



Spheres of immanent justice: Sacred violations evoke expectations of cosmic punishment, irrespective of societal punishment[☆]

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ABSTRACT

People like to believe that misdeeds do not escape punishment. However, do people expect that some kinds of sins are particularly punished by “the universe,” not just by society? Five experiments ($N = 1184$) found that people expected more cosmic punishment for transgressions of sacred rules than transgressions of secular rules or conventions (Studies 1–3) and that this “sacred effect” holds even after violations have been punished by society (Study 4a–4b). In Study 1, participants expected more cosmic punishment for a person who had sex with a cousin (sacred taboo) than sex with a subordinate (secular harm) or sex with a family associate (convention violation). In Study 2, people expected more cosmic punishment for eating a bald eagle (sacred violation) than eating an endangered puffin (secular violation) or a farm-raised emu (convention violation). In Study 3, Hindus expected more cosmic punishment for entering a temple wearing shoes (sacred violation) rather than entering a temple wearing revealing clothing (secular violation) or sunglasses (convention violation). In all three studies, this “sacred effect” was mediated by the perceived blasphemy rather than the perceived harm, immorality, or unusualness of the violations. Study 4a measured both expectations of societal and cosmic punishment, and Study 4b measured expectations of cosmic punishment after each violation had received societal punishment. Even after violations received societal punishment, people expected more cosmic punishment for sacred violations than secular or convention violations. Results are discussed in relation to models of immanent justice and just world beliefs.

In the time of the bubonic plague, visitations of the illness to a household were often attributed to suspected sins against nature, such as incest (Nash, 2007). Providentialist tracts of the era recounted cases of blasphemers struck down by random ailments, lightning strikes, runaway carts, or haphazardly placed knives—aleatory misfortunes indicative of divine retribution (Nash, 2007). Associating freak accidents with blasphemous actions no longer passes as a police report, but does it still linger in our fatalistic intuitions?

Research on immanent justice reasoning (Lerner, 1980; Piaget, 1932) finds that people make judgments based on a need to believe in a “just world.” People prefer to hear about wrongdoers who suffered negative consequences than those that escape punishment, retrospectively associate negative outcomes with prior misdeeds (Callan, Sutton, Harvey, & Dawtry, 2014), and expect negative outcomes to follow acts of wrongdoing (Harvey, Callan, Sutton, Foulsham, & Matthews, 2017).

Sometimes these expected negative outcomes are punishment from society, i.e., others' deliberate actions. For example, people may expect that adulterers are more likely to face disapproval from their community than faithful spouses. In other cases, expected negative outcomes are punishment “from the universe,” i.e., misfortunes delivered by aleatory systems (such as the weather or chain reaction collisions), which are often seen as a sign of divine intervention (Callan et al., 2014; Harvey et al., 2017). For example, people may expect that adulterers are more likely to encounter freak accidents or lightning strikes compared to faithful spouses. We call misfortunes delivered by aleatory systems *cosmic punishment*.

In this research, we propose that violations of sacred rules are particularly associated with cosmic punishment. Research on sacred rules, such as the incest taboo, finds that these violations are perceived as blasphemous evoking strong moral outrage even when no people are

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harmed (Tetlock, 2002). We contrast these types of sacred moral violations with secular moral violations, such as acts of unfairness, and with violations of social conventions, which are more surprising than immoral. We hypothesize that people expect more cosmic punishment for sacred violations than secular or convention violations, that this sacred effect is associated with blasphemy, and holds irrespective of whether violations have been punished by society.

1. Immanent justice reasoning

Jean Piaget observed that children expect negative outcomes to follow misdeeds, a bias that he called *immanent justice* (Piaget, 1932). Lerner (1980) incorporated this bias into his theory of “just world” needs, the desire to see that people get what they deserve and deserve what they get. Psychological research in the decades since has found expressions of this need in many specific biases, such as the preference to read about a negative outcome for a character who has engaged in a misdeed (Callan et al., 2014) and the spatial association of bad outcomes with bad acts (Callan, Moreton, & Hughes, 2021; Harvey et al., 2017, Harvey, Callan and Matthews, 2014).

The tendency to engage in immanent justice reasoning has also been observed in non-Western cultures. The bias of expecting outcomes that reward people for their deeds has been documented in reasoning about cause and effect (Horton, 1967; Menon, 2013), divine intervention (Turner, 1968), witchcraft (Evans-Pritchard & Gillies, 1937), and karma (Menon, 2013; Shweder, Much, Mahapatra, & Park, 1997; White, Kelly, Shariff, & Norenzayan, 2019). In cultures that hold the belief in karmic compensation across lifetimes, there is no limit to the misdeeds that can be adduced to explain misfortunes (Daniel, 1983).

This trenchant research program has illuminated many deep paradoxes of social behavior, such as the distressing tendency to derogate victims by speculating about possible prior misdeeds. Within research on immanent justice judgments, though, there has been relatively little attention to societal vs. cosmic punishment or how different types of wrongdoing may differentially evoke expectations of punishment. Research on immanent justice has found that people expect cosmic punishment for unpunished transgressions. Nevertheless, after a transgression has received punishment, people no longer anticipate further cosmic punishment for the transgressions as justice has been restored (Harvey et al., 2017). For example, in one study, participants read stories about “bad people” (i.e., a person who stole from a charity, a person who was mean to an elderly person) who received “just desserts” (i.e., got mugged, got injured in a car accident). Participants were asked to judge whether the person deserved additional punishments (e.g., contracting a serious illness, losing one's home in a flood) for their bad actions (Harvey et al., 2017). This work found that people were less likely to anticipate further punishment for bad actions once bad actors had received just desserts for their transgressions. However, in these studies, researchers did not distinguish between the types of bad actions or the types of punishment received. Furthermore, researchers assessed “bad actions” that were harmful to other people more so than blasphemous, and assessed instances of punishment that were for the most part “cosmically” mediated rather than socially mediated, i.e., intentionally directed at the bad actors from other people. Although scales have been developed to distinguish cosmic and societal punishment from each other (Stroebe, Postmes, Täuber, Stegeman, & John, 2015), no research to our knowledge has investigated whether violations simply elicit a desire for punishment regardless of the type of punishment, or whether certain types of violations (e.g., sacred violations) evoke the desire for punishment in a specific sphere (such as the cosmic sphere).

In this paper, we go beyond current research on immanent justice reasoning, assessing whether sacred violations particularly evoke a desire for punishment in the cosmic sphere. We propose that sacred violations evoke greater expectations of cosmic punishment than other types of violations (i.e., secular violations and social convention violations), irrespective of whether the actions have already been punished

by society.

2. Sacred violations and cosmic punishment

Developmental psychology research has long distinguished two spheres of social rules: morality and conventions (Turiel, 1998). Moral rules are akin to injunctive norms whereas social conventions are akin to descriptive norms (Cialdini, Kallgren, & Reno, 1991; Turiel, 1998). What distinguishes convention violations from moral ones, is that the former elicits surprise rather than disapproval. Recently however, morality researchers have drawn further distinctions between types of moral rules, distinguishing the sacred domain—rules involving *sanctity* and *purity* (Haidt, 2007; Shweder et al., 1997)—from more secular domains, such as protecting vulnerable people (Graham et al., 2011). Although semantically, the word “sacred” may imply some association with religion, many sacred rules are non-religious in nature (Berns et al., 2012; Goyal, Adams, Cyr, Maass, & Miller, 2020). For example, sacred rules may pertain to symbols (e.g., among Americans, honoring the bald eagle), objects (e.g., among Indians, books on the ground), and superstitions (e.g., among Italians, tossing coins into an ancient fountain).

What distinguishes sacred violations from secular violations is that sacred violations usually do not hurt other people. Both secular and sacred violations are perceived as morally wrong; however, sacred violations are considered immoral not because they harm others (as secular violations do) but because they are blasphemous (Chakroff & Young, 2015; Graham et al., 2011). That is, sacred violations tend to be perceived as insufficiently reverent to higher powers (Haidt, 2007; Shweder et al., 1997; Turner, 1968). For example, non-procreative incest among consenting adults may not harm anyone, yet it is “spiritually or carnally impure”—it is irreverent to nature and/or higher powers (Haidt, 2007, p.1001; Shweder, Much, Mahapatra, & Park, 2003).

Decades of research has shown that people expect some form of societal punishment to follow all types of norm violations (Haidt, 2007; Shweder et al., 1997). However, sometimes, norm violations escape societal punishment, especially when they are performed in private. Therefore, in the absence of societal punishment, people may want “higher powers” to step in and punish norm violators because people are motivated by a desire to perceive the world as a just place where people get what they deserve (Harvey et al., 2017). We argue, however, that sacred violations are unique in that they are perceived as blasphemous. That is, many people believe that higher powers are personally offended by sacred violations. Therefore, in addition to evoking expectations of societal punishment, sacred violations also evoke expectations of cosmic punishment because people expect retribution from higher powers. For these reasons, we hypothesize that in the absence of societal punishment, people would think that sacred violators receive *more* cosmic punishment than non-sacred violators. Furthermore, we argue that after a sacred violation has been punished by society, people may still expect retribution from higher powers as people may expect that outraged higher powers would not care about whether or not the act has been punished by society but wish to personally punish blasphemous acts. For these reasons, we hypothesize that people will expect more cosmic punishment for sacred violations than non-sacred violations even after the acts have been punished by society.

In contrast, non-sacred violations (e.g., convention and secular violations) do not involve blasphemy. Thus, many people believe that higher powers are not personally offended by these violations, as these violations do not break rules assumed to have been ordained by extra-human powers. Nevertheless, when such violations escape societal punishment, people may want higher powers to step in to punish secular and convention violations as they are motivated by a desire to see the world as a just place. However, after such violations have received societal punishment, people's just world needs are satisfied, so they are no longer motivated to believe that violators would incur cosmic punishment. For these reasons we hypothesize that in the absence of societal

punishment, people would anticipate more cosmic punishment for secular and convention violators than non-violations. However, after secular and convention violations have received societal punishment, people would expect secular and convention violators to receive similar baseline levels of cosmic punishment as non-violators.

3. Overview of studies

Across five studies, we investigated whether sacred violations evoke more cosmic punishment than secular and convention violations, whether this sacred effect is more strongly associated with the perceived blasphemy of the act (rather than acts perceived immorality, harm, or uncommonness) and whether this sacred effect holds even after violations have been punished by society. In Study 1, we tested whether people believe that violations of sacred norms deserve more comic punishment than violations of secular norms and social conventions. In Studies 2–3 and 4b, we tested whether people perceive cosmic punishment following violations of sacred norms as more sensible than violations of secular norms and social conventions. In Study 4a we assessed whether participants felt a norm violator vs a follower was more likely to receive cosmic punishment.

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in each study. The verbatim materials for all studies are reported in the Supplementary Materials. Exploratory measures are also reported in the Supplementary Materials. Sample sizes for all the studies were determined before data collection. The survey data and analysis code can be accessed here: https://osf.io/bqa2d/?view_only=d3b8a76837024c8d8622d78069076e36.

4. Study 1

In most of the Western world, sex with a blood relative is considered a sin, a sacred violation. Sex with a work subordinate is considered wrong for a more secular reason—the superior can be seen as abusing their position of power. Sex with a step-sibling who became a member of your family at an adult age may be neither incestuous nor harmful but still violates social conventions. We assessed which of these acts people see as most deserving of cosmic punishment. Sacred violations may differ from other violations not only in terms of the perceived blasphemy of the act but also in the extent to which the actions are considered uncommon, immoral, and presumed to be harmful (Gutierrez & Giner-Sorolla, 2007). We thus assessed the extent to which people feel each of the sexual behaviors is blasphemous, harmful to others, immoral, and uncommon.

We predicted that people would perceive sacred violations as more deserving of cosmic punishment than secular or convention violations. Further, we predicted that differences between the sacred violation vs. other violation conditions on deservingness of cosmic punishment would be associated with participants' perceptions of the act's blasphemy rather than the act's immorality, harm, or unusualness.

4.1. Method

We pre-registered the method, hypothesis, and analysis plan for this study at: https://osf.io/w3rkq/?view_only=62d30f2e15b34777937259e8cf58de58.

4.1.1. Participants

This study uses a within-participant repeated measures design. A pilot study found an effect size of $\eta_p^2 = 0.277$ ($f = 0.60$) for the comparison between the secular and sacred conditions on the cosmic punishment measure. We ran an a-priori power analysis using G*Power (F tests, repeated measures) with this effect size and power = 80% and alpha = 0.05, which indicated an estimated total sample size of $N = 6$ participants. Keeping with the norms in the field of social psychology, we posted a survey seeking 100 American residents on Amazon

Mechanical Turk using Cloud Research. A total of 100 participants completed the study ($M_{age} = 43.45$ years, $SD = 13.94$; 45 women, 55 men, 1 other; all American citizens residing in the US). Next, we conducted a sensitivity analysis using G*power for a repeated ANOVA with $\alpha = 0.05$, power = 0.80, $N = 100$ (the final sample size), number of groups = 4 (sacred, secular, convention, no violation), number of measurements = 5 (cosmic punishment, blasphemy, uncommon, immorality and harm), correlations among rep measures = 0.5 (assuming non-sphericity correction = 1), and found that the study is properly powered to detect an effect size of $f = 0.10$, $\eta_p^2 = 0.01$.

4.1.2. Procedure

Participants read about four women who slept with a first cousin (sacred violation), a subordinate (secular violation), an unrelated family associate (convention violation), and a lover without any of these complications (no violation). In all cases, the sexual encounter was private and unknown to others. See Supplementary Materials for verbatim materials.

We assessed which of these acts people see as most deserving of cosmic punishment by asking them whether the woman deserved a series of outcomes. These included misfortunes (e.g., a bird poops on her shirt, she slips and breaks her arm), positive fortunes (e.g., she finds a \$100 bill on the street, she wins a lottery), and neutrally balanced events (e.g., her dog wants to go outside, her neighbor asks to borrow a pressure cooker). Participants responded on a scale ranging from “1 does not deserve this” to “5 completely deserves this.” We averaged ratings of misfortunes and reverse-coded positive fortunes to form an index of perceived cosmic punishment ($\alpha = 0.74$).

Next, we measured the extent to which participants saw each of the sexual behaviors as blasphemous, causing harm to others, uncommon and immoral on a “1 (Definitely No)” to “5 (Definitely Yes)” scale.¹ Lastly, we confirmed that participants were interpreting the fortune-related outcomes in terms of cosmic punishment by asking them to assess the extent to which they perceived each event as a “random/fluke event (1)” vs “a sign from the universe (8).”

4.2. Results

Although we pre-registered exclusions based on inattentive responses, we did not observe any such responses and thus did not exclude any participants.

4.2.1. Pre-registered primary analyses

As per our pre-registration plan, we ran a repeated measures ANOVA with condition as the repeated measures factor and cosmic punishment as the outcome, which found a significant effect of condition, $F(3, 297) = 45.375$, $p < .001$, $\eta_p^2 = 0.314$. LSD contrasts found that people perceived the sacred ($M = 4.21$, $SD = 1.10$, 95% CI [4.01, 4.41] violation as more deserving of cosmic punishment than the secular violation ($M = 3.78$, $SD = 1.10$, 95% CI [3.57, 3.98]), $t(297) = 3.998$, $p < .001$, $d = 0.422$, the convention violation ($M = 3.03$, $SD = 1.07$, 95% CI [2.83, 3.23]), $t(297) = 6.197$, $p < .001$, $d = 0.114$ and the non-violation ($M = 1.44$, $SD = 0.79$, 95% CI [1.23, 1.64]), $t(297) = 11.425$, $p < .001$, $d = 2.69$). People also viewed secular violations $t(297) = 7.427$, $p < .001$, $d = 2.27$ and social conventions, $t(297) = 5.228$, $p < .001$, $d = 1.59$, as more deserving of cosmic punishment than non-violations. The secular violation was viewed as more deserving of cosmic punishment than the convention violation, $t(297) = 2.200$, $p = .029$, $d = 0.723$.

4.2.2. Pre-registered exploratory analyses

Four separate repeated measures ANOVAs with condition as the repeated measures factor yielded significant effects on blasphemy $F(3,$

¹ In studies 1–3, we also included an exploratory variable measuring the extent to which participants disapproved of each action.

297) = 109.892, $p < .001$, $\eta_p^2 = 0.526$, harmfulness $F(3, 297) = 56.818$, $p < .001$, $\eta_p^2 = 0.365$, uncommonness $F(3, 297) = 206.350$, $p < .001$, $\eta_p^2 = 0.676$, and wrongness $F(3, 297) = 169.607$, $p < .001$, $\eta_p^2 = 0.631$. People perceived the sacred violation as more blasphemous, harmful, uncommon, and immoral than the secular violation, convention violation, and non-violation. See Table 1 for means and pairwise comparisons. See Fig. 1.

4.2.3. Non-preregistered analyses

As our interest was in understanding why people perceive sacred violations as more deserving of cosmic punishment than other violations, we compared the anticipated cosmic punishment and perceptions of blasphemy, harm, uncommonness, or immorality among the violation conditions only. Our goal was to assess whether perceptions of blasphemy, harm, uncommonness, or immorality were most strongly associated with judgments of cosmic punishment for sacred violations vs. the other two violations. We analyzed the data in a long format with four rows per participant, one indicating each condition. Next, we created orthogonal contrasts: for contrast1, sacred = 0, secular = -1, and convention = 1, and for contrast2, sacred = 2, secular = -1 and convention = -1. These contrast variables assessed whether the secular and convention violations significantly differed from each other

Table 1

Means, SD, and CI for perceived blasphemy, uncommonness, harm, and immorality, by condition in Studies 1–4.

	Sacred Violation: Sex with First Cousin	Secular Violation: Sex with subordinate	Convention Violation Sex with Family Associate	No Violation Sex with romantic partner
Study 1: Sexual Behavior	M (SD) [95% CI]	M (SD) [95% CI]	M (SD) [95% CI]	M (SD) [95% CI]
Blasphemy	3.90 (1.43) ^a [3.62, 4.18]	2.76 (1.34) ^b [2.50, 3.02]	2.35 (1.29) ^c [2.10, 2.60]	1.25 (0.796) ^d [1.09, 1.41]
Uncommonness	4.39 (1.00) ^a [4.19, 4.59]	2.58 (1.20) ^b [2.35, 2.81]	3.75 (1.28) ^c [3.50, 4.00]	1.23 (0.617) ^d [1.11, 1.35]
Harmful to others	3.20 (1.44) ^a [2.92, 3.48]	2.81 (1.90) ^b [2.44, 3.18]	2.19 (1.18) ^c [1.94, 2.42]	1.49 (1.04) ^d [1.22, 1.76]
Immorality	3.41 (0.98) ^a [3.22, 3.60]	3.02 (1.04) ^b [3.82, 3.22]	2.51 (1.06) ^c [2.30, 2.72]	0.54 (0.979) ^d [0.35, 0.73]
Study 2: Poultry in the US	M (SD) [95% CI]	M (SD) [95% CI]	M (SD) [95% CI]	M (SD) [95% CI]
	Sacred Violation Eating Bald Eagle	Secular Violation Eating Puffin	Convention Violation Eating Emu	No Violation Eating Chicken
Blasphemy	5.75 (1.65) ^a [5.38, 6.12]	3.79 (2.03) ^b [3.40, 4.17]	3.16 (2.16) ^c [2.78, 3.54]	1.64 (1.41) ^d [1.25, 2.06]
Uncommonness	6.80 (0.61) ^a [6.60, 6.96]	6.50 (0.93) ^b [6.31, 6.65]	6.60 (0.87) ^{ab} [6.41, 6.78]	1.36 (1.07) ^c [1.17, 1.54]
Harmful to others	2.31 (1.28) ^a [1.99, 2.63]	2.10 (1.21) ^a [1.77, 2.42]	1.70 (1.32) ^b [1.38, 2.03]	1.59 (1.35) ^{bc} [1.26, 1.91]
Immorality	5.03 (1.43) ^a [5.34, 4.73]	3.68 (1.57) ^b [4.00, 3.04]	3.35 (1.48) ^b [3.66, 3.04]	1.57 (1.54) ^c [1.89, 1.26]
Study 3: Hindu Temple-Attire	Sacred Violation Shoes in Temple	Secular Violation Tight Clothing in Temple	Convention Violation Sunglasses in Temple	No Violation Sari in Temple
Blasphemy	6.42 (0.79) ^a [5.59, 6.44]	4.16 (1.90) ^b [3.74, 4.53]	3.53 (1.84) ^c [3.12, 3.23]	1.47 [1.12] ^d [1.06, 1.88]
Uncommonness	6.02 (1.75) ^a [5.28, 6.49]	5.14 (1.55) ^b [4.70, 5.58]	5.23 (1.42) ^b [4.80, 5.64]	1.86 (1.45) ^c [1.43, 2.29]
Harmful to others	3.34 (1.94) ^a [2.94, 3.73]	1.73 (1.27) ^b [1.32, 2.14]	1.77 (1.38) ^b [1.37, 2.16]	1.51 (1.24) ^b [1.10, 1.91]
Immorality	3.26 (2.37) ^a [2.75, 3.80]	3.31 (1.50) ^a [2.80, 3.90]	3.47 (1.53) ^a [2.96, 3.99]	2.37 (2.05) ^b [1.49, 2.90]

Note: Different superscripts across denote significant differences between conditions.

(contrast1) and whether the sacred violation differed from both the convention violation and secular violation conditions (contrast2).

We first ran a mixed model with trials nested with participants, cosmic punishment as the outcome variable, and the two contrast variables as predictors. We used random slopes for both contrast variables and estimated the covariance between their random slopes. We found a nonsignificant effect of contrast1, indicating that the secular and convention violations did not differ on cosmic punishment $b = -0.116$, $SE = 0.073$, $z = -1.59$, $p = .112$, 95% CI [-0.25, 0.027], but a significant effect of contrast2, indicating that the sacred condition different from both the secular and convention violation conditions $b = 0.179$, $SE = 0.042$, $z = 4.25$, $p < .001$, 95% CI [0.096, 0.262].

To assess whether perceived blasphemy, harm, uncommon, or immorality were associated with condition effect (i.e., the effect of contrast2 on cosmic punishment), we included these four variables as predictors in the above model. As hypothesized, we found that perceived blasphemy $b = 0.303$, $SE = 0.046$, $z = 6.58$, $p < .001$, 95% CI [0.213, 0.394] significantly predicted cosmic punishment. Perceived immorality also significantly predicted cosmic punishment $b = 0.153$, $SE = 0.057$, $z = 2.67$, $p = .008$, 95% CI [0.040, 0.266]. However, neither uncommon $b = 0.044$, $SE = 0.047$, $z = 0.92$, $p = .357$, 95% CI [-0.049, 0.137], nor harm $b = 0.030$, $SE = 0.045$, $z = 0.68$, $p = .496$, 95% CI [-0.057, 0.118] predicted cosmic punishment. The direct effect of contrast1 $b = -0.029$, $SE = 0.072$, $z = 0.41$, $p = .683$, 95% CI [-0.171, 0.112] and contrast2 $b = -0.015$, $SE = 0.042$, $z = -0.36$, $p = .719$, 95% CI [-0.098, 0.067] were not significant with these four predictors in the model. These results suggest that perceived blasphemy and immorality were associated with condition differences between the sacred vs. other violation conditions (Baron & Kenny, 1986).

Next, we analyzed whether participants' expectations of the protagonist's likelihood of experiencing neutral outcomes (e.g., a dog barking to go outside, a neighbor asking to borrow a pressure cooker) varied by condition. We found that participants rated the non-violation as more deserving of neutral outcomes than the sacred, secular, and convention violations. Finally, we assessed the interpretation of fortune-related events. We found that participants indeed interpreted the fortune-based events as signs from the universe (not as fluke events) more so than neutral events (see Supplementary materials for the detailed results).

4.3. Discussion

As expected, we found that people perceived those who violate sacred norms as more deserving of cosmic punishment than violations of secular norms, conventions, and non-violations. Importantly, as predicted, this sacred effect was associated with perceptions of blasphemy of the sacred violation.

We also found that in addition to perceived blasphemy, perceived immorality of the sacred violation (compared to other violations) mediated the relationship between the sacred violation condition (vs. the other conditions) on expected cosmic punishment. Past research has found that people may expect cosmic punishment to follow wrongdoing that escapes societal punishment to maintain their view of the world as just (Callan et al., 2014). However, as the effect of perceived blasphemy on cosmic punishment was larger than the effect of perceived immorality, we interpret these findings to suggest that the relationship between sacred violations and expectations of cosmic punishment is better explained by perceptions of blasphemy than of immorality.

We also found that people perceived violations of secular and convention norms as more deserving of cosmic punishment than non-violations, possibly because participants wanted to perceive the world as a just place but these violations had not been punished by society; thus, expectations of cosmic punishment would allow participants to view the world as just. These findings are consistent with prior work on immanent justice reasoning.

One unexpected finding here was that people perceived the sacred

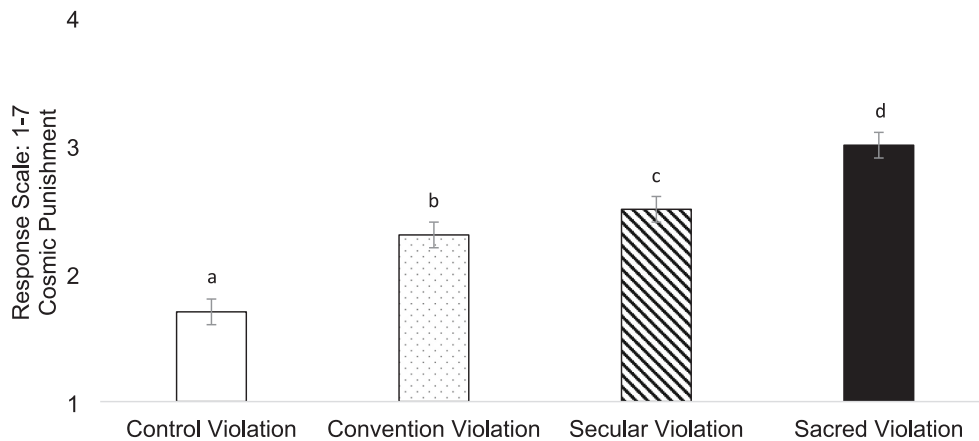


Fig. 1. Mean ratings of deservingness of cosmic punishment, by condition.

Note: Error bars indicate standard errors. Different superscripts denote significant differences.

violation as more harmful than the secular violation. Some work has found that even though sacred violations may not involve harm, people often rate them as more harmful than other types of violations (Gutierrez & Giner-Sorolla, 2007). In other words, sacred violations by nature are often “presumed” to be harmful even when they are objectively not. Nevertheless, in the next study, we manipulate whether an individual violates a sacred norm, secular norm, or convention in a context in which perceptions of harm and uncommonness are similar across conditions. Furthermore, in the next study (Study 2), we use a between-participant design to reduce any potential fatigue, practice, and learning effects that may have been observed in the current study which used a within-participant design.

5. Study 2

Eating a bald eagle, the US national emblem, is sacrilegious among Americans. Eating an Atlantic puffin is wrong for another reason—it is an endangered species, and thus violates the secular foundation of harm. Eating an emu is not wrong, but a peculiar choice, and hence a violation of a social convention.

Like in the previous study, we also assessed the extent to which people thought eating each of the birds was blasphemous, harmful to others, immoral, and uncommon. We hypothesized that American observers would rate cosmic punishment as making more sense when it follows the action of eating a bald eagle (sacred violation) compared to eating a puffin (secular violation), an emu (convention violation), or a chicken (no violation). Further, we predict that judgments of cosmic punishment for the sacred vs. other violation conditions will be associated with participants' perceptions of the act's blasphemy more so than the act's perceived harm, uncommonness, or immorality.

5.1. Method

5.1.1. Participants

In a pilot study, we obtained an effect in the predicted direction with an effect size of $d = 0.39$ between the sacred violation and the secular violation conditions. A power analysis based on $d = 0.39$, $\alpha = 0.05$ (one-tailed), and power = 80% indicated that we need to recruit 82 participants per condition $N = 328$. We posted the ad on Turk Prime (Cloud Research), and a total of 365 participants completed the study ($M_{age} = 41.91$ years, $SD = 12.15$; 164 women, 165 men, 2 others; all American citizens residing in the US). Next, we conducted a sensitivity analysis using G*power for the one-way ANOVA with $\alpha = 0.05$, power = 0.80, $N = 365$ (the final sample size), number of groups = 4 (sacred, secular, convention, no violation) and found that and found that study is properly powered to detect an effect size of $f = 0.17$, $\eta_p^2 = 0.03$.

5.1.2. Procedure

Participants read a vignette about an American man named John, who was living in Canada and who prepared dinner for himself. In a between-participant design, we varied whether the protagonist cooked a bald eagle (sacred violation), an Atlantic puffin (secular violation), an emu (convention violation), or a chicken (no violation). In all cases, the violation occurred in private (so the action did not offend other people). See Supplementary Materials for verbatim materials.

We measured participants' expectations of cosmic punishment by asking them to rate whether it made sense if John experienced misfortunes (e.g., a bird poops on his shirt, he slips and breaks his arm), positive fortunes (e.g., he finds a \$100 bill on the street, he wins a game of poker), or filler neutral outcomes (e.g., his dog wants to go outside, his cousin calls to say hello). Participants responded on a scale ranging from “1 does not make sense” to “7 makes sense.” We reverse-coded ratings of positive fortune and averaged them along with ratings of misfortune to form a *cosmic punishment* score ($\alpha = 0.82$). See Supplementary Materials for detailed results pertaining to the neutral outcomes.

Next, we measured perceptions of blasphemy, harm, immorality, and unusualness in the same way as in Study 1. Lastly, we included the same measures as in Study 1, confirming that indeed people interpreted misfortunes in terms of cosmic punishment. See Supplementary Materials for detailed results.

5.2. Results

A one-way ANOVA with cosmic punishment as the outcome variable, and violation condition as the independent variable found a significant effect of condition $F(3, 361) = 9.820$, $p < .001$, $\eta_p^2 = 0.075$. As predicted, LSD contrasts indicated that people were more likely to think that cosmic punishment made sense following a sacred violation condition ($M = 4.72$, $SD = 0.93$, 95% $CI [4.54, 4.90]$) compared to a secular violation ($M = 4.41$, $SD = 0.91$, 95% $CI [4.23, 4.59]$, $p = .018$, $d = 0.33$, $t(361) = 2.37$, $SE = 0.12$, $d = 0.32$), convention violation ($M = 4.18$, $SD = 0.77$, 95% $CI [4.00, 4.36]$, $t(361) = 4.25$, $SE = 0.12$, $p < .001$, $d = 0.55$) or a non-violation ($M = 4.09$, $SD = 0.81$, 95% $CI [3.91, 4.21]$, $t(361) = 4.956$, $SE = 0.12$, $p < .001$, $d = 0.64$). People also felt that cosmic punishment made more sense following the secular violation compared to the non-violation $t(361) = 2.56$, $SE = 0.12$, $p = .011$, $d = 0.46$. However, no differences were observed between the secular and convention violation $t(361) = 1.85$, $SE = 0.12$, $p = .064$, $d = 0.11$ and convention violation vs non-violation condition $t(361) = 0.717$, $SE = 0.12$, $p = .474$, $d = 0.12$. See Fig. 2.

Four one-way ANOVAs with condition as the independent variable (Sacred, Secular, Convention, No Violation) and blasphemy, harm, uncommon, and immorality as outcomes indicated significant effects of

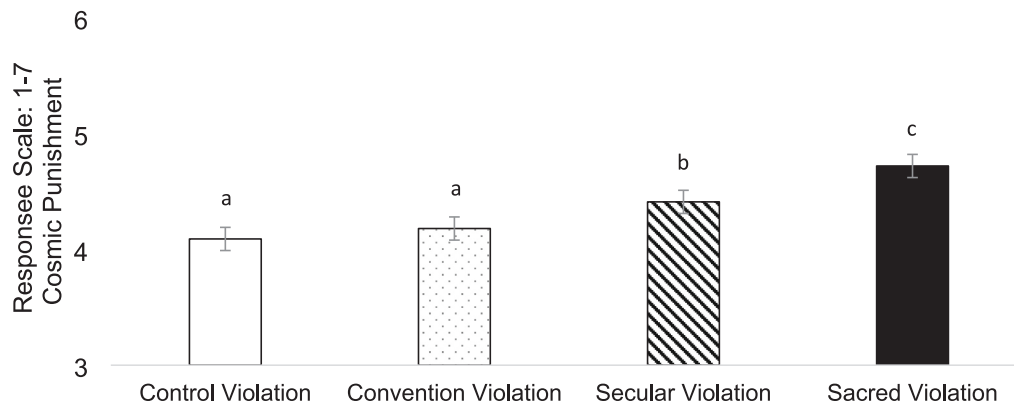


Fig. 2. Mean ratings of expected cosmic punishment, by condition.

Note: Error bars represent standard errors. Different superscripts denote significant differences.

condition: for blasphemy, $F(3, 361) = 78.447, p < .001, \eta_p^2 = 0.395$; for harm $F(3, 361) = 4.496, p = .004, \eta_p^2 = 0.036$; for uncommon $F(3, 361) = 800.467, p < .001, \eta_p^2 = 0.869$; and for immorality $F(3, 361) = 81.90, p < .001, \eta_p^2 = 0.405$. Participants perceived the sacred violation as more blasphemous and wrong than the secular and convention violations. However, the sacred and secular violations were rated as similarly harmful, and the sacred and convention violation were rated as similarly uncommon. See Table 1 for means and pairwise comparisons.

Like in the previous study, we created orthogonal contrasts. We created two contrasts: contrast 1 (sacred condition = 2, secular = -1, convention = -1) and contrast 2 (sacred = 0, secular = 1, convention = -1). We found that contrast 1 significantly predicted cosmic punishment $b = 0.141, SE = 0.037, t(273) = 3.763, 95\% CI [0.067, 0.214], p < .001$ but contrast 2 did not $b = -0.119, SE = 0.065, t(273) = -1.826, 95\% CI [-0.247, 0.009], p = .069$. Next, we ran a bootstrapped mediation analysis using the PROCESS macro (MODEL 4, bootstrapped samples = 10,000), with entering contrast 1 (sacred condition = 2, secular = -1, convention = -1) the independent variable, perceived blasphemy, harm, uncommonness and wrongness as simultaneous mediators, and cosmic punishment as the outcome and contrast 2 (sacred = 0, secular = 1, convention = -1) as a covariate. The model fit the data well, $F(6, 267) = 8.36, MSE = 0.699, R^2 = 0.158, p < .001$. As predicted, we found that perceived blasphemy served as a mediator, $b = 0.070, SE = 0.023, 95\% CI [0.027, 0.120]$ as the confidence intervals did not contain zero. We also found an indirect effect via perceived uncommonness $b = 0.014, SE = 0.008, 95\% CI [0.001, 0.033]$, but not via either perceived immorality $b = 0.037, SE = 0.021, 95\% CI [-0.005, 0.081]$, or perceived harm $b = 0.003, SE = 0.008, 95\% CI [-0.010, 0.022]$. The effect of contrast 2 (covariate) on cosmic punishment remained non-significant $b = -0.081, 95\% CI [-0.204, 0.426], SE = 0.062, t(267) = -1.290, p = .197$. The direct effect of contrast 1 on cosmic punishment became non-significant $b = 0.014, 95\% CI [-0.067, 0.099], SE = 0.042, t(267) = 0.344, p = .731$ after adding the mediators in the model.

Next, we analyzed whether participants' expectations of the protagonist's likelihood of experiencing neutral outcomes (e.g., dog barking to go outside, cousin calling to say hello) varied by condition. We found that participants rated the neutral events as making the least sense in the sacred violation condition compared to the secular violation, convention violation, and no violation condition. Lastly, we assessed the interpretation of fortune-related events. We found that people indeed interpreted the fortune-based events as signs from the universe (vs. fluke events) more so than neutral events. For detailed analyses and results see Supplementary materials.

5.3. Discussion

As expected, we found that people think cosmic punishments make more sense when they follow sacred norm violations compared to other

types of norm violations. Importantly, we found that the sacred effect was associated with perceived blasphemy of the sacred act (compared to other violations) more so than perceptions of the act as harmful or immoral. Importantly, in this study, we find support for our hypothesis with sacred violations that were perceived as similarly harmful as secular violations and similarly unusual as convention violations.

As in the previous study, we found that participants perceived cosmic punishments as more sensible when they followed the secular violation than the non-violation, possibly because the secular violation was socially unpunished. However, unlike in the previous study, participants expected a similar degree of cosmic punishment for the convention violation and the non-violation. Unlike in the previous study, the convention violation in this study (eating emu) was perceived as similarly harmful as the non-violation (see Table 1), which might explain why participants expected a similar degree of cosmic punishment for the convention violation and non-violation.

One unexpected finding was that the effect of the sacred violation condition on expected cosmic punishment was explained both by the perceived blasphemy and perceived uncommonness of the violation. The sacred violation presented in Study 1—incest—was perceived as unusual and blasphemous but likely not bizarre, given that cousin marriage is legal in some parts of the US (Washington Post, 2005). The sacred violation used in this study, however—eating a bald eagle—may also have been perceived as bizarre because people in Western countries (where we ran the study) typically do not eat large birds of prey. It is likely that our perceived uncommonness measure may also include perceptions of how bizarre the act is, and the more bizarre participants found the act, the more they expected cosmic punishment. Nevertheless, as the effect of perceived blasphemy on cosmic punishment was larger than the effect of perceived unusualness, we interpret these findings to suggest that the relationship between sacred violations and expectations of cosmic punishment is more strongly associated with perceptions of blasphemy than of unusualness.

In the next study, we assessed whether our effects generalize to other cultural groups. We focused on Hindus because the Hindu philosophy of karma is specifically about cosmic reward and punishment (Taylor, Clutterbuck, Player, Shah, & Callan, 2022; White et al., 2019). Specifically, Hindus believe that the universe punishes all types of immoral actions, including secular and sacred violations, whether in one's current lifetime or in one's future lives (Goyal & Miller, 2022; White et al., 2019). Therefore, it is possible that Hindus do not distinguish between different types of immoral actions (i.e., secular and sacred violations) when expecting cosmic punishment (i.e., bad karma). If Hindus do not draw a qualitative distinction between different types of moral rules when anticipating cosmic punishment, they may expect similar levels of cosmic punishment for immoral actions, regardless of whether the violation is secular or sacred. In this case, for Hindus, expectations of cosmic punishment would be more strongly associated with the

perceived immorality, rather than the blasphemy of the action. However, if Hindus do draw a qualitative distinction between sacred and secular violations when anticipating cosmic punishment, they would exhibit a similar pattern of expectations of cosmic punishment as the participants in Study 1. Therefore, in the next study, we assess sacred violations that are perceived as similarly immoral, but more blasphemous than secular violations to assess whether our results generalize to Hindu participants.

6. Study 3

Indian Hindus consider shoes as impure and degrading objects (Goyal et al., 2020). Thus, wearing shoes inside a temple is sacrilegious. Wearing revealing clothing is wrong for a different reason—it is inconsiderate towards fellow worshippers. Wearing sunglasses in a temple is not wrong but is an unconventional choice. We assessed the extent to which people believed that cosmic punishment made sense following each of these acts performed in private (i.e., there was no opportunity for societal punishment). We also assessed the extent to which they perceived wearing each of these items in a temple as blasphemous, harmful to others, wrong, and uncommon. We hypothesized that Hindu observers would see cosmic punishment as making more sense after an actor wears shoes inside a temple (sacred violation) compared to if an actor wears revealing clothing (secular violation), sunglasses (convention violation), or a sari (no violation). Further, we predicted that condition differences between the sacred and other violation conditions would be associated with perceived blasphemy rather than by perceived harm, uncommonness, or immorality of the action.

6.1. Method

6.1.1. Participants

In the previous study, we obtained an overall effect based on the omnibus one-way ANOVA of $f = 0.28$ ($\eta_p^2 = 0.075$). A power analysis based on $f = 0.28$, $\alpha = 0.05$ (two-tailed), and power = 90% indicated that we need to recruit 188 participants. We posted the ad on Turk Prime (Cloud Research), and a total of 206 participants completed the survey ($M_{age} = 28.06$ years, $SD = 9.91$; 51 women, 48 men, all self-identified as Hindu). Next, we conducted a sensitivity analysis using G*power for the one-way ANOVA with $\alpha = 0.05$, power = 0.80, $N = 206$ (the final sample size), number of groups = 4 (sacred, secular, convention, no violation) and found that study is properly powered to detect an effect size of $f = 0.23$, $\eta_p^2 = 0.05$.

6.1.2. Procedure

Participants read a vignette about a Hindu woman named Nita, who was visiting a Hindu temple alone when nobody was around. In a between-participant design, we varied whether the protagonist entered the temple wearing shoes (sacred violation), revealing clothing (secular violation), sunglasses (convention violation), or a sari (no violation). In all cases, we explicitly told participants that Nita went to the temple early in the morning, when “no one was around”. Therefore, the violations occurred in private, so the acts did not offend other people. See Supplementary Materials for verbatim materials.

Like in the previous study, we then measured participants' expectations of cosmic punishment by asking them to rate whether it made sense if Nita experienced misfortunes (e.g., a bird poops on her head, she accidentally slips and stains her shirt, she catches the coronavirus), positive fortunes (e.g., she finds 500 rupees on the street, she wins a card game, she receives a gift coupon in the mail) and filler neutral outcomes (e.g., her dog wants to play outside, her neighbor asks to borrow a pressure cooker). Participants responded on a scale ranging from “1 does not make sense” to “7 makes sense”. We reverse-coded ratings of positive fortune and averaged them along with ratings of misfortune to form a *cosmic punishment* score ($\alpha = 0.82$). See Supplementary Materials

pertaining to results of neutral outcomes.

We measured whether participants perceived wearing the relevant attire inside a Hindu temple in the violation conditions as blasphemous, causing harm to others, uncommon, and wrong on a “1 (not at all)” to “7 (extremely)” scale.

Also, like in previous studies, we checked that participants were indeed interpreting the fortune-related items in terms of cosmic punishment by asking them to rate how much they felt each item was a “random/fluke event (1)” versus “a sign from the universe (7).” See Supplementary Materials for results.

6.2. Results

A one-way ANOVA with cosmic punishment as the outcome variable and violation condition as the independent variable, and found a significant effect of condition $F(3,205) = 12.636$, $p < .001$, $\eta_p^2 = 0.158$. LSD contrasts indicated as predicted that participants were more likely to anticipate that the protagonist would receive cosmic punishment in the sacred ($M = 4.51$, $SD = 0.78$, 95% CI [4.32, 4.70]) compared to secular ($M = 3.93$, $SD = 0.57$, 95% CI [3.74, 4.13], $t(202) = 4.23$, $SE = 0.13$, $p < .001$, $d = 1.05$), convention ($M = 4.01$, $SD = 0.67$, 95% CI [3.83, 4.20], $t(202) = 3.700$, $SE = 0.13$, $p < .001$, $d = 0.90$) or no violation ($M = 3.70$, $SD = 0.71$, 95% CI [3.51, 3.90], $t(202) = 5.94$, $SE = 0.13$, $p < .001$, $d = 1.33$) condition. Ratings of cosmic punishment were similar across the secular violation condition compared to no violation condition, $t(202) = 1.636$, $SE = 0.13$, $p = .10$, $d = 0.35$ but significantly higher in the convention violation compared to the no-violation condition, $t(202) = 2.28$, $SE = 0.13$, $p = .023$, $d = 0.44$. No significant effects were observed between the secular and convention violation conditions $t(202) = -0.609$, $SE = 0.13$, $p = .543$, $d = 0.12$. See Fig. 3.

Four one-way ANOVAs with condition as the independent variable (Sacred, Secular, No Violation) and blasphemy, harm, uncommon, and immorality as outcomes indicated significant effects of condition for blasphemy $F(3,202) = 97.34$, $p < .001$, $\eta_p^2 = 0.591$, for harm $F(3, 202) = 17.34$, $p < .001$, $\eta_p^2 = 0.205$, for uncommonness $F(3, 202) = 72.24$, $p < .001$, $\eta_p^2 = 0.518$, and for immorality $F(3, 202) = 3.46$, $p = .016$, $\eta_p^2 = 0.049$. People perceived the sacred violation as more blasphemous, harmful, and uncommon than the secular and convention violations. However, people rated the sacred violation as similarly immoral compared to both the secular and convention violation conditions (see Table 1 for the means).

Like in the previous study, we created orthogonal contrasts. We created two contrasts: contrast 1 (sacred condition = 2, secular = -1, convention = -1) and contrast 2 (sacred = 0, secular = 1, convention = -1). We found that contrast 1 significantly predicted cosmic punishment $b = 0.180$, $SE = 0.039$, 95% CI [0.103, 0.256], $t(154) = 4.650$, $p < .001$ but contrast 2 did not $b = -0.042$, $SE = 0.068$, $t(154) = 0.616$, 95% CI [-0.092, 0.176], $p = .539$. Next, we ran a bootstrapped mediation analysis using the PROCESS macro (MODEL 4, bootstrapped samples = 10,000), with contrast 1 (sacred condition = 2, secular violation = -1, convention violation = -1) as the independent variable, perceived blasphemy, harm, immorality and uncommonness as simultaneous mediators, and cosmic punishment as the outcome, and contrast 2 (sacred = 0, secular = -1, convention = 1) as a covariate. The model fit the data well, $F(6, 148) = 6.946$, $MSE = 0.428$, $R^2 = 0.219$, $p < .001$. As predicted, we found that perceived blasphemy served as a mediator, $b = 0.093$, $SE = 0.031$, 95% CI [0.033, 0.157] as the confidence intervals did not contain zero, however harm $b = 0.024$, $SE = 0.026$, 95% CI [-0.0322, 0.082], immorality $b < 0.001$, $SE = 0.004$, 95% CI [-0.010, 0.010] or uncommonness $b = 0.006$, $SE = 0.011$, 95% CI [-0.016, 0.029] did not mediate the effect of condition on cosmic punishment. The direct effect of condition on cosmic punishment, after accounting for the mediators was no longer significant $b = 0.054$, 95% CI [-0.040, 0.149], $SE = 0.048$, $t(148) = 1.13$, $p = .260$. The effect of contrast 2 on cosmic punishment remained non-significant $b = 0.074$, 95% CI [-0.055, 0.205], $SE = 0.066$, $t(148) = 1.13$, $p = .260$.

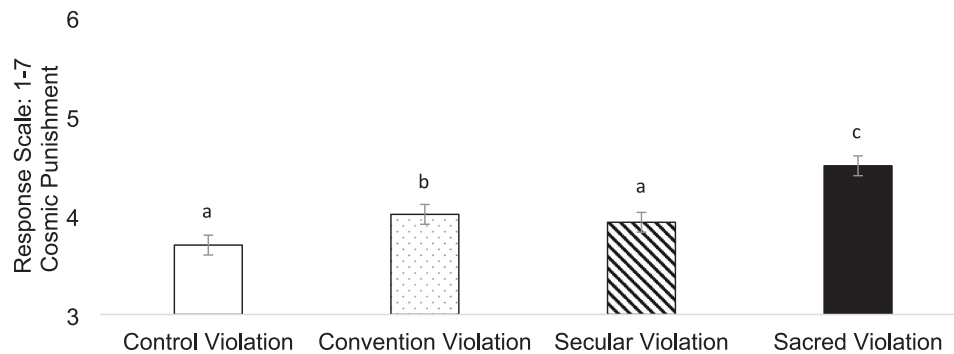


Fig. 3. Mean ratings of expected cosmic punishment by condition.

Note. Error bars represent standard errors. Different superscripts denote significant differences.

Next, we analyzed whether participants' expectations of the protagonist's likelihood of experiencing neutral outcomes (e.g., dog barking to go outside, a neighbor asking to borrow a pressure cooker) varied by condition. We found the neutral events were rated as similarly sensible between conditions. Lastly, we assessed the interpretation of fortune-related events. We found that Hindu participants indeed interpreted the fortune-based events as signs from the universe (vs. fluke events) more so than neutral events. For detailed analyses and results see Supplementary materials.

6.3. Discussion

Like in the previous studies, we found that people expected cosmic punishments to follow sacred norm violations more so than other types of norm violations. Additionally, we found that participants' anticipations of cosmic punishment were associated with perceptions of blasphemy rather than harm, unusualness, or immorality. Importantly, in this study, the sacred violations were perceived as similarly immoral but more blasphemous than the secular and convention violation.

Unlike in the previous studies, participants expected a similar degree of cosmic punishment for secular violations and non-violations. In our studies, we measure expectations of cosmic punishment immediately after a violation. Research has shown that Hindus often expect delayed punishment because they believe that karma operates over a longer time scale (Young, Morris, Burrus, Krishnan, & Regmi, 2011). Thus, Hindus may expect a delayed cosmic punishment for secular norm violations that are not punished by society.

As in Study 1, we found that even though the act of wearing shoes in the temple does not objectively harm others, participants perceived this act as causing more harm to others than the other norm violations. One explanation is that people presume that sacred violations cause harm even when they objectively do not (Gutierrez & Giner-Sorolla, 2007). Another explanation is that purity violations are perceived to be indelible, spreading contamination across time and space (Niemi, Leone, & Young, 2021). That is, it is possible that participants perceived wearing shoes in a shared public space to pollute the space and therefore harm others who entered the temple later in the day. Nevertheless, we found that only ratings of perceived blasphemy, not ratings of perceived harm, uncommonness, or immorality, were associated with between-condition differences in anticipated cosmic punishment.

In this study, we replicated findings from Studies 1–2 among Hindus, a cultural group that tends to believe in karma. Our findings suggest that even Hindus expect sacred violations to evoke the strongest expectations of cosmic punishment than other types of violations. In fact, the effect sizes in this study appear to be larger than those observed in the other studies in the investigation.

Research has found that people display an omission bias in moral decision-making (Ritov & Baron, 1990; Spranca, Minsk, & Baron, 1991). That is, they judge acts of omission (e.g., not telling the truth) as less

immoral than acts of commission. (e.g., actively lying). In Studies 1–3, we assessed violations that involved acts of commission, e.g., wearing shoes in a temple, eating a bald eagle, and having sex with a blood relative. In the next study (i.e., Study 4a), we assess violations that involve acts of omission to assess whether our effects generalize to sacred violations that involve both omissions and commission.

7. Study 4a

Studies 1–3 assessed participants' expectations of cosmic punishment for each type of violation in the absence of societal punishment. Thus, it is possible that our measure picked up participants' desire to generally punish the wrongdoer. That is, people may view social punishment and cosmic punishment as substitutes, and may simply have a general desire to punish sacred violations to satisfy their desire for a just world (Harvey et al., 2017).

In this study, we measured both expected cosmic punishment and expected societal punishment. We assessed whether participants believed that sacred violations would receive more cosmic punishment compared to other violations while assessing the extent to which they expected that each violation would receive social punishment. By doing this, we can assess whether participants simply expect more punishment for sacred violations (compared to non-sacred violations), or whether they expect more cosmic punishment for sacred violations (compared to non-sacred violations) above and beyond societal punishment.

Furthermore, in this study, we framed an arbitrary behavior in terms of a sacred norm, secular norm, or convention. This feature allowed us to experimentally manipulate the relevant norms without relying on pre-existing norms (as we did in the previous studies). Importantly, this feature allowed us to more tightly and experimentally vary perceptions of blasphemy, uncommonness, harm, and immorality across conditions.

7.1. Method

7.1.1. Participants

In a similar study, we obtained an effect in the predicted direction with an effect size of $f = 0.22$ (equivalent to $d = 0.44$ based on a comparison between the sacred and no violation conditions). A power analysis for F-tests (fixed effects, omnibus, one way) using $f = 0.22$, $\alpha = 0.05$, and power = 87% indicated that we need to recruit 272 participants across four conditions. We posted a survey seeking 272 participants on Cloud Research, and a total of 279 participants completed the survey ($M_{age} = 37.71$ years, $SD = 13.71$; 170 women, 107 men, 2 other; all US citizens residing in the US). Next, we conducted a sensitivity analysis using G*power for the one-way ANOVA with $\alpha = 0.05$, power = 0.80, $N = 279$ (the final sample size), number of groups = 4 (sacred, secular, convention, no violation) and found that and found that the study is properly powered to detect an effect size of $f = 0.19$, $n_p^2 = 0.035$.

7.1.2. Procedure

Participants read a story about two different protagonists, Elena and Maria, who were tourists visiting a small Italian city called Bari. We framed an arbitrary action (i.e., tossing coins into a fountain), in terms of a sacred norm, convention, or secular norm. In a between-participant design, we randomly assigned participants to one of four conditions. In the *convention violation condition*, we framed the behavior of tossing coins into a fountain pool to be a violation of a descriptive norm (i.e., what most people do) “Most tourists that visit Bari toss coins into the fountain pool.” In the *secular condition*, we framed the behavior of tossing coins into the fountain pool to be a violation of a secular injunctive norm (i.e., what people ought to do), “The people of Bari appreciate those that toss coins into the fountain pool as donations go towards street cleaning.” In the *sacred violation condition*, we framed the behavior (of tossing coins into the fountain pool) to be a violation of an injunctive time-honored tradition (i.e., what people have always been doing): “For centuries, people who visit the fountain toss coins into the fountain pool as a way of paying reverence to one’s ancestors.” In the no violation condition, participants were not given any additional information. In all conditions, participants were told that Elena is the *norm follower* (i.e., she tosses a few coins into the fountain pool), whereas Maria is the *norm violator* (i.e., she does not toss any coins into the fountain).²

We then measured participants’ expectations of cosmic and social punishment by asking participants to guess whether eight outcomes happened to Maria (the norm violator) or Elena (the norm follower). Participants indicated whom they felt each outcome was more likely to happen to – Elena (1) or Maria (8).

7.1.3. Social punishment

Our index of social punishment comprised of two positive behaviors (e.g., a local child at the fountain gives someone a rose, locals at a café near the fountain smile at someone), and two negative behaviors (e.g., a policeman *at the fountain* is impolite while giving directions, someone gets cursed at by a homeless person *at the fountain*) intended as acts of approval (positive behaviors) or disapproval towards Maria and Elena that took place *at the fountain*.³ Ratings of negative behaviors and (reverse-scored) positive behaviors formed an index of *social punishment* ($\alpha = 0.85$).

7.1.4. Cosmic punishment

The cosmic punishment index, like in previous studies, comprised of two misfortunes (e.g., after leaving the fountain, someone accidentally drops a 100-dollar bill from their pocket, someone gets sick after eating oysters *after leaving the fountain*), and two positive fortunes (e.g., after leaving the fountain, someone gets upgraded to first class on a flight, someone finds a designer dress on sale in the perfect size after leaving the fountain) that took place *after* Maria and Elena left the fountain and were aleatory events.⁴ Ratings of misfortunes and (reverse-scored)

fortunes formed an index of *cosmic punishment* ($\alpha = 0.79$).⁵

7.2. Results

We first tested whether expectations of cosmic and societal punishment vary by condition. We conducted a 4 (Condition: No violation, convention, secular, sacred;) \times 2 (Punishment type: cosmic vs. social) mixed ANOVA with punishment type as the within-participant factor, condition as the between participant factor and expected punishment as the outcome variable. We found significant main effects of condition, $F(3,275) = 38.253, p < .001, \eta_p^2 = 0.294$, and punishment type, $F(3,275) = 21.644, p < .001, \eta_p^2 = 0.073$, and a significant condition \times punishment type interaction, $F(3,275) = 6.642, p < .001, \eta_p^2 = 0.068$. To decompose the interaction, we ran LSD contrasts on each of the measures (cosmic and social punishment) to assess whether people anticipate the sacred norm violator to be more likely to receive a certain type of punishment compared to the other norm violators.

7.2.1. Cosmic punishment

As predicted, we found that participants expected the sacred violator as more likely to be the target of cosmic punishment than the secular violator $t(275) = 2.074, SE = 0.23, 95\% CI [0.02, 0.93], p = .039, d = 0.34$, convention violator, $t(275) = 4.263, SE = 0.23, 95\% CI [0.54, 1.48], p < .001, d = 0.72$, and non-violator $t(275) = 7.83, SE = 0.23, 95\% CI [1.30, 2.17], p < .001, d = 1.65, 95\% CI [1.19, 1.93]$. Participants also expected more cosmic punishment for the secular and convention conditions compared to the no violation condition. See Table 2 and Fig. 4 for means of cosmic punishment by condition.

7.2.2. Social punishment

Participants expected the sacred violator as equally likely to be the target of social punishment as the secular violator $t(275) = -1.123, SE = 0.23, 95\% CI [-0.73, 0.20], p = .26, d = 0.19$, but more likely to be the target of social punishment than the convention violator, $t(275) = 2.92, SE = 0.24, 95\% CI [0.23, 1.19], p < .001, d = 0.56$, and the non-violator $t(275) = 8.15, SE = 0.22, 95\% CI [1.41, 2.30], p < .001, d = 1.58$. Participants also expected more social punishment for the secular and convention conditions compared to the no violation condition. See Table 2 and Fig. 4 for means of social punishment.

7.2.3. Cosmic punishment by condition controlling for social punishment

To assess the impact of condition on cosmic punishment independent of social punishment, we ran an ANOVA with cosmic punishment as the outcome, condition as the sole predictor, and the social punishment index as a covariate. We found a significant effect of condition $F(3,274) = 5.560, p = .001, \eta_p^2 = 0.041$, and a significant effect of social pun-

Table 2
Means, SD and CI for cosmic and societal punishment in Study 4.

	Sacred Violation	Secular Violation	Convention Violation	No Violation
Cosmic Punishment	6.40 (1.28) ^a [6.06, 6.73]	5.91 (1.54) ^b [5.60, 6.22]	5.38 (1.55) ^c [5.05, 5.70]	4.65 (0.88) ^d [4.37, 4.93]
Societal Punishment	6.52 (1.37) ^a [6.16, 6.86]	6.80 (1.39) ^a [6.47, 7.11]	5.81 (1.61) ^b [5.47, 6.46]	4.66 (1.07) ^d [4.37, 4.95]

Note. Different superscripts denote statistically significant differences.

² A pilot study pretested these conditions to assess the extent to which the conditions varied on blasphemy, harm, uncommonness, and immorality. The sacred violation was perceived as more blasphemous than both the secular and convention violation. However, the sacred violation was rated as similarly harmful and immoral as the secular violation and similarly uncommon as the convention violation. We thus confirmed that our manipulations differed on perceptions of blasphemy but not perceptions of harm, immorality, or uncommonness. See Supplementary Materials.

³ A pilot study pretested these items confirming that the negative and positive behaviors were indeed perceived as acts of approval/disapproval (i.e., societal punishment) rather than signs from the universe (i.e., cosmic punishment). See supplementary materials.

⁴ A pilot study pretested these items confirming that the misfortunes and positive fortunes were indeed perceived as signs from the universe (i.e., cosmic punishment) rather than acts of approval/disapproval from people (i.e., societal punishment). See supplementary materials.

⁵ We also included exploratory measures. Specifically, we asked participants to rate the extent to which they felt Elena and Maria’s behavior was surprising, expected, inappropriate, giving, blasphemous, disturbing, inspiring, awesome, depressing, and amusing on a 1 (not at all) to 7 (extremely) point scale.

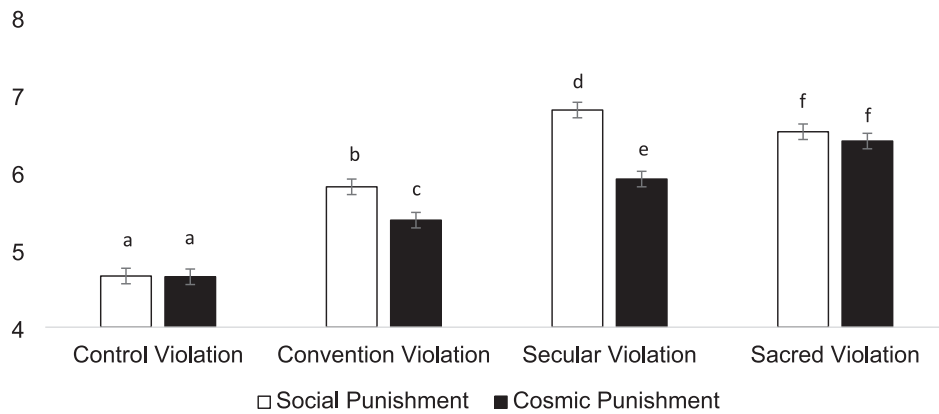


Fig. 4. Means for expected cosmic punishment and social punishment towards the norm violator, by condition.

Note. The response scale ranged from 1 to 8; thus scores above 4.5 indicate higher likelihood of punishment for the norm violator, and below 4.5 indicate a higher likelihood of punishment for the norm follower. Error bars indicate standard errors of the means. Different superscripts denote significant differences, $p < .05$.

ishment $F(1,274) = 112.18$, $p < .001$, $\eta_p^2 = .287$. We then assessed whether participants expected sacred norm violations (compared to the other violations) to receive cosmic punishment above and beyond social punishment. LSD contrasts at the mean level of social punishment indicated that participants were more likely to anticipate cosmic punishment for the sacred violation ($M_{adj} = 6.04$, $SD = 1.28$, 95% CI [5.75, 6.33]) compared to the secular violation ($M_{adj} = 5.42$, $SD = 1.54$, 95% CI [5.14, 5.70], $t(274) = 3.16$, $SE = 0.19$, $p = .002$, 95% CI [0.23, 1.00], $d = 0.53$, convention violation ($M_{adj} = 5.40$, $SD = 1.55$, 95% CI [5.13, 5.68]), $t(274) = 3.13$, $SE = 0.20$, $p = .002$, 95% CI [0.23, 1.04], $d = 0.54$ and non-violation ($M_{adj} = 5.28$, $SD = 0.88$, 95% CI [5.01, 5.55]), $t(274) = 3.65$, $SE = 0.20$, $p < .001$, 95% CI [0.35, 1.17], $d = 0.63$. See Fig. 4 for means.

7.3. Discussion

We found that independent of social punishment, people anticipated more cosmic punishment for the sacred norm violator than other norm violators. That is, participants anticipated cosmic punishment for sacred violations over and above societal punishment. Importantly, in this study, we found support for our hypothesis with sacred violations that were perceived as similarly harmful and immoral as secular violations and similarly uncommon as convention violations.

It may be important to note that in our analysis, we found that sacred violations were expected to receive a similar degree of cosmic punishment and social punishment (See Table 1 and Fig. 4). We do not interpret this finding as inconsistent with our theorizing or hypothesis, as our focus was on whether expected cosmic punishment varies across conditions after controlling for expected social punishment, not on the difference between levels of cosmic and social punishment in each condition. Given that cosmic events are rarer than social events, it would be surprising if participants perceived cosmic punishments as more likely than social punishment in any of the conditions.

Study 4a conceptually replicated the findings of Studies 1–3 using acts of omission rather than acts of commission, as in the previous studies. Our findings thus extend the work by Mandel and Vartanian (2008), who found that the omission bias may not apply to taboo behaviors. In contrast, we find that participants also see sacred violations involving acts of omission as deserving of cosmic punishment. Nevertheless, in the next study, we use a similar design as in Study 4a but instead frame the violation as an act of commission (i.e., tossing coins into a fountain pool) rather than omission (i.e., not tossing coins into a fountain pool).

In this study, participants provided ratings of both expected societal punishment and cosmic punishment. Thus, we were unable to experimentally hold constant the type and degree of actual societal

punishment faced by the violator and assess whether people expect cosmic punishment even *after* a transgression has been punished by society. In the next study, we experimentally hold constant the type and degree of societal punishment faced by the violator. We assessed if people still expect cosmic punishment for sacred violations after the violation has been punished by society.

8. Study 4b

The goal of this study was to assess whether people associate sacred violations with cosmic punishment even if the act has been punished by society. If people expect cosmic punishment for secular and convention violations because of their need to perceive the world as just, then after these violations have been punished by society, people should no longer expect cosmic punishment above a baseline level (i.e., the level expected for non-violators). However, if people expect cosmic punishment for sacred violations because they believe that blasphemous acts have violated the laws of nature, then they should continue to expect more cosmic punishment for sacred violations compared to secular violations, convention violations, and non-violations even after the violations have been punished by society.

8.1. Method

8.1.1. Participants

We based our sample size on the power analysis conducted in Study 4a (as we used similar materials). We posted a survey seeking 272 participants on Cloud Research. A total of 271 participants completed the survey ($M_{age} = 38.25$ years, $SD = 10.97$; 99 women, 170 men, 2 other; all born and residing in the US). Next, we conducted a sensitivity analysis using G*power for the one-way ANOVA with $\alpha = 0.05$, power = 0.80, $N = 271$ (the final sample size), number of groups = 4 (sacred, secular, convention, no violation) and found that and found that study is properly powered to detect an effect size of $f = 0.20$, $\eta_p^2 = 0.04$ (G*Power estimate).

8.1.2. Procedure

Participants read similar vignettes as in Study 4a about a protagonist named Maria, who is an Italian tourist visiting a fountain where we varied whether the act of tossing coins into a fountain pool violates a sacred rule, secular rule, or convention. In this study, however, we framed the act of tossing coins into the pool (an act of commission) rather than refraining from tossing coins into the fountain pool (an act of omission) as the violation. Therefore, in the *convention condition*, we framed the behavior in terms of prevalence “Most tourists that visit Bari do not toss coins into the fountain pool.” In the *secular condition*, we

framed the behavior in terms of a pro-social act: “The people of Bari get annoyed with those who toss coins into the fountain pool as it is expensive to maintain” In the *sacred condition*, we framed the behavior in terms of a time-honored tradition “People believe that the fountain pool is sacred and thus it is a taboo to toss coins into the fountain pool.” In the *no-violation condition*, participants were not given any additional information.

In all conditions, participants were told that Elena visits the fountain and tosses two coins into the fountain pool and that a policeman fines Elena (i.e., she receives social punishment) for her actions.

8.1.3. Cosmic punishment

We measured participants' expectations of cosmic punishment by asking them to rate whether it made sense (on a 1 not at all – 7 totally scale) if Elena experienced misfortunes (e.g., a bird poops on her shirt, he slips and breaks her arm), positive fortunes (e.g., she finds \$100 bill on the street, he wins a game of poker), or filler neutral outcomes (e.g., her dog wants to go outside, her cousin calls to say hello). Ratings of misfortunes and (reverse-scored) fortunes formed an index of *cosmic punishment* ($\alpha = 0.79$).

8.2. Results

A one-way ANOVA with condition (Sacred, Secular, Convention, No Violation) as the predictor and expected cosmic punishment as the outcome was significant $F(3,274) = 13.881, p < .001, \eta_p^2 = 0.135$. As predicted, LSD contrasts found that people expected more expected cosmic punishment for the sacred violation ($M = 4.62, SD = 1.36, 95\% CI [4.35, 4.90]$), compared to the secular violation ($M = 3.74, SD = 0.097, 95\% CI [3.36, 4.01]$) $t(266) = 4.54, SE = 0.195, p < .001, d = 0.78$, the convention violation ($M = 3.63, SD = 1.09, 95\% CI [3.36, 3.91]$), $t(266) = 5.00, SE = 0.197, p < .001, d = 0.87$ or the no violation condition ($M = 3.48, SD = 1.06, 95\% CI [3.21, 3.74]$) $t(266) = 5.90, SE = 0.195, p < .001, d = 1.00$. Also as predicted, no condition differences were observed between the secular and no violation condition $t(266) = 1.33, SE = 0.193, p = .185, d = 0.22$, or the convention and no violation condition $t(266) = 0.800, SE = 0.195, p = .424, d = 0.13$. We also found that people expected similar degrees of cosmic punishment for the secular and convention violations $t(266) = 0.511, SE = 0.197, p = .610, d = 0.09$. See Fig. 5.

8.3. Discussion

As expected, we found that after the violations received societal punishment, participants anticipated more cosmic punishment for

sacred violations compared to secular violations, convention violations, and non-violations. In contrast, after secular and convention violations received societal punishment, participants anticipated baseline levels of cosmic punishment for these actions. That is people expected the similar degrees of cosmic punishment for secular violations and convention violations as non-violations. This finding indicates that people expect cosmic punishment to follow sacred violations irrespective of societal punishment. However, cosmic punishment (above baseline levels) is no longer anticipated for secular and convention violations when the violations have already been punished by society.

Work on just-world beliefs by Harvey et al. (2017) has found that people are less likely to engage in immanent justice reasoning after wrongdoers have received “just deserts.” That is, people are less likely to expect cosmic punishment for a wrongdoer if the wrongdoer has already been punished for their actions. In making a distinction between the different types of wrongdoing (sacred, secular, convention) and the different sources of punishment (cosmic vs. societal), we extend this line of work. We find that participants expect more cosmic punishment for sacred violations than non-sacred violations irrespective of societal punishment. Sacred violations may be especially linked to cosmic punishment; people expect freak accidents to follow these violations even after they have received societal punishment.

9. General discussion

Across five studies, we found that people expect more cosmic punishment for transgressions of sacred rules than secular rules or conventions (Studies 1–3), even though actions may be socially punished (Study 4a), and even after actions have already received societal punishment (Study 4b). In Study 1, people anticipated an individual who violated a sacred norm (i.e., by having sex with their first cousin) as more deserving of cosmic punishment than an individual who violates a secular moral norm (i.e., by having sex with their subordinate), social convention (i.e., by having sex with a family associate) or does not violate any norm (i.e., by having sex with a romantic partner). In Study 2, we replicated these findings by relying on norms about sacred symbols in the United States. Americans anticipated a person to receive more cosmic punishment when they violated a sacred norm (i.e., by eating the national symbol, a bald eagle) compared to when they violated a secular norm (i.e., by eating a puffin, an endangered species), convention (i.e., by eating an emu, an unusual form of poultry), or did not violate any norm (i.e., by eating chicken). In Study 3, we replicated findings from Studies 1–3 relying on temple attire norms among a different cultural group (i.e., Hindus). In all three studies, participant expectations of cosmic punishment were associated with the perceived blasphemy of the

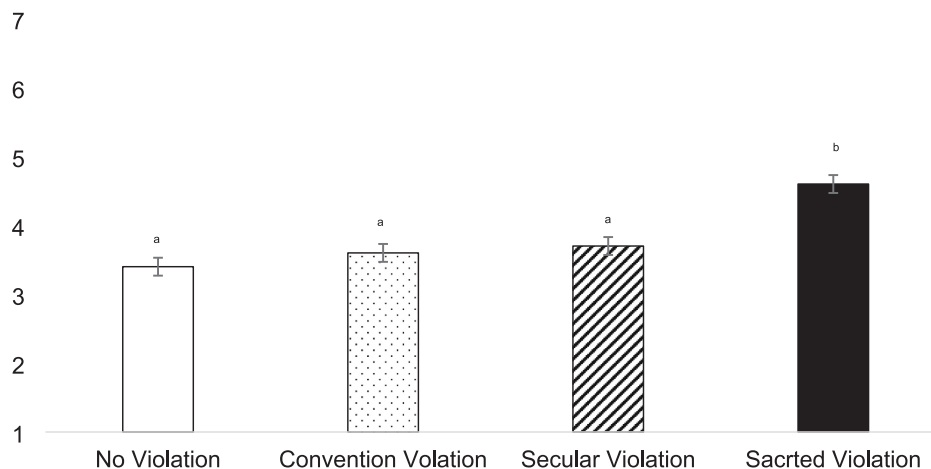


Fig. 5. Means for expected cosmic punishment towards the norm violator, after each violation, has been punished by society, by condition. Note. Error bars indicate standard errors of the means. Different superscripts denote significant differences, $p < .05$.

act, more so than with the act's perceived harm, immorality, or uncommonness. In Study 4a and 4b, we framed the same behavior as violating either a sacred rule, a secular rule, or a social convention, and measured participants' expectations of cosmic punishment over and above societal punishment. We found that people anticipated more cosmic punishment for sacred violations than other violations over and above expectations of societal punishment (Study 4a). People also anticipated more cosmic punishment for sacred violations compared to other violations *after* the acts had received societal punishment (Study 4b). Taken together, these studies suggest that sacred violations evoke expectations of cosmic punishment, irrespective of societal punishment.

9.1. Theoretical contribution

The current research extends research on just-world beliefs and immanent justice reasoning. Firstly, in drawing a distinction between different classes of wrongdoing, we find that people expect more cosmic punishment for sacred violations (i.e., blasphemous acts) than secular violations (i.e., harmful or unfair actions) and convention violations (i.e., peculiar actions). We found support for this hypothesis with sacred violations that were perceived as similarly harmful and immoral as secular violations and as uncommon as convention violations. We found that perceived blasphemy of an action most strongly predicts expectations of cosmic punishment. Second, our studies experimentally distinguish between misfortunes that are cosmically mediated (i.e., by random non-human systems) versus those that are socially mediated (i.e., by non-random human agents and systems). We find that although people anticipate some degree of cosmic punishment for all types of (unpunished) violations, the relationship between secular and convention violations and cosmic punishment is qualified. Secular and convention violations likely evoke expectations of cosmic punishment in the absence of societal punishment. However, sacred violations evoke expectations of cosmic punishment irrespective of societal punishment. Thus, in this paper, we highlight that the different spheres of justice (cosmic and societal) may operate independently in people's minds.

The current research also extends work on sacred values. Here we find that sacred rules indeed have a connection with sacredness and with the supernatural. Specifically, many sacred prohibitions (e.g., not eating bald eagle) are "secular" rather than religious in nature. Thus, it is not obvious why they are labeled "sacred" values. We extend work on sacred values (Atran, 2002; Tetlock, 2003) by finding that people connect even non-religious sacred issues with the supernatural, such that they expect violations of these non-religious sacred rules to be met with cosmic punishment delivered by non-human forces. Our research suggests that sacred values, irrespective of whether they are religious or non-religious in nature, involve a special psychology of the supernatural.

We contribute to the literature on social norms by demonstrating that sacred rules are not just "stricter" versions of injunctive norms that people "defend with force" (Anderson & Dunning, 2014, p.723; see also Cialdini et al., 1991). Instead, sacred norms are likely qualitatively distinct from injunctive norms as unlike injunctive norms (i.e., secular norms) sacred norms evoke expectations of cosmic punishment irrespective of societal punishment. Thus, people expect sacred rules to operate in ways distinct from injunctive norms.

Our studies extend past research on fate judgments (Risen, 2016; Risen & Gilovich, 2008). Work on "tempting fate" has found that when misfortunes match superstitious beliefs (e.g., forgetting an umbrella leads to increased chances of rain), people tend to engage in counterfactual thinking, creating an intuitive association between superstitious beliefs and domain-specific bad luck. Here, we find that people associate even unmatched misfortune with sacred transgressions. For example, participants rated that losing a card game made sense after eating a bald eagle and that contracting coronavirus was sensible after wearing shoes inside a temple. Thus, we propose a novel intuitive process involved in magical thinking about misfortunes: acts of blasphemy that disturb the "natural order of the world" elicit anticipations of general and even

unmatched cosmic misfortunes.

9.2. Implications

This research identifies a form of magical thinking, and circumstances under which people may see others as prone to aleatory negative events. Our research may be particularly important in the aftermath of natural disasters and global health pandemics, as our findings suggest that people may retrospectively justify this type of aleatory misfortune by attributing it to a person's social transgressions, even if the transgression has already accrued punishment and even if the transgression does not objectively harm others or violate others' rights. For example, in our studies, we found that people thought getting sick from eating oysters was more likely for a person who had violated a sacred norm (that did not harm or inconvenience anyone else) compared to a person who had violated norms that inconvenienced others. Importantly, this remained true even when the sacred violator had accrued social punishment by being reprimanded by a police officer for violating the sacred norm.

9.3. Summary

In sum, here we find that people particularly associate cosmic punishment with sacred transgressions, i.e., victimless, but blasphemous wrongdoing. Our studies shed light on how "non-rational" norms involving no direct pro-social benefit when followed, and victims when violated (i.e., sacred norms) may persist over time. Cultural models of cosmic punishment may thus work not only to promote cooperation among group members (Norenzayan, 2013) but also the continuity of the group's sacred symbols and rituals.

Open science practices

Open Data: Data sets for all five studies in this investigation can be found at: https://osf.io/bqa2d/?view_only=d3b8a76837024c8d8622d78069076e36

https://osf.io/bqa2d/?view_only=d3b8a76837024c8d8622d78069076e36

Open Materials: Verbatim materials used in the study are reported in Supplementary Materials.

Pre-registration: We pre-registered the hypothesis, method, and analysis plan for Study 1 at https://osf.io/w3rkq/?view_only=62d30f2e15b34777937259e8cf58de58

Data availability

I have shared my data at: https://osf.io/bqa2d/?view_only=d3b8a76837024c8d8622d78069076e36

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2023.104458>.

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