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SUPPLEMENTARY INFORMATION

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Global evidence of extreme intuitive moral prejudice against atheists

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Supplementary Information

Supplementary Methods

Baseline Methods

Here is the baseline set of methods. Some countries tweaked elements of this (e.g., used different religious categories, measured political attitudes differently). These differences are noted in their data, translated methods, and in the data summaries.

Methods

The methods are simple: participants answered one representativeness heuristic question, three other logic puzzles that acted as a smokescreen, one item included to ensure people are paying attention (e.g., Oppenheimer, Meyvis, & Davidenko, 2009), and basic demographics.

I. Representativeness Heuristic task.

Participants began with a single representativeness heuristic task with a description of an unambiguously immoral character. Between subjects, we manipulated the contents of Option #2:

> *When a man was young, he began inflicting harm on animals. It started with just pulling the wings off flies, but eventually progressed to torturing stray cats and other animals in his neighborhood.*
>
> *As an adult, the man found that he did not get much thrill from harming animals, so he began hurting people instead. He has killed 5 homeless people that he abducted from poor neighborhoods in his home city. Their dismembered bodies are currently buried in his basement.*
>
> Which is more probable?
> 1. The man is a teacher
> 2. The man is a teacher and [does not believe in any gods. / is a religious believer.]

II. Attention Check.

> Here is a different type of question. SKIP THE NEXT QUESTION. It is only included to ensure that you are paying attention and reading directions. Do not leave an answer for the question about US presidents.
>
> Who is the current President of the United States of America?
> a) Barack Obama
> b) Mitt Romney
> c) Steve Perry

d) George Washington

We dropped participants who actually answered this question.

III. Distractor Items

A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? ____cents
If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____minutes
In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____days

IV. Suspicion check

What do you think this study is mainly about so far?

a) Stereotyping and prejudice
b) Logic and reasoning
c) Language fluency
d) Emotion perception
e) Memory

V. Demographics

1. How old are you? _____
2. What is your gender?
   a. Male
   b. Female
   c. Other

3. What is your religious affiliation?
    a. Christian (Catholic)
    b. Christian (Baptist)
    c. Christian (Other)
    d. Hindu
    e. Buddhist
    f. Muslim
    g. Jewish
    h. Sikh
    i. None
    j. Atheist
    k. Agnostic
    l. Other (Please specify)

4. How strongly do you believe in God or gods (from 0-100)? To clarify, if you are certain that God (or gods) does not exist, please put "0" and if you are certain that God (or gods) does exist, then put "100." _____

5. How would you describe your race/ethnicity?

    a. White/Caucasian
    b. Hispanic/Latino
    c. Black/African American
    d. American Indian/Alaskan Native
    e. Asian
    f. Native Hawaiian/Pacific Islander
    g. Mixed
    h. Other: _____

6. We are interested in your political beliefs. Would you consider yourself more liberal or conservative? Select an option below:
    a. Very liberal
    b. Liberal
    c. Slightly liberal
    d. Moderate
    e. Slightly conservative
    f. Conservative
    g. Very conservative

7. We are interested in how you perceive your life. Think of a ladder representing where people stand in [insert country here]. At the top of the ladder are the people who are the best off–those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off–who have

the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Imagine this rating scale represents the ladder. Where would you place yourself, relative to other people in [insert country here]?

   a. Rating scale from 0 (Bottom) to 10 (Top)

8. Location: City _____ State/Province _____

9. "What is the highest degree of education you have completed?"

   a. Some high school
   b. Completed high school or equivalent
   c. Some university/college
   d. Completed university/college
   e. Some postgraduate work
   f. Completed a postgraduate degree

Sampling and Demographics

Additional sampling and demographic information is presented in Supplementary Tables 1-4

Additional modeling details

All analyses were conducted in R[1-4].

Overall, 35.9% of the sample made errors in the control condition, whereas 64.1% made errors in the experimental Atheist condition ($X^2=163.512, df=1, \Phi=.225, p<.001$). See Supplementary Table 2.

There was substantial heterogeneity by country in the error rates. Notably, 31.13% of the total sample (n=993) were from Finland, where the error rate in the experimental condition was only 28% which is similar to the baseline error rate of 26.7% in this country ($X^2=0.140, df=1, \Phi=.014 \cdot p=.709$). Country-level differences are in accordance with our experimental hypothesis that culturally evolved country level differences in anti-atheist prejudice.

The proportion of errors in both experimental conditions for each country are giving in Supplementary Table 2.

We next turned to estimate country level differences in religious belief. We first calculated an Interclass Correlation Coefficient for Belief in God by Country using a random coefficient model. This estimates the proportion of within country variation in religious belief relative to between country variation at the level of participants. The $ICC_{Belief} = 0.335$, indicating high levels of country-level clustering in religious belief, a finding consistent with other studies investigating global variation in religious belief (e.g., the World Values Survey).

Evidence of marked country-level heterogeneity both in experimental outcomes and in religious beliefs suggests the need to appropriately handle country dependencies.

We modelled the expected error rates using a Bayesian multilevel model in R using McElreath's Rethinking package[5]. Bayesian regression yields results with transparent and intuitive probabilistic interpretations: the posterior distributions that are generated are probabilistic distributions for modelled associations, which are conditional on the data, model, and priors. Priors for the effects modelled as fixed in the current study weakly regularizing, with a mean of zero and standard deviation of 1. Varying slopes and intercepts used adaptively regularizing priors[5]. The full model code is available at https://osf.io/f0upy/

Access to materials and data

All materials and methods (including translated materials for some countries), as well as all raw data, is available at the following link:

https://osf.io/f0upy/

Our initial study registration can be found here:

https://osf.io/f6tcr/

Our experimental methods were uploaded on November 12, 2013. Due to a technical oversight, formal preregistration did not occur until August 26, 2015. Experimental protocol went unchanged during this time.

Supplementary Notes

Atheist and maximum belief inferences

In the main manuscript, we report some inferences regarding atheist participants. To do so, we used our full model posterior and evaluated predictions at minimum level of belief on God (0 out of 100). Supplementary Table 5 summarizes inferences across all sites.

In the main manuscript, we report some inferences regarding participants at maximum belief in God. To do so, we used our full model posterior and evaluated predictions at maximum level of belief on God (100 out of 100). Supplementary Table 6 summarizes inferences across all sites.

Supplementary Studies

Study S1

Overview. Our primary cross-cultural experiment tested whether, when given a description of someone engaging in animal torture and serial murder, people intuitively assumed that the perpetrator was an atheist. Notably, this experiment focused on a rather extreme moral violation. In addition, the primary experimental contrast across conditions was between someone who "does not believe in any gods" and someone who "is a religious believer." This phrasing may have led participants to conflate issues of belief in a god with the broader construct of religiosity, which may connote additional norms and behaviors. To simultaneously address both of these concerns, we conducted a study in which we tested whether participants intuitively assume that the perpetrator of a more mundane moral violation is also an atheist. For symmetrical framing, we contrasted conditions in which the conjunction target was framed in terms of either belief or disbelief in God.

Method. We recruited 205 American participants from Amazon Mechanical Turk (Age: $M = 34.4$, $SD = 11.2$; Belief in God [0-100]: $M = 43.4$, $SD = 41.2$; 44% female). We presented participants with the following vignette of a mundane moral violation and conjunction question [experimental conditions in brackets]:

> "A 42 year-old woman was out of town on vacation. She had dinner at a restaurant, finished her meal, and left without paying the bill.
>
> Which is more probable?
> a) The woman is a teacher
> b) The woman is a teacher and [**does**/ **does not**] believe in God"

Results. As with main analyses, we utilized Bayesian estimation and present model predicted conjunction error probabilities [with 95% HPDIs]. Given a description of a mundane moral violation, participants were more likely to commit conjunction errors for targets who do not believe in God, .31 [.22, .40], than targets who do believe in God, .19 [.12, .26], posterior probability = .99.

Summary. Study S1 suggests that moral distrust is evident in—but not exclusive to—extreme moral violations. In addition, it appears that inferences about belief in God, rather than religiosity more broadly, are sufficient to generate these effects.

Study S2

Overview. Our primary cross-cultural experiment suggested that people intuitively assume that the perpetrators are likely to disbelieve in gods. It is possible that this intuition was not driven by an association between religion and moral restraint, but rather by a general disbelief bias: that, if all we know is something someone does not believe, we cannot infer what they do believe, and as such treat them as potential moral wildcards. Study S2 used the same extreme moral violation as the primary analysis and the conjunction task pitted targets who disbelieve in God against disbelievers of other stripes. We chose a disparate assortment of disbeliefs that span the political and religious spectra.

Method. We recruited 394 American participants from Amazon Mechanical Turk (Age: $M = 33.6$, $SD = 10.5$; Belief in God [0-100]: $M = 41.3$, $SD = 40.8$; 45% female). We presented participants with the same moral violation used in the main analysis, and provided potential targets who disbelieve in God, evolution, horoscopes, global warming, or vaccine safety (manipulated between subjects).

Results. As with main analyses, we utilized Bayesian estimation and present model predicted conjunction error probabilities [with 95% HPDIs]. Given a description of a mundane moral violation, participants were more likely to commit conjunction errors for targets who do not believe in God than targets who disbelieve in evolution, horoscopes, vaccine safety, or global warming, see Supplementary Table 7.

Summary. Our main study suggests extreme moral distrust of people who do not believe in gods. Study S2 suggests that this effect does not readily generalize to various other specific disbeliefs.

Study S3

Overview. Our primary cross-cultural investigation suggested that extreme moral violations are intuitively associated with atheists. However, it is possible that other extreme moral violations might, in fact, suggest a religious perpetrator. Specifically, given the prominence of sex abuse scandals in the Catholic church, it is possible that people might intuitively assume that the perpetrators of chronic child molestation might in fact be men of the cloth. In addition, none of our previous studies explored whether moral impropriety might outweigh other overt cues that one is religious in people's intuitive attributions of atheism to moral violators. Study S3 tested whether people would assume that a serial child molester who also happens to be a priest is, in fact, a priest who does not believe in God.

Method. We recruited 265 participants from the University of Kentucky campus in Lexington, KY, USA (Age: $M = 21.7$, $SD = 6.7$; Belief in God [0-100]: $M = 70.8$, $SD = 34.1$; 57% female). We presented participants with the following vignette [experimental conditions in brackets]:

> "Keith is a well-respected figure in his community. All his friends describe him as a very caring and friendly 60-year-old-man. However, Keith actually spends most of his free time luring young boys into his office to molest them. In the past 10 years, Keith has molested over 30 boys.
>
> Which is more probable?
> a) Keith is a priest
> b) Keith is a priest and [**believes**/ **does not believe**] in God"

Results. As with main analyses, we utilized Bayesian estimation and present model predicted conjunction error probabilities [with 95% HPDIs]. Given a description of a serial child molesting priest, participants were more likely to commit conjunction errors for targets who do not believe in God, .57 [.49, .65], than targets who do believe in God, .40 [.32, .48], posterior probability = .998.

Summary. Study S3 suggests that intuitive moral distrust extends to moral violations that could possibly be popularly associated with religious people (child molestation), given current events. Further, a description of immorality seemingly outweighed even overt evidence of religiosity, leading people to nonetheless assume that a perpetrator of serial child molestation does not believe in God, even though he is a priest.

Supplementary Tables

Supplementary Table 1. Sampling details.

Country	Sample	English	Payment	Contact
Australia	student	Y	credit	ilan.dar-nimrod@sydney.edu.au
China	community	N	money	buchtel@eduhk.hk
Czech Rep.	student	N	credit	eva.klocova@gmail.com
Finland	mixed	N	none	tapani.riekki@helsinki.fi annika.svedholm@helsinki.fi
Hong Kong	student	N	lottery	buchtel@eduhk.hk
India	community	Y	money	will.gervais@uky.edu
Mauritius	community	N	none	xygalatas@uconn.com
Netherlands	student	N	credit	M.vanElk@uva.nl
NZ	student	Y	lottery	joseph.bulbulia@gmail.com
Singapore	student	Y	credit	jonathanramsay@unisim.edu.sg
UAE	student	Y	credit	maveyard@aus.edu
UK	student	Y	lottery	Ryan.McKay@rhul.ac.uk
USA	student	Y	candy	will.gervais@uky.edu

Supplementary Table 2. Raw descriptive statistics: Proportion conjunction errors (with 95% CIs) for atheist and religious targets.

Site	*Atheist Error Rate*	*95% CI*	*Religious Error Rate*	*95% CI*
Australia	.53	[.42, .65]	.29	[.19, .40]
China	.69	[.59, .78]	.51	[.41, .62]
Czech Rep.	.51	[.40, .61]	.24	[.16, .34]
Finland	.28	[.24, .32]	.26	[.22, .30]
Hong Kong	.67	[.56, .77]	.34	[.23, .46]
India	.80	[.74, .86]	.39	[.32, .46]
Mauritius	.56	[.43, .68]	.27	[.19, .37]
Netherlands	.43	[.34, .53]	.25	[.17, .35]
New Zealand	.38	[.28, .49]	.29	[.20, .40]
Singapore	.78	[.68, .87]	.28	[.19, .39]
UAE	.77	[.66, .86]	.17	[.09, .28]
UK	.47	[.35, .58]	.29	[.19, .41]
USA	.65	[.56, .74]	.25	[.17, .35]
Aggregate	.52	[.50, .54]	.30	[.27, .32]

Supplementary Table 3. General demographics.

Country	Age *M* [*SD*]	Female %	Belief *M* [*SD*]	Educ. *Mdn*	SSES *M* [*SD*]	Cons. Pol. *M* [*SD*]
Australia	20.0 [5.12]	70	53.9 [38.5]	Some univ	6.60 [1.48]	3.53 [1.41]
China	29.8 [5.95]	63	28.7 [35.7]	University	6.84 [1.57]	3.38 [1.43]
Czech Rep.	22.0 [2.08]	68	47.2 [39.8]	--	3.53 [1.15]	4.47 [1.15]
Finland	28.1 [8.22]	73	31.3 [35.3]	University	5.99 [1.59]	--
Hong Kong	21.3 [3.39]	80	63.2 [36.1]	Some univ	4.90 [1.66]	2.89 [1.08]
India	32.3 [9.44]	65	85.0 [26.9]	University	4.93 [1.51]	3.34 [1.41]
Mauritius	21.7 [1.33]	47	76.5 [39.2]	Some univ	4.07 [4.06]	2.86 [1.42]
Netherlands	19.5 [2.14]	75	21.2 [29.9]	University	6.78 [1.45]	4.14 [2.75]
New Zealand	23.1 [7.94]	67	42.0 [39.5]	Some univ	6.01 [1.60]	2.69 [1.60]
Singapore	20.8 [1.69]	68	69.8 [30.3]	HS*	5.53 [1.48]	3.57 [1.30]
UAE	19.9 [1.56]	60	94.3 [18.9]	HS*	6.80 [1.34]	--
UK	25.1 [9.29]	67	35.1 [37.1]	Some univ	6.29 [1.78]	3.24 [1.23]
USA	19.1 [2.33]	80	83.4 [29.2]	Some univ	6.39 [1.50]	3.98 [1.56]
Aggregate	25.2 [7.99]	69	51.2 [41.4]	Some univ	5.58 [2.02]	3.49 [1.63]

*Median education was listed as "Completed High School" despite the fact that all students were at university ("Some University"). See Methods Packet in this document for disambiguation of items and scoring. SSES = subjective socioeconomic status. Cons. Pol = political attitudes, from 1 (Very liberal) to 7 (very conservative).

Supplementary Table 4. Religious demographics (%).

Country	Christian	Hindu	Buddhist	Muslim	None	Atheist	Agnostic	Other
Australia	41	2	4	4	14	15	15	5
China	4	--	18	--	--	75*		3
Czech	36	4	.5	1	3	31	18	6.5
Finland	42			.4	25	18	11	3.6
HK	33	--	3	--	--	60*		4
India	17	69	.2	10	.2	1	1	1.6
Mauritius	25	43	2	22	3	4	.6	.4
Neth.								
NZ	22	.6	3	1	71	2	0	.4
Singapore	28	7	30	5		30*		
UAE	4	4	1	84		.6*		6.4
UK	20	2	0	6	27	22	15	8
USA	79	0	.4	.4	10	4	5	1.2

* Notes: China and Hong Kong used slightly different religious ID options. Among other things, Atheist/agnostic was an option, rather than atheist or agnostic as separate choices. Dashes (--) indicate an option was not provided. Singapore used a "freethinker" category instead of none, atheist, and agnostic. UAE used "Non-Religious Other philosophy not listed here" category. Data taken from final data set, after dropping inattentive participants. Specific denominational demographics for the Netherlands are available in full posted dataset. Please contact Michiel van Elk for coding information.

Supplementary Table 5: Model summary at minimum belief in God (0 out of 100). Predicted conjunction error probabilities for both atheist and religious targets [with 95% highest posterior density intervals], along with relative risks [95% HPDI], and posterior probability of atheist target error rates exceeding religious target error rates, pr(A > R). Relative risk = pr(atheist target error) / pr(religious target error). UAE = United Arab Emirates, UK = the United Kingdom, USA = United States of America.

	Atheist	Religious	Relative Risk	pr(A >R)
Total	0.52	0.27	1.91	> .999
	[0.4, 0.64]	[0.22, 0.33]	[1.40, 2.45]	
Australia	0.48	0.27	1.81	.999
	[0.35, 0.59]	[0.19, 0.35]	[1.16, 2.51]	
China	0.65	0.40	1.63	> .999
	[0.55, 0.74]	[0.30, 0.51]	[1.18, 2.09]	
Czech Rep.	0.46	0.25	1.90	> .999
	[0.36, 0.56]	[0.17, 0.32]	[1.25, 2.65]	
Finland	0.24	0.24	1.00	.489
	[0.2, 0.28]	[0.20, 0.28]	[0.77, 1.24]	
Hong Kong	0.55	0.31	1.83	.999
	[0.43, 0.67]	[0.22, 0.40]	[1.19, 2.53]	
India	0.72	0.32	2.31	> .999
	[0.62, 0.8]	[0.24, 0.40]	[1.69, 2.95]	
Mauritius	0.49	0.26	1.92	.999
	[0.36, 0.61]	[0.18, 0.34]	[1.19, 2.73]	
Netherlands	0.43	0.26	1.70	.998
	[0.34, 0.53]	[0.19, 0.33]	[1.16, 2.34]	
New Zealand	0.36	0.28	1.33	.905
	[0.26, 0.46]	[0.20, 0.36]	[0.83, 1.86]	
Singapore	0.7	0.27	2.68	> .999
	[0.58, 0.81]	[0.18, 0.36]	[1.78, 3.79]	
UAE	0.65	0.22	3.12	> .999
	[0.52, 0.78]	[0.13, 0.31]	[1.81, 4.84]	
UK	0.42	0.27	1.58	.988
	[0.32, 0.53]	[0.19, 0.35]	[1, 2.19]	
USA	0.58	0.23	2.56	> .999
	[0.46, 0.69]	[0.15, 0.32]	[1.63, 3.68]	

Supplementary Table 6: Model summary at maximum belief in God (100 out of 100). Predicted conjunction error probabilities for both atheist and religious targets [with 95% highest posterior density intervals], along with relative risks [95% HPDI], and posterior probability of atheist target error rates exceeding religious target error rates, pr(A > R). Relative risk = pr(atheist target error) / pr(religious target error). UAE = United Arab Emirates, UK = the United Kingdom, USA = United States of America.

	Atheist	Religious	Relative Risk	pr(A >R)
Total	0.64	0.32	1.98	> .999
	[0.53, 0.74]	[0.27, 0.38]	[1.55, 2.41]	
Australia	0.6	0.32	1.93	> .999
	[0.49, 0.71]	[0.24, 0.41]	[1.32, 2.57]	
China	0.75	0.46	1.65	> .999
	[0.66, 0.84]	[0.35, 0.58]	[1.25, 2.14]	
Czech Rep.	0.59	0.3	2.02	> .999
	[0.48, 0.69]	[0.22, 0.38]	[1.41, 2.7]	
Finland	0.35	0.29	1.21	.904
	[0.28, 0.41]	[0.24, 0.35]	[0.89, 1.54]	
Hong Kong	0.67	0.36	1.88	> .999
	[0.56, 0.77]	[0.27, 0.46]	[1.31, 2.47]	
India	0.81	0.37	2.21	> .999
	[0.75, 0.87]	[0.30, 0.44]	[1.81, 2.63]	
Mauritius	0.61	0.31	2.01	> .999
	[0.5, 0.72]	[0.23, 0.39]	[1.42, 2.65]	
Netherlands	0.55	0.31	1.84	> .999
	[0.44, 0.65]	[0.22, 0.40]	[1.26, 2.45]	
New Zealand	0.49	0.33	1.49	.977
	[0.37, 0.6]	[0.24, 0.43]	[0.97, 2.06]	
Singapore	0.79	0.32	2.56	> .999
	[0.71, 0.87]	[0.23, 0.40]	[1.86, 3.36]	
UAE	0.76	0.26	2.97	> .999
	[0.66, 0.84]	[0.17, 0.35]	[1.98, 4.17]	
UK	0.54	0.32	1.73	0.997
	[0.43, 0.66]	[0.23, 0.42]	[1.16, 2.34]	
USA	0.7	0.28	2.56	> .999
	[0.61, 0.78]	[0.20, 0.36]	[1.85, 3.41]	

Supplementary Table 7: Predicted conjunction error rates across a variety of specific disbeliefs

Specific Disbelief	Point	Low HPDI	High HPDI	Posterior probability (relative to god)
God	0.55	0.43	0.66	---
evolution	0.26	0.15	0.36	>.999
horoscopes	0.32	0.22	0.44	>.999
vaccines	0.25	0.14	0.36	>.999
warming	0.38	0.27	0.50	0.98

Supplementary References

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