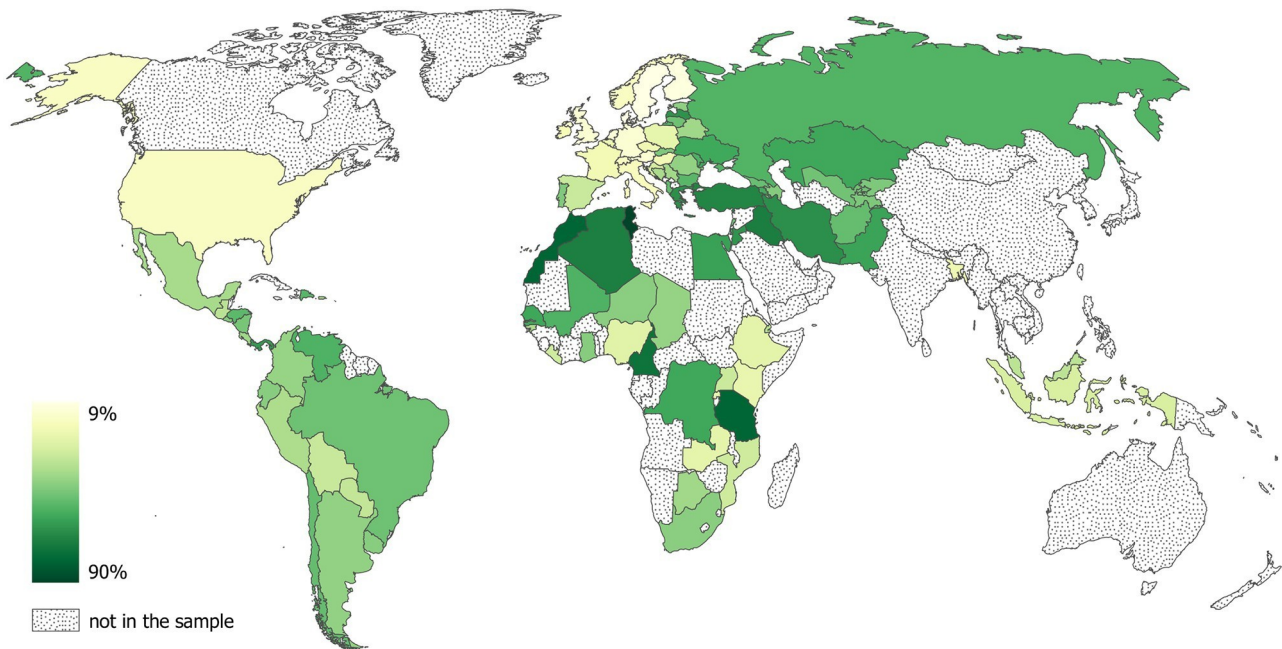


Global witchcraft inventory

2022-10-24



Percentage of people who believe in witchcraft

This file contains:

(1) PLOS. "Witchcraft beliefs are widespread, highly variable around the world, study finds: In new global dataset, witchcraft beliefs are associated with weak institutions, conformist cultures." ScienceDaily. ScienceDaily, 23 November 2022.
<www.sciencedaily.com/releases/2022/11/221123193702.htm>.

(2) Boris Gershman. Witchcraft beliefs around the world: An exploratory analysis. PLOS ONE, 2022; 17 (11): e0276872 DOI: 10.1371/journal.pone.0276872

(3) Supplementary material for (2)

[Assembled by Wergosum on 2022-10-24]

Witchcraft beliefs are widespread, highly variable around the world, study finds

In new global dataset, witchcraft beliefs are associated with weak institutions, conformist cultures

Date: November 23, 2022

Source: PLOS

Summary: A newly compiled dataset quantitatively captures witchcraft beliefs in countries around the world, enabling investigation of key factors associated with such beliefs.

FULL STORY

A newly compiled dataset quantitatively captures witchcraft beliefs in countries around the world, enabling investigation of key factors associated with such beliefs. Boris Gershman of American University in Washington, D.C., presents these findings in the open-access journal *PLOS ONE* on November 23, 2022.

Numerous prior studies conducted around the world have documented people's beliefs in witchcraft -- the idea that certain individuals have supernatural abilities to inflict harm. Understanding people's witchcraft beliefs can be important for policymaking and other community engagement efforts. However, due to a lack of data, global-scale statistical analyses of witchcraft beliefs have been lacking.

To deepen understanding of witchcraft beliefs, Gershman compiled a new dataset that captures such beliefs among more than 140,000 people from 95 countries and territories. The data come from face-to-face and telephone surveys conducted by the Pew Research Center and professional survey organizations between 2008 and 2017, which included questions about religious beliefs and belief in witchcraft.

According to the dataset, over 40 percent of survey participants said they believe that "certain people can cast curses or spells that cause bad things to happen to someone." Witchcraft beliefs appear to exist around the world but vary substantially between countries and within world regions. For instance, 9 percent of participants in

Sweden reported belief in witchcraft, compared to 90 percent in Tunisia.

Using this dataset, Gershman then conducted an investigation of various individual-level factors associated with witchcraft beliefs. This analysis suggests that, while beliefs cut across socio-demographic groups, people with higher levels of education and economic security are less likely to believe in witchcraft.

Gershman also combined this dataset with other country-level data, finding that witchcraft beliefs differ between countries according to various cultural, institutional, psychological, and socioeconomic factors. For instance, witchcraft beliefs are linked to weak institutions, low levels of social trust, and low innovation, as well as conformist culture and higher levels of in-group bias -- the tendency for people to favor others who are similar to them"

These findings, as well as future research using the new dataset, could be applied to help optimize policies and development projects by accounting for local witchcraft beliefs.

The author adds: "The study documents that witchcraft beliefs are still widespread around the world. Moreover, their prevalence is systematically related to a number of cultural, institutional, psychological, and socioeconomic characteristics."

Story Source:

Materials provided by **PLOS**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Boris Gershman. **Witchcraft beliefs around the world: An exploratory analysis.** *PLOS ONE*, 2022; 17 (11): e0276872 DOI: 10.1371/journal.pone.0276872
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Cite This Page:

MLA	APA	Chicago
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PLOS. "Witchcraft beliefs are widespread, highly variable around the world, study finds: In new global dataset, witchcraft beliefs are associated with weak institutions, conformist cultures." ScienceDaily. ScienceDaily, 23 November 2022.

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RESEARCH ARTICLE

Witchcraft beliefs around the world: An exploratory analysis

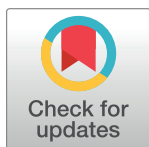
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Abstract

This paper presents a new global dataset on contemporary witchcraft beliefs and investigates their correlates. Witchcraft beliefs cut across socio-demographic groups but are less widespread among the more educated and economically secure. Country-level variation in the prevalence of witchcraft beliefs is systematically linked to a number of cultural, institutional, psychological, and socioeconomic characteristics. Consistent with their hypothesized function of maintaining order and cohesion in the absence of effective governance mechanisms, witchcraft beliefs are more widespread in countries with weak institutions and correlate positively with conformist culture and in-group bias. Among the documented potential costs of witchcraft beliefs are disrupted social relations, high levels of anxiety, pessimistic worldview, lack of entrepreneurial culture and innovative activity.



OPEN ACCESS

Citation: Gershman B (2022) Witchcraft beliefs around the world: An exploratory analysis. PLoS ONE 17(11): e0276872. <https://doi.org/10.1371/journal.pone.0276872>

Editor: Eugenio Proto, University of Glasgow, UNITED KINGDOM

Received: May 18, 2022

Accepted: October 15, 2022

Published: November 23, 2022

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Data Availability Statement: Data and replication code are publicly available at <https://doi.org/10.7910/DVN/MWC7BT>.

Funding: The author(s) received no specific funding for this work.

Competing interests: The authors have declared that no competing interests exist.

Introduction

I see witch beliefs as the standardized nightmare of a group, and I believe that the comparative analysis of such nightmares is not merely an antiquarian exercise but one of the keys to the understanding of society.

Monica Hunter Wilson (1951)

Beliefs in witchcraft, defined as an ability of certain people to intentionally cause harm via supernatural means, have been documented all over the world, both recently and in the distant past [1, 2]. Although extensive research on the subject has greatly contributed to our understanding of witchcraft beliefs, the bulk of available evidence comes from narrowly focused ethnographic case studies and qualitative cross-cultural comparisons. In contrast, formal statistical analyses, particularly at the global scale, have been lacking, in large part due to the paucity of data [3].

This paper presents a new global dataset on contemporary witchcraft beliefs that covers countries and territories representing roughly one half of the world's adult population. The data reveal that, far from being a remnant of the past limited to small isolated communities, witchcraft beliefs are highly widespread throughout the modern world. At the same time, there

are significant differences in their prevalence within and across nations, and we explore this variation at the individual and country levels.

Our individual-level analysis shows that witchcraft beliefs cut across socio-demographic groups and are negatively associated with age, education, and material well-being. Furthermore, witchcraft beliefs are positively correlated with belief in god and religiosity, but affiliation with Christianity (versus Islam) does not make a significant difference.

Guided by the key themes from the literature, our cross-country analysis focuses on the following four issues: 1) the role of witchcraft beliefs in maintaining conformity and self-governance, 2) their relationship to social capital, psychological well-being, and world outlook, 3) the link between witchcraft beliefs, innovation, and economic development, 4) exposure to misfortunes as a factor in sustaining witchcraft beliefs. We examine 60 characteristics and establish the following patterns. First, witchcraft beliefs are substantially more prevalent in countries with weak institutions and low quality of governance. Second, they are strongly positively correlated with measures of cultural conformity and in-group bias. Third, witchcraft beliefs are associated with the erosion of social capital manifested in low levels of trust and other antisocial attitudes and behaviors. Fourth, people in countries with more widespread witchcraft beliefs display lower levels of life satisfaction, diminished sense of control over life and self-efficacy, along with a higher degree of fatalism. Fifth, witchcraft beliefs are negatively related to creative culture and metrics of innovative activity. Sixth, there is a nonlinear, inverted-U relationship between standard metrics of economic development and the prevalence of witchcraft beliefs. Finally, there is mixed evidence on the role of exposure to misfortunes in promoting witchcraft beliefs. These patterns are robust to accounting for continental fixed effects and a number of potentially confounding characteristics, and are generally consistent with existing views on the costs and benefits of witchcraft beliefs in societies.

Our study relies on the working definition of witchcraft introduced above. This definition matches the survey question used to construct the main variables in our analysis, captures the essence of witchcraft beliefs, and is sufficient to build a basic conceptual framework explaining their behavioral consequences. The key idea of this framework is that witchcraft beliefs generate two types of fear, ubiquitous in communities where such beliefs are present: the fear of witchcraft attacks and the fear of witchcraft accusations and ensuing punishment. These fears affect people's attitudes and behaviors in fundamental ways as they seek to avoid provoking a witch and being labeled as one, which explains both the negative consequences and the social functions of witchcraft beliefs. The former include depleted trust and mutual help, anxiety and paranoid worldview, limited social mobility, avoidance of risks and unorthodox views or actions, disregard for creativity and innovation. On the flip side is the ability of witchcraft-related fears to generate cultural conformity and maintain group-level cohesion under the threat of punishment (in the form of bewitchment or accusation) for transgressing existing norms and challenging the status quo. Thus, our definition of witchcraft is both parsimonious and powerful enough to generate testable predictions, construct relevant survey-based metrics, and conduct an exploratory empirical analysis.

This paper contributes to the vast interdisciplinary literature on witchcraft beliefs, most recently summarized in [2, 3]. More specifically, it advances the emerging quantitative literature relying on observational data and experiments to investigate the present and historical roles of witchcraft beliefs across societies. Several earlier studies focused on social relations. [4] uses survey and ethnographic data to establish a negative association between witchcraft beliefs and several metrics of social capital, including trust, with a focus on regional variation within Sub-Saharan Africa. [5] conducts experiments in the northern Democratic Republic of the Congo and finds support for the adverse causal effect of witchcraft beliefs on trust. [6] shows that witchcraft-like beliefs among the Mosuo in China effectively split the local community

into separate networks and hamper inter-group cooperation. Looking at the historical determinants of witchcraft beliefs, [7] links contemporary variation in their prevalence across ethnic and ancestral groups in Sub-Saharan Africa and Latin America, respectively, to the uneven experience of transatlantic slave trade in the past. Witch trials, killings, and witchcraft-related conflicts have also been studied quantitatively, both in the context of contemporary Sub-Saharan Africa [8, 9] and historical Europe [10]. The present study expands the scale of analysis to the global level to pinpoint the key patterns relating to variation in witchcraft beliefs across individuals and countries.

A global dataset

The data on contemporary witchcraft beliefs come from a sequence of six survey waves conducted by the Pew Research Center (PRC) between 2008 and 2017 in cooperation with professional survey organizations and covering 95 countries and territories around the world. As detailed in Table A.1 of [S1 Appendix](#), 84 of these surveys represent 95% or more of the total adult population in respective countries. In the remaining 11 cases, representativeness rates vary from 70% in Chad to 94% in Afghanistan largely reflecting inaccessibility of certain areas due to armed conflict, political instability, local restrictions, or geographic remoteness (the results reported below are robust to the exclusion of these 11 cases from the sample). All of the interviews were conducted face-to-face with the exception of countries in Western Europe and the U.S., where surveys were implemented via telephone.

Overall, in their design and content the PRC surveys are similar to the “values surveys” (e.g., World Values Survey and European Values Study) and regional “barometers” (e.g., Afrobarometer and Latinobarómetro) widely used across social sciences to measure culture and conduct comparative analyses at the individual and country levels [11]. However, unlike these popular data sources, the PRC surveys were more focused on religious beliefs and, more importantly for the present study, included several questions that can be used to identify witchcraft believers. While the respondents were asked in various forms about the issues of magic, sorcery, and witchcraft, only one relevant question was present in every single survey: “Do you believe in the evil eye, or that certain people can cast curses or spells that cause bad things to happen to someone?” Although the reference to the evil eye belief, representing the fear of supernatural harm caused by envious glances [12], is somewhat confusing, the second part of the question captures precisely the concept of witchcraft adopted above and thus provides a unique way to pinpoint witchcraft believers in the entire merged survey sample. Altogether, the resulting dataset covers more than 140,000 individuals from 95 countries and territories in 5 continents. Over 40% of all survey respondents claimed to believe in witchcraft.

[Fig 1](#) maps the country-level prevalence of witchcraft beliefs around the world, computed as a fraction of “yes” answers to the above question in the total number of responses. Strikingly, the prevalence rates cover almost the entire possible range varying from 9% in Sweden to 90% in Tunisia, with a mean of 43%. Overall, a simple calculation based on the adult population data yields close to a billion believers in just the 95 countries in the sample, most certainly an undercount due to the sensitivity of the witchcraft question for at least some respondents.

Although the areas covered by the dataset represent roughly a half of the global adult population, [Fig 1](#) reveals several important gaps. Most notably, the surveys did not include China and India, the world’s most populous nations, and generally provide a rather poor coverage of East and Southeast Asia. This, of course, does not mean that witchcraft beliefs are irrelevant in these and other regions not represented in the sample, as the ethnographic literature makes clear, for example, in the cases of India [13], Southeast Asia [14], and Melanesia [15]. These regional gaps in coverage also reflect the focus of the PRC surveys on countries with

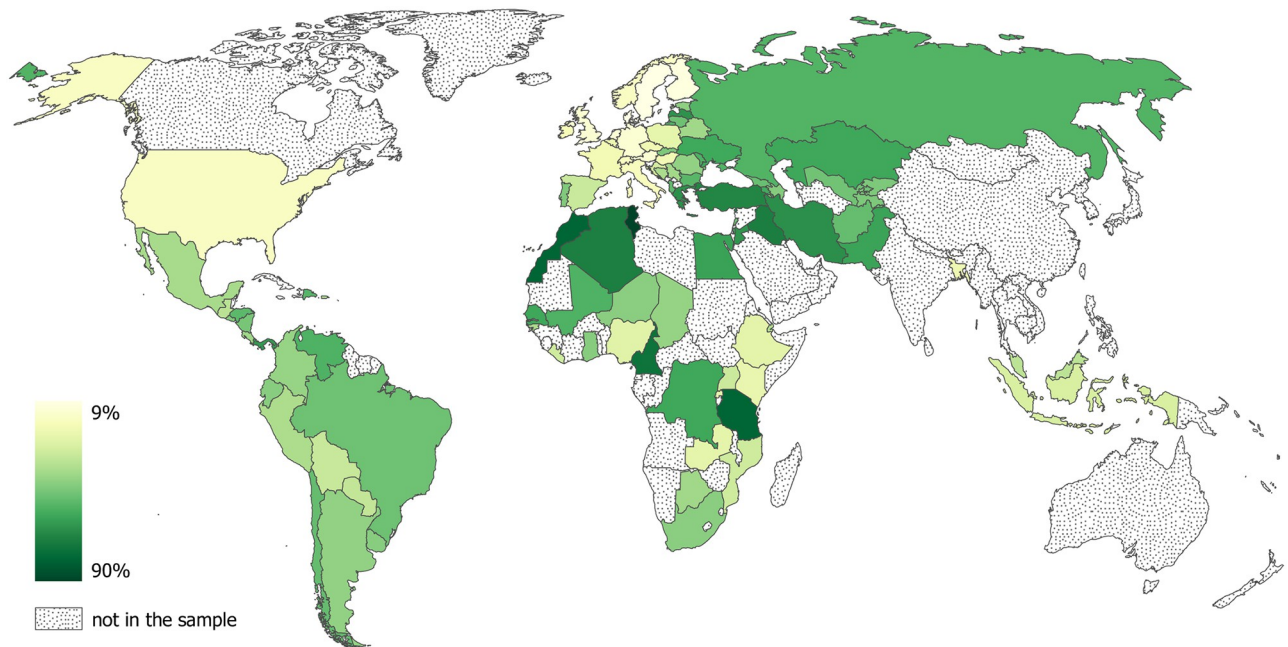


Fig 1. Witchcraft beliefs around the world. Author's work using country basemap from <https://www.naturalearthdata.com>.

<https://doi.org/10.1371/journal.pone.0276872.g001>

predominantly Christian and Muslim populations and the resulting lack of representation of other religions. Despite these caveats, our new dataset makes it clear that, first, witchcraft beliefs are a global contemporary phenomenon that is not restricted to just a few selected areas and, second, there is a substantial variation in their prevalence both across and within world regions providing an appealing basis for an exploratory analysis of this paper.

Before delving into cross-country patterns, we examine the socio-demographic correlates of personal witchcraft beliefs based on the individual-level data in the merged survey sample. Fig 2 shows the “raw” bivariate relationships, based on harmonized variable definitions across survey waves, whereas Table 1 reports estimates from regression models including various characteristics simultaneously while controlling for country fixed effects (and thus capturing relevant nation-level factors). Differences in sample size across the panels of Fig 2 and columns of Table 1 reflect data availability constraints. Most importantly, the personal economic situation question was not asked in Central and Eastern Europe and the U.S., while the urban location and household size variables are missing in the Western Europe wave. Note that, since each country is only covered in one survey wave, it is not feasible to additionally include wave or year fixed effects. For comparison, Table B.2 in S1 Appendix provides estimates for specifications of Table 1 when accounting for just the wave, but not country, fixed effects (these estimates are largely similar to the baseline reported below). Section A of S1 Appendix provides detailed definitions of all variables and Table A.2 in S1 Appendix presents summary statistics.

The bivariate patterns and regression estimates yield qualitatively similar conclusions. Witchcraft beliefs are slightly more prevalent among younger people, women, and urban residents in the raw data, although the role of gender is not robust across specifications in Table 1 and the urban location indicator is statistically insignificant in the regression setting. More educated and economically secure individuals are less likely to believe in witchcraft, as are those living in smaller households. Although these correlations are consistent with simple modernization theory, witchcraft beliefs are present across all socio-demographic categories

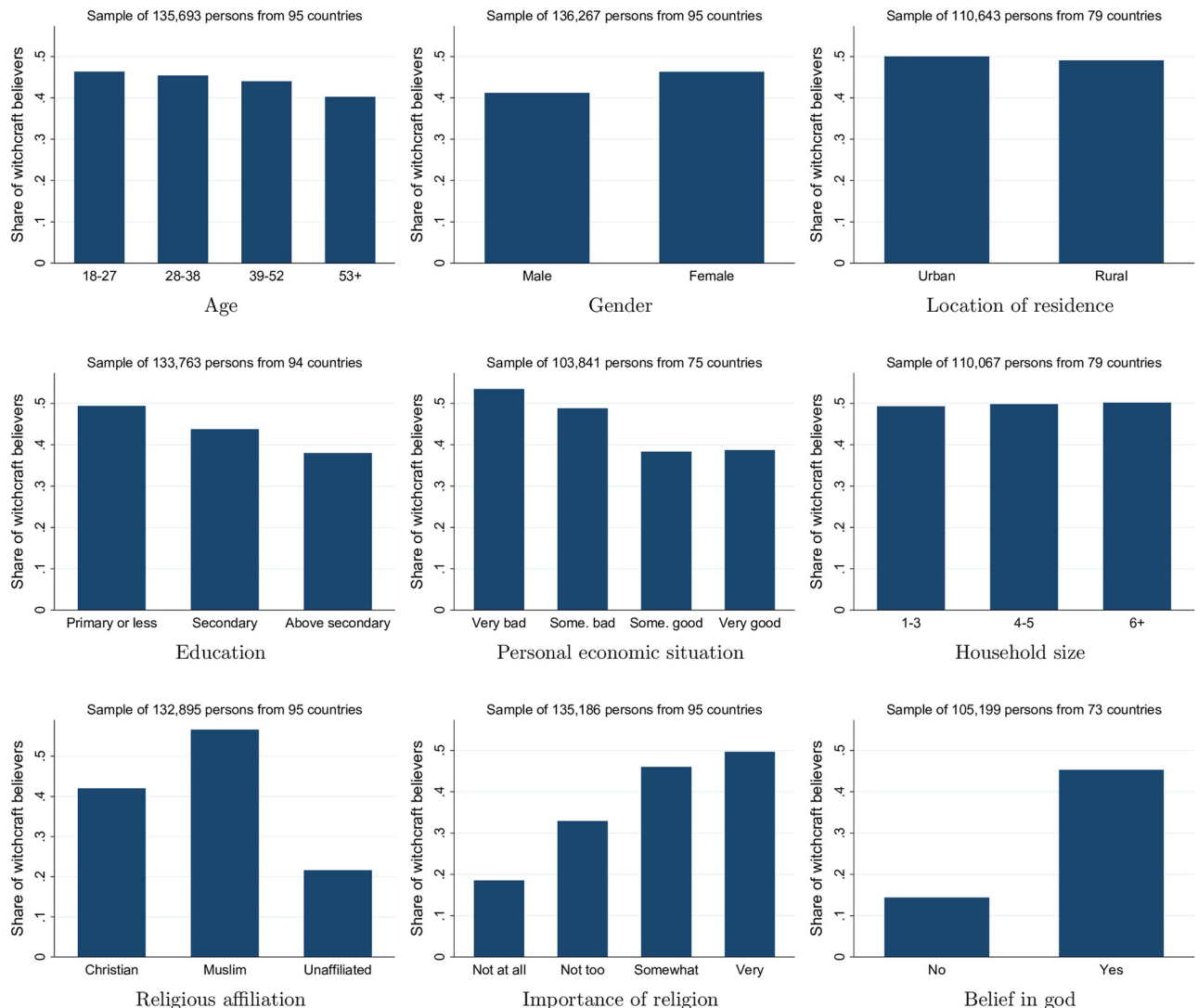


Fig 2. Socio-demographic correlates of witchcraft beliefs. In the sample underlying the religious affiliation panel, about 62% and 27% of respondents identify themselves as Christian and Muslim, respectively, while slightly over 10% are “unaffiliated.” Overall, 95% of witchcraft believers consider themselves either Christian or Muslim.

<https://doi.org/10.1371/journal.pone.0276872.g002>

and the group mean differences are relatively mild. The estimates in [Table 1](#) imply that, other things equal, an individual reporting a “very good” personal economic situation is 6–7 percentage points less likely to believe in witchcraft compared to someone in a “very bad” economic situation. Education “above secondary” relative to “primary or less” makes a quantitatively similar difference.

The relationship between witchcraft beliefs and religion is illustrated in the third row of [Fig 2](#). Although the bivariate correlation implies that the prevalence of witchcraft beliefs is higher among Muslims, this pattern is driven by cross-country differences. As shown in columns 6–8 of [Table 1](#), accounting for country fixed effects, that is, effectively comparing Christians and Muslims within countries where they coexist, there is no statistically significant difference in the prevalence of witchcraft beliefs between these two groups. Religiously “unaffiliated” individuals, including atheists and agnostics, are less likely to believe in witchcraft relative to

Table 1. Socio-demographic correlates of witchcraft beliefs: Regression estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.002 (0.002)	-0.006** (0.002)	-0.008*** (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.008*** (0.002)	-0.008*** (0.003)	-0.007** (0.003)
Gender: woman	0.048*** (0.008)	0.046*** (0.009)	0.016** (0.007)	0.011 (0.008)	0.010 (0.008)	0.039*** (0.008)	0.042*** (0.008)	0.011 (0.007)
Education: vs. "primary or less"								
Some or completed secondary		-0.037*** (0.008)	-0.034*** (0.008)	-0.033*** (0.009)	-0.034*** (0.010)	-0.032*** (0.008)	-0.043*** (0.008)	-0.030*** (0.009)
Above secondary		-0.079*** (0.013)	-0.070*** (0.014)	-0.068*** (0.015)	-0.070*** (0.016)	-0.070*** (0.012)	-0.084*** (0.012)	-0.065*** (0.015)
Econ. situation: vs. "very bad"								
Somewhat bad			-0.034*** (0.009)	-0.033*** (0.010)	-0.033*** (0.010)			-0.033*** (0.010)
Somewhat good			-0.071*** (0.010)	-0.057*** (0.010)	-0.058*** (0.010)			-0.059*** (0.011)
Very good			-0.069*** (0.012)	-0.066*** (0.014)	-0.066*** (0.014)			-0.065*** (0.014)
Household size: vs. 1–3								
4–5				0.004 (0.006)	0.004 (0.006)			0.003 (0.006)
6 and above				0.018** (0.009)	0.019** (0.009)			0.018** (0.008)
Urban resident					0.010 (0.009)			0.013 (0.009)
Religion: vs. Christian								
Muslim						0.014 (0.024)	0.013 (0.024)	-0.009 (0.029)
Unaffiliated						-0.060*** (0.016)	-0.033** (0.015)	0.019 (0.023)
Imp. of religion: vs. "not at all"								
Not too important						0.108*** (0.011)		0.058** (0.027)
Somewhat important						0.196*** (0.012)		0.107*** (0.029)
Very important						0.195*** (0.015)		0.107*** (0.029)
Belief in god							0.222*** (0.010)	
Observations	135,693	133,244	101,264	75,746	75,746	129,037	101,556	73,849
Countries	95	94	74	58	58	94	73	58

Notes. The binary dependent variable is personal belief in witchcraft. Maximum likelihood estimates of marginal effects from probit regressions are reported in all columns. Standard errors clustered by country are shown in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. Country fixed effects are included in all specifications. Age is measured in tens of years. Data are not weighted. The number of observations and countries for each specification reflects data availability constraints. Table B.1 in [S1 Appendix](#) presents (similar) estimates from the linear probability model.

<https://doi.org/10.1371/journal.pone.0276872.t001>

Christians (based on model specifications of columns 6 and 7) and Muslims (based on re-estimating these models after setting Muslims as the reference religious affiliation). Note that the coefficient estimate for the “unaffiliated” changes sign and becomes statistically insignificant in column 8. This happens because, due to missing data, the sample underlying this most demanding specification excludes the entire survey waves for Europe and the U.S., where most of the “unaffiliated” are found. Those who believe in god and consider religion to be an important part of their lives are also more likely to be witchcraft believers. Overall, religious and witchcraft beliefs, both centered on the key role of supernatural powers in life, go hand in hand.

Our analysis thus far shows that witchcraft beliefs are present throughout the world and cut across socio-demographic groups while also revealing certain regularities at the individual level. The following section examines cross-country variation in the prevalence of witchcraft beliefs and its links to cultural, institutional, psychological, and socioeconomic characteristics.

Cross-country patterns

In the spirit of an exploratory analysis, our main goal is to establish robust patterns of correlation rather than identify causal relationships, the latter being complicated by the challenge of finding quasi-experimental variation in witchcraft beliefs or any other country-level characteristics. To this end, we expand our dataset to include dozens of relevant variables constructed and compiled using a variety of data sources described in section A of [S1 Appendix](#). Note that all variables based on individual-level survey data, including the prevalence of witchcraft beliefs, are aggregated to the country level using appropriate weights provided in the original sources. Although the PRC surveys were conducted at somewhat different points in time between December 2008 and August 2017 (see Table A.1 of [S1 Appendix](#)), we consider country-level prevalence rates of witchcraft beliefs to be comparable within the sample: these rates are unlikely to change substantially within a period of several years, given the notorious persistence of religious beliefs and other cultural characteristics [16]. Furthermore, continental fixed effects included in the analysis to a significant degree reflect survey waves that were largely conducted by major geographic region. Summary statistics for all country-level variables are provided in Table A.3 of [S1 Appendix](#).

We formalize the analysis by estimating multivariate linear regression equations, in which witchcraft beliefs appear either on the left- or the right-hand side, depending on the theoretical hypothesis being explored and pre-existing evidence (fixing their position on the same side of the equation regardless of context does not change the qualitative results). For example, when considering the indicators typically viewed in the literature as the social costs, or consequences, of witchcraft beliefs, it is more natural to model the latter as an “independent” variable. In contrast, when exploring the hypothesized determinants of witchcraft beliefs, it is natural to view them as a “dependent” variable. Although this flexible approach makes the presentation and interpretation of results more convenient, it is important to be mindful of the correlational nature of cross-country relationships estimated below.

For consistency, we rely on a similar set of control variables across specifications. First, we include continental fixed effects (for Africa, Americas, Asia, and Europe) making sure that our estimates do not simply reflect differences across world regions. Second, we control for several key geographic characteristics, namely absolute latitude, terrain ruggedness, agricultural suitability of land, and distance to the coastline, all of which have been argued to represent important exogenous determinants of socioeconomic and cultural outcomes [17–19]. Third, in further robustness checks, we additionally account for potentially confounding endogenous characteristics including income per capita, religiosity, historical strength of kinship ties [20],

and the quality of institutions. We standardize the main variables of interest to have zero mean and unit standard deviation in relevant samples of countries and present estimation results graphically for their easy visual comparison across model specifications. Section C of [S1 Appendix](#) further illustrates selected patterns in the form of scatterplots.

Institutions and conformity

The idea that witchcraft-related fears enforce cultural conformity and social cohesion goes back to the classical work of Evans-Pritchard on the Azande [21] and Kluckhohn on the Navajo [22]. This “social control” function was shown to play a role in communities across the world, particularly where formal mechanisms of governance and conflict resolution are missing or defunct [23, 24]. It is in such cases that witchcraft beliefs may provide a useful alternative mechanism of maintaining order that benefits societies at the group level [25].

Fig 3 shows that, indeed, witchcraft beliefs are substantially more widespread in countries with weak formal institutions and low state capacity. The first set of metrics used for this analysis are expert-opinion-based indices of the rule of law, government effectiveness, control of corruption, efficiency of tax administration, legitimacy of political authorities, proper functioning of the justice system, and security of property rights, obtained from the Worldwide Governance Indicators and Institutional Profiles databases. The second set of metrics captures

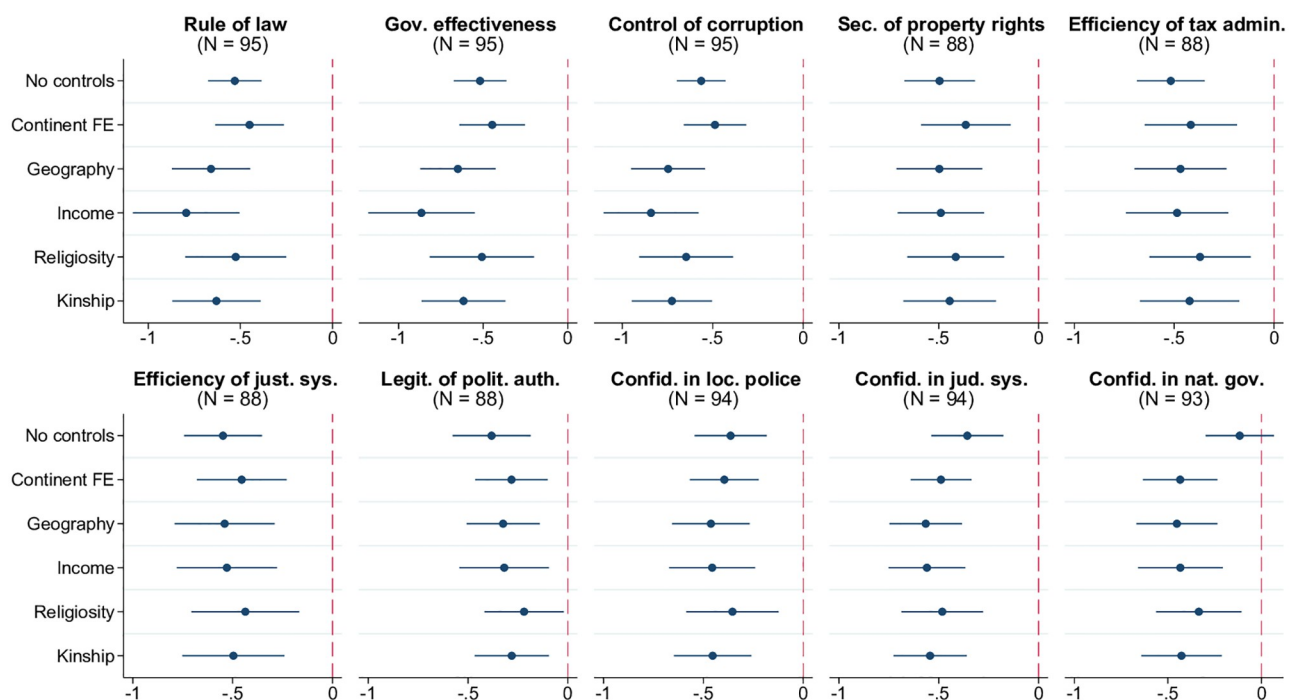


Fig 3. Witchcraft beliefs and institutions. Each panel of the figure presents the results of estimating 6 different models, in which the prevalence of witchcraft beliefs at the country level is regressed on the metric of institutions indicated in the panel title, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 3 models, named “Income,” “Religiosity,” and “Kinship,” include, respectively, real GDP per capita, average religiosity, and kinship intensity index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the respective index of institutions, and the linear segment around each marker is the corresponding 95% confidence interval based on heteroskedasticity-robust standard errors. Confidence intervals that do not cross the reference vertical line at 0 correspond to statistical significance of the respective point estimates at the 5% level. Sample size *N* indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

<https://doi.org/10.1371/journal.pone.0276872.g003>

perceptions of institutional quality based on public opinion surveys (namely the Gallup World Poll, hereafter GWP) and delivers the same message: witchcraft beliefs are more prevalent in countries with lower confidence in local police, judicial system, and national government.

This relationship is robust to potentially confounding characteristics, including income per capita, and is quantitatively important: for example, other things equal, a one-standard-deviation increase in the rule-of-law index is associated with an average reduction in the prevalence of witchcraft beliefs by more than 0.5 standard deviations (or 9 percentage points) in models accounting for geography, income, religiosity, and kinship tightness, in addition to continental fixed effects. Given this strong connection, the following analyses incorporate the rule-of-law index as an additional control variable.

The main channel through which witchcraft beliefs have been argued to maintain social cohesion is the enforcement of conformity due to expected punishment for norm violation in the form of witchcraft attacks or accusations. The patterns documented in Fig 4 support the close connection between witchcraft beliefs and conformism. The first set of relevant measures includes multiple scales capturing cultural conformity and tightness. The “embeddedness vs. autonomy” scale reflects the extent to which societies view their members as part of a group rather than independent individuals [26]. “Embedded” cultures operate against the disruption of traditional order and value obedience and conformity over creativity and independence. A similar dichotomy is captured by the well-known “individualism vs. collectivism” scale [27]. The first two panels in Fig 4 show that a higher prevalence of witchcraft beliefs is associated with lower degrees of autonomy and individualism. In addition, as illustrated in the next two panels, countries with more widespread witchcraft beliefs score higher on the “uncertainty avoidance” scale and lower on the “indulgence vs. restraint” scale reflecting reliance on rigid social norms, conservative values, and suppression of the basic human drive to enjoy life [27]. Consistent with these results, witchcraft beliefs are also negatively correlated with the cultural looseness index [28] capturing homogeneity of people’s values, norms, and behaviors in society.

The second line of evidence is based on more specific aspects of conformist culture. When asked about issues and character traits they consider valuable, respondents in countries with more widespread witchcraft beliefs are more likely to stress the importance of tradition and downplay the role of creativity and risk taking, based on the data from the World Values Survey (WVS) and the European Values Study (EVS). Similar conformist pattern is seen in the approaches to child socialization, both at home and in school, across societies where witchcraft beliefs are more common: independence and imagination are less frequently mentioned in WVS/EVS as important qualities to cultivate in children, while the prevalent style of instruction, as captured in the 2018 Global Competitiveness Report (GCR), is focused on memorizing and rule-following rather than promoting creative and critical thinking.

The last four panels of Fig 4 examine another dimension of conformity, namely the extent of in-group bias and xenophobic attitudes as captured by four different metrics. First, witchcraft beliefs are positively related to the gap between in- and out-group trust measured, respectively, as average trust across in-groups (family, neighbors, and other acquaintances) and out-groups (newly met individuals and people of another religion and nationality) based on WVS/EVS responses. Second, they are positively related to the share of blood donations to family members [20], although this correlation is sensitive to accounting for institutional quality. Third, in countries with a higher prevalence of witchcraft beliefs, people are less supportive of immigrants living in their country, becoming their neighbors, and marrying into their families, as captured by the lower values of Gallup’s migrant acceptance index. Finally, in-group bias in such societies is cultivated since childhood as shown in the lower importance attached to instilling tolerance and respect for other people in children (WVS/EVS).

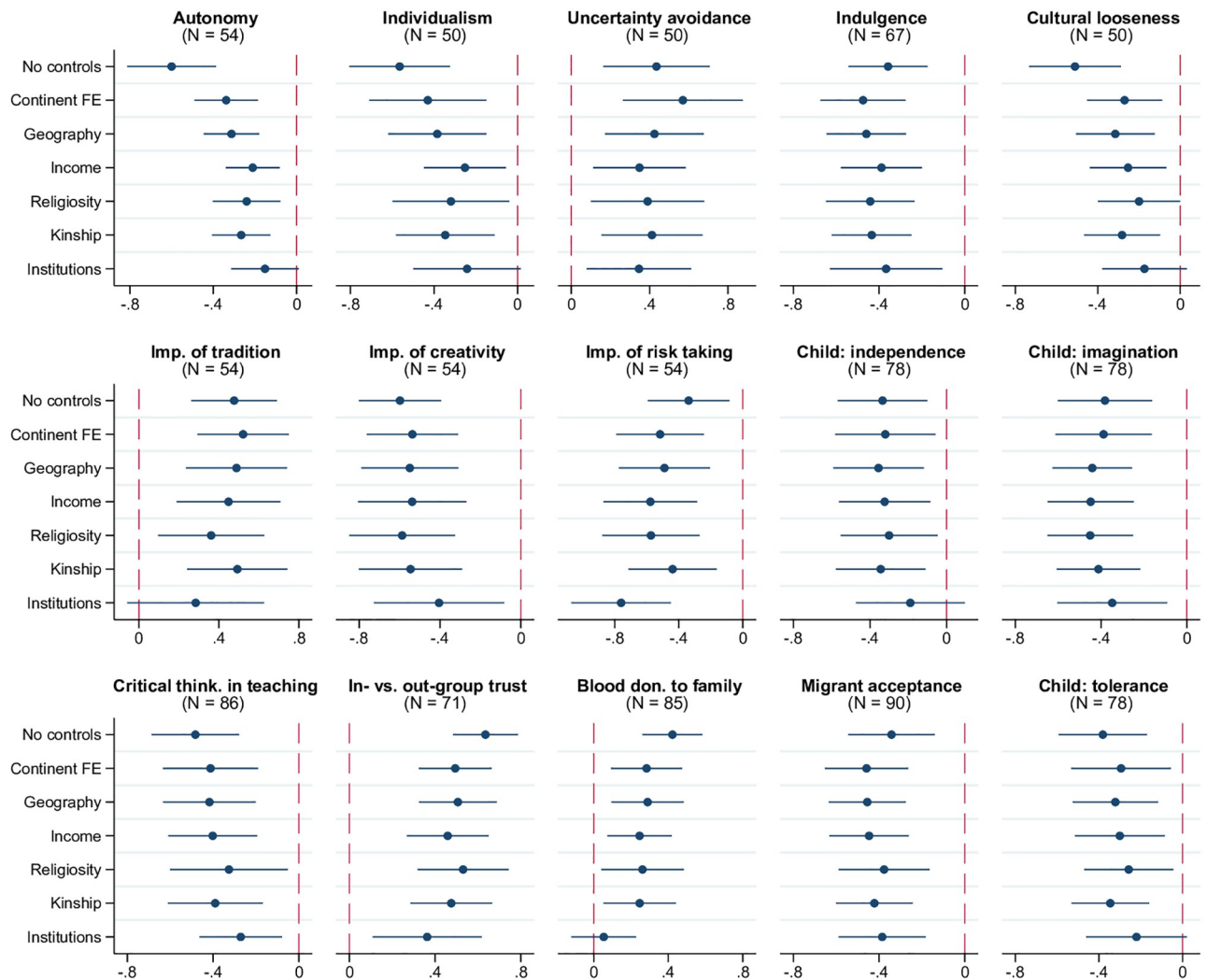


Fig 4. Witchcraft beliefs, conformity, and in-group bias. Each panel of the figure presents the results of estimating 7 different models, in which the metric of conformity indicated in the panel title is regressed on the prevalence of witchcraft beliefs, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 4 models, named “Income,” “Religiosity,” “Kinship,” and “Institutions” include, respectively, real GDP per capita, average religiosity, kinship intensity index, and the rule-of-law index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the prevalence of witchcraft beliefs, and the linear segment around each marker is the respective 95% confidence interval based on heteroskedasticity-robust standard errors. Sample size *N* indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

<https://doi.org/10.1371/journal.pone.0276872.g004>

The evidence presented so far supports the view that witchcraft beliefs represent a simple mechanism of self-governance and operate to maintain traditional order, promote conformism, and contribute to in-group cohesion. While this constitutes one of the plausible social benefits of witchcraft beliefs, it likely comes with a range of individual and social costs explored in the following sections.

Social relations, anxiety, and worldview

As argued in previous studies, witchcraft beliefs and related fears are associated with the erosion of social capital including diminished cooperation and mutual help, mistrust, and a

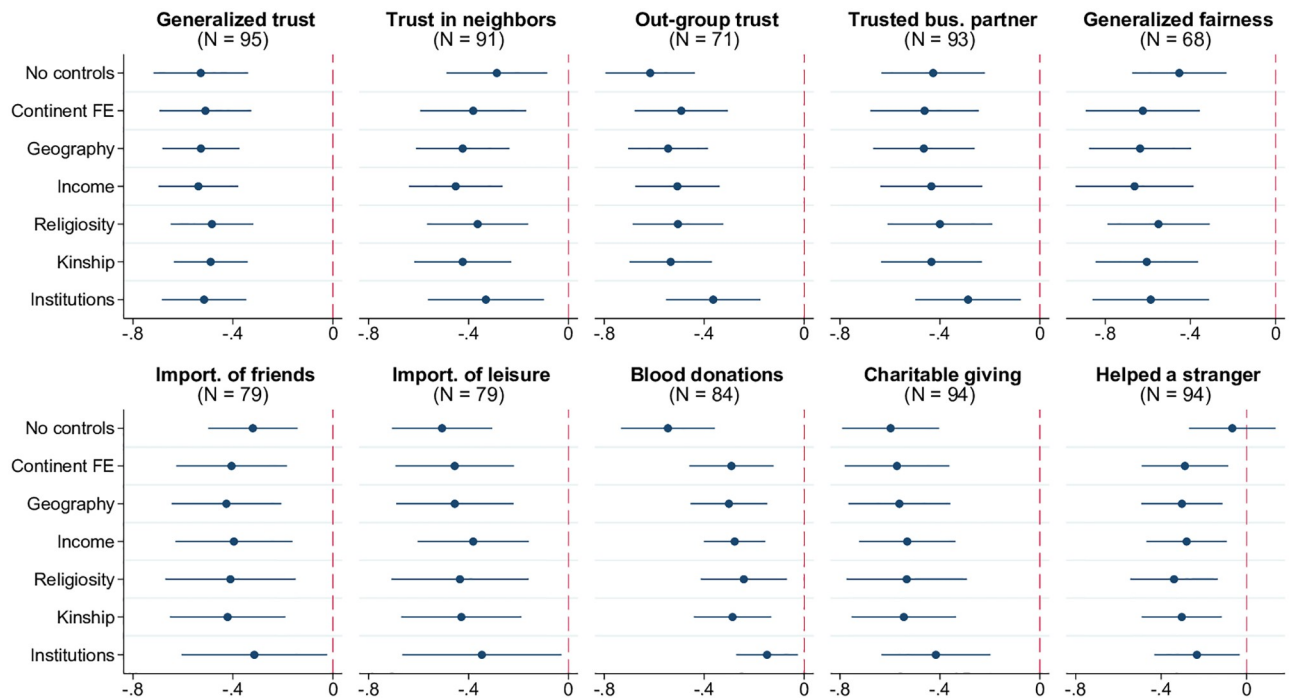


Fig 5. Witchcraft beliefs and ruptured social relations. Each panel of the figure presents the results of estimating 7 different models, in which the metric of social relations indicated in the panel title is regressed on the prevalence of witchcraft beliefs, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 4 models, named “Income,” “Religiosity,” “Kinship,” and “Institutions” include, respectively, real GDP per capita, average religiosity, kinship intensity index, and the rule-of-law index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the prevalence of witchcraft beliefs, and the linear segment around each marker is the respective 95% confidence interval based on heteroskedasticity-robust standard errors. Sample size N indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

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general lack of friendly social interactions [4–6, 29]. Consistent with this notion, Fig 5 shows that countries with more widespread witchcraft beliefs are characterized by strained social relations as manifested in lower levels of “generalized” trust, trust in neighbors, out-group trust, and a smaller share of people believing they can find a trusted business partner outside their own family (WVS/EVS; PRC; GWP). Closely related to mistrust is the diminished “generalized fairness,” that is, perception of people as trying to be fair rather than take advantage of others (WVS/EVS). Ruptured community relations are further reflected in lower importance of friends and leisure time in life, as reported in WVS/EVS. Finally, the last three panels in Fig 5 show that prosocial behavior, in addition to attitudes, is also negatively associated with witchcraft beliefs. This includes lower per capita levels of voluntary blood donations to non-family [20] and fewer positive survey responses regarding recent experiences of charitable contributions and helping strangers in need (GWP).

The same witchcraft-related fears that disrupt normal social relations have also been argued to drive anxiety and a pessimistic worldview. The stress-inducing impact of witchcraft beliefs is well-documented in both early ethnographic work on the subject and recent studies [22, 30–32]. Psychometric research also found that beliefs in the supernatural, including witchcraft, are generally associated with an external locus of control, that is, attribution of personal outcomes to outside forces such as chance and supernatural powers [33]. Cross-country evidence supports these links. As shown in Fig 6, residents of countries with widespread witchcraft beliefs

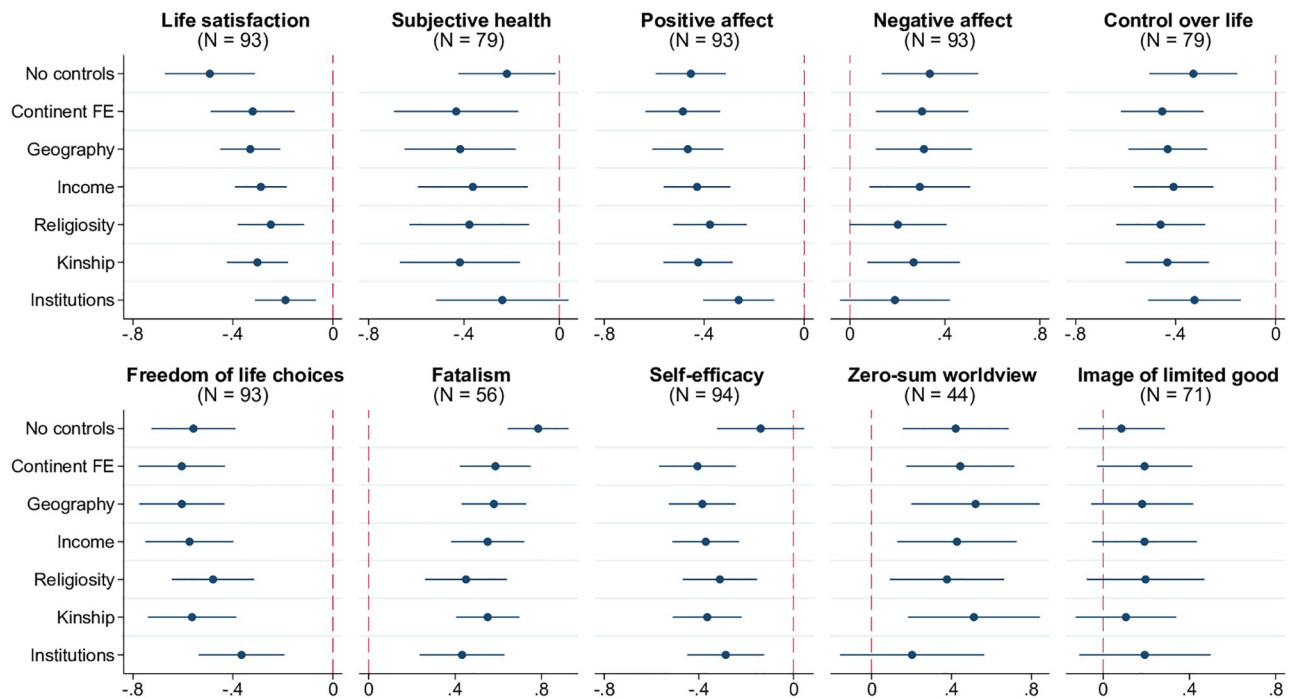


Fig 6. Witchcraft beliefs, anxiety, and worldview. Each panel of the figure presents the results of estimating 7 different models, in which the metric of anxiety or worldview indicated in the panel title is regressed on the prevalence of witchcraft beliefs, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 4 models, named “Income,” “Religiosity,” “Kinship,” and “Institutions” include, respectively, real GDP per capita, average religiosity, kinship intensity index, and the rule-of-law index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the prevalence of witchcraft beliefs, and the linear segment around each marker is the respective 95% confidence interval based on heteroskedasticity-robust standard errors. Sample size N indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

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have lower levels of life satisfaction, based on the 2019 World Happiness Report (WHR), and are more likely to assess the state of their health as poor (WVS/EVS). They also report fewer “positive affect” experiences of happiness, laughter, and enjoyment, and more “negative affect” experiences of worry, sadness, and anger (WHR). Furthermore, there is a very strong relationship between witchcraft beliefs and perceived lack of control over life (WVS/EVS) and inability to freely make life choices (WHR). They are also positively associated with fatalism (PRC) and negatively with self-efficacy, that is people’s belief in their ability to advance in life through own effort and hard work (GWP).

Closely related to fatalism and the lack of personal agency is the zero-sum mindset commonly underlying witchcraft accusations [7]. According to this view, one person’s gain is always someone else’s loss, and witchcraft is seen as a method to achieve individual success at the expense of other community members. [34] proposed a “belief in a zero-sum game” scale to capture such worldview at the country level. As shown in Fig 6, there is a positive relationship between this scale and the prevalence of witchcraft beliefs, although it loses statistical significance when controlling for the quality of institutions. A weaker positive correlation is also observed for the “image of limited good” [35] measure based on the WVS/EVS question asking whether “people can only get rich at the expense of others” or “wealth can grow so there is enough for everyone.”

Although eroded social relations, anxiety, and perceived loss of control over life are all plausible costly consequences of witchcraft beliefs, causality may simultaneously run in the opposite direction. For instance, by hampering cooperation, witchcraft beliefs may aggravate the living conditions of community members and increase the incidence of misfortunes driving mutual accusations. Similarly, by providing an “explanation” for the apparent lack of control over life and poor state of health, witchcraft beliefs may address the basic need for “making sense” of certain life events and coping with adversity and stress. In general, the apparent coexistence of witchcraft beliefs, poor social relations, and pessimistic worldview may be seen as a “cultural package” of mutually reinforcing antisocial beliefs and norms. This stands in sharp contrast to the prosocial cultural package typically associated with religions featuring moralizing high gods [36].

Innovation and economic development

The conformist culture and resistance to change promoted by witchcraft beliefs poses a threat to the process of innovation, a backbone of long-run economic growth. Country-level data from the GCR are consistent with this hypothesis, as shown in Fig 7. Similar to earlier results, there is a strong negative relationship between witchcraft beliefs and expert-opinion-based measures of innovative culture evaluating people’s appetite for taking entrepreneurial risk and the willingness of businesses to embrace disruptive ideas. Beyond attitudes, negative correlations also hold for standard metrics of actual innovative activity including patent applications, scientific publications, and the share of expenditures on research and development in GDP.

The interplay between witchcraft beliefs and economic development broadly defined is more complicated. As shown in the top row of Fig 8, there are no robust linear patterns involving standard measures of socioeconomic advancement such as real GDP per capita, poverty rate, life expectancy, mean years of schooling, and the composite human development index capturing income, health, and education (World Development Indicators; Penn World Table; GCR; Human Development Report). The absence of a simple relationship may be explained by the multitude of causal pathways connecting the variables of interest. On the one hand, witchcraft beliefs may inhibit the process of development through various channels described

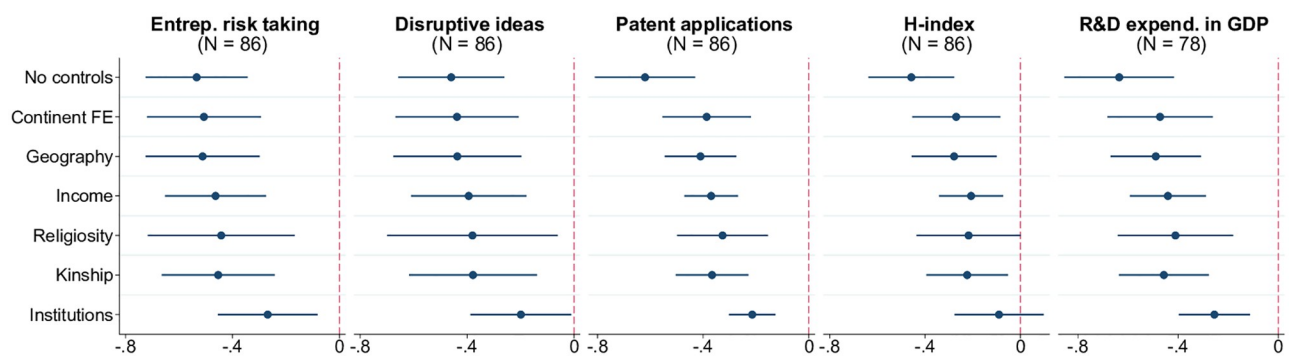


Fig 7. Witchcraft beliefs and innovation. Each panel of the figure presents the results of estimating 7 different models, in which the metric of innovation indicated in the panel title is regressed on the prevalence of witchcraft beliefs, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 4 models, named “Income,” “Religiosity,” “Kinship,” and “Institutions” include, respectively, real GDP per capita, average religiosity, kinship intensity index, and the rule-of-law index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the prevalence of witchcraft beliefs, and the linear segment around each marker is the respective 95% confidence interval based on heteroskedasticity-robust standard errors. Sample size N indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

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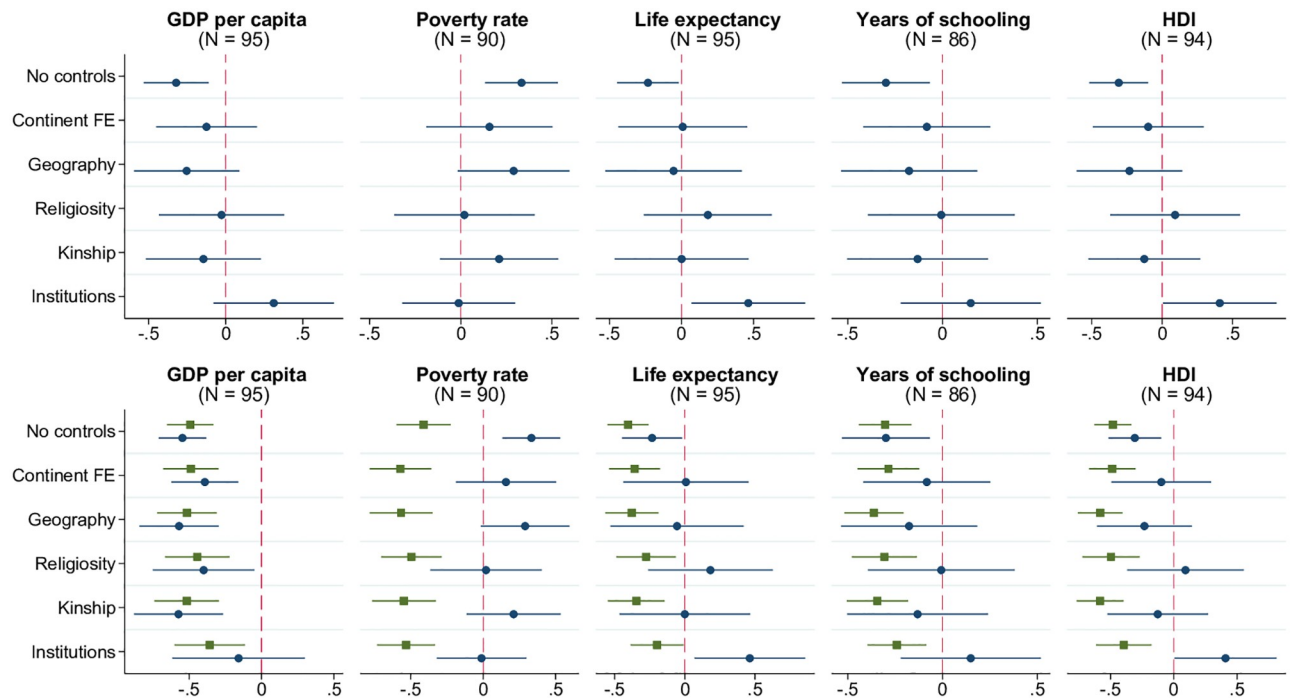


Fig 8. Witchcraft beliefs and development. Each panel in the top row of the figure presents the results of estimating 6 different models, in which the prevalence of witchcraft beliefs at the country level is regressed on the metric of development indicated in the panel title, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 3 models, named “Religiosity,” “Kinship,” and “Institutions” include, respectively, average religiosity, kinship intensity index, and the rule-of-law index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the respective development indicator, and the linear segment around each marker is the corresponding 95% confidence interval based on heteroskedasticity-robust standard errors. Model specifications for the bottom row of the figure are identical, but the right-hand side of the regression equation includes both the linear and quadratic terms for development indicators. The square and round markers and associated confidence intervals in the bottom-row panels correspond to the coefficient estimates on the square and linear terms, respectively. Sample size N indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

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earlier, including the erosion of social capital, promotion of anxiety and the culture of conformity, hampering entrepreneurial spirit and innovation. On the other hand, the rise in living standards and other aspects of development likely affect the prevalence of witchcraft beliefs, and the direction of this impact is a priori ambiguous. According to standard modernization theory, witchcraft beliefs should decline in the process of development due to improved security and health, lower exposure to shocks, spread of education and scientific approach to explaining life events. In contrast, the literature on “modernity of witchcraft,” largely inspired by observations from Sub-Saharan Africa, has argued that some aspects of development, namely rising inequality, globalization, technological change, and migration, may instead revive witchcraft beliefs by disrupting established social order [37].

Interestingly, as shown in the second row of Fig 8, there is a statistically significant *quadratic*, inverted-U-type association between development indicators and witchcraft beliefs. This nonlinearity suggests that, other things equal, countries at an intermediate level of development are characterized by the highest prevalence of witchcraft beliefs. One, admittedly speculative interpretation is that the “modernity” effect dominates at relatively early stages of development but eventually gives way to the “modernization” effect at higher levels of socio-economic maturity. Such pattern and its tentative interpretation are reminiscent of [9] which

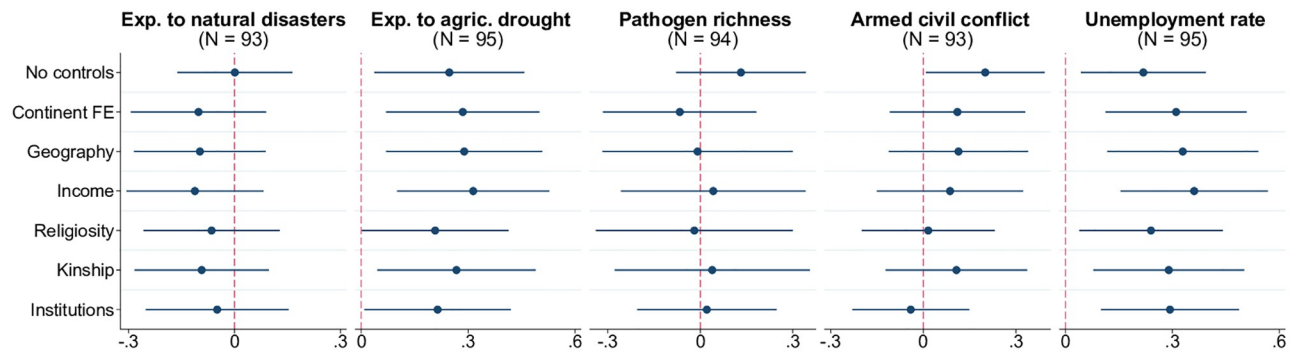


Fig 9. Witchcraft beliefs and exposure to misfortunes. Each panel of the figure presents the results of estimating 7 different models, in which the prevalence of witchcraft beliefs at the country level is regressed on the metric of exposure to misfortune indicated in the panel title, along with a set of control variables. The latter is defined as follows according to the tickmarks on the vertical axis: 1) none for “No controls”, 2) only continental fixed effects for “Continent FE”, 3) continental fixed effects and baseline geographic controls (absolute latitude, terrain ruggedness, agricultural suitability of land, distance to the coastline) for “Geography.” The remaining 4 models, named “Income,” “Religiosity,” “Kinship,” and “Institutions” include, respectively, real GDP per capita, average religiosity, kinship intensity index, and the rule-of-law index (in addition to continental fixed effects and geographic variables). The round marker represents the point estimate for the coefficient on the respective metric of exposure to misfortune, and the linear segment around each marker is the corresponding 95% confidence interval based on heteroskedasticity-robust standard errors. Confidence intervals that do not cross the reference vertical line at 0 correspond to statistical significance of the relevant point estimate at the 5% level. Sample size N indicated in parentheses. The key variables are standardized to have zero mean and unit standard deviation in relevant samples.

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found that witchcraft-related concerns and conflict across villages in eastern Sierra Leone were most prevalent in communities where traditional agrarian subsistence economy collided with new market-oriented developments. Specifically, the authors detected an inverted-U relationship between witchcraft salience and market integration measured as the degree of reliance on cash crop production. In their interpretation, communities “caught in the middle” between modern and traditional socioeconomic systems were the most vulnerable to manifestations of witchcraft.

Misfortunes

Through the ages, the most obvious purpose of witchcraft beliefs has been to provide an ultimate explanation for unfortunate events in people’s lives and thus help with coping. Examples of misfortunes historically and presently attributed to witchcraft include death, disease, weather shocks, crop failure, enslavement, accidents, business problems, joblessness, infertility, and marital issues [1, 7, 8, 38].

Fig 9 shows the country-level relationships between the prevalence of witchcraft beliefs and overall exposure to five types of misfortune: natural disasters (earthquakes, storms, floods, droughts, and rising sea levels, based on the 2020 WorldRiskReport), agricultural drought [39], diseases [40], armed civil conflict [41], and unemployment (World Development Indicators). The only two measures showing a robust positive correlation with witchcraft beliefs are exposure to drought, consistent with evidence on crop failures and weather shocks being important triggers of witchcraft accusations, and unemployment rate possibly reflecting the stress-inducing nature of joblessness in the modern world. This mixed overall evidence shows that aggregate shocks need not automatically lead to entrenchment of witchcraft beliefs in societies.

Conclusion

In her seminal paper quoted in the epigraph [42], Monica Hunter Wilson argued that comparative cross-cultural studies linking witchcraft beliefs to various aspects of societies are essential

for understanding the purpose and evolution of these “standardized nightmares.” This paper conducts such a comparative analysis of contemporary witchcraft beliefs at the global scale and reveals their robust association with many individual and country-level characteristics. Consistent with ethnographic evidence on their functional role in maintaining social order, witchcraft beliefs are positively related to conformist culture and are particularly widespread in countries with weak institutions. Witchcraft beliefs are also correlated with exposure to certain shocks such as agricultural drought and unemployment and may provide a coping mechanism for dealing with misfortunes. But these potential functions, or benefits, likely come at a steep cost of destroying the social fabric, contributing to anxiety and economic stagnation.

These multiple facets must be taken into account when considering the implications of witchcraft beliefs in the context of policy interventions, technological, institutional, and cultural changes. One attractive but potentially ineffective avenue is to focus on the large social costs of witchcraft beliefs and attempt drastic changes without thinking through the unintended consequences. An example of such an attempt are various anti-witchcraft laws implemented by colonial and current administrations in developing countries with the goal of preventing witchcraft accusations and persecutions. While reasonable on the surface, such laws have often been disregarded in practice or, even when enforced, raised rather than assuaged witchcraft-related fears since the alleged witches were viewed as being “let loose” and protected by the new laws [1, 43].

Another reasonable but superficial strategy is to focus on education, modernization, and promotion of a scientific worldview as solutions to the issue of witchcraft. While people with higher levels of education and economic security are indeed less likely to believe in witchcraft, these beliefs generally cut across socio-demographic strata. Furthermore, technological development, urbanization, and other aspects of globalization may actually revive rather than alleviate witchcraft concerns by rupturing pre-existing traditional social organization and triggering the conformity-inducing function of witchcraft beliefs and accusations [37]. A focus on instilling an understanding of natural rather than supernatural causes of misfortunes, such as disease or drought, would miss the long-known point about witchcraft [21]: for believers, it provides an ultimate and individualized explanation of misfortune, even when proximate causality mechanisms are well-understood. For instance, a person who accepts mosquito bites as a proximate cause of contracting malaria may, at a deeper level, still attribute a specific disease event to witchcraft.

Finally, an obvious danger is to simply disregard witchcraft beliefs as irrelevant when conducting policy interventions or development projects, that is, fail to take culture into account [44]. Policymakers and researchers may face implementation difficulties, if, for example, a certain project requires mutual trust, cooperation and communal effort, the kind of social capital that is typically lacking in societies with widespread witchcraft beliefs. They may also miss the unintended effects of a project due to witchcraft-related fears such as those that are likely to arise in case of unequal outcomes across community members, for instance, due to selective adoption of a new technology or a novel lending mechanism [45].

Given the goal of minimizing the costs of witchcraft beliefs while minding the functions they may perform in communities, a constructive way to think about policy implementation in this context is the “cultural mismatch” framework recently proposed in [16]. A mismatch happens if, due to its tendency for persistence as a result of intergenerational transmission, the prevalent culture becomes obsolete, that is, offers no clear benefits in the current socio-economic and institutional environment. Detecting a mismatch is instrumental for policy success since, in its presence, interventions aimed at cultural change are less likely to have undesirable side effects. In the case of witchcraft beliefs, an environment supporting their self-governance and “explanatory” functions is the one of institutional vacuum and vulnerability to external

shocks. In such societies, direct attempts to eradicate witchcraft beliefs via laws or curriculum changes are most likely to backfire. On the other hand, in communities where the fundamentals make witchcraft beliefs less relevant, that is, where local institutions effectively maintain order and a social safety net is in place to protect from adverse shocks, policies aimed at reducing the prevalence of witchcraft beliefs, and thus mitigating their costs, are more likely to succeed. The same approach to evaluating local fundamentals may be followed before considering development projects and other interventions in communities with a salient presence of witchcraft beliefs.

Supporting information

S1 Appendix. Supplementary information. This appendix provides further details of the data used in the study, robustness checks, and illustrations.
(PDF)

Acknowledgments

I am grateful to the editor and two anonymous reviewers for their useful comments. BINDERIYA Byambasuren and TINATIN MUMLADZE provided excellent research assistance.

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Writing – review & editing: Boris Gershman.

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S1 Appendix

Supplementary information

“Witchcraft beliefs around the world: an exploratory analysis”

by Boris Gershman

A Data details

Table A.1: Pew Research Center surveys

Country	Sample size	Representativeness	Excluded areas and/or residents
1. Tolerance and Tension: Islam and Christianity in Sub-Saharan Africa (12/2008–4/2009)			
Botswana	1,002	100%	
Cameroon	1,503	100%	
Chad	1,503	70%	Borkou-Ennedi-Tibesti (sparsely populated and unsafe), Mandoul, Moyen-Chari, Ouaddai, Salamat and Wadi Fira (unstable)
D. R. of the Congo	1,519	80%	Inaccessible and unstable areas, some conflict areas along the border with Rwanda
Djibouti	1,500	100%	
Ethiopia	1,500	100%	
Ghana	1,500	100%	
Guinea-Bissau	1,000	100%	
Kenya	1,500	100%	
Liberia	1,500	100%	
Mali	1,000	100%	
Mozambique	1,500	100%	
Nigeria	1,516	100%	
Rwanda	1,000	100%	
Senegal	1,000	100%	
South Africa	1,504	100%	
Tanzania	1,504	100%	
Uganda	1,040	100%	
Zambia	1,000	100%	
Total	25,091		
2. Religion and Public Life Survey B (8/2009)			
U.S.A.	2,003	100%	Non-continental U.S.

3. The World's Muslims (10/2011–11/2012)

Afghanistan	1,509	94%	Nomadic populations
Albania	788	98%	Some difficult-to-reach areas
Algeria	1,181	75%	Western region (due to an administrative error)
Azerbaijan	996	85%	Upper Karabakh, Nakhchivan, Kalbacar-Lacin
Bangladesh	1,918	100%	
Egypt	1,798	98%	Five sparsely populated frontier provinces
Indonesia	1,880	87%	Papua and other remote sparsely populated areas
Iran	1,519	100%	
Iraq	1,416	100%	
Jordan	966	100%	
Kyrgyzstan	1,292	100%	
Lebanon	551	98%	Areas of Beirut controlled by a militia group, a few villages near the border with Israel
Malaysia	1,244	100%	
Morocco	1,472	100%	
Niger	946	97%	Agadez
Pakistan	1,450	82%	Federally Administered Tribal Areas, Gilgit-Baltistan, Azad Jammu and Kashmir (security reasons), unstable areas in Khyber Pakhtunkhwa and Balochistan
Palestine	994	95%	Bedouins, some communities near Israeli settlements (due to military restrictions)
Tajikistan	1,453	99%	
Tunisia	1,450	100%	
Turkey	1,485	100%	
Uzbekistan	965	99%	
Total	27,273		

4. Religion in Latin America (10/2013–2/2014)

Argentina	1,512	99%	Tierra del Fuego, inaccessible or sparsely populated areas, villages with fewer than 400 people
Bolivia	1,503	90%	Villages with fewer than 110 people
Brazil	2,000	97%	Remote areas in the Amazon rainforest and interior parts of the Amazonian states
Chile	1,504	99%	Remote areas in the Atacama desert, mountains, on islands and in the far South
Colombia	1,508	97%	Remote areas in the Amazon rainforest and San Andrés island
Costa Rica	1,500	99%	Gated communities and multi-story residential buildings
Dominican Rep.	1,699	100%	

Ecuador	1,850	98%	Remote areas in the Galápagos and non-delimited areas between provinces
El Salvador	1,500	100%	
Guatemala	1,500	98%	Gated communities and multi-story residential buildings
Honduras	1,500	98%	Bay Islands, small urban populations of five departments, gated communities and multi-story residential buildings
Mexico	2,000	100%	
Nicaragua	1,500	99%	Gated communities and multi-story residential buildings
Panama	1,500	100%	
Paraguay	1,504	100%	
Peru	1,500	99%	
Puerto Rico	1,700	100%	
Uruguay	1,506	100%	
Venezuela	1,540	95%	Delta Amacuro, Amazonas, Dependencias Federales, 183 inaccessible (unsafe) parishes
<hr/>			
Total	30,326		

5. Religion and Social Life in Central and Eastern Europe (6/2015–7/2016)

Armenia	1,523	100%	
Belarus	1,513	100%	
Bosnia	1,561	99.7%	Some inaccessible remote areas
Bulgaria	1,619	100%	
Croatia	1,616	97.5%	Smallest islands and some sparsely populated rural areas
Czech Republic	1,490	100%	
Estonia	1,689	100%	
Georgia	1,533		Abkhazia and South Ossetia
Greece	1,465	93%	Small islands
Hungary	1,483	99%	Some remote areas
Kazakhstan	1,692	100%	
Latvia	1,649	100%	
Lithuania	1,572	99%	Peripheral farms
Moldova	1,841	100%	
Poland	1,484	100%	
Romania	1,361	98.5%	Danube Delta
Russia	2,471	100%	
Serbia	1,574	99.5%	Some remote sparsely populated areas
Ukraine	2,409		Donetsk and Luhansk regions, Crimea
<hr/>			
Total	31,545		

6. Being Christian in Western Europe (4/2017–8/2017)

Austria	1,791	99%	People without cell or landline phones
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Belgium	1,500	100%	
Denmark	1,493	99%	People without cell or landline phones
Finland	1,498	100%	
France	1,788	99%	People without cell or landline phones
Germany	2,211	100%	
Ireland	1,499	99%	People without cell or landline phones
Italy	1,804	97%	People without cell or landline phones
Netherlands	1,497	100%	
Norway	1,498	98%	People without cell or landline phones
Portugal	1,501	98%	People without cell or landline phones
Slovakia	1,497	96%	People without cell or landline phones
Spain	1,499	99%	People without cell or landline phones
Sweden	1,493	100%	
Switzerland	1,686	99%	People without cell or landline phones
United Kingdom	1,841	100%	
Total	26,096		

Notes. Representativeness rates reported for the adult population (age 18 or above). The Thailand survey is excluded since it only represents adult Muslims in five southern provinces. The Kosovo survey is excluded due to unavailability of most variables used in the cross-country analysis separately for Kosovo. The surveys in Georgia and Ukraine are representative of 100% of the adult population in covered regions (countrywide numbers are unavailable). *Source:* survey documentation provided by the Pew Research Center.

Table A.2: Summary statistics: individual-level analysis

Variable	Mean	St. dev.	Min	Max	Obs.
Belief in witchcraft, binary	.438	.496	0	1	136,267
Age	42.3	16.9	18	96	135,693
Gender (woman), binary	.52	.5	0	1	136,267
Urban location, binary	.593	.491	0	1	110,643
Belief in god, binary	.861	.346	0	1	105,199
Education, categories					133,763
Completed primary or less	.239	.427	0	1	
Some or completed secondary	.474	.499	0	1	
Above secondary	.287	.452	0	1	
Economic situation, categories					103,841
Very bad	.111	.314	0	1	
Somewhat bad	.218	.413	0	1	
Somewhat good	.549	.498	0	1	
Very good	.122	.328	0	1	
Household size, categories					110,067
1-3	.488	.5	0	1	
4-5	.293	.455	0	1	
6 and above	.219	.414	0	1	
Religious affiliation, categories					132,895
Christian	.622	.485	0	1	
Muslim	.273	.445	0	1	
Unaffiliated	.105	.306	0	1	
Importance of religion, categories					135,186
Not at all important	.095	.293	0	1	
Not too important	.118	.322	0	1	
Somewhat important	.244	.43	0	1	
Very important	.543	.498	0	1	

Notes. Summary statistics are shown for the sample of people who gave a “yes” or “no” response to the witchcraft question. In addition to missing data for some respondents, several questions were not asked in certain survey waves. Specifically, the personal economic situation question was not asked in Central and Eastern Europe and the U.S., the urban location and household size variables are missing in the Western Europe wave, and the belief in god question is phrased differently and missing in the World’s Muslims and the U.S. surveys, respectively.

Table A.3: Summary statistics: country-level analysis

Variable	Mean	St. dev.	Min	Max	Obs.	Source
Witchcraft beliefs	.43	.18	.089	.9	95	Pew Research Center
Continent indicators						
Africa	.25	.44	0	1	95	
Americas	.21	.41	0	1	95	
Asia	.19	.39	0	1	95	
Europe	.35	.48	0	1	95	
Other control variables						
Absolute latitude	31	18	.53	64	95	Nunn and Puga (2012)
Terrain ruggedness	1.3	1.1	.037	5.3	95	Nunn and Puga (2012)
Agricultural suitability	1,266	651	5.1	2,743	95	Galor and Özak (2016)
Distance to the coast	.4	.45	.012	2.2	95	Nunn and Puga (2012)
Religiosity	3.3	.62	1.8	4	95	Pew Research Center
Kinship intensity	-.25	.99	-1.6	1.5	95	Schultz et al. (2019)
Institutions and conformity						
Rule of law	-.055	1	-1.9	2	95	Worldwide Governance Indicators
Government effectiveness	.032	.92	-1.6	2.1	95	Worldwide Governance Indicators
Control of corruption	-.072	.99	-1.5	2.3	95	Worldwide Governance Indicators
Security of property rights	2.5	.91	.5	4	88	Institutional Profiles database
Efficiency of tax administration	2.6	.88	0	4	88	Institutional Profiles database
Efficiency of justice system	2.4	.75	1	4	88	Institutional Profiles database
Legitimacy of political authorities	2.7	.68	1.3	4	88	Institutional Profiles database
Confidence in local police	.62	.15	.3	.94	94	Gallup World Poll
Confidence in judicial system	.47	.17	.14	.9	94	Gallup World Poll
Confidence in national government	.47	.17	.18	.97	93	Gallup World Poll
Autonomy vs. embeddedness	.13	.84	-1.6	1.6	54	Schwartz (2014)
Individualism vs. collectivism	45	24	6	91	50	Hofstede et al. (2010)
Uncertainty avoidance	72	21	23	112	50	Hofstede et al. (2010)
Indulgence vs. restraint	45	24	0	100	67	Hofstede et al. (2010)
Cultural looseness	54	27	0	120	50	Uz (2015)
Importance of tradition	.51	.33	-.22	1.2	54	WVS/EVS
Importance of creativity	.22	.3	-.64	.88	54	WVS/EVS
Importance of risk taking	-.81	.3	-1.4	-.24	54	WVS/EVS
Child qualities: independence	.43	.14	.21	.81	78	WVS/EVS
Child qualities: imagination	.18	.072	.04	.38	78	WVS/EVS
Critical thinking in teaching	3.5	.84	2.2	5.7	86	Global Competitiveness Report
In- vs. out-group trust	1	.24	.61	1.7	71	WVS/EVS
Share of blood donations to family	.34	.35	0	.97	85	Schultz et al. (2019)
Child qualities: tolerance	.66	.097	.4	.87	78	WVS/EVS
Migrant acceptance index	5.2	1.8	1.7	8.2	90	Gallup World poll

Social relations, anxiety, and worldview

Generalized trust	.25	.14	.043	.69	95	Multiple
Trust in neighbors	3.3	.18	3	3.7	91	WVS/EVS
Out-group trust	2.2	.31	1.6	2.9	71	WVS/EVS
Trusted business partner	.49	.12	.23	.82	93	Gallup World Poll
Generalized fairness	5.6	.79	4.1	8	68	WVS/EVS
Importance of friends	3.3	.22	2.6	3.7	79	WVS/EVS
Importance of leisure	3.1	.23	2.5	3.5	79	WVS/EVS
Blood donations to non-family	16	17	.16	57	84	Schultz et al. (2019)
Recent charitable donation	.27	.15	.044	.7	94	Gallup World Poll
Helped a stranger recently	.48	.098	.3	.78	94	Gallup World Poll
Life satisfaction	5.5	1	3.6	7.6	93	World Happiness Report
Subjective state of health	3.8	.25	3.2	4.3	79	WVS/EVS
Positive affect	.71	.1	.51	.87	93	World Happiness Report
Negative affect	.26	.069	.14	.51	93	World Happiness Report
Locus of control	6.9	.61	5.8	8.3	79	WVS/EVS
Freedom of life choices	.72	.13	.45	.95	93	World Happiness Report
Fatalism	.68	.23	.25	.98	56	Pew Research Center
Self-efficacy	.76	.16	.32	.95	94	Gallup World Poll
Zero-sum worldview	3.6	.39	2.4	4.3	44	Różycka-Tran et al. (2015; 2018; 2019)
Image of limited good	4.7	.59	3.5	6.1	71	WVS/EVS

Innovation and economic development

Entrepreneurial risk taking	50	9.5	30	79	86	Global Competitiveness Report
Embracing disruptive ideas	3.6	.58	2.6	5.7	86	Global Competitiveness Report
Patent applications	27	33	0	100	86	Global Competitiveness Report
H-index	78	13	51	100	86	Global Competitiveness Report
R&D expenditures in GDP	.9	.86	.01	3.3	78	Global Competitiveness Report
Log of real GDP per capita	9.4	1.1	6.9	11	95	Multiple
Log of poverty rate	1.6	2.1	-3.2	4.5	90	World Development Indicators
Life expectancy	72	7.8	52	83	95	World Development Indicators
Mean years of schooling	9.3	3	1.9	14	86	Global Competitiveness Report
Human development index	.73	.15	.36	.95	94	Human Development Report

Exposure to misfortunes

Exposure to natural disasters	15	7.1	3.7	43	93	WorldRiskReport
Exposure to agricultural drought	.93	.44	.042	2.1	95	Meza et al. (2020)
Pathogen richness	208	13	187	248	94	Fincher and Thornhill (2008)
Armed civil conflict	.024	.031	0	.14	93	Arbatli et al. (2020)
Unemployment rate	8.2	5.2	.85	26	95	World Development Indicators

Notes. WVS and EVS stand for World Values Survey and European Values Study, respectively. Multiple sources for generalized trust are the Pew Research Center, WVS, EVS, and the Gallup World Poll. Multiple sources for the log of real GDP per capita are the World Development Indicators and the Penn World Table 10.0 (for Venezuela only). The cross-country regression analysis uses standardized versions of all variables with zero mean and unit standard deviation in relevant samples. See the detailed definitions below.

Definitions of variables used in the analysis

WITCHCRAFT BELIEFS

Personal belief in witchcraft. A dummy variable coding “yes” (1) and “no” (0) answers to the following question: “Do you believe in the evil eye, or that certain people can cast curses or spells that cause bad things to happen to someone?” *Source:* Pew Research Center surveys.

Prevalence of witchcraft beliefs at the country level. The fraction of respondents who claim to believe “in the evil eye, or that certain people can cast curses or spells that cause bad things to happen to someone” relative to the total number of respondents. Computed at the country level using individual-level survey weights provided for aggregation purpose. *Source:* Pew Research Center surveys.

SOCIO-DEMOGRAPHIC CHARACTERISTICS

All socio-demographic characteristics of respondents are constructed and harmonized based on the original surveys listed in table A.1.

Age. Age of respondent in tens of years.

Gender. A dummy variable equal to 1 (0), if female (male).

Location of residence. A dummy variable equal to 1 (0) for urban (rural) locations.

Education. A categorical variable classifying the data on self-reported educational attainment into three categories: primary or less, secondary, above secondary.

Personal economic situation. A categorical variable reflecting respondents’ assessment of their personal economic situation on the following scale: very bad, somewhat bad, somewhat good, very good.

Household size. A categorical variable capturing self-reported household size: 1–3 people, 4–5, and 6 or more.

Religious affiliation. A categorical variable capturing religious affiliation or its absence: Christian, Muslim, unaffiliated (including agnostics and atheists). About 0.5% of respondents representing all other religions are excluded from the sample when using this variable.

Importance of religion. A categorical variable capturing self-reported importance of religion in life: not at all important, not too important, somewhat important, very important.

Belief in god. A dummy variable equal to 1, if the respondent claims to believe in god, and 0, if not.

BASELINE CONTROL VARIABLES

Continental fixed effects. A set of dummy variables indicating the belonging of a given country to one of the following world regions (total number of countries indicated in parentheses): Africa (24), Americas (20), Asia (18), Europe (33).

Absolute latitude. Absolute latitude of the country centroid. *Source:* Nunn and Puga (2012).

Terrain ruggedness. Mean terrain ruggedness index. *Source:* Nunn and Puga (2012).

Distance to the coast. Average distance (in thousands of kilometers) to the nearest ice-free coast. *Source:* Nunn and Puga (2012).

Agricultural suitability of land. Caloric suitability index capturing average potential agricultural output (measured in calories) based on crops that were available for cultivation in the post-1500CE era. *Source:* <https://ozak.github.io/Caloric-Suitability-Index/>, based on Galor and Özak (2016).

Religiosity. Country-level average religiosity based on individual-level data on the importance of religion in life. *Source:* own calculations based on the Pew Research Center surveys.

Kinship ties. Kinship intensity index based on anthropological reports and combining information on five sub-indicators capturing key dimensions of kin-based organization: cousin marriage preference, polygamy, co-residence of extended families, lineage organization, community organization. *Source:* Schulz et al. (2019).

INSTITUTIONS AND CONFORMITY

Rule of law. Measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence; average across 2008–2017. *Source:* Worldwide Governance Indicators (2020).

Government effectiveness. Measures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies; average across 2008–2017. *Source:* Worldwide Governance Indicators (2020).

Control of corruption. Measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests; average across 2008–2017. *Source:* Worldwide Governance Indicators (2020).

Security of property rights. Captures the efficiency of legal means to protect property rights in the event of conflict between private stakeholders, the extent of arbitrary pressure exerted on private property by the state, state’s compensation for expropriation of land and means of production. *Source:* Institutional Profiles Database (2012).

Efficiency of the tax administration. Captures the efficiency of collecting corporate and household income taxes, the ability to collect taxes across the entire state territory and limit tax evasion. *Source:* Institutional Profiles Database (2012).

Functioning of the justice system. Captures the degree of judicial independence from the state, enforcement of judicial decisions, timeliness of judicial decisions, and equal treatment of citizens and foreigners before the law. *Source:* Institutional Profiles Database (2012).

Legitimacy of political authorities. Captures the strength of political legitimacy stemming from the ability to ensure economic and social benefits, as well as a sense of national pride for large sections of the population. *Source:* Institutional Profiles Database (2012).

Confidence in local police, judicial system and courts, national government. The share of survey respondents expressing confidence in respective institutions; averages of the available data up to 2020. *Source:* own calculations based on the Gallup World Poll data.

Autonomy vs. embeddedness. A scale capturing the extent to which people are autonomous rather than embedded in their groups. Calculated as the difference between the average of “affective” and “intellectual” autonomy scores and embeddedness score. Autonomous cultures “encourage people to cultivate and express their own preferences, feelings, ideas, and abilities, and to find meaning in their own uniqueness.” Intellectual autonomy “encourages individuals to pursue their own ideas and intellectual directions independently. Examples of important values in such cultures include broadmindedness, curiosity, and creativity. Affective autonomy encourages individuals to pursue arousing, affectively positive personal experience. Important values include pleasure, exciting life, and varied life.” Embedded cultures “treat people as entities embedded in the collectivity. Meaning in life is expected to come largely through in-group social relationships, through identifying with the group, participating in its shared way of life, and striving toward its shared goals. Embedded cultures emphasize maintaining the status quo and restraining actions that might disrupt in-group solidarity or the traditional order. Important values in such cultures are social order, respect for tradition, security, obedience, and wisdom.” *Source:* Schwartz (2014), data downloaded at <http://dx.doi.org/10.13140/RG.2.1.3313.3040>.

Individualism vs. collectivism. A scale capturing individualistic societies as opposed to collectivist. Individualism “can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families.” Collectivism “represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular ingroup to look after them in exchange for unquestioning loyalty.” *Source:* Hofstede et al. (2010).

Uncertainty avoidance. A scale expressing “the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity.” Societies with strong uncertainty avoidance “maintain rigid codes of belief and behaviour, and are intolerant of unorthodox behaviour and ideas.” *Source:* Hofstede et al. (2010).

Indulgence vs. restraint. “Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.” *Source:* Hofstede et al. (2010).

Cultural looseness. An index constructed based on standard deviations of responses in WVS/EVS pertaining to questions about the roles of work, family, and religion. *Source:* Uz (2015).

Importance of tradition, creativity, risk-taking. These measures are based on Schwartz’s human values module of the WVS/EVS. Respondents rate on a six-point scale how much they believe a person described as follows is like them: 1) “Tradition is important to this person; to follow the customs handed down by one’s religion or family;” 2) “It is important to this person to think up new ideas and be creative; to do things one’s own way;” 3) “Adventure and taking risks are important to this person; to have an exciting life.” Following Schwartz’s recommendation, responses are adjusted by subtracting the mean answers a

respondent gave to all human values questions; averages across available years 1981–2020. *Source*: own calculations based on WVS/EVS.

Child qualities: independence, imagination, tolerance and respect for other people. Fraction of respondents in the World Values Survey (WVS) or the European Values Study (EVS) indicating respective trait as an important quality to instill in children; average across available years 1981–2020. Note that the survey question prompts the respondents to choose up to 5 such important qualities; “incorrect” responses listing more than 5 qualities were dropped for consistency and surveys with more than 20% of such “faulty” responses were fully excluded. *Source*: own calculations based on WVS/EVS.

Critical thinking in teaching. Based on the following survey question: “In your country, how do you assess the style of teaching?” Measured on a 1–7 scale, where 1 corresponds to “frontal, teacher based, and focused on memorizing” and 7 corresponds to “encourages creative and critical individual thinking.” Question originally asked in the World Economic Forum, Executive Opinion Survey; 2017–2018 weighted average or most recent period available. *Source*: World Economic Forum, Global Competitiveness Report (2018).

In- vs. out-group trust. Based on the WVS/EVS trust questions posed in the following way: “I’d like to ask you how much you trust people from various groups. Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all?” (responses are numerically coded from 4 to 1, respectively). The groups are (i) family, (ii) neighbors, (iii) people the respondent knows personally, (iv) people met for the first time, (v) people of another religion, and (vi) people of another nationality. The final measure is constructed by taking the difference between the average responses to the first three questions (in-group trust) and the last three questions (out-group trust); average across available years 1981–2020. *Source*: own calculations based on WVS/EVS.

Share of blood donations to family. Blood donations to family members as a fraction of total blood donations; average for 2011–2013. *Source*: Schulz et al. (2019) based on the original data from the WHO Global Status Report on Blood Safety and Availability (2016).

Migrant acceptance index. Gallup’s migrant acceptance index is based on three questions. Respondents are asked whether the following situations are “good things” or “bad things”: immigrants living in their country, an immigrant becoming their neighbor and immigrants marrying into their families. “A good thing” response is worth three points in the index calculation, a volunteered response of “it depends” or “dont know” is worth one point, and “a bad thing” is worth zero points. The index is a sum of the points across the three questions. The higher the score, the more accepting the population is of migrants. *Source*: Gallup World Poll, 2016–2017.

SOCIAL RELATIONS, ANXIETY, AND WORLDVIEW

Generalized trust. Share of respondents replying that “people can be trusted” in the generalized trust question: “Generally speaking would you say that most people can be trusted or that you cant be too careful in dealing with people?” Averages across available years. *Source*: own calculations based on Pew Research Center surveys, WVS/EVS, and Gallup World Poll (as recorded in the 2019 World Happiness Report database).

Trust in neighbors. Based on the following survey question: “How much do you trust the people in your neighborhood?” Possible answers are: a lot (4), some (3), not much (2), not at all (1); data for the year 2018. *Source:* own calculations based on the Gallup World Poll.

Out-group trust. See the definition of the “in- vs. out-group trust” variable above.

Trusted business partner. The share of respondents who believe they can find someone outside their own family to be a trusted business partner; average across available years. *Source:* own calculations based on the Gallup World Poll.

Generalized fairness. Based on the WVS/EVS question: “Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?” Answers range on a 0–10 scale, from “most people would try to take advantage of me” (0) to “most people would try to be fair” (10); average across available years 1981–2020. *Source:* own calculations based on WVS and EVS.

Importance of friends and leisure. Based on the WVS/EVS question on how important friends and leisure are in respondents’ lives. Answers range on a 1–4 scale, from “not important at all” (1) to “very important” (4); average across available years 1981–2020. *Source:* own calculations based on WVS and EVS.

Blood donations. Voluntary blood donations to non-family per 1,000 inhabitants; average for 2011–2013. *Source:* Schulz et al. (2019) based on the original data from the WHO Global Status Report on Blood Safety and Availability (2016).

Charitable giving. The share of survey respondents who claimed they donated money to a charity in the past month; average across available years. *Source:* own calculations based on the Gallup World Poll.

Helped a stranger. The share of survey respondents who claimed they helped a stranger or someone they didn’t know who needed help; average across available years. *Source:* own calculations based on the Gallup World Poll.

Life satisfaction. Average life satisfaction score based on the Cantril life ladder question: “Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?”; average across 2008–2017. *Source:* own calculations based on the World Happiness Report (2019) database which in turn relies on the Gallup World Poll data.

Subjective health. Based on the following WVS/EVS question: “All in all, how would you describe your state of health these days?” Answers coded on a 1–5 ordinal scale from “very poor” (1) to “very good” (5); average across available years 1981–2020. *Source:* own calculations based on WVS/EVS.

Positive affect. Average of three positive affect measures in the Gallup World Poll capturing recent experiences of happiness, smiling/laughing, and enjoyment (on the day before survey date); average across 2008–2017. *Source:* own calculations based on the World Happiness Report (2019) which relies on the Gallup World Poll data.

Negative affect. Average of three negative affect measures in the Gallup World Poll capturing recent experiences of worry, sadness, and anger (on the day before survey date); average across 2008–2017. *Source:* own calculations based on the World Happiness Report (2019) which relies on the Gallup World Poll data.

Control over life. Based on the following question: “Some people feel they have completely free choice and control over their lives, and other people feel that what they do has no real effect on what happens to them. Please use the scale to indicate how much freedom of choice and control you feel you have over the way your life turns out?” Answers coded on a 1–10 ordinal scale from “none at all” (1) to “a great deal” (10); average across available years 1981–2020. *Source:* own calculations based on WVS/EVS.

Freedom of life choices. Fraction of respondents replying “satisfied” to the following question: “Are you satisfied or dissatisfied with your freedom to choose what you do with your life?”; average across 2008–2017. *Source:* own calculations based on the World Happiness Report (2019) which relies on the Gallup World Poll data.

Fatalism. Fraction of respondents claiming to believe in “fate, the idea that the course of your life is largely or wholly preordained.” *Source:* own calculations based on the Pew Research Center surveys.

Self-efficacy. Fraction of respondents replying “yes” to the following question: “Can people in this country get ahead by working hard, or not?”; average across available years. *Source:* own calculations based on the Gallup World Poll data.

Zero-sum worldview. A scale constructed to capture a “belief system about the antagonistic nature of social relations – that one person’s gain is possible only at the expense of other persons.” *Source:* Rózycka-Tran et al. (2015; 2018; 2019).

Image of limited good. Based on the WVS/EVS “wealth accumulation” scale varying from “people can only get rich at the expense of others” (1) to “wealth can grow so there’s enough for everyone” (10); average across available years 1981–2020. *Source:* own calculations based on WVS/EVS.

INNOVATION AND ECONOMIC DEVELOPMENT

Entrepreneurial risk taking. Based on the survey question in the Executive Opinion Survey of the World Economic Forum: “In your country, to what extent do people have an appetite for entrepreneurial risk?” Possible answers ranged on a 1–7 ordinal scale from “not at all” (1) to “to a great extent” (7); 2017–2018 average or most recent period available. *Source:* World Economic Forum, Global Competitiveness Report (2018).

Embracing disruptive ideas. Based on the survey question in the Executive Opinion Survey of the World Economic Forum: “In your country, to what extent do companies embrace risky or disruptive business ideas?” Possible answers ranged on a 1–7 ordinal scale from “not at all” (1) to “to a great extent” (7); 2017–2018 average or most recent period available. *Source:* World Economic Forum, Global Competitiveness Report (2018).

Patent applications. Total number of patent family applications per million population; 2012–2014 average. Computed as the sum of the patent family applications filed in at least two of the major five offices in the World: the European Patent Office, the Japan Patent Office, the Korean Intellectual Property Office, the State Intellectual Property Office of the People’s Republic of China, and the United States Patent and Trademark Office. A log transformation is applied to the raw score before it is normalized to a 0 to 100 scale. *Source:* World Economic Forum, Global Competitiveness Report (2018), based on the original data from OECD.

H-index. An index measuring the number of publications and their citations; 2015–2017 average. The H-index measures the number of published papers cited in other papers at least H times. A log transformation is applied to the raw score before it is normalized to a 0 to 100 scale. *Source:* World Economic Forum, Global Competitiveness Report (2018), based on the original data from SCImago.

R&D expenditures. Expenditures on research and development (including basic research, applied research, and experimental development), expressed as a percentage of GDP; data for the year 2015. *Source:* World Economic Forum, Global Competitiveness Report (2018), based on the original data from the UNESCO Institute for Statistics.

Real GDP per capita. Natural logarithm of real gross domestic product per capita measured at purchasing power parity in 2017 international dollars; average across 2008–2017. *Source:* Penn World Table 10.0 and World Development Indicators for Venezuela.

Poverty rate. Natural logarithm of the poverty headcount ratio measured as the percentage of population living on less than \$3.20 a day at 2011 purchasing power parity exchange rates; 2008–2017 average. *Source:* own calculations based on the World Development Indicators database.

Life expectancy. Life expectancy at birth, in years; 2008–2017 average. *Source:* own calculations based on the World Development Indicators database.

Mean years of schooling. Average number of completed years of education of a country’s population aged 25 years and older, excluding years spent repeating individual grades; data for 2015. *Source:* World Economic Forum, Global Competitiveness Report (2018), based on the original data from UNESCO and the Wittgenstein Centre for Demography and Global Human Capital.

Human development index. Human development index; average across 2010, 2014, 2015, 2017. *Source:* UNDP Human Development Report (2020) database.

EXPOSURE TO MISFORTUNES

Exposure to natural disasters. Share of population physical exposed to earthquakes, storms, floods, droughts, and sea-level rise. *Source:* WorldRiskReport (2020).

Exposure to agricultural drought. An index of exposure to agricultural drought based on historical climate conditions. *Source:* Meza et al. (2020).

Pathogen richness. The number of all infectious diseases listed for a given country in the Global Infectious Disease and Epidemiology Network; April–August 2007. *Source:* Fincher and Thornhill (2008).

Armed civil conflict. The natural logarithm of one plus the number of new civil conflict onsets per year during the 1960–2017 time period, based on the UCDP/PRIO armed conflict dataset. *Source:* Arbatli et al. (2020).

Unemployment rate. Modeled ILO estimate of the unemployment rate; 2008–2017 average. *Source:* own calculations based on the World Development Indicators database.

B Additional analyses

Table B.1: Socio-demographic correlates: linear probability model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.002 (0.002)	-0.005** (0.002)	-0.007*** (0.002)	-0.005* (0.003)	-0.006* (0.003)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006** (0.003)
Gender: woman	0.043*** (0.008)	0.041*** (0.008)	0.014** (0.006)	0.010 (0.007)	0.010 (0.007)	0.035*** (0.007)	0.038*** (0.007)	0.010 (0.007)
Education: vs. "primary or less"								
Some or completed secondary		-0.034*** (0.008)	-0.031*** (0.008)	-0.030*** (0.009)	-0.031*** (0.009)	-0.029*** (0.007)	-0.040*** (0.007)	-0.028*** (0.008)
Above secondary		-0.070*** (0.012)	-0.062*** (0.013)	-0.063*** (0.015)	-0.065*** (0.015)	-0.061*** (0.011)	-0.076*** (0.011)	-0.060*** (0.014)
Econ. situation: vs. "very bad"								
Somewhat bad			-0.031*** (0.008)	-0.029*** (0.009)	-0.029*** (0.009)			-0.029*** (0.009)
Somewhat good			-0.064*** (0.009)	-0.052*** (0.009)	-0.052*** (0.009)			-0.053*** (0.009)
Very good			-0.064*** (0.011)	-0.060*** (0.013)	-0.060*** (0.013)			-0.058*** (0.013)
Household size: vs. 1-3								
4-5				0.004 (0.005)	0.004 (0.005)			0.003 (0.005)
6 and above				0.017** (0.008)	0.017** (0.008)			0.016** (0.007)
Urban resident					0.009 (0.008)			0.011 (0.009)
Religion: vs. Christian								
Muslim						0.016 (0.022)	0.016 (0.022)	-0.007 (0.026)
Unaffiliated						-0.041*** (0.013)	-0.022* (0.011)	0.018 (0.022)
Imp. of religion: vs. "not at all"								
Not too important						0.066*** (0.010)		0.056** (0.026)
Somewhat important						0.143*** (0.011)		0.104*** (0.028)
Very important						0.149*** (0.013)		0.104*** (0.028)
Belief in god							0.175*** (0.015)	
Observations	135,693	133,244	101,264	75,746	75,746	129,037	101,556	73,849
Countries	95	94	74	58	58	94	73	58

Notes. The binary dependent variable is personal belief in witchcraft. Ordinary least-squares estimates from the linear probability regressions are reported in all columns. Standard errors clustered by country are shown in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. Country fixed effects are included in all specifications. Age is measured in tens of years. The number of observations and countries for each specification reflects data availability constraints.

Table B.2: Socio-demographic correlates: accounting for wave fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.008** (0.004)	-0.012*** (0.004)	-0.010*** (0.004)	-0.003 (0.004)	-0.004 (0.004)	-0.013*** (0.004)	-0.011*** (0.003)	-0.004 (0.004)
Gender: woman	0.044*** (0.009)	0.042*** (0.009)	0.016* (0.008)	0.008 (0.008)	0.007 (0.008)	0.037*** (0.009)	0.042*** (0.009)	0.009 (0.008)
Education: vs. "primary or less"								
Some or completed secondary		-0.059*** (0.019)	-0.041** (0.018)	-0.037* (0.020)	-0.045** (0.019)	-0.048*** (0.018)	-0.053*** (0.020)	-0.039** (0.018)
Above secondary		-0.091*** (0.026)	-0.069*** (0.023)	-0.056** (0.027)	-0.068*** (0.026)	-0.073*** (0.024)	-0.083*** (0.022)	-0.061** (0.026)
Econ. situation: vs. "very bad"								
Somewhat bad			-0.043*** (0.012)	-0.044*** (0.013)	-0.045*** (0.013)			-0.046*** (0.013)
Somewhat good			-0.097*** (0.016)	-0.081*** (0.017)	-0.081*** (0.017)			-0.084*** (0.017)
Very good			-0.102*** (0.020)	-0.090*** (0.022)	-0.091*** (0.022)			-0.091*** (0.022)
Household size: vs. 1-3								
4-5				0.010 (0.008)	0.012 (0.008)			0.012 (0.008)
6 and above				0.039** (0.016)	0.042*** (0.015)			0.039*** (0.015)
Urban resident					0.047*** (0.014)			0.048*** (0.014)
Religion: vs. Christian								
Muslim						0.060 (0.037)	0.042 (0.034)	0.027 (0.045)
Unaffiliated						-0.069*** (0.024)	-0.018 (0.019)	0.036 (0.027)
Imp. of religion: vs. "not at all"								
Not too important						0.117*** (0.015)		0.057** (0.027)
Somewhat important						0.197*** (0.018)		0.092*** (0.028)
Very important						0.194*** (0.022)		0.087*** (0.029)
Belief in god							0.245*** (0.017)	
Observations	135,693	133,244	101,264	75,746	75,746	129,037	101,556	73,849
Countries	95	94	74	58	58	94	73	58

Notes. The binary dependent variable is personal belief in witchcraft. Maximum likelihood estimates of marginal effects from probit regressions are reported in all columns. Standard errors clustered by country are shown in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. Survey wave fixed effects are included in all specifications (the waves correspond to those reported in table A.1, with the U.S. incorporated into the 2008-2009 wave based on the survey year). Age is measured in tens of years. The number of observations and countries for each specification reflects data availability constraints.

C Cross-country patterns in scatterplots

This section further illustrates selected cross-country patterns from the main text of the paper. With the exception of quadratic relationships for development indicators in figure C.6, represented by augmented component-plus-residual plots, all panels are standard scatterplots of residuals after accounting for continental fixed effects. The reported t -statistics are based on heteroskedasticity-robust standard errors.

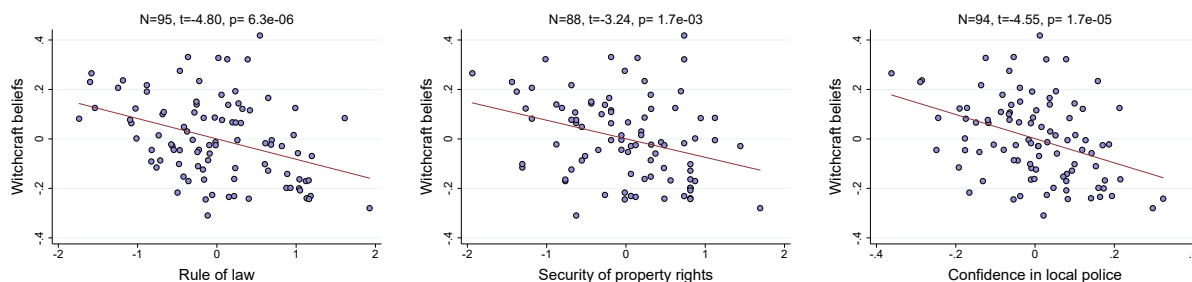


Figure C.1: Witchcraft beliefs and institutions.

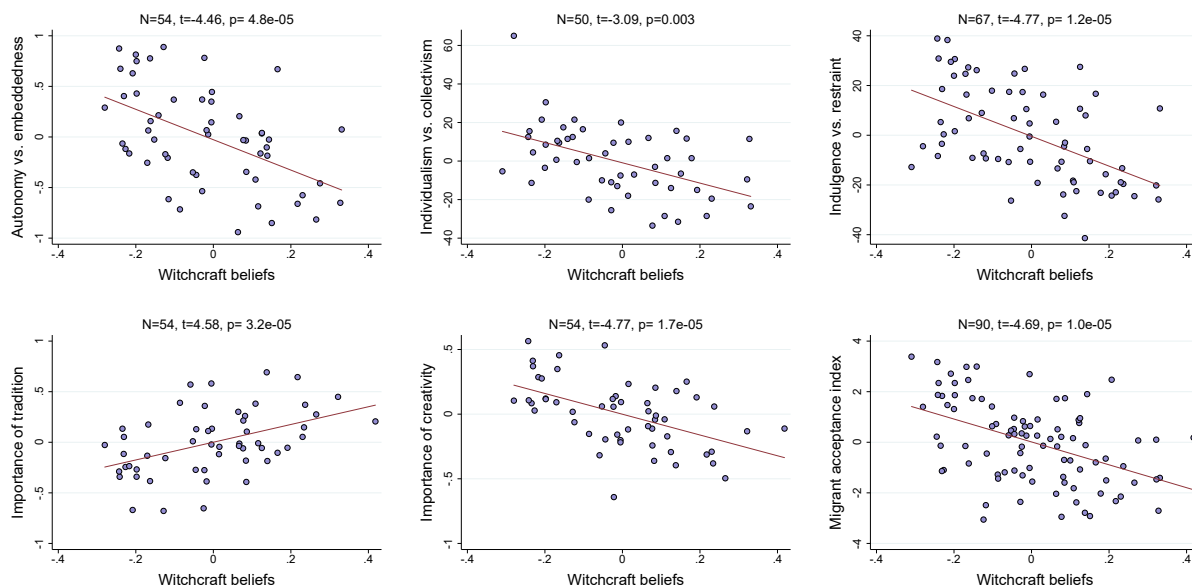


Figure C.2: Witchcraft beliefs, conformity, and in-group bias.

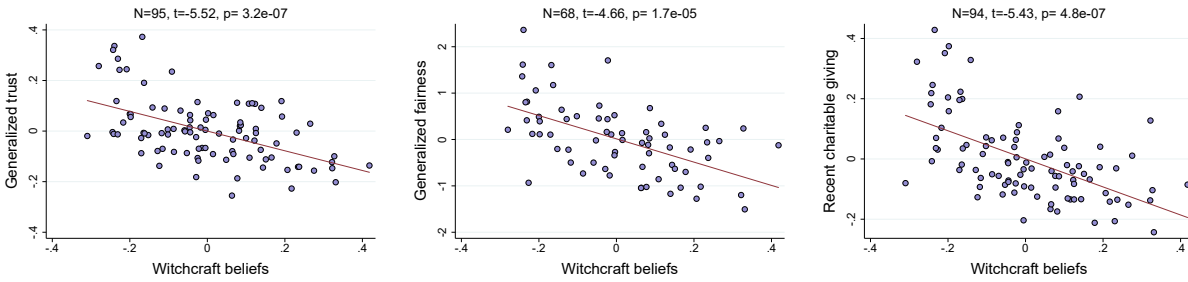


Figure C.3: Witchcraft beliefs and ruptured social relations.

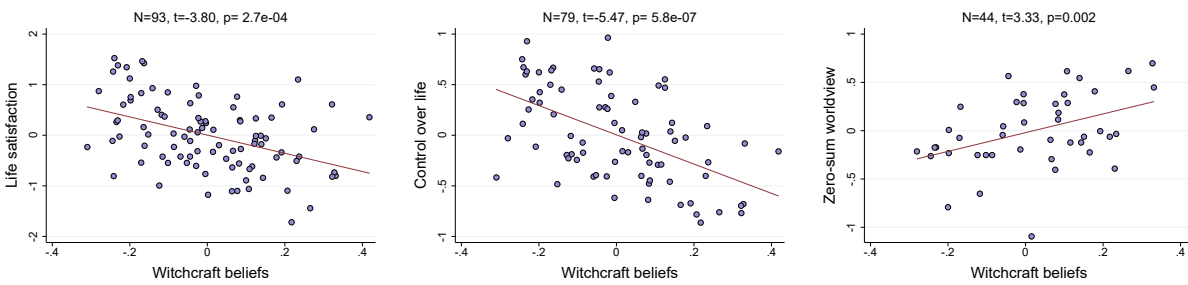


Figure C.4: Witchcraft beliefs, anxiety, and worldview.

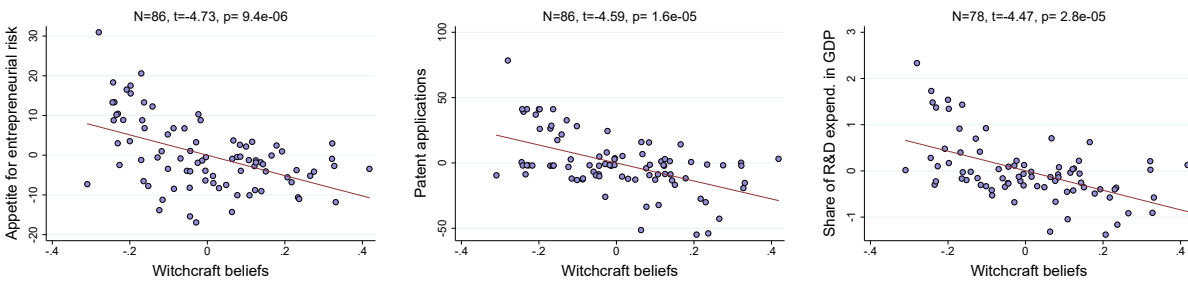
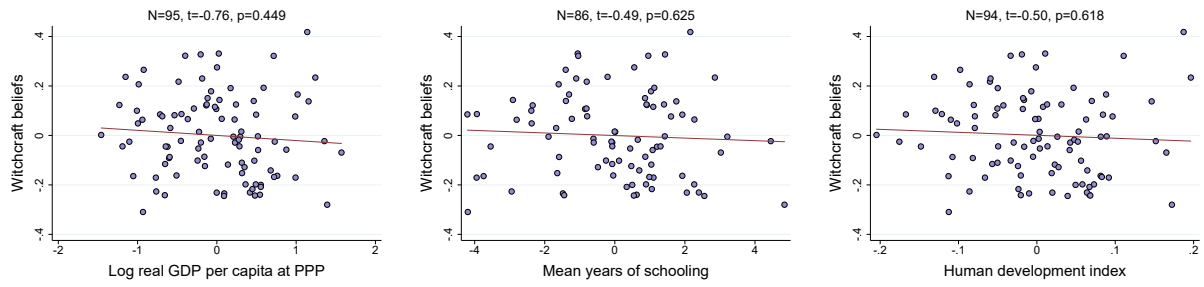
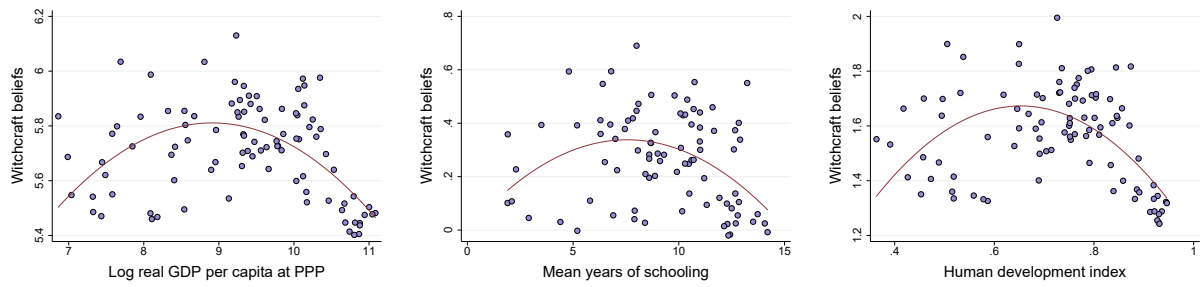


Figure C.5: Witchcraft beliefs and innovation.



(a) Linear relationship



(b) Quadratic relationship

Figure C.6: Witchcraft beliefs and development.

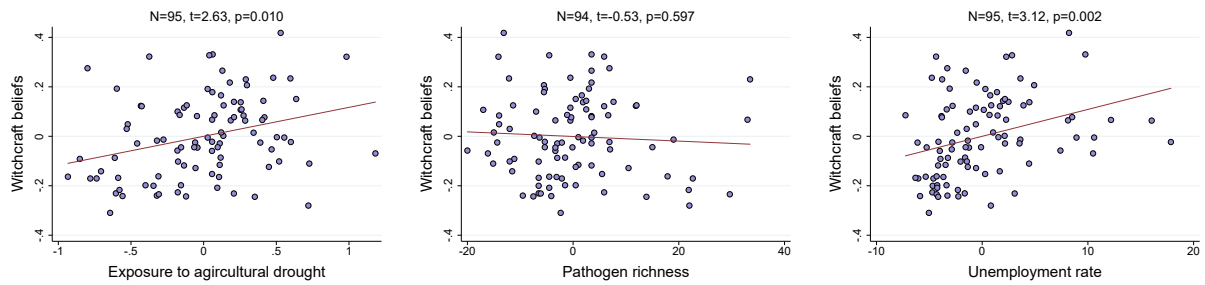


Figure C.7: Witchcraft beliefs and exposure to misfortunes.

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