morality: A first look. Poster presented at the 25th annual meeting of the Human Behavior and Evolution Society, Miami Beach, FL.

Abstract

Recent theorizing suggests that religious people's moral convictions are quite strategic (albeit unconsciously so), designed to make their worlds more amenable to their favored approaches to solving life's basic challenges. In a meta-analysis of five experiments and a pre-registered replication, we find that religious identity places a "*sex premium*" on moral judgments, causing people to judge violations of conventional sexual morality as particularly objectionable. The sex premium is especially strong among highly religious people, and applies to both legal and illegal acts. Religion's influence on moral reasoning emphasizes conventional sexual norms, and may reflect the strategic projects to which religion has been applied throughout history.

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Worldwide, billions of religious people turn to their religious texts, traditions, and teachers for moral guidance, and in some nations virtually 100% of citizens believe religion is necessary for morality (Pew Research Center, 2014). Many religious moral prescriptions appear to benefit individuals, relationships, or societies (e.g., prohibitions against theft and covetousness help to secure property rights, prohibitions against excessive anger encourage a constructive approach to conflict resolution, commandments to donate to the poor create a social safety net). By identifying the specific domains of behavior that religions are particularly effective at encouraging their adherents to moralize, it might be possible to shed new light on the basic challenges of existence that people through history have sought to address by founding, formalizing, and affiliating with religions (Shaver, 2018).

Two prominent bodies of evolutionary theory provide distinct accounts of the specific social challenges people seek to solve through religion. The first body of theorizing, here called Prosociality Theory, posits that religious practices and beliefs have developed over history in response to their effectiveness in promoting cooperation (Lang et al., 2019; Norenzayan et al., 2016). On this view, religions should be particularly effective at encouraging individual adherents to condemn selfishness, dishonesty, and untrustworthiness. In support of Prosociality Theory, surveys have revealed that religious people report high levels of prosocial behavior (Batson, Schoenrade, & Ventis, 1993; Saroglou, Pichon, Trompette, Verschueren, & Dernetli, 2005). Also, experimental inductions of religious cognition have in some experiments increased prosocial behavior toward strangers (e.g., Shariff, Willard, Andersen, & Norenzayan, 2016; cf. Gomes & McCullough, 2015; Billingsley, Gomes, & McCullough, 2018). In a set of recent studies, for example, instructing

people (particularly religious believers) to consider Karma and God increased their offers in dictator games (White, Kelly, Shariff, & Norenzayan, 2019).

The second body of theory, here called Reproductive Theory, posits that religion has developed not because of its effects on cooperation, but instead because of its effects on sexuality and reproduction (Deak & Saroglou, 2015; Moon, Krems, Cohen, & Kendrick, 2019; Reynolds & Tanner, 1995; Rigo & Saroglou, 2018; Saroglou, 2019; Schmitt & Fuller, 2015; Shaver, 2017, 2019; Strassmann et al., 2012; Weeden & Kurzban, 2013). Reproductive Theory starts with the observation that promiscuity (e.g., male abandonment and female cuckoldry) undermines the sexual strategies of people who choose instead to pursue sexual strategies characterized by monogamy and extensive investment in one's offspring. In light of this fundamental biological fact of human social life, Reproductive Theory posits further that religious communities are social ecologies in which people typically forsake promiscuous sexual strategies in favor of marital fidelity and extended parental investment. On this view, religious people condemn promiscuity and unconventional sexuality because it threatens to undermine the pro-monogamy, pro-family religious ecosystems upon which they have come to rely to make their own sexual strategies work (Moon, Krems, Cohen, & Kenrick, 2019).

In support of Reproductive Theory, cross-sectional surveys have for more than 50 years shown that religious belief, behavior, and commitment are associated with more conservative attitudes toward sex (e.g., Cardwell, 1968; Schmitt & Fuller, 2015), even after statistically controlling for non-sexual and non-familial moral views (Weeden, Cohen, & Kenrick, 2008). Additional support comes from evidence that experimentally manipulating religious salience increases benevolent sexism (Haggard, Kaelen, Saroglou, Klein, & Rowatt, 2018), and that exhortations to greater acceptance of same-sex marriage are more persuasive

to religious people (but not non-religious people) when they come from religious authorities than from anonymous peers (Harrison & Michelson, 2015).

To be sure, cooperative and sexual morality often overlap. For example, religious norms can motivate people to care for other people's children, which is both a form of cooperation and a form of reproductive support (Shaver 2017, 2019). Liminal cases notwithstanding, might there nevertheless be something in the structure of religion, or of morality, that makes religion better at moralizing one of these domains of behavior than the other? Some theories of morality, such as the theory of morality as cooperation (Curry, Mullins, & Whitehouse, 2019), appear silent on religion altogether. Other theories address the relationship of religion and morality more explicitly, but do not do not attribute any privileged status to either cooperation or sex as a target of religious moralization. For instance, although the Dyadic Theory of morality notes that religions often moralize behaviors that do not seem harmful in the eyes of non-believers because religious believers perceive gods, spirits, and ancestors as conscious agents who can, in fact, be harmed (Gray, Waytz, Young, 2012), the theory provides no rationale for viewing religion's influence on sexual morality as any different from its influence on cooperative morality.

Two other prominent theories of morality, however, do provide impetus for expecting religion to influence sexual morality and cooperative morality differently. Moral Foundations Theory, for its part, identifies "Purity/Sanctity" as one of the five fundamental considerations that govern people's moral judgments (Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011). The close link between religion and purity-based moralization is revealed by the fact that 86% of the groups of people that Graham et al. (2011) identified as morally noteworthy due to their observance or defiance of purity considerations were either sexual (e.g., virgins,

prostitutes, homosexuals) or religious (e.g., highly religious people, spiritual people, atheists) in nature. In this sense, the purity/sanctity foundation appears to be religious at its core.

Unsurprisingly, then, Graham and colleagues (2011) and Bulbulia, Osborne, and Sibley (2013) found that religious people in general (and intrinsically religiously motivated people in particular) place a higher priority on considerations of purity/sanctity in their moral judgements than less religious people do. And crucially, measures of religiosity such as these are more strongly related to the Purity foundation than to the Harm, Fairness, In-group Loyalty, and Authority foundations (Bulbulia et al, 2015; Graham et al., 2015). In describing some of the evolved cognitive bases of religion that might interact with the five moral foundations to produce religiously motivated moral judgments, McKay and Whitehouse (2015) provide some guidance for more fine-grained research into how religious cognitive representations might end up privileging sex over cooperation as a domain for moralization.

Consider also the Relationship Regulation theory of morality. Rai and Fiske (2011) conjectured that religions tend to moralize all forms of disobedience to the commandments of authority figures such as gods, spirits, and ancestors—no matter whether those commandments concern cooperation, sex, or anything else—because disobedience undermines the social hierarchies that underlie the Authority-Ranking model of relationships, which is one of the four cognitive models of relationships that people intuitively use to make sense of social life. However, Rai and Fiske (2011) also conjectured that religious adherents might be especially prone to moralizing in the sexual domain because sexual behaviors such as infidelity, abortion, and homosexuality—construed as they commonly are as disruptions to the purity of marriages, families, and castes—undermine the unity considerations that underlie people's cognitive representations of Communal Sharing relationships.

Because Moral Foundations Theory and the Relationship Regulation Theory of morality both admit the possibility that religious believers are especially prone to moralizing unconventional sexual behavior, it is fitting that some of the best research on religion and morality has explicitly examined whether religion's links to cooperative morality differ in magnitude from its links to sexual morality (Weeden, Cohen, & Kenrick, 2008; Weeden & Kurzban, 2013). In one especially wide-ranging endeavor, researchers used a data set comprising data on nearly 300,000 people from approximately 90 nations. The data set included measures of subjects' religiosity and their ratings of the justifiability of 20 different behaviors that violated norms related to cooperation (e.g., accepting a bribe, cheating on taxes) or conventional sexuality (e.g., marital infidelity, casual sex; Weeden & Kurzban, 2013). Across all 10 world regions, religious people viewed the 20 infractions as less justifiable on average than less religious people did, but people's ratings of the justifiability of the unconventional sexual behaviors were related to religiosity even after controlling for their ratings of the justifiability of the violations of cooperative norms. On the other hand, people's ratings of the justifiability of the violations of cooperative norms were not uniquely associated with religiosity after controlling for their ratings of the justifiability of the unconventional sexual behaviors (Weeden & Kurzban, 2013). This pattern of results suggests that religiosity was more closely related to sexual morality than to cooperative morality.

Although these findings suggest that sexuality is more central to religious moralization than cooperation is—which we call the *sex premium* in religiously motivated moral judgments—they permit only weak causal inferences due to the cross-sectional nature of the data. Research on social identity, however, suggests an approach for generating stronger causal evidence (Akerlof & Kranton, 2000). When important aspects of people's social identities are made salient, people tend to adjust their behavior and attitudes to bring

them into closer alignment with the perceived ideals (or stereotypes) of the social group that has been made salient, perhaps out of a chronic desire to aspire to the group's ideals or its members' perceived behavioral characteristics. Research has shown, for instance, that making salient people's identities as members of particular ethnic groups (Benjamin, Choi, & Strickland, 2010), as felons (Cohn, Maréchal, & Noll, 2015), as bankers (Cohn, Fehr, & Maréchal, 2014), or even as affiliates of particular political parties (Unsworth & Fielding, 2014), can alter their behaviors and attitudes in stereotype-consistent ways. Likewise, making people's religious identities salient temporarily alters their attitudes and self-perceptions that are consistent with the ideals they associate with their membership in those social groups (Burris & Jackson, 2000; Randolph-Seng & Nielsen, 2007; Shariff et al., 2016).

Here, we conducted six experiments to test whether activating people's religious identities leads them to apply a sex premium when judging the justifiability of specific moral acts. We also tested whether the sex premium on religiously motivated moral judgments was more pronounced among highly religious people.

Predictions

Prosociality Theory and Reproductive Theory both accommodate the predictions that (a) highly religious people condemn moral infractions more harshly than less religious people; (b) people reminded of their religious identities condemn moral infractions more harshly in general; and (c) the effect of reminding people of their religious identities is stronger for religious people than for non-religious people. However, the two theories make rival predictions about whether sexuality or cooperation is closer to the core of religious morality. For its part, Reproductive Theory entails three additional predictions: (d) religious people more strongly condemn breaches of conventional sexual morality than cooperative morality (the sex premium); (e) activating people's religious identities also creates a sex

premium in moral judgment; and (f) experimentally activating religious identity creates a larger sex premium among religious people than among less religious people. Prosociality Theory predicts the opposite pattern with regard to these three latter predictions, with religion appearing more closely related to cooperative morality than to conventional sexual morality.

The Present Experiments

In four of our first five experiments, we activated subjects' religious identities by having them complete (a) a self-report religiosity questionnaire and then a morality questionnaire (religion-salient condition) or (b) the same questionnaires in the opposite order (control condition). The order effect manipulation is based on the religious priming methods used in Study 2 of Sheikh, Ginges, Coman, and Atran (2012), in which subjects received a religious questionnaire before completing a sacred values questionnaire. Given that Sheikh and colleagues' order effect manipulation successfully increased religious people's evaluation of sacred values, we expected that the priming effect would have a similar effect on religious people's moral judgments. Moreover, peoples' moral judgments have been shown to be susceptible to subtle manipulations, including the order in which morally relevant information is presented (Schwitzgebel & Cushman, 2012). In the remaining experiment, we activated people's religious identities by assigning them to complete a writing task in which they wrote for five minutes about either (a) their religion and god (religion-salient condition), (b) their country and culture (control condition); or (c) objects in their home (control condition). The morality questionnaire for all five experiments instructed subjects to rate the justifiability of 21 infractions of cooperative morality and traditional sexual morality.

Upon completing and then analyzing the data from each of these five experiments, vagaries in the results led us to believe they were underpowered, so we proceeded to analyze the results from all five experiments simultaneously in a three-level random effects meta-

analysis. Doing so enabled us to (a) detect smaller effects; (b) explicitly model individual differences in subjects' responses to the two classes of moral judgments; and (c) model between-study variance. Experiment 6 was a high-powered pre-registered replication using a morality questionnaire with additional items for measuring subjects' moral judgments regarding 14 new violations of conventional sexual and cooperative morality (for a total of 35). We also tested whether differing responses to the two classes of moral violations might be caused by systematic differences in their legality (Finke & Adamczyk, 2008).

Experiments 1-5 (Meta-Analysis)

Subjects

Subjects (n = 2,265) were college students who were granted course credit for their participation and online Amazon's Mechanical Turk (MTurk) workers who were paid for their time. Experiment 1 subjects were 334 undergraduates who completed the study on laboratory computers and we excluded data from students who were not native English speakers. For Experiment 2 we replicated Experiment 1 using an online sample of 803 MTurk workers. For Experiment 3, we used a new experimental design and subjects were 553 MTurk workers. In Experiments 4 and 5 we replicated Experiments 1 and 2 in additional online samples of 341 MTurk workers (Experiment 4) and 234 undergraduates (Experiment 5). We excluded data from subjects in Experiments 1-5 who were suspicious of our manipulation (i.e., if they mentioned words such as "prime," "control," or "experimental condition,") and who finished below the 5th percentile or above the 95th percentile of time to complete the survey for Experiments 2 (n = 106), 3 (n = 97), 4 (n = 110), and 5 (n = 159). Our resultant sample consisted of 1,648 subjects ranging from age 17 to 81 (M = 32.46, SD = 12.52; age data is based on 1,390 subjects, as age data was missing for some subjects). These experiments were approved by the University of Miami's Institutional Review Board

(Protocol Numbers: 20130674 & 20171102; Title: "Religion & Sexual Morality") and informed consent was obtained from all subjects online or by Collaborative Institutional Training Initiative (CITI)-certified researchers.

Measures

The religiosity questionnaire (see Supplementary Information) comprised items pertaining to subjects' religious commitment and belief in God (e.g., "How much do you believe in God?"). Items were endorsed on five-point scale (1 = Not at all; 5 = Completely). The morality questionnaire (see Supplementary Information) comprised Likert-type items assessing the extent to which subjects thought certain amoral cooperative (e.g., "Cheating on taxes") and sexual (e.g., "Using birth control") acts could be justified. Twelve items that measured subjects' avowals of cooperative morality were taken from Atkinson and Bourrat's list of 14 moral transgressions (Atkinson & Bourrat, 2011). The other two items ("Married men/women having an affair" and "Sex under the legal age of consent") from Atkinson and Bourrat's list were deemed by the authors to reflect sexual, rather than cooperative transgressions, so these two items were added to a list of seven items from Weeden, Cohen, and Kenrick (2008) to measure subjects' avowals of sexual morality. Items were endorsed on seven-point scale (1 = Can *never* be justified; 7 = Can *always* be justified). The religiosity, cooperative morality, and sexual morality scales evinced high internal consistency reliability in Experiments 1, (αs = 0.92, 0.82, 0.75), 2 (αs = 0.95, 0.87, 0.84), 3 (αs = 0.95, 0.85, 0.85), 4 (αs = 0.97, 0.82, 0.86), and 5 (αs = 0.90, 0.86, 0.74). See Supplementary Information for additional analyses using data from Experiments 1, 2, 4, and 5, which included additional measures not discussed here.

Do the cooperative morality items reflect a single underlying factor in Experiments 1-5?

For all experiments, we presented subjects with moral infractions that maximized the contrast between cooperative and sexual concerns. One implicit consequence of this approach is that all cooperative moral violations in our multilevel model are treated as indicators of a single underlying latent variable (Curran, 2003). The structure of prosocial morality is hotly debated, with some researchers claiming that cooperative morality should be treated as a single domain spanning harm to care (Gray, 2017), and others arguing that cooperative morality is multidimensional, reflecting motivations such as in-group loyalty, kin-based altruism, and obedience to authority (Curry, 2018; Graham et al., 2013). If subjects' responses to the cooperative morality items are caused by multiple underlying latent variables, then the responses would not be valid indicators of cooperative morality (Borsboom, Mellenbergh, & Van Heerden, 2003). We therefore sought additional statistical evidence that subject' responses to the cooperative moral items reflected a single underlying dimension.

To do so, we fit the 12 cooperative morality item responses to a unidimensional confirmatory factor model. To account for the ordinal structure of the data, the model was estimated using diagonally weighted least squares (DWLS). To account for the non-normality of the indicators, we applied a Satorra-Bentler χ^2 correction (Satorra & Bentler, 2001). The resultant model had acceptable fit according to conventional fit criteria, *Satorra-Bentler* $\chi^2(54) = 620.634$, $p < .001$; *Robust CFI* = 0.990; *Robust RMSEA* = 0.057, *90% CI* = [0.053, 0.061]; *SRMR* = 0.045, providing evidence that a single factor underlies responses to the cooperative morality items.

Are cooperative and sexual morality distinguishable from one another in Experiments 1-5?

Although cooperative and sexual morality items appear to be distinct from each other, it was unclear whether they truly represented distinct constructs. Indeed, composites formed

from the cooperative and sexual morality scales were moderately correlated with one another, $r(1,647) = .31$, $p < .001$[1]. Although this moderate correlation would suggest that the two underlying constructs are related but distinct, we sought to obtain stronger statistical evidence. We did so by comparing two confirmatory factor analysis models: A unidimensional model in which all 21 morality items loaded onto a single factor, and a two-factor model in which the 12 cooperative morality items loaded onto one factor while the 9 sexual morality items loaded onto a second factor. Model estimation was conducted using diagonally weighted least squares (DWLS), and non-normality of the indicators was accounted for by applying a *Satorra-Bentler* χ^2 correction. Because the unidimensional and two-factor models were nested (i.e., the only difference between the models is the latent between-factors correlation estimated in the two-factor model), we were able to directly compare the models using an ANOVA test. Results of the ANOVA test indicated that the two-factor model had substantially better fit than the unidimensional model, $\chi^2(1) = 1066$, $p < .001$. We concluded from the results of these factor analyses that cooperative and sexual morality are discrete, but correlated, latent variables.

Religious Salience Manipulations

For Experiment 1, we manipulated religious salience by randomly assigning subjects to complete the religiosity questionnaire before the morality questionnaire or the morality questionnaire followed by the religiosity questionnaire as in Sheikh, Ginges, Coman, and Atran's Study 2 (Sheikh et al., 2012). In Experiments 2, 4, and 5, we manipulated religious salience using the same method as in Experiment 1 with a slight modification: We included an unrelated physical fitness and health questionnaire to counterbalance the assignment of

1 Due to missing data for some of the item responses, the number of subjects included in the correlation analysis was slightly smaller than the total number of subjects included in other analyses from Studies 1-5.

religious and morality questionnaires. Subjects either completed the religiosity questionnaire first, followed by the morality questionnaire, followed by the health questionnaire (religion-salient condition) or the health questionnaire first, the morality questionnaire second, and the religiosity questionnaire third (control condition). For Experiment 3, we manipulated religious salience using a writing task designed to activate religious cognition. Subjects were randomly assigned to write for five minutes about either (a) their religion and god (religion-salient condition) or (b) their country and culture; or objects in their home (control conditions; see Supplementary Information).

Analyses

Using a random effects meta-analytic model in the *lme4* function of R (Bates et al., 2014), our data conformed to a three-level multi-level model in which 21 item responses to our morality questionnaire are nested within subjects, nested within five experiments. Level 1 variables included the content coding of the morality items (-0.5 = cooperative; 0.5 = sexual). Level 2 variables included subjects' treatment condition for the religious salience manipulation (-0.5 = control condition; 0.5 = religion-salient condition), individual differences in religiosity, and the two-, and three-way interactions between variables. Religiosity was grand-mean centered. The Level 3 variable included the experiment from which subjects' data originated (n = 5). Interested readers may access the data, associated code, and materials online via Open Science Framework (https://osf.io/egcaj). Zero-order correlations between subject's responses to all 21 moral items are shown in Table 1.

Results

Table 2 displays the results of a three-level random effects analysis for Experiments 1-5. The large effect for moral domain (γ_{100} = 1.99, $t(1,642) = 76.86$, $p < .001$) indicated that

cooperative-moral violations (M = 2.25, SD = 1.45) were considered less justifiable than were sexual-moral violations (M = 4.23, SD = 2.23).

Prediction (a): *Do religious people condemn moral infractions more harshly than less religious people?* Yes (Table 2). Replicating previous results (Weeden & Kurzban, 2013), religious subjects rated the 21 transgressions as less justifiable on average than did less religious subjects (γ_{020} = -0.34, t(1,642) = -24.58, p < .001). The main effect of religiosity was the largest effect observed in Experiments 1-5.

Prediction (b): *Do people reminded of their religious identities condemn moral infractions more harshly in general?* No. The religious identity manipulation did not affect the average subject's judgments of the justifiability of the 21 transgressions (γ_{010} = -0.01, t(1,640) = -0.41, p = .683).

Prediction (c): *Does the effect of activating people's religious identities influence the moral judgments of religious people more strongly than those of less religious people?* No. The interaction of religiosity with the experimental manipulation of religious identity was not significant (γ_{030} = -0.05, t(1,639) = -1.91, p = .056), but see prediction (f), below.

Prediction (d): *Do religious people more strongly condemn breaches of sexual morality or cooperative morality in particular?* Sexual morality. A two-way interaction of religiosity and moral domain indicated that even after controlling highly religious subjects' tendency to rate all moral violations as less justifiable, they rated sexual moral violations as especially unjustifiable (γ_{120} = -0.48, t(1,642) = -22.93, p < .001).

Prediction (e): *Does activating people's religious identities cause them to more strongly condemn breaches of sexual morality or cooperative morality?* Neither. The non-significant interaction of experimental condition and moral domain (γ_{110} = 0.03, t(1,642) =

0.59, $p = .556$) indicated that subjects whose religious identities had been made salient were no more or less likely to condemn violations of sexual morality or cooperative morality.

Prediction (f): *Does activating people's religious identities exert a particularly strong influence on religious people's endorsements of sexual morality or cooperative morality?* Sexual morality (Figure 1). A significant three-way interaction of religiosity, the religious salience manipulation, and moral domain revealed that the effect of the religious salience manipulation in reducing the perceived justifiability of the sexual morality violations in particular was especially pronounced among more religious subjects ($\gamma_{130} = -0.10$, $t(1,642) = -2.30$, $p = .022$). Though the interaction among religiosity, the religious salience manipulation, and moral domain was smaller than the two-way interaction between religiosity and moral domain, the three-way-interaction indicates that our experimental manipulation succeeded in amplifying the sex premium among religious individuals. Re-running the model with dummy codes for the religious salience manipulation and moral domain allowed us to probe this three-way interaction. For sexual morality items, there was a significant interaction between religiosity and the religious salience manipulation, such that religious people rated items as less justifiable in the religion-salient condition than in the control condition ($\gamma_{030} = 0.10$, $t(1,634) = 2.79$, $p = .005$). In contrast, the same two-way interaction was not significant for the cooperative items ($\gamma_{030} = 0.005$, $t(1,637) = 0.151$, $p = .880$), indicating that religious people did not rate these items differently in the religion-salient condition than in the control condition.

Experiment 6 (Pre-Registered Replication)

Subjects

Based on Experiments 1-5, to detect an expected effect of $f^2 = 0.004878$ with 90% power, Experiment 6 required 2,156 subjects. We aimed to terminate data collection when the

sample of valid responses reached 2,200. Subjects (n = 2,952) were recruited from MTurk and paid for their time. We excluded subjects according to pre-registered criteria in a sequence beginning with (a) subjects who responded more than once (we retained their first response; n = 328), (b) subjects who did not complete the study in MTurk (i.e., they did not enter a validation code in MTurk and were not paid; n = 270), (c) subjects who were suspicious of our hypothesis (i.e., they mentioned words such as "prime," "control," or "experimental condition;" n = 18), and finally (d) subjects who finished below the 5th percentile or above the 95th percentile of time to complete the survey (n = 119). Median time to complete the study was 11.03 minutes. Our final sample consisted of n = 2,217 subjects ranging from age 18 to 82 (M = 37.28; SD = 11.67).

We conducted an intent-to-treat analysis that included all unique subjects (n = 2,624) to determine whether the exclusions enumerated above influenced our final results. The results of the intent-to-treat analysis were nearly identical to the analysis conducted on our final sample, and did not meaningfully influence our results (see Supplementary Information). This experiment was approved by the University of Miami's Institutional Review Board (Protocol Numbers: 20130674 & 20171102; Title: "Religion & Sexual Morality") and informed consent was obtained from all subjects online.

Measures

We administered the religiosity and the morality items used in Experiments 1-5. In addition, because we wanted also to ascertain whether the sex premium that we identified in Experiments 1-5 was due to differences in the legality of the sexual behaviors (most of which did not involve breaking a law) and the cooperative ones (most of which did involve breaking a law), we added several new morality questionnaire items (see Supplementary Information).

In Experiment 6, the religiosity, cooperative morality, and sexual morality scales evinced high internal consistency reliability (αs = 0.96, 0.91, 0.88).

Do cooperative morality items reflect a single underlying factor in Experiment 6?

In addition to the 12 cooperative morality items used in Studies 1-5, Experiment 6 included 7 new items measuring cooperative morality. We therefore examined the factor structure of the 19 cooperative morality items to determine whether a unidimensional model of cooperative morality was still a reasonable fit for the data. As in Experiments 1-5, the unidimensional model of cooperative morality items exhibited acceptable fit, *Satorra-Bentler* $\chi^2(152) = 3715.066$, $p < .001$; *Robust CFI* = 0.973; *Robust RMSEA* = 0.069, *90% CI* = [0.067, 0.071]; *SRMR* = 0.055.

Are cooperative and sexual morality distinguishable from one another in Experiment 6?

Next, we examined whether cooperative and sexual morality remained statistically distinct from one another when using the expanded set of items. As in Experiments 1-5, composites of the two scales were significantly correlated with one another, $r(2,215) = 0.48$, $p < .001$. We compared a unidimensional confirmatory factor analysis model in which all 35 items loaded on a single factor to a two-factor model in which the 19 cooperative morality items loaded onto one factor, and the 16 sexual morality items loaded onto a second factor. An ANOVA test revealed that the two-factor model had much better model fit than the unidimensional model, $\chi^2(1) = 1504.6$, $p < .001$.

Religious Salience Manipulation

To manipulate religious salience, subjects either completed the religiosity questionnaire first, followed by the expanded morality questionnaire, followed by the health questionnaire (religion-salient condition; n = 1,086) or the health questionnaire first, the expanded morality questionnaire second, and the religiosity questionnaire third (control

condition; n = 1,131). The difference in the number of subjects assigned to each condition was not significant, $\chi^2(1) = 0.91$, $p = .34$.

Analyses

Our data conformed to a two-level multi-level model in which 35 item responses to our expanded morality questionnaire were nested within subjects. Level 1 variables included the content coding of the morality items (-0.5 = cooperative; 0.5 = sexual) and their legality (-0.5 = legal; 0.5 = illegal). Level 2 variables included subjects' treatment condition for the religious salience manipulation (-0.5 = control condition; 0.5 = religion-salient condition), individual differences in religiosity, and the two- and three-way interactions among variables. Interested readers may access the data, associated code, and materials online via Open Science Framework (https://osf.io/egcaj). Correlations between the responses of all moral items in Experiment 6 are shown in Table 3.

Results

Table 4 displays the results of a two-level random effects analysis for the pre-registered replication. The large effect for moral domain ($\gamma_{10} = 0.97$, $t(2,307) = 59.71$, $p < .001$) indicated that cooperative-moral violations ($M = 2.01$; $SD = 1.39$) were considered less justifiable than were sexual-moral violations ($M = 3.06$; $SD = 2.26$).

Prediction (a): *Do religious people condemn moral infractions more harshly than less religious people?* Yes. As in Experiments 1-5, religious subjects rated all 35 behaviors as less justifiable on average than did less religious subjects ($\gamma_{02} = -0.21$, $t(2,213) = -18.91$, $p < .001$).

Prediction (b): *Do people reminded of their religious identities condemn moral infractions more harshly in general?* No. As in Experiments 1-5, the religious identity manipulation did not affect the typical subject's judgments of the justifiability of the 35 moral infractions ($\gamma_{01} = 0.03$, $t(2,213) = 0.83$, $p = .408$).

Prediction (c): *Does the effect of activating people's religious identities influence the moral judgments of religious people more strongly than those of less religious people?* No. As in Experiments 1-5, the interaction of religiosity with the religious identity manipulation was not significant (γ_{03} = -0.04, t(2,213) = -1.64, p = .101).

Prediction (d): *Do religious people more strongly condemn breaches of sexual morality or cooperative morality in particular?* Sexual morality. As in Experiments 1-5, a significant two-way interaction of religiosity and moral domain indicated that after controlling for highly religious subjects' tendency to rate all 35 moral violations as less justifiable, they rated sexual moral violations as especially unjustifiable (γ_{12} = -0.35, t(2,307) = -28.38, p < .001). The interaction between religiosity and moral domain was the largest effect observed in Experiment 6.

Prediction (e): *Does activation of people's religious identities cause them to more strongly condemn breaches of sexual morality or cooperative morality?* Sexual morality. Unlike in Experiments 1-5, the cross-level interaction of experimental condition and moral domain was significant (γ_{11} = -0.09, t(2,307) = -2.63, p = .009), indicating that subjects whose religious identities had been made salient—irrespectively of how religious they were—were more likely to condemn violations of sexual morality than cooperative morality.

Prediction (f): *Does activation of people's religious identities exert a particularly strong influence on religious people's endorsements of sexual morality or cooperative morality?* Sexual morality (Figure 2). As in Experiments 1-5, a significant three-way interaction of religiosity, the religious salience manipulation, and moral domain indicated that the effect of the religious salience manipulation in reducing the justifiability of the sexual morality violations was especially pronounced among highly religious subjects (γ_{13} = -0.07, t(2,307) = -2.72, p = .007). As in Experiments 1-5, the three-way interaction was smaller than

the two-way interaction between religiosity and moral domain, but was robust. Re-running the model with dummy codes for the religious salience manipulation and moral domain allowed us to probe this three-way interaction, which revealed the same pattern of results as in Experiments 1-5: For the sexual morality items, there was a significant interaction between religiosity and the religious salience manipulation, such that religious people rated the sexual behaviors as more justifiable in the control condition than in the religion-salient condition (γ_{03} = 0.07, t(2,218) = 2.69, p = .007). In contrast, the same interaction was not significant for the cooperative items (γ_{03} = 0.004, t(2,223) = 0.158, p = .874), indicating that the religious salience manipulation did not differentially affect religious people's ratings of cooperative behaviors.

The effects reported above obtained even when controlling for the legality of the 35 behaviors, and the interactions of their legality with the other terms in the model (see Table 4 for results pertaining to legality). Thus, the sex premium in religiously motivated moral judgments was not due to differences in the legality of the sexual and cooperative moral acts (Burris & Jackson, 2000). An intent-to-treat analysis produced results that were nearly identical to the results in our primary analysis, with no meaningful differences in results.

Discussion

The world's major religions have long concerned themselves with social solidarity and regard for others' welfare, plausibly in the service of economic growth and success in between-group competition (Norenzayan et al., 2016) or as a result of other broad cultural changes (Sanderson, 2018). However, religious beliefs and rituals have been put to other uses as well. For example, people have used religious cultural artifacts (e.g., scriptures and justifications) to inculcate conservative attitudes toward sex, mating, and childrearing for centuries, if not millennia (Endsjø, 2012; Reynolds & Tanner, 1995; Strassmann et al., 2012).

Additionally, recent correlational work has documented that religiosity is more strongly related to conservative moral stances toward sexual and reproductive issues than toward moral issues that concern lying, cheating, and stealing (Weeden, Cohen, & Kenrick, 2008; Weeden & Kurzban, 2013). Additionally, two major psychological theories of morality hint at the possibility that religion is more intimately involved with moralization in the domain of sex and reproduction than in the domain of cooperation (Graham et al., 2011; Rai & Fiske, 2015). For these reasons, we sought here to experimentally evaluate what we have called the sex premium in religiously motivated moral judgment.

The main contribution of the present work was our discovery (in six experiments involving 3,865 subjects) that the sex premium in religiously motivated moral judgments is a causal phenomenon: When religious people are encouraged to reflect on their religious identities, they become harsher moralists about breaches of conventional sexuality and reproductive issues, but not about breaches of prosocial morality. Although the effect of our experimental manipulations of religious salience was small relative to the large effect of religiosity, our replication effort demonstrated that the causal effect is robust. It may be that the small effect size reflects the subtlety of our manipulation; had we used a more overt prime of religious cognition, we might have observed a more pronounced effect (although more overt religious manipulations might also be subject to experiment demand; Billingsley et al., 2018). The effects of religious identity on people's judgments of morality could not be attributed to differences in the legality of these two moral domains. Conservative stances toward sex and reproduction, our results show, are quite close to the core of what it means to be a religious person.

How is the sex premium in religiously motivated moral judgment activated, promoted, maintained? We see three plausible pathways. First, society's vectors for religious

cultural learning may simply devote more attention to sex and reproduction than to prosociality when they seek to influence others' moral stances. Conservative preachers, for instance, devote more time to issues of sexual purity than do liberal preachers (Graham, Haidt, & Nosek, 2009), and religious parents discuss the morality of sex with their children more frequently than do less religious parents, even though they discuss sex with their children less frequently overall (Regnerus, 2005). Second, strong emotions facilitate cultural learning (Sperber, 2006) by improving attention, memory, and motivation. If the emotions that regulate sexual attraction, arousal, and avoidance (e.g., sexual disgust) are stronger than those that regulate prosocial behavior (e.g., empathy; moralistic anger), then the sex premium documented here may emerge from the fact that religiously motivated sexual moralists can create more powerful cultural learning experiences than prosocial moralists can. Finally, given the extreme importance of sex and reproduction to fitness, the children of religiously adherent adults may observe that violations of local sexual standards evoke greater moral outrage and condemnation from third parties than do violations of local standards for prosocial behavior. Each of these potential pathways merits further inquiry.

The generalizability of our conclusions might be limited by three factors. First, we relied on samples of subjects (students and online workers) who were mostly from the United States. Although the link between religion and conservative sexual morality has been documented across diverse cultures (e.g., Weeden & Kurzban, 2013), the relationship likely depends as well on the local ecological problems that religion helps to solve: After all, cultural systems function in part to solve the challenges that people face in their daily lives (Yamagishi, 2011) and religion itself can be conceptualized as a kind of cultural system (Cohen & Varnum, 2016). It would not be surprising, therefore, to find that the sex premium in religious moral judgment is less pronounced in societies (for example) with high mean

levels of religiosity (Stavrova & Siegers, 2014), or with low levels of gender equality (Schnabel, 2016), or with low levels of economic development (Jung, 2016). Societies with these characteristics are likely to have social institutions in place that deter promiscuous sex (e.g., laws)—just as countries with lower mean levels of religiosity, higher levels of gender equality, and higher levels of economic development are likely to have social institutions in place that deter aggression, cheating, and dishonesty. More generally, future research should seek to replicate the results reported in the present paper in non-WEIRD populations (Henrich, Heine, & Norenzayan, 2010).

Second, the measures of cooperative morality that we used here may not perfectly reflect the domains of social life that religion is best at moralizing. Moral Foundations Theory (Graham & Haidt, 2011) and Relationship Regulation Theory (Rai & Fiske, 2011) both posit that religion is particularly good at moralizing group cohesion and respect for authority, irrespective of its tendency to moralize prosociality and cooperation. For this reason, future work should examine whether religious moralization in the sexual domain also outstrips religious moralization in the domains of in-group loyalty and respect for authority, just as it apparently outstrips moralization in the domain of prosociality (as measured here).

Third, our conclusions might be limited by the generalizability of our manipulations of religious identity (self-report religiosity surveys and short essays on the meaning of religion). Activations of religious cognition such as these represent only a limited range of the means by which people's religious identities might become active in daily life. Different results might have emerged had we used other common approaches to manipulating religious cognition, such as priming subjects with cues to a punishing god (e.g., McKay et al., 2011). More generally, varying the experimental stimuli used to test the relationship between

religion and morality would be a royal road to enhancing the validity of research into the foundations of religious moral cognition (Kenny, 2019).

For millennia, religion has powerfully shaped humans' judgments of right and wrong. In the contemporary world, religion encourages people to specialize in resolving moral dilemmas by consulting the behavioral guidance that their religious texts, traditions, and teachers have provided. Religion's effects on people's moral convictions about sex and reproduction in particular, our research shows, are strong, perhaps because people in authority have for many centuries taken advantage of religious cultural artefacts to make their worlds more conducive to their own preferred approaches to sex and reproduction. Thus, it is perhaps little wonder that issues of sex and reproduction remain some of the strongest culture war issues we face today.

References

Akerlof, G. A., & Kranton, R. E. (2000). Economics and identity. *Quarterly Journal of Economics*, *115*(3), 715–753. https://doi.org/10.1162/003355300554881

Alexander, R. D. (1987). *The biology of moral systems*. New York: Aline de Gruyter.

Atkinson, Q. D., & Bourrat, P. (2011). Beliefs about God, the afterlife and morality support the role of supernatural policing in human cooperation. *Evolution and Human Behavior*, *32*(1), 41–49. https://doi.org/10.1016/j.evolhumbehav.2010.07.008

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2014). *Fitting Linear Mixed-Effects Models using lme4*. http://arxiv.org/abs/1406.5823.

Batson, C. D., Schoenrade, P., & Ventis, W. L. (1993). *Religion and the individual: A social-psychological perspective*. Oxford University Press.

Benjamin, D. J., Choi, J. J., & Strickland, A. J. (2010). Social identity and preferences. *American Economic Review*, *100*(4), 1913–1928. https://doi.org/10.1257/aer.100.4.1913.

Billingsley, J., Gomes, C. M., & McCullough, M. E. (2018). Implicit and explicit influences of religious cognition on Dictator Game transfers. *Royal Society open science*, *5*(8), 170238.

Borsboom, D., Mellenbergh, G. J., & Van Heerden, J. (2003). The theoretical status of latent variables. *Psychological review*, *110*(2), 203.

Bulbulia, J., Osborne, D., & Sibley, C. G. (2013). Moral foundations predict religious orientations in New Zealand. *PLoS One, 8*(12), e80224.

Burris, C. T., & Jackson, L. M. (2000). Social identity and the true believer: Responses to threatened self-stereotypes among the intrinsically religious. *British Journal of Social Psychology*, *39*(2), 257–278. https://doi.org/10.1348/014466600164462

Buunk, A. P., Park, J. H., & Dubbs, S. L. (2008). Parent-Offspring Conflict in Mate

Preferences. *Review of General Psychology*, *12*(1), 47–62. https://doi.org/10.1037/1089-2680.12.1.47

Cohen, A. B., & Varnum, M. E. (2016). Beyond East vs. West: Social class, region, and religion as forms of culture. *Current Opinion in Psychology*, *8*, 5-9.

Cohn, A, Maréchal, M. A., & Noll, T. (2015). Bad boys: How criminal identity salience affects rule violation. *The Review of Economic Studies*, *82*(4), 1289–1308.

Cohn, A., Fehr, E., & Maréchal, M. A. (2014). Business culture and dishonesty in the banking industry. *Nature*, *516*(7529), 86–89. https://doi.org/10.1038/nature13977

Curran, P. J. (2003). Have multilevel models been structural equation models all along?. *Multivariate Behavioral Research*, *38*(4), 529-569.

Curry, O. S., Mullins, D., A., & Whitehouse, H. (2019). Is it good to cooperate? Testing the theory of morality-as-cooperation in 60 societies. *Current Anthropology, 60*.

Deak, C., & Saroglou, V. (2015). Opposing abortion, gay adoption, euthanasia, and suicide: Compassionate openness or self-centered moral rigorism?. *Archive for the Psychology of Religion*, *37*(3), 267-294.

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: a new look at an old issue. *Psychological methods, 12*(2), 121.

Endsjø, D. Ø. (2012). *Sex and Religion: Teachings and Taboos in the History of World Faiths*. London: Reaktion Books.

Finke, R., & Adamczyk, A. (2008). Cross-national moral beliefs: The influence of national religious context. *The Sociological Quarterly*, *49*(4), 617–652. https://doi.org/10.1016/j.asieco.2008.09.006.EAST

Gelman, A., & Su, Y.S. (2018). *arm: Data Analysis Using Regression and Multilevel/Hierarchical Models*. R package version 1.10-1. https://CRAN.R-project.org/

package=arm.

Gomes, C. M., & McCullough, M. E. (2015). The effects of implicit religious primes on dictator game allocations: A preregistered replication experiment. *Journal of Experimental Psychology: General*, *144*(6), e94–e104. https://doi.org/10.1037/xge0000027

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral foundations theory: The pragmatic validity of moral pluralism. In *Advances in experimental social psychology* (Vol. 47, pp. 55-130). Academic Press.

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and Conservatives Rely on Different Sets of Moral Foundations. *Journal of Personality and Social Psychology*, *96*(5), 1029–1046. https://doi.org/10.1037/a0015141

Graham, J, Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology*, *101*(2), 366–385. https://doi.org/10.1037/a0021847.

Gray, K., Waytz, A., & Young, L. (2012). The moral dyad: A fundamental template unifying moral judgment. *Psychological Inquiry, 23*, 206-215.

Haggard, M. C., Kaelen, R., Saroglou, V., Klein, O., & Rowatt, W. C. (2018). Religion's role in the illusion of gender equality: Supraliminal and subliminal religious priming increases benevolent sexism. *Psychology of Religion and Spirituality*. https://doi.org/10.1037/rel0000196

Harrison, B. F., & Michelson, M. R. (2015). God and marriage: The impact of religious identity priming on attitudes toward same-sex marriage. *Social Science Quarterly*, *96*(5), 1411-1423.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the

world?. *Behavioral and brain sciences*, *33*(2-3), 61-83.

Hox, J. J., Moerbeek, M., & Van de Schoot, R. (2010). *Multilevel analysis: Techniques and applications*. Routledge.

Johnson, K. A., Hook, J. N., Davis, D. E., Van Tongeren, D. R., Sandage, S. J., & Crabtree, S. A. (2016). Moral foundation priorities reflect U.S. Christians' individual differences in religiosity. *Personality and Individual Differences*, *100*, 56–61. https://doi.org/10.1016/j.paid.2015.12.037

Jung, J. H. (2016). A cross-national analysis of religion and attitudes toward premarital sex: Do economic contexts matter?. *Sociological Perspectives*, *59*(4), 798-817.

Kenny, D. A. (2019). Enhancing validity in psychological research. American Psychologist, 74(9), 1018.

Koleva, S. P., Graham, J., Iyer, R., Ditto, P. H., & Haidt, J. (2012). Tracing the threads: How five moral concerns (especially Purity) help explain culture war attitudes. *Journal of Research in Personality*, *46*(2), 184–194. https://doi.org/10.1016/j.jrp.2012.01.006

Lang, M., Purzycki, B. G., Apicella, C. L., Atkinson, Q. D., Bolyanatz, A., Cohen, E., … Henrich, J. (2019). Moralizing gods, impartiality and religious parochialism across 15 societies. *Proceedings of the Royal Society B: Biological Sciences*, *286*(1898), 20190202. https://doi.org/10.1098/rspb.2019.0202

McKay, R., Efferson, C., Whitehouse, H., & Fehr, E. (2011). Wrath of God: Religious primes and punishment. *Proceedings of the Royal Society B: Biological Sciences*, *278*(1713), 1858-1863.

McKay, R., & Whitehouse, H. (2015). Religion and morality. *Psychological Bulletin, 141*, 447-473.

Moon, J. W., Krems, J. A., Cohen, A. B., & Kendrick, D. (2019). Is nothing sacred? Religion,

sex, and reproductive strategies. *Current Directions in Psychological Science*. https://doi.org/10.1177/0963721419838242

Norenzayan, A., Shariff, A. F., Gervais, W. M., Willard, A. K., McNamara, R. A., Slingerland, E., & Henrich, J. (2016). The cultural evolution of prosocial religions. *Behavioral and Brain Sciences*, *39*, 1–65. https://doi.org/10.1017/S0140525X14001356

Pew Research Center. (2014). *Worldwide, many see belief in God as essential to morality: Richer nations are exception*. Retrieved from http://www.pewglobal.org/files/2014/03/Pew-Research-Center-Global-Attitudes-Project-Belief-in-God-Report-FINAL-March-13-2014.pdf

Rai, T. S., & Fiske, A. P. (2011). Moral psychology is relationship regulation: Moral motives for unity, hierarchy, equality, and proportionality. *Psychological Review, 118*(1), 57-75.

Randolph-Seng, B., & Nielsen, M. E. (2007). Honesty: One effect of primed religious representations. *International Journal for the Psychology of Religion*, *17*(4), 303–315. https://doi.org/10.1080/10508610701572812

Regnerus, M. D. (2005). Talking about sex: Religion and Patterns of parent-child communication about sex and contraception. *The Sociological Quarterly*, *46*(1), 79–105.

Reynolds, V., & Tanner, R. (1995). *The social ecology of religion*. York: Oxford University Press.

Rigo, C., & Saroglou, V. (2018). Religiosity and Sexual Behavior: Tense Relationships and Underlying Affects and Cognitions in Samples of Christian and Muslim Traditions. *Archive for the Psychology of Religion*, *40*(2–3), 176–201. https://doi.org/https://doi.org/10.1163/15736121-12341359

Sanderson, S. K. (2018). *Religious evolution and the axial age: From shamans to priests to prophets*. London: Bloomsbury Publishing.

Saroglou, V., Pichon, I., Trompette, L., Verschueren, M., & Dernetli, R. (2005). Prosocial behavior and religion: New evidence based on projective measures and peer ratings. *Journal for the Scientific Study of Religion*, *44*(3), 323–348.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, *66*(4), 507-514.

Scheidel, W. (2009). Sex and empire: A Darwinian perspective. In I. Morris & W. Scheidel (Eds.), *The dynamics of ancient empires: State power from Assyria to Byzantium* (pp. 255–324). New York: Oxford University Press.

Schein, C., & Gray, K. (2018). The theory of dyadic morality: Reinventing moral judgment by redefining harm. *Personality and Social Psychology Review, 22*, 32-70.

Schmitt, D. P., & Fuller, R. C. (2015). On the varieties of sexual experience: Cross-cultural links between religiosity and human mating strategies. *Psychology of Religion and Spirituality*, *7*(4), 314–326. https://doi.org/10.1037/rel0000036.

Schnabel, L. (2016). Religion and gender equality worldwide: A country-level analysis. *Social Indicators Research*, *129*(2), 893-907.

Schwitzgebel, E., & Cushman, F. (2012). Expertise in moral reasoning? Order effects on moral judgment in professional philosophers and non-philosophers. *Mind & Language*, *27*(2), 135-153.

Shariff, A. F., Willard, A. K., Andersen, T., & Norenzayan, A. (2016). Religious priming: A meta-analysis with a focus on prosociality. *Personality and Social Psychology Review*, *20*(1), 27–48. https://doi.org/10.1177/1088868314568811

Shaver, J. H. (2017). Why and how do religious individuals, and some religious groups, achieve higher relative fertility? *Religion, Brain and Behavior*, *7*(4), 324–327. https://doi.org/10.1080/2153599X.2016.1249920

Shaver, J. H. (2018). Religious change is driven primarily by individual-level Darwinian processes. *Religion, Brain & Behavior*, *8*(2), 1–6. https://doi.org/10.1080/2153599X.2018.1513858

Shaver, J. H. (2019). Alloparenting and religious fertility: A test of the religious alloparenting hypothesis. *Evolution and Human Behavior*, *8*(6), 639–661. https://doi.org/10.1016/j.evolhumbehav.2019.01.004

Sheikh, H., Ginges, J., Atran, S., Coman, A., & Atran, S. (2012). Religion, group threat and sacred values. *Judgment and Decision Making*, *7*(2), 110–118. Retrieved from http://journal.sjdm.org/12/12305/jdm12305.html

Sperber, D. (2006). Why a deep understanding of cultural evolution is incompatible with shallow psychology. In N. Enfield & S. Levinson (Eds.), *Roots of Human Sociality* (pp. 431–449). Oxford: Berg.

Stavrova, O., & Siegers, P. (2014). Religious prosociality and morality across cultures: How social enforcement of religion shapes the effects of personal religiosity on prosocial and moral attitudes and behaviors. *Personality and Social Psychology Bulletin*, *40*(3), 315-333.

Strassmann, B. I., Kurapati, N. T., Hug, B. F., Burke, E. E., Gillespie, B. W., Karafet, T. M., & Hammer, M. F. (2012). Religion as a means to assure paternity. *Proceedings of the National Academy of Sciences*, *109*(25), 9781–9785. https://doi.org/10.1073/pnas.1110442109

Unsworth, K. L., & Fielding, K. S. (2014). It's political: How the salience of one's political identity changes climate change beliefs and policy support. *Global Environmental Change*, *27*, 131–137. https://doi.org/10.1016/j.gloenvcha.2014.05.002

Weeden, J., Cohen, A. B., & Kenrick, D. T. (2008). Religious attendance as reproductive

support. *Evolution and Human Behavior*, *29*(5), 327-334.

Weeden, J., & Kurzban, R. (2013). What predicts religiosity? A multinational analysis of reproductive and cooperative morals. *Evolution and Human Behavior*, *34*, 440–445. https://doi.org/10.1016/j.evolhumbehav.2013.08.006

White, C. J., Kelly, J. M., Shariff, A. F., & Norenzayan, A. (2019). Supernatural norm enforcement: Thinking about karma and God reduces selfishness among believers. *Journal of Experimental Social Psychology*, *84*, 103797.

Yamagishi, T. (2011). An institutional approach to culture. In X. Wang & Y. Su (Eds.), *Thus spake evolutionary psychologists* (pp. 251-257). Peking University Press.

Scheidel, W. (2009). Sex and empire: A Darwinian perspective. In I. Morris & W. Scheidel (Eds.), *The dynamics of ancient empires: State power from Assyria to Byzantium* (pp. 255–324). New York: Oxford University Press.

Table 1. *Means, standard deviations, and correlations between the 21 morality items in Experiments 1-5. Items 1-12 reflect sexual morality, and 13-21 reflect cooperative morality. Please see Supplementary Information for details.*

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1.	1.91	1.27																				
2.	3.52	1.83	.25																			
3.	4.82	2.02	.19	.43																		
4.	4.92	1.96	.22	.43	.83																	
5.	2.15	1.42	.60	.28	.31	.33																
6.	5.09	2.20	.09	.29	.52	.54	.11															
7.	6.25	1.29	-.04	.16	.40	.42	.04	.46														
8.	4.36	2.13	.16	.31	.51	.55	.22	.60	.45													
9.	5.09	1.57	.13	.23	.38	.43	.19	.48	.42	.53												
10.	1.96	1.30	.32	.17	.04	.07	.31	-.02	-.12	.09	.06											
11.	2.61	1.46	.26	.26	.16	.17	.25	.05	.02	.12	.13	.43										
12.	2.07	1.40	.33	.19	.16	.18	.30	.00	-.05	.10	.11	.45	.46									
13.	1.92	1.24	.32	.25	.13	.14	.27	-.01	-.05	.12	.07	.47	.43	.43								
14.	1.63	1.06	.29	.11	.02	.02	.27	-.05	-.14	.01	-.05	.33	.29	.32	.34							
15.	3.04	1.48	.28	.24	.31	.33	.26	.17	.12	.28	.22	.29	.34	.34	.38	.26						
16.	2.07	1.27	.26	.12	.03	.03	.22	-.10	-.11	.00	-.04	.36	.36	.29	.39	.33	.32					
17.	1.52	1.01	.30	.19	.09	.09	.30	-.04	-.11	.05	.00	.35	.27	.34	.38	.37	.26	.40				
18.	3.45	1.87	.20	.18	.20	.22	.18	.07	.10	.16	.15	.24	.28	.43	.28	.17	.32	.19	.23			
19.	2.49	1.41	.19	.27	.16	.17	.17	.05	.01	.13	.05	.26	.34	.26	.36	.28	.33	.39	.44	.25		
20.	2.11	1.30	.30	.28	.17	.19	.27	.08	-.03	.17	.09	.39	.43	.46	.44	.35	.39	.39	.38	.31	.41	
21.	2.11	1.23	.29	.25	.14	.16	.28	.05	-.02	.14	.06	.37	.40	.36	.38	.32	.38	.44	.36	.28	.35	.48

Table 2. *Coefficients and model fit for the multilevel model in Experiments 1-5.*

Fixed components	*γ [95% CI]*	*SE γ*	*p*
(Intercept)	3.25 [3.09, 3.41]	0.08	<0.001
Moral domain	1.99 [1.94, 2.04]	0.03	<0.001
Religious salience	-0.01 [-0.09, 0.05]	0.03	0.683
Religiosity	-0.34 [-0.37, -0.31]	0.01	<0.001
Religious salience × Religiosity	-0.05 [-0.11, 0.00]	0.03	0.056
Moral domain × Religious salience	0.03 [-0.07, 0.13]	0.05	0.557
Moral domain × Religiosity	-0.48 [-0.52, -0.44]	0.02	<0.001
Moral domain × Religious salience × Religiosity	-0.10 [-0.18, -0.01]	0.04	0.022
Random components	σ^2	*SD* σ^2	*SE* σ^2
Subject intercepts	0.36	0.60	0.31
Moral domain	0.59	0.77	0.52
Study intercepts	0.03	0.18	-
Study 1	-	-	0.04
Study 2	-	-	0.03
Study 3	-	-	0.03
Study 4	-	-	0.04
Study 5	-	-	0.05
Residual	2.61	1.61	-
Intraclass correlations	ρ		
Subject	0.12		
Study	0.01		
Model R^2	R^2		
Cox-Snelling Psudeo-R^2	0.44		

Note. *γ [95% CI]* = Unstandardized coefficients and 95% confidence intervals for fixed effects. *SE γ* = standard errors of fixed effects. *p* = p-values for fixed effects. σ^2 = variance estimates for the random components. *SD* σ^2 = standard deviation of the variances estimates. *SE* σ^2 = standard errors of the variance components. For study intercepts, standard errors are generated for each study. ρ = intraclass correlation coefficient. R^2 = Cox-Snelling Psudeo-R^2 for global model fit. Fixed effects, random effects, and model R^2 were estimated using the *lme4* package, and random effect standard errors were computed using the *arm* package (Gelman and Su, 2018). We omitted *p*-values for the variance components, because these estimates are often incorrect (Hox, Moerbeek, & Van de Schoot, 2010).

Table 3. *Means, standard deviations, and correlations between the 35 morality items in Experiment 6. Items 1-19 reflect sexual morality, and 20-35 reflect cooperative morality. Please see Supplementary Information for details.*

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.
1.	1.74	1.19																																		
2.	2.07	1.43	.61																																	
3.	6.17	1.44	-.02	.05																																
4.	2.60	1.69	.30	.31	.12																															
5.	4.72	2.17	.21	.30	.40	.33																														
6.	4.03	2.19	.19	.26	.42	.31	.54																													
7.	4.85	1.68	.16	.20	.45	.23	.48	.55																												
8.	4.79	2.07	.21	.29	.43	.34	.83	.56	.50																											
9.	4.94	2.30	.12	.19	.50	.28	.58	.65	.55	.60																										
10.	2.54	1.64	.35	.38	.13	.34	.37	.28	.22	.38	.26																									
11.	2.72	1.89	.38	.39	.21	.39	.45	.43	.36	.47	.37	.44																								
12.	1.20	0.79	.41	.34	-.08	.24	.08	.12	.05	.06	.04	.30	.26																							
13.	1.19	0.79	.37	.31	-.07	.24	.07	.10	.05	.09	.03	.29	.29	.71																						
14.	2.04	1.50	.39	.37	.11	.32	.29	.30	.23	.30	.27	.38	.48	.34	.36																					
15.	1.34	0.99	.41	.38	.00	.32	.16	.18	.12	.16	.12	.32	.38	.65	.65	.44																				
16.	2.00	1.38	.36	.35	.10	.31	.28	.28	.21	.28	.25	.51	.43	.39	.38	.44	.41																			
17.	2.05	1.45	.39	.34	.00	.29	.16	.15	.10	.18	.08	.32	.39	.29	.29	.30	.30	.32																		
18.	3.45	1.87	.23	.23	.07	.25	.24	.16	.16	.24	.13	.28	.30	.15	.13	.22	.15	.20	.46																	
19.	1.43	0.97	.42	.34	-.13	.22	.02	.06	-.04	.04	-.04	.23	.19	.46	.42	.24	.36	.29	.37	.22																
20.	2.27	1.34	.32	.30	-.03	.25	.12	.09	.03	.12	.03	.31	.20	.31	.28	.20	.24	.28	.38	.27	.41															
21.	2.22	1.37	.35	.35	-.03	.29	.14	.16	.10	.15	.10	.33	.29	.27	.28	.28	.25	.30	.47	.32	.37	.40														
22.	1.83	1.19	.37	.34	-.09	.21	.04	.01	-.02	.05	-.05	.25	.17	.32	.33	.22	.29	.28	.38	.23	.45	.43	.46													
23.	1.73	1.21	.40	.35	-.09	.29	.08	.12	.04	.09	.06	.30	.25	.39	.36	.30	.37	.33	.51	.29	.45	.36	.48	.47												
24.	1.98	1.32	.40	.38	-.01	.31	.15	.18	.12	.17	.11	.33	.36	.37	.36	.32	.35	.34	.49	.35	.44	.43	.53	.48	.50											
25.	1.99	1.34	.37	.34	-.07	.24	.08	.11	.08	.08	.05	.24	.24	.35	.33	.22	.32	.25	.39	.26	.41	.38	.44	.44	.47	.46										
26.	2.93	1.44	.37	.36	.15	.31	.29	.26	.23	.30	.24	.31	.35	.23	.20	.27	.24	.27	.42	.33	.27	.35	.40	.33	.34	.41	.35									
27.	1.53	1.01	.41	.35	-.13	.22	.04	.08	-.01	.03	.02	.25	.20	.46	.42	.27	.39	.36	.32	.16	.48	.38	.38	.45	.47	.43	.38	.26								
28.	1.77	1.21	.41	.32	-.05	.27	.06	.10	.02	.08	.03	.26	.24	.36	.34	.26	.30	.29	.46	.29	.46	.41	.47	.45	.52	.51	.43	.41	.45							
29.	1.63	1.05	.43	.34	-.07	.25	.06	.08	.01	.06	.02	.31	.24	.42	.41	.30	.36	.35	.40	.23	.48	.49	.45	.51	.47	.50	.44	.36	.48	.50						
30.	1.62	1.05	.41	.36	-.08	.25	.05	.04	-.02	.05	-.01	.32	.22	.42	.40	.27	.38	.34	.37	.20	.46	.46	.40	.49	.45	.45	.45	.34	.46	.49	.77					
31.	1.60	1.03	.43	.37	-.09	.23	.07	.08	.00	.08	.04	.30	.20	.43	.41	.28	.37	.35	.36	.19	.43	.39	.43	.46	.44	.42	.40	.34	.48	.43	.61	.63				
32.	1.67	1.21	.32	.27	-.12	.21	.03	-.03	-.04	.03	-.08	.21	.18	.39	.38	.23	.35	.26	.29	.17	.34	.32	.26	.32	.31	.33	.29	.23	.34	.33	.42	.45	.38			
33.	1.94	1.17	.36	.31	-.06	.20	.04	.05	.02	.04	.00	.27	.17	.34	.32	.24	.30	.32	.34	.20	.37	.42	.45	.51	.40	.42	.39	.30	.41	.41	.58	.57	.54	.39		
34.	2.57	1.70	.24	.23	.07	.24	.19	.17	.15	.20	.13	.24	.30	.22	.24	.24	.25	.27	.25	.17	.21	.20	.25	.28	.20	.26	.17	.21	.20	.18	.25	.23	.24	.23	.29	
35.	1.91	1.21	.33	.29	-.05	.22	.07	.01	.01	.07	-.05	.22	.21	.37	.36	.23	.33	.27	.29	.19	.37	.37	.30	.38	.33	.37	.32	.27	.34	.35	.52	.53	.42	.51	.48	.29

Note. M and SD are used to represent mean and standard deviation, respectively.

Table 4. *Coefficient and model fit for the multilevel model in Experiment 6.*

Fixed components	*γ [95% CI]*	*SE γ*	*p*
(Intercept)	2.57 [2.54, 2.60]	0.02	<0.001
Moral domain	0.97 [0.94, 1.01]	0.02	<0.001
Legality	-1.00 [-1.03, -0.98]	0.01	<0.001
Religious salience	0.03 [-0.03, 0.08]	0.03	0.408
Religiosity	-0.21 [-0.24, -0.19]	0.01	<0.001
Religious salience × Religiosity	-0.04 [-0.08, 0.01]	0.02	0.101
Moral domain × Religious salience	-0.09 [-0.15, -0.02]	0.03	0.009
Moral domain × Religiosity	-0.35 [-0.37, -0.32]	0.01	<0.001
Moral domain × Religious salience × Religiosity	-0.07 [-0.11, -0.02]	0.02	0.007
Legality × Religious salience	0.05 [0.003, 0.10]	0.03	0.037
Legality × Religiosity	0.17 [0.15, 0.19]	0.01	<0.001
Legality × Religious salience × Religiosity	0.05 [0.01, 0.09]	0.02	0.007
Random components	σ^2	*SD* σ^2	*SE* σ^2
Subject intercepts	0.44	0.66	0.25
Moral domain	0.31	0.55	0.35
Legality	0.08	0.28	0.18
Residual	2.43	1.56	-
Intraclass correlations	ρ		
Subject	0.15		
Model R^2	R^2		
Cox-Snelling Psudeo-R^2	0.36		

Note. *γ [95% CI]* = Unstandardized coefficients and 95% confidence intervals for fixed effects. *SE γ* = standard errors of fixed effects. *p* = p-values for fixed effects. σ^2 = variance estimates for the random components. *SD* σ^2 = standard deviation of the variances estimates. *SE* σ^2 = standard errors of the variance components. ρ = intraclass correlation coefficient. R^2 = Cox-Snelling Psudeo-R^2 for global model fit. Fixed effects, random effects, and model R^2 were estimated using the *lme4* package, and random effect standard errors were computed using the *arm* package (Gelman and Su, 2018). We omitted *p*-values for the variance components, because these estimates are often incorrect (Hox, Moerbeek, & Van de Schoot, 2010).

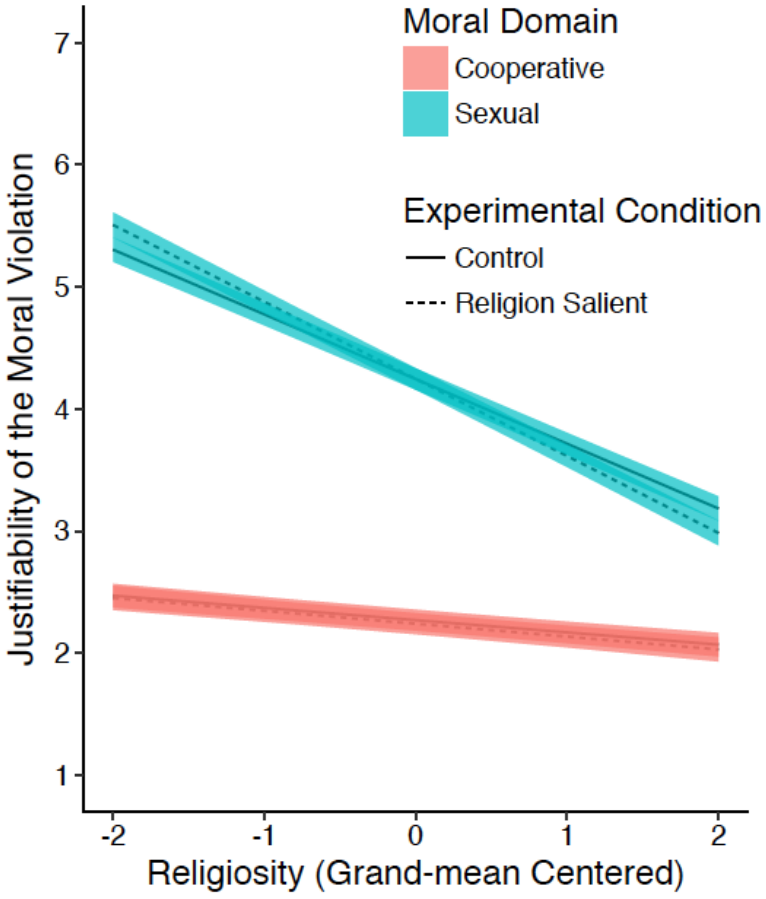

Figure 1. Experiments 1-5: Three-way interaction between religiosity, moral domain, and experimental condition. Standard errors of the parameter estimates are denoted by the width of the lines. Using a random effects model in the *lme4* function of R, our data conformed to a three-level multi-level model in which 21 item responses to our morality questionnaire (items were endorsed on seven-point scale; 1 = Can *never* be justified; 7 = Can *always* be justified) are nested within subjects, nested within five experiments. Level-1 variables included the items' moral domain (-0.5 = cooperative; 0.5 = sexual). Level-2 variables included subjects' treatment condition for the religious salience manipulation (-0.5 = control; 0.5 = religion salient), individual differences in religiosity, and the two-, and three-way interactions among variables. Level-3 variable was the experiment from which subjects' data originated (n = 5). Individual differences in religiosity were grand-mean centered, as grand-mean centering (as opposed to group-mean centered or a raw metric) is an appropriate centering solution for level-2 variables (Enders & Tofighi, 2007).

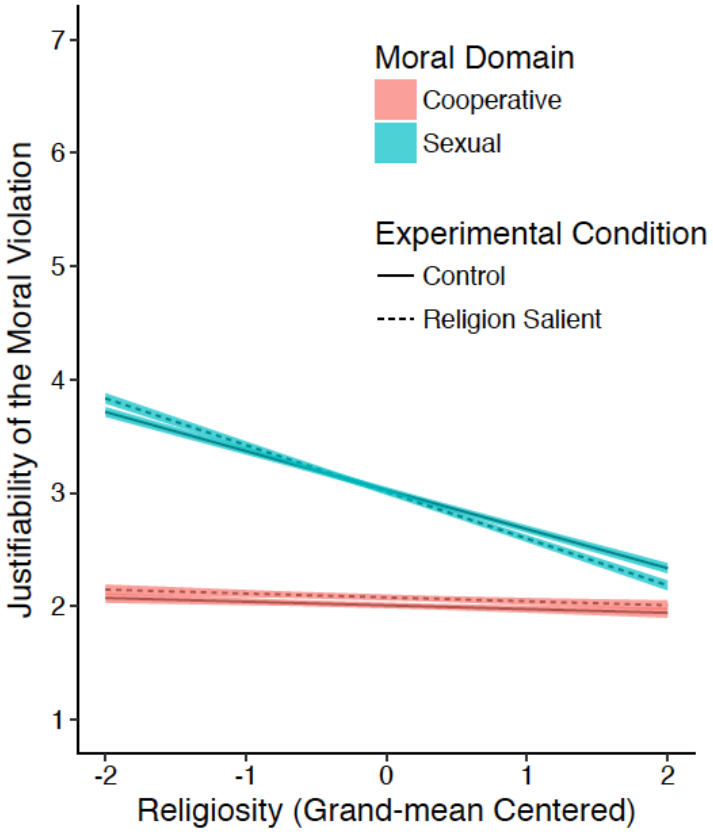

Figure 2. Experiment 6: Three-way interaction between religiosity, moral domain, and experimental condition. Standard errors of the parameters are denoted by the width of the lines. Using a random effects model in the *lme4* function of R, our data conformed to a two-level multi-level model in which 35 item responses to our expanded morality questionnaire (items were endorsed on seven-point scale; 1 = Can *never* be justified; 7 = Can *always* be justified) were nested within subjects. Level-1 variables included the items' moral domain (-0.5 = cooperative; 0.5 = sexual) and their legality (-0.5 = legal; 0.5 = illegal). Level-2 variables included subjects' treatment condition for the religious salience manipulation (-0.5 = control; 0.5 = religion salient), individual differences in religiosity (grand-mean centered), and the two- and three-way interactions among variables.