Free will beliefs predict attitudes toward unethical behavior and criminal punishment

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Do free will beliefs influence moral judgments? Answers to this question from theoretical and empirical perspectives are controversial. This study attempted to replicate past research and offer theoretical insights by analyzing World Values Survey data from residents of 46 countries (n = 65,111 persons). Corroborating experimental findings, free will beliefs predicted intolerance of unethical behaviors and support for severe criminal punishment. Further, the link between free will beliefs and intolerance of unethical behavior was moderated by variations in countries' institutional integrity, defined as the degree to which countries had accountable, corruption-free public sectors. Free will beliefs predicted intolerance of unethical behaviors for residents of countries with high and moderate institutional integrity, but this correlation was not seen for countries with low institutional integrity. Free will beliefs predicted support for criminal punishment regardless of countries' institutional integrity. Results were robust across different operationalizations of institutional integrity and with or without statistical control variables.

free will beliefs | morality | criminal punishment | transparent governance | corruption

Free will has been a topic of philosophical debate for centuries and recently has emerged as a key area of scientific investigation (1). Although prominent voices in academia challenge the idea of free will (e.g., refs. 2, 3), lay belief in free will is strong and widespread (4, 5). Moreover, a growing body of evidence highlights the behavioral, cognitive, and neural consequences of endorsing or rejecting the notion of free will (e.g., refs. 6, 7).

Experimental research has demonstrated a link between free will beliefs and morality judgments and behaviors. Exposure to anti-free will messages can incite selfishness (8) and aggression (9), both of which have bases in morality (5, 10). Chiefly related to the present investigation, treatments that weaken the belief in free will, compared with leaving it unchanged, incite more unethical behavior (e.g., in the form of cheating) (11) and reduce support for harsh punishment for criminals (e.g., by recommending shorter prison sentences) (12). The latter two experimental findings formed the basis of the current hypotheses.

We conducted a global analysis of the link between free will beliefs and moral judgments using data from the World Values Survey (WVS), a coordinated series of nationally representative cross-sectional surveys (13). The WVS included two items related to free will beliefs, namely, beliefs about whether fate is self- or predetermined and perceptions of freedom of choice and control, which conform to items from validated assessments of free will belief (14). These items formed the predictor variables. Respondents also indicated the acceptability of certain unethical actions and their agreement with the notion that criminals should be severely punished, both of which mirror outcomes used in experimental work (e.g., refs. 11, 12). These moral judgments formed the outcome measures.

The WVS offered a unique, cross-national opportunity to assess experimental findings that free will beliefs affect morality and to make theoretical advances. To date, research on free will beliefs has relied on small samples, and these samples, with rare exceptions (15, 16), comprised North American and European university students. Psychological science has been criticized for its heavy reliance on samples from societies characterized as "Western, educated, industrialized, rich, and democratic" (WEIRD) (17). Testing published effects among a broad population with ample representation of both WEIRD and non-WEIRD countries can address questions of generalizability and produce theoretical insights.

Recent investigations have raised questions about the robustness of the effects of free will beliefs. One high-profile laboratory replication of an experiment showing that free will beliefs hinder unethical behavior reported a nonsignificant effect (18). Another investigation failed to find support for the link between free will beliefs and condemnation of others' unethical behavior (19). Hence, further investigations of the influence of free will beliefs on moral judgments are warranted.

We also tested hypotheses concerning the influence of country-level differences in institutional integrity, defined as the extent to which a country's public sector is free of corruption and exercises transparent authority. Institutional integrity likely reflects and affects expectations about a society's base rate of immoral behavior as well as expectations about whether people will be held responsible for their actions.

Laboratory experiments using WEIRD samples have shown that stronger free will beliefs predict lower rates of unethical behavior (11) and stronger support for criminal punishment (12). Accordingly, we expected that in countries with moderate-to-high levels of institutional integrity, which fit the WEIRD profile (17), respondents' free will beliefs would predict the degree to which they view unethical behaviors as unjustifiable and their support for criminal punishment.

Studying countries with poor institutional integrity offered opportunities for theoretical insights. Although we expected that free will beliefs would predict negative attitudes toward unethical

Significance

Understanding the bases of moral judgment has been a long-standing goal of social science. Factors undergirding morality are argued to be both globally uniform and regionally variable. The current study found evidence of both. For residents of countries with low levels of corruption and transparent systems of governance, free will beliefs predicted greater support for harsh criminal punishment and an intolerance of unethical behavior. For residents of countries beset with corruption and obfuscation, free will beliefs predicted greater support for criminal punishment but were decoupled from judgments of unethical behavior. These findings confirm causal conclusions from experimental research about the influence of free will beliefs on moral judgments and demonstrate variation by sociopolitical context.

behaviors for residents of countries with moderate-to-high institutional integrity, we did not expect to observe this pattern for residents of countries with weak institutional integrity, amounting to a moderated effect. The moral behavior of individuals often mirrors the moral codes of the society or groups to which they belong (e.g., refs. 20, 21). For example, Gächter and Schulz (22) showed that residents of countries beset with fraud and corruption were more likely than others to cheat in a laboratory task. Moreover, people often project their own history of unethical behavior onto how acceptable they find those acts (23). These findings suggest that if living in a country with rampant corruption and weak governance normalizes unethical actions as part of everyday life (24), then attitudes about unethical behaviors may become untethered from personal beliefs about free choice or control over one's outcomes, two pillars of free will beliefs (14).

Support for criminal punishment, the second outcome of interest, was expected to track respondents' free will beliefs regardless of their country's institutional integrity. Why would this effect not depend on the quality of public sectors? The WVS item asks about criminals, a label that implies moral transgressions. Others' moral transgressions can stoke negative emotions rooted in concerns about fairness and the desire to right moral wrongs, which underlie preferences for retributive punishment (25–27). Those immediate psychological influences may be stronger determinants of responses than the broader sociopolitical milieu, resulting in a similar relationship between free will beliefs and criminal punishment preferences across countries with strong, moderate, and weak institutional integrity.

Results

Main Effects Models. Do free will beliefs predict intolerance of unethical behaviors? This hypothesis was supported by a significant, positive association between scores measuring free will belief and intolerance of unethical behavior (Table 1, model 1 A and B). This result mirrors Vohs and Schooler's (11) experimental finding that free will beliefs deter unethical behavior.

The effect of free will beliefs in explaining intolerance of unethical behavior was not large, but it was similar in size to other psychological variables known to correlate with moral judgments (e.g., ref. 28). Wald tests using the Holm–Bonferroni adjustment for multiple comparisons showed that the standardized coefficient of scores measuring free will belief was comparable to the standardized coefficients of religiosity ($\chi^2 = 1.74$, $P = 0.747$) and overall happiness ($\chi^2 = 0.65$, $P = 0.962$).

Do free will beliefs predict support for criminal punishment? This hypothesis was supported: Free will beliefs predicted stronger desires to see criminals punished (Table 1, model 2 A and B), in accordance with Shariff et al.'s (12) experimental findings.

Free will beliefs were more strongly associated with support for criminal punishment than were other candidate psychological factors. The explanatory power of free will beliefs was significantly greater than that of religiosity ($\chi^2 = 5.48$, $P = 0.039$) and overall happiness ($\chi^2 = 7.03$, $P = 0.032$), as indicated by Wald tests with Holm–Bonferroni corrections. In line with experimental findings showing that attitudes toward unethical behavior influence preferences for criminal punishment (29), a stronger intolerance of unethical behavior predicted stronger preferences that criminals be severely punished (Table 1, model 2 A and B). Moreover, there was no difference between the relative effect sizes of free will beliefs and intolerance of unethical behavior in predicting support for criminal punishment ($\chi^2 = 2.05$, $P = 0.153$).

At the country level, institutional integrity was positively associated with intolerance of unethical behavior (Table 1, model 1) and was negatively associated with support for harsh criminal punishments (Table 1, model 2). That is, in countries characterized by relatively high levels of institutional integrity, the average adult was both less tolerant of unethical actions and less supportive of criminal punishment than in countries with corrupt, unaccountable public sectors.

The results from models without control variables (Table 1, models 1B and 2B) were nearly identical to models with covariates (Table 1, models 1A and 2A, and Table S1). No unstandardized regression coefficient differed by more than 0.002, and all effects were in the same direction and remained statistically significant.

Table 1. Results from linear mixed-effects regression models predicting intolerance of unethical behavior (model 1) and support for criminal punishment (model 2)

Variable	Model 1: Intolerance for unethicality			Model 2: Support for criminal punishment		
	b	SE b	β	b	SE b	β
(A) With control variables						
Individual-level variables						
Free will beliefs	0.02	(0.01)	0.09**	0.07	(0.02)	0.26***
Intolerance for unethicality				0.12	(0.02)	0.40***
Female	0.09	(0.02)	0.09***	−0.10	(0.02)	−0.10***
Age	0.01	(0.00)	0.35***	0.00	(0.00)	0.05
Education: primary or less	−0.11	(0.03)	−0.11***	−0.03	(0.06)	−0.03
Education: postsecondary	0.12	(0.03)	0.12***	−0.16	(0.08)	−0.16*
Religion importance	0.11	(0.02)	0.14***	0.08	(0.03)	0.11**
Overall happiness	0.04	(0.02)	0.06	0.04	(0.03)	0.06
Country-level variable						
Institutional integrity index	0.10	(0.05)	0.34*	−0.24	(0.06)	−0.80***
Intercept	8.07	(0.35)		8.72	(0.36)	
(B) Without control variables						
Individual-level variables						
Free will beliefs	0.02	(0.01)	0.08*	0.07	(0.02)	0.27***
Country-level variable						
Institutional integrity index	0.10	(0.05)	0.34*	−0.24	(0.06)	−0.80***
Intercept	8.07	(0.35)		8.72	(0.36)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. P values: ***$P \leq 0.001$, **$P \leq 0.01$, *$P \leq 0.05$.

Table 2. Results from linear mixed-effects regression models: Cross-level interactions (free will beliefs × institutional integrity)

| Variable	Model 1: Intolerance for unethicality			Model 2: Support for criminal punishment		
	b	SE b	β	b	SE b	β
(A) With control variables						
FWB	−0.03	(0.03)	−0.13	0.14	(0.06)	0.52*
FWB × institutional integrity	0.01	(0.00)	0.23*	−0.01	(0.01)	−0.28
Intolerance of unethicality				0.12	(0.02)	0.40***
Female	0.09	(0.02)	0.09***	−0.10	(0.02)	−0.10***
Age	0.01	(0.00)	0.35***	0.00	(0.00)	0.05
Education: primary or less	−0.11	(0.03)	−0.11***	−0.03	(0.06)	−0.03
Education: postsecondary	0.12	(0.03)	0.12***	−0.16	(0.08)	−0.16*
Religion importance	0.11	(0.02)	0.14***	0.08	(0.03)	0.10**
Overall happiness	0.04	(0.02)	0.05	0.05	(0.03)	0.06
Institutional integrity index	0.10	(0.05)	0.34*	−0.24	(0.06)	−0.80***
Intercept	8.07	(0.35)		8.72	(0.36)	
(B) Without control variables						
FWB	−0.03	(0.03)	−0.12	0.14	(0.06)	0.53*
FWB × institutional integrity	0.01	(0.01)	0.21*	−0.01	(0.01)	−0.26
Institutional integrity index	0.10	(0.05)	0.34*	−0.24	(0.06)	−0.80***
Intercept	8.07	(0.35)		8.72	(0.36)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. P values: ***$P \leq 0.001$, **$P \leq 0.01$, *$P \leq 0.05$. FWB, free will beliefs.

Tests of Moderation by Institutional Integrity. Next, we tested whether the effect of free will beliefs on moral judgments was moderated by institutional integrity. As predicted, there was a significant interaction between countries' institutional integrity scores and individuals' free will beliefs (Table 2, model 1 A and B). As countries' governance quality increased, so did the relationship between free will beliefs and harsher attitudes toward unethical behavior (Fig. 1). [In Figs. 1 and 2, predictive margins (also known as adjusted predictions) represent the average values of intolerance of unethical behavior (Fig. 1) and support for criminal punishment (Fig. 2). They were derived from model estimates that treated all observations as if they were equal to selected levels of free will beliefs and institutional integrity.]

Average marginal effects (AMEs) were calculated at high (1 SD above the mean; e.g., Chile, Japan, and Spain), moderate (mean; e.g., Poland, South Korea, and Trinidad and Tobago), and low (1 SD below the mean; e.g., Iran, Moldova, and Rwanda) levels of country-level institutional integrity. [A marginal effect approximates the expected change in the outcome given a unit change in the predictor (30). Marginal effects were calculated by finding a slope for each case using the observed values for other covariates.] The effect of free will beliefs on intolerance of unethical behaviors was significantly different from zero at high (AME = 0.05; 95% CI 0.03, 0.07) and moderate (AME = 0.03; 95% CI 0.01, 0.04) but not at low (AME = 0.01; 95% CI −0.02, 0.03) levels of institutional integrity. These results show that the link between free will beliefs and intolerance of unethical behavior varies with countries' institutional integrity.

In contrast to models predicting attitudes toward unethical behavior, countries' institutional integrity did not moderate the link between free will beliefs and preferences for harsh criminal punishment, as evidenced by a nonsignificant interaction term. The main effect of free will beliefs remained significant and in the direction reported in the main effect models (Fig. 2 and Table 2, model 2 A and B). Across levels of institutional integrity, free will beliefs positively predicted support for harsh criminal punishment, as seen in the average marginal effects at high (AME = 0.04; 95% CI 0.00, 0.08), moderate (AME = 0.06; 95% CI 0.03, 0.10), and low (AME = 0.09; 95% CI 0.04, 0.14) levels of institutional integrity.

Alternate Operationalizations of Institutional Integrity. Two checks of robustness were conducted by replacing our institutional integrity index with available cross-national measures of state institution quality: (i) the Polity IV score, which represents the presence of formalized democratic institutions, constraints on executive power, and guarantees of civil liberties (0 = no institutionalized democracy; 10 = fully institutionalized democracy) and (ii) Gächter and Schulz's (22) prevalence of rule violations (PRV)
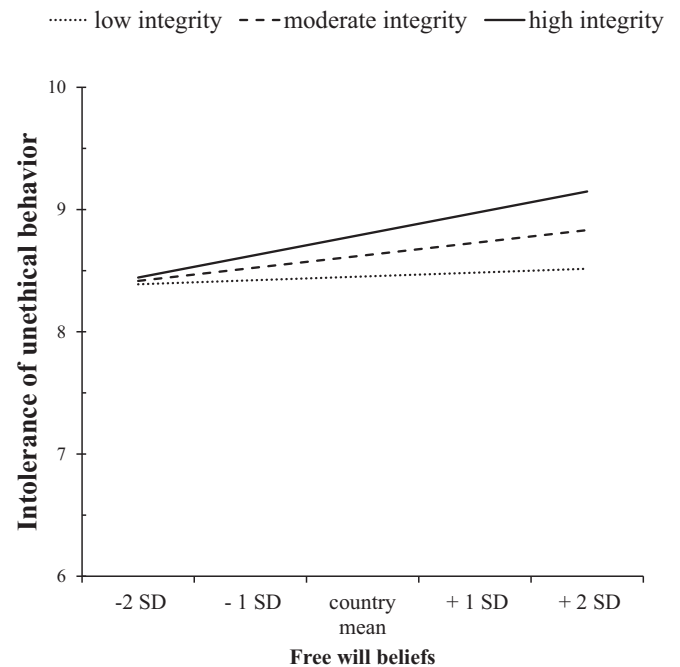
Fig. 1. Predictive margins (adjusted predictions) for intolerance of unethical behavior by degree of free will beliefs at low (1 SD below mean), moderate (mean), and high (1 SD above mean) levels of institutional integrity. The y axis ranges from 1 to 10.

········· low integrity   - - - moderate integrity   —— high integrity
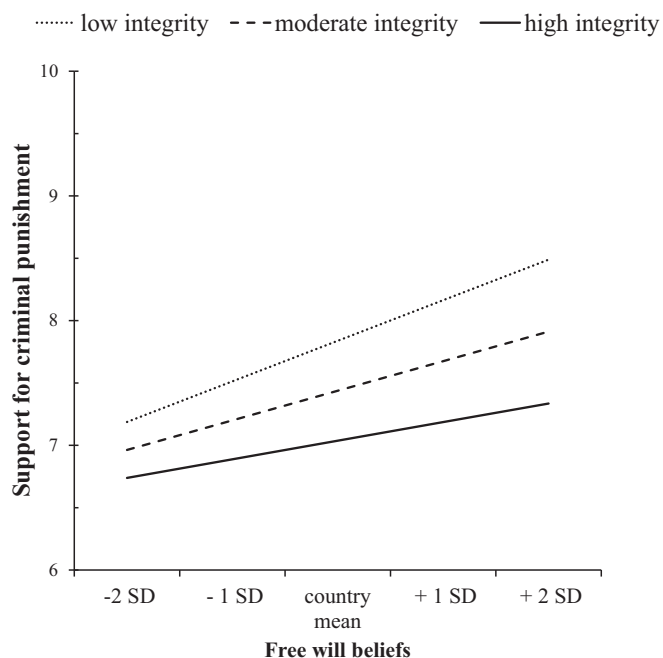
Fig. 2. Predictive margins (adjusted predictions) for support for criminal punishment by degree of free will beliefs at low (1 SD below mean), moderate (mean), and high (1 SD above mean) levels of institutional integrity. The y axis ranges from 1 to 10.

index, which averages standardized values from the Freedom House political rights rating, the control of corruption subscale of the World Governance Indicators (WGI), and an estimate of the size of the shadow economy (higher values = fewer rule violations).

The results with these alternative operationalizations of political institutions were fully consistent with models using the main institutional integrity index. The impact of free will beliefs on intolerance of unethical behavior showed evidence of moderation with either the Polity score or the PRV index (Table S2). In models predicting support for criminal punishment, free will beliefs did not interact with either measure (Table S3), in accordance with results using the institutional integrity index. The consistent patterns of results across three specifications of countries' degree of transparency and corruption bolsters conclusions that countries' institutional integrity matters for the link between free will beliefs and intolerance for unethical behavior but not for the link between free will beliefs and the endorsement of retributive punishment.

Democratic vs. Nondemocratic Countries. The wording of the item assessing support for criminal punishment ("how essential of a characteristic of democracy is it that criminals are severely punished") raises questions about a potential confound, namely, whether respondents resided in a democratic regime. To address this possibility, we repeated the main analyses using separate models for respondents living in democratic (Table S4) and nondemocratic countries (Table S5); the results of these separate models corroborated the results for the entire sample. That is, stronger belief in free will predicted greater support for criminal punishment in both types of countries.

Although the primary concern was that living in a democratic or nondemocratic country had an untoward effect on the conclusions regarding preferences for criminal punishment, we used the separation of these countries as an opportunity for another conceptual test of the results regarding intolerance of unethical action. Offering support for the moderation hypothesis, free will beliefs had a significant, positive association with intolerance of unethical behaviors within democratic countries (Table S4, model 1) but not

within nondemocratic countries (Table S5, model 1). This pattern is consistent with the interaction between free will beliefs and institutional integrity (Fig. 1 and Table 2), because levels of institutional integrity are significantly lower in nondemocratic countries (mean = 4.19, SD = 0.68) than in democratic countries [mean = 5.76, SD = 1.73; t (44) = 3.05; P = 0.004]. These tests assuage concerns that the reported effects turned on the wording of the punishment item and added confidence to our conclusions that the relationship between free will beliefs and attitudes toward unethical behavior varies across countries and political contexts.

Discussion

Our investigation aimed to make three contributions. First, it tested whether experimental claims that stronger free will beliefs hinder unethical tendencies and bolster support for criminal punishment were replicated. Second, it tested a global sample of adults from both WEIRD and non-WEIRD countries to assess the generalizability of those effects. Third, it made theoretical advances by considering the role of the broader institutional environment and by studying how the interplay of micro- and macrolevel factors affects the link between free will beliefs and moral judgments.

The data supported two experimental findings reported in the literature. Free will beliefs predicted stronger desires to see criminals punished, confirming Shariff et al.'s (12) experimental studies. Free will beliefs also predicted intolerance of unethical behavior, consistent with Vohs and Schooler's (11) experimental findings that diminishing free will beliefs encourages cheating. Notably, the main effect of free will beliefs in predicting harsh attitudes toward unethical behavior was influenced by country-level institutional integrity.

Institutional integrity reflects the extent to which countries' public sectors are free of corruption and maintain strong, transparent governance. Among residents of countries with average to high institutional integrity, stronger free will beliefs predicted stronger intolerance of unethical behavior. However, in countries with widespread corruption and lax governance, whether people slightly or strongly endorsed free will beliefs was decoupled from their attitudes toward unethical action. In these countries, unethical behavior could be attributed to external circumstances or viewed as a rational strategy rather than a reflection of moral character (22, 24).

Free will beliefs predicted support for retributive criminal punishment, an effect that was not moderated by countries' institutional integrity. The notion of a criminal presupposes moral violations (25), which can evoke negative emotional reactions (26) and the desire to see harm come to harm-doers (27, 31, 32). These processes may have swamped the influence of distal sociopolitical factors.

Average levels of support for criminal punishment were lower in countries with high levels of institutional integrity, which are predominately WEIRD societies (17). Strong democratic institutions reinforce the value of personal freedom and maintain legal systems for the protection of civil liberties, in particular the rights of criminals (33, 34). High degrees of institutional integrity could shift public sentiment toward other ways to address criminal behavior, such as deterrence or rehabilitation efforts, even as citizens with stronger free will beliefs support harsh criminal punishment more than their compatriots with weaker beliefs.

Although the WVS provides exceptional coverage of the global variation in beliefs and values, our study was limited to its measures. Future cross-national research adopting more refined measures of free will beliefs and moral judgments is welcomed. Additionally, it is possible that preferences for criminal punishment and tolerance of unethical behavior are the driving forces behind differences in free will beliefs, and not the reverse. The observational nature of our data cannot argue against that interpretation, but experimental investigations can. The current findings, although modest in size, parallel prior experimental findings (11, 12), were

observed across a wide swath of the global population, and remained robust across model specifications, lending confidence in the results.

The overall patterns suggest two broad conclusions, one empirical and one theoretical. The link between free will beliefs and support for criminal punishment appears stronger and more consistent than the link between free will beliefs and judgments of unethical actions. The former was consistent across differences in countries' institutional integrity (which was operationalized in three ways) and across democratic and nondemocratic countries, as well as for each item of the free will beliefs index (Table 2, model 2, Fig. S1, and Tables S3–S6). The link between free will beliefs and judgments of unethical actions varied, albeit in consistent patterns, by the three indicators of public institution quality and whether the country was democratic (Table 2, model 1, Fig. S1, and Tables S2, S4, and S5). Furthermore, estimates were less precise when examining the individual items of the free will beliefs index (Tables S6 and S7). There may be theoretical reasons for the fragility of attitudes toward unethical behaviors. Unethical behaviors represent moral temptations, promising near-term benefits to the self but long-term costs to society (26), which may hint at why strong personal convictions combined with statewide support are needed to resist their lure.

Our results point to the importance of considering how free will beliefs operate in different social, political, and cultural contexts. The long arc of history has seen sweeping movements toward democracy, respect for individual autonomy, and freedom of choice (35, 36). If this trend continues, free will beliefs should be expected to shape attitudes toward ethical behavior, crime, and punishment throughout the world. To be sure, such a trend is far from given, because states may attempt to curtail democratic rights and freedoms in response to economic downturn or civil strife.

Conclusion

Belief in free will might seem esoteric, unworthy of scientific study, or academic (in the pejorative sense). It is not. Attesting to its widespread impact, our global analysis found that the more that people endorsed notions supporting free will beliefs (4, 5), the harsher their attitudes toward wrong-doing and wrong-doers, with one notable exception. For residents of countries with corrupt and ineffectual public sectors, free will beliefs did not bear on judgments of unethical actions but nevertheless predicted preferences that criminals receive harsh punishments. The influence of free will beliefs in people around the world, along with the moderating influence of countries' institutional integrity, provides evidence that seeing one's own and others' actions as reflecting personal choice, accountability, and self-determination can broadly affect moral attitudes and judgments.

Materials and Methods

Participants. The sample consisted of 65,111 adults aged 18 y or older (52% female; mean age = 41.9 y, SD = 16.5 y) from 46 countries who participated in the fifth (2005–2009) wave of the WVS, the only wave to include both of the questions related to free will beliefs described below. Tables S8 and S9 provide descriptive statistics and measurement notes.

Individual-Level Measures: Free Will Beliefs and Moral Judgments. Our central individual-level explanatory variable was free will beliefs, operationalized as the average of two items (WVS questions A173 and F198, in which higher numbers indicate stronger free will beliefs). Participants rated the extent to which they have freedom of choice and control over their lives (1 = not at all; 10 = a great deal) and the extent to which people's fates are self-determined (1 = everything in life is determined by fate; 10 = people shape their fate themselves). These questions are highly similar to two items on a widely used free will beliefs scale ("People have complete control over the decisions they make," and "I believe that my future has already been pre-determined by fate") (14).

Two moral judgments formed the outcome measures. One, which we labeled "intolerance of unethical behavior," was operationalized as the average of four ratings of how justifiable it was to cheat on taxes, claim false government benefits, avoid transit fares, and accept bribes (1 = always justifiable; 10 = never justifiable; WVS questions F114–F117; $\alpha = 0.80$). This measure was reverse-coded so that higher values indicated that respondents viewed those actions as unjustifiable. The second moral judgment, support for criminal punishment, was measured by support for the notion that severe punishment for criminals is essential to democracy (1 = not essential; 10 = definitely essential; WVS question E231).

Following recommendations by Simmons, et al. (37), we estimated models with and without statistical control variables that have been shown to correlate with free will beliefs or moral attitudes (4, 12, 32, 38): gender (1 = female; 0 = male), age (in years), educational attainment (less than secondary, secondary, or postsecondary), overall happiness (1 = not at all; 4 = very happy), and the personal importance of religion (1 = not at all; 4 = very important). Unless otherwise specified, the results and robustness checks reported above refer to models including control variables (see also SI Robustness Checks and Tables S6 and S7). Models with and without statistical controls showed the same patterns.

Country-Level Measure: Institutional Integrity. We measured countries' political milieu by creating an institutional integrity index. It combined composite scores from two respected indicators of governmental transparency, accountability, and corruption: the WGI (http://info.worldbank.org/governance/wgi/#home) and the Corruption Perceptions Index (CPI; https://www.transparency.org/research/cpi). We used country-level data from 2003 (except for Burkina Faso, for which we used 2004 CPI data). By using country-level data from two or more years before the collection of the WVS data, we aimed to reduce the potential for reverse causation. The WGI composite score sums ratings of six political dimensions: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption (−2.5 = least free; 2.5 = most free). The CPI rating combines assessments of the quality of public sector governance by business leaders and country experts (0 = highly corrupt; 10 = highly clean). WGI and CPI scores were rescaled to have a range of 1 (lowest integrity) to 10 (highest integrity) so as to be consistent with the scoring of free will beliefs and moral judgments and were averaged to form a scale ($\alpha = 0.83$).

Statistical Procedures. The multilevel structure of our dataset, with respondents nested in countries, violated the assumption of independence across observations. In null models with only random intercepts, there were positive intraclass correlation coefficients for both moral judgement outcomes (intolerance of unethical behavior: 0.13; 95% CI 0.09, 0.20; support for criminal punishment: 0.11; 95% CI 0.07, 0.15), indicating the need to account for clustering by country (39). Accordingly, we used linear mixed-effects models with maximum likelihood estimation and robust SEs in Stata 14.1 (40). Because we estimated effects at both levels, individual-level covariates were differenced from the country mean. To calculate standardized coefficients, we divided interval-ratio and ordinal variables by two SDs to aid comparisons with categorical variables (41).

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Supporting Information

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SI Materials and Methods

Sample. Individual-level data were drawn from the fifth (2005–2009) wave of the WVS (13). Our sample was 65,111 adults age 18 y and older from all 46 countries with data available for each variable (mean number of adults per country = 1415.5; minimum = 999; maximum = 3,051). The countries and their survey year were Argentina (2006), Australia (2005), Brazil (2006), Bulgaria (2005), Burkina Faso (2007), Canada (2006), Chile (2006), China (2007), Cyprus (2006), Egypt (2008), Ethiopia (2007), Finland (2005), Georgia (2009), Germany (2006), Ghana (2007), Hungary (2009), India (2006), Indonesia (2006), Iran (2007), Japan (2005), Jordan (2007), Malaysia (2006), Mali (2007), Mexico (2005), Moldova (2006), Morocco (2007), Norway (2007), Poland (2005), Republic of Korea (2005), Romania (2005), Rwanda (2007), Serbia and Montenegro (2005), Slovenia (2005), South Africa (2006), Spain (2007), Sweden (2006), Switzerland (2007), Taiwan (2006), Thailand (2007), Trinidad and Tobago (2006), Turkey (2007), Ukraine (2006), United States (2006), Uruguay (2006), Viet Nam (2006), and Zambia (2007).

Missing Values. We excluded WVS respondents from Andorra because country-level information that was needed to compute the institutional integrity index was missing and from Italy because the individual-level measure of support for criminal punishment was missing. No variable had more than 2% missing values. Missing values were replaced with the group (country) mean.

Descriptive Statistics and Measurement Notes. Descriptive statistics are presented in Table S8. Table S9 provides full question wording, reliability coefficients, and factor loadings for all scale items.

Tests for Multicollinearity. To address the possibility of multicollinearity, we examined pairwise correlations among the individual-level variables and calculated variance inflation factors (VIFs) for the fixed portion of our models using linear regression with clustered SEs. No correlation coefficient was greater than 0.20, nor was any VIF greater than 1.2, indicating that multicollinearity was not a major issue (42).

Free Will Beliefs Scale Reliability. The low levels of internal consistency ($\alpha = 0.39$) for the two items comprising the free will beliefs measure may raise concerns about scale reliability. Cronbach's α can substantially underestimate reliability for two-item scales (43); $\alpha = 0.39$ for a two-item scale corresponds to $\alpha = 0.70$ for a seven-item scale using the Spearman–Brown correction. The low reliability score also could signal that the two items simply tap different constructs. A feeling one lacks choice need not track a belief in a predetermined fate (44).

To address concerns and test interpretations, we created separate regression models for each free will belief item. The results were largely consistent with those from the main models, which used the combined free will beliefs index (Tables S6 and S7). One discrepancy concerned the intolerance of unethical behavior outcome. The main effect models (Table S7, column A) showed that the item asking about belief in a predetermined fate was not a significant predictor, whereas the item asking about freedom of choice was significant. We hesitate to speculate on what that pattern may mean because we had no relevant hypotheses and observed that difference only once. For models predicting preferences regarding criminal punishment and models testing moderation by institutional integrity, the combined measure and individual items show consistent patterns (Fig. S1). In predicting tolerance of unethical behavior, the interaction terms for institutional integrity × each item

individually are similar in effect size (Tables S6 and S7, column B), but the estimate is less precise using the freedom of choice item, as seen in its larger SE and significance level.

SI Robustness Checks

Alternate Operationalizations of Institutional Integrity. Tables S2 and S3 report results from models that replaced our institutional integrity index with two other cross-national measures pertaining to the quality of state institutions that were available for the year 2003: The Polity IV democracy score (0 = no institutionalized democracy; 10 = fully institutionalized democracy) and Gächter and Schulz's (22) PRV standardized index (higher values = lower prevalence of rules violations). The PRV index was unavailable for Serbia and Montenegro because of missing information about the size of the shadow economy (45), leaving $n = 63,901$ adults in 45 countries for models using this index.

The patterns of results using either the Polity score or the PRV index were consistent with results from models using the institutional integrity index. As reported in the main text, there were significant interactions between free will beliefs and both alternative measures in models predicting tolerance for unethical behavior (Table S2). Also, there were no significant cross-level interactions in models predicting support for criminal punishment (Table S3).

Democratic vs. Nondemocratic Countries. The wording of the item assessing support for criminal punishment could have introduced a confound, because it asks about punishment being vital to democracy. Therefore, residents of nondemocratic countries might not have found the item applicable to their views. We tested this alternate explanation by conducting separate analyses for adults residing in democratic (Table S4) and nondemocratic (Table S5) countries. Classification of a regime as democratic was based on the Polity IV categorization. As described in the main text, the pattern of results replicated in both democratic and nondemocratic samples and therefore was not unduly influenced by the wording of the question. Stronger belief in free will predicted significantly greater support for criminal punishment in both democratic and nondemocratic countries, but free will beliefs had a significant, positive association with intolerance of unethical behaviors only in democratic countries.

Controlling for Political Beliefs. Endorsing a belief in free will corresponds with endorsing conservative political ideologies (e.g., refs. 4, 12), raising the possibility that the main results reflect political ideologies and not free will beliefs. As a final robustness check, we included political orientation as an additional control. WVS respondents were asked, "In political matters, people talk of 'the left' and 'the right.' How would you place your views on this scale, generally speaking?" (1 = left; 10 = right). This measure was missing for three countries, China, Iran, and Malaysia, leaving $n = 56,173$ respondents in 43 countries.

Table S1 displays results from models predicting intolerance for unethical behavior (model 1) and support for criminal punishment (model 2) that included political beliefs as a control variable. Free will beliefs still significantly and positively predicted both intolerance for unethical behavior and support for criminal punishment, confirming that the results reported in the main text are robust.

Also replicating the results from models that did not include political orientation, there was a significant, positive interaction between free will beliefs and institutional integrity in models predicting tolerance of unethical behaviors ($b = 0.01$; 95% CI 0.00, 0.02; $P = 0.029$), and there was no significant cross-level interaction

in models predicting support for criminal punishment ($b = -0.01$; 95% CI -0.03, 0.01; $P = 0.250$). Free will beliefs predicted intolerance of unethical behavior and support for criminal punishment while statistically holding constant political orientation and other potential confounding variables. These tests offered another check of the results' robustness, thereby bolstering confidence in the conclusion that free will beliefs help explain moral judgments and attitudes.
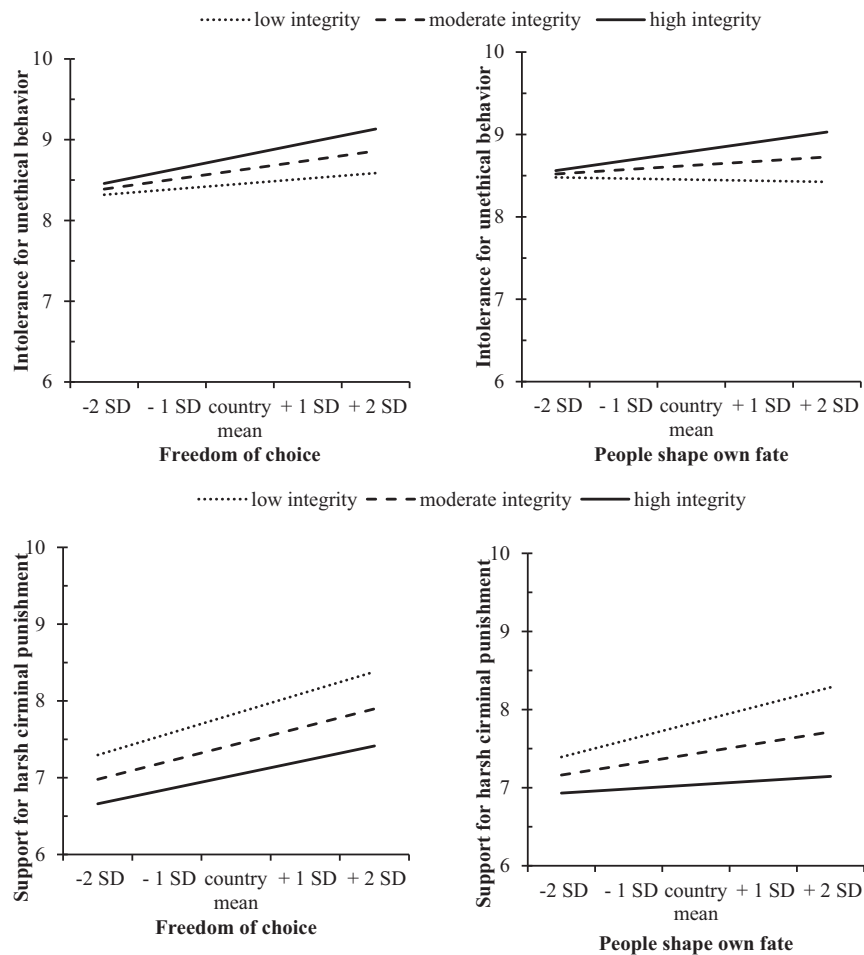
Fig. S1. Predictive margins (adjusted predictions) by degree of free will beliefs at low (1 SD below mean), moderate (mean), and high (1 SD above mean) levels of institutional integrity. The *y* axes range from 1 to 10. This figure is based on linear mixed-effects regression models predicting intolerance of unethical behaviors (Table S4, models 1B and 2B) and support for criminal punishment (Table S5, models 1B and 2B).

Table S1. Results from linear mixed-effects regression models predicting intolerance of unethical behavior (model 1) and support for criminal punishment (model 2): Controlling for political ideology

Variable	Model 1: Intolerance for unethicality			Model 2: Support for criminal punishment		
	b	SE b	β	b	SE b	β
Individual-level variables						
Free will beliefs	0.03	(0.01)	0.09**	0.06	(0.02)	0.23***
Intolerance for unethicality				0.12	(0.02)	0.40***
Political ideology	−0.02	(0.01)	−0.08*	0.05	(0.01)	0.19***
Female	0.09	(0.02)	0.09***	−0.09	(0.03)	−0.09***
Age	0.01	(0.00)	0.36***	0.00	(0.00)	0.04
Education: primary or less	−0.12	(0.03)	−0.12***	−0.03	(0.06)	−0.03
Education: postsecondary	0.11	(0.03)	0.11***	−0.16	(0.09)	−0.16
General happiness	0.03	(0.02)	0.05	0.04	(0.03)	0.05
Religion importance	0.13	(0.02)	0.16***	0.06	(0.03)	0.08*
Country-level variable						
Institutional integrity index	0.11	(0.05)	0.36*	−0.24	(0.07)	−0.80***
Intercept	8.06	(0.37)		8.71	(0.38)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. P values: ***P ≤ 0.001, **P ≤ 0.01, *P ≤ 0.05.

Table S2. Results from linear mixed-effects regression models predicting intolerance of unethical behaviors: Cross-level interactions with alternative country-level measures

Variable	Model 1			Model 2		
	b	SE b	β	b	SE b	β
Individual-level variables						
FWB	−0.02	(0.01)	−0.08	−0.08	(0.03)	−0.29**
Female	0.09	(0.02)	0.09***	0.09	(0.02)	0.09***
Age	0.01	(0.00)	0.36***	0.01	(0.00)	0.36***
Education: primary or less	−0.11	(0.03)	−0.11***	−0.10	(0.03)	−0.10***
Education: postsecondary	0.12	(0.03)	0.12***	0.11	(0.03)	0.11***
General happiness	0.04	(0.02)	0.05	0.03	(0.02)	0.04
Religion importance	0.11	(0.02)	0.14***	0.12	(0.02)	0.15***
Country-level variables						
Polity IV democracy score	0.02	(0.02)	0.14			
Polity × FWB	0.01	(0.00)	0.19***			
PRV index				0.07	(0.05)	0.25
PRV × FWB				0.02	(0.00)	0.38***
Intercept	8.50	(0.20)		8.17	(0.36)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. The PRV index was unavailable for Serbia and Montenegro (leaving n = 63,901 adults in 45 countries). P values: ***P ≤ 0.001, **P ≤ 0.01, *P ≤ 0.05. FWB, free will beliefs.

Table S3. Results from linear mixed-effects regression models predicting support for criminal punishment: Cross-level interactions with alternative country-level measures

Variable	Model 1			Model 2		
	b	SE b	β	b	SE b	β
Individual-level variables						
FWB	0.10	(0.05)	0.37*	0.13	(0.09)	0.49
Intolerance for unethicality	0.12	(0.02)	0.40***	0.13	(0.02)	0.42***
Female	−0.10	(0.02)	−0.10***	−0.10	(0.02)	−0.10***
Age	0.00	(0.00)	0.05	0.00	(0.02)	0.05
Education: primary or less	−0.03	(0.06)	−0.03	−0.03	(0.06)	−0.03
Education: postsecondary	−0.16	(0.08)	−0.16*	−0.16	(0.08)	−0.16*
General happiness	0.04	(0.03)	0.06	0.04	(0.03)	0.06
Religion importance	0.08	(0.03)	0.10**	0.08	(0.03)	0.10**
Country-level variables						
Polity IV democracy score	−0.07	(0.03)	−0.53*			
Polity × FWB	−0.00	(0.01)	−0.13			
PRV index				−0.20	(0.06)	−0.68***
PRV × FWB				−0.01	(0.01)	−0.24
Intercept	7.92	(0.24)		7.58	(0.42)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. The PRV index was unavailable for Serbia and Montenegro (leaving $n = 63,901$ adults in 45 countries). P values: ***$P \le 0.001$, **$P \le 0.01$, *$P \le 0.05$. FWB, free will beliefs.

Table S4. Results from linear mixed-effects regression models predicting intolerance of unethical behaviors (model 1) and support for criminal punishment (model 2): Democratic countries only

Variable	Model 1: Intolerance for unethicality			Model 2: Support for criminal punishment		
	b	SE b	β	b	SE b	β
Individual-level variables						
Free will beliefs	0.04	(0.01)	0.14***	0.06	(0.01)	0.21***
Intolerance for unethicality				0.13	(0.02)	0.42***
Female	0.10	(0.02)	0.10***	−0.07	(0.03)	−0.07*
Age	0.01	(0.00)	0.40***	0.00	(0.00)	0.06
Education: primary or less	−0.15	(0.03)	−0.15***	−0.03	(0.07)	−0.03
Education: postsecondary	0.11	(0.03)	0.11***	−0.21	(0.10)	−0.21*
General happiness	0.05	(0.02)	0.07*	0.07	(0.04)	0.09
Religion importance	0.11	(0.02)	0.14***	0.04	(0.03)	0.05
Country-level variable						
Institutional integrity index	0.14	(0.07)	0.48*	−0.23	(0.08)	−0.77**
Intercept	7.81	(0.49)		8.65	(0.46)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. Democratic regime classification based on Polity IV categorization ($n = 45,354$ adults in 34 countries). P values: ***$P \le 0.001$, **$P \le 0.01$, *$P \le 0.05$.

Table S5. Results from linear mixed-effects regression models predicting intolerance for unethical behaviors (model 1) and support for criminal punishment (model 2): Nondemocratic countries

Variable	Model 1: Intolerance for unethicality			Model 2: Support for criminal punishment		
	b	SE b	β	b	SE b	β
Individual-level variables						
Free will beliefs	−0.01	(0.01)	−0.04	0.09	(0.05)	0.34
Intolerance for unethicality				0.11	(0.04)	0.35*
Female	0.06	(0.03)	0.06*	−0.15	(0.02)	−0.15***
Age	0.01	(0.00)	0.23***	0.00	(0.00)	0.05
Education: primary or less	−0.00	(0.06)	−0.00	−0.02	(0.11)	−0.02
Education: postsecondary	0.15	(0.07)	0.15*	0.03	(0.09)	0.03
General happiness	0.01	(0.05)	0.01	−0.01	(0.03)	−0.01
Religion importance	0.12	(0.06)	0.16*	0.25	(0.05)	0.32***
Country-level variable						
Institutional integrity index	−0.43	(0.29)	−1.43	−0.16	(0.35)	−0.52
Intercept	10.37	(1.17)		8.43	(1.39)	

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. Reference category is secondary education. Democratic regime classification based on Polity IV categorization ($n = 19{,}757$ adults in 12 countries). P values: ***$P \leq 0.001$, **$P \leq 0.01$, *$P \leq 0.05$.

Table S6. Results from linear mixed-effects regression models predicting support for criminal punishment separately by each item on the free will beliefs scale

Variable	(A) No interaction term			(B) With interaction term		
	b	SE b	β	b	SE b	β
With control variables						
Model 1						
Freedom of choice [A173]	0.06	(0.01)	0.24***	0.08	(0.04)	0.36*
Institutional integrity	−0.24	(0.06)	−0.80***	−0.24	(0.06)	−0.80***
A173 × institutional integrity				−0.01	(0.01)	−0.13
Model 2						
People shape own fate [F198]	0.03	(0.01)	0.16**	0.08	(0.04)	0.41
Institutional integrity	−0.24	(0.06)	−0.80***	−0.24	(0.06)	−0.80***
F198 × institutional integrity				−0.01	(0.01)	−0.26
No control variables						
Model 3						
Freedom of choice [A173]	0.06	(0.01)	0.27***	0.09	(0.04)	0.38*
Institutional integrity	−0.24	(0.06)	−0.80***	−0.24	(0.06)	−0.80***
A173 × institutional integrity				−0.01	(0.01)	−0.12
Model 4						
People shape own fate [F198]	0.03	(0.01)	0.16**	0.08	(0.04)	0.41
Institutional integrity	−0.24	(0.06)	−0.80***	−0.24	(0.06)	−0.80***
F198 × institutional integrity				−0.01	(0.01)	−0.25

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. P values: ***$P \leq 0.001$, **$P \leq 0.01$, *$P \leq 0.05$. The bracketed letter–number strings represent the item names in the WVS.

Table S7. Results from linear mixed-effects regression models predicting intolerance of unethical behaviors separately by each item on the free will beliefs scale

Variable	(A) No interaction term			(B) With interaction term		
	b	SE b	B	b	SE b	β
With control variables						
Model 1						
Freedom of choice [A173]	0.02	(0.01)	0.11**	−0.01	(0.03)	−0.04
Institutional integrity	0.10	(0.05)	0.34*	0.10	(0.05)	0.34*
A173 × institutional integrity				0.01	(0.00)	0.16
Model 2						
People shape own fate [F198]	0.01	(0.01)	0.04	−0.03	(0.02)	−0.16
Institutional integrity	0.10	(0.05)	0.34*	0.10	(0.05)	0.34*
F198 × institutional integrity				0.01	(0.00)	0.20**
No control variables						
Model 3						
Freedom of choice [A173]	0.03	(0.01)	0.12**	−0.01	(0.03)	−0.04
Institutional integrity	0.10	(0.05)	0.34*	0.10	(0.05)	0.34*
A173 × institutional integrity				0.01	(0.00)	0.16
Model 4						
People shape own fate [F198]	0.00	(0.01)	0.02	−0.03	(0.02)	−0.15
Institutional integrity	0.10	(0.05)	0.34*	0.10	(0.05)	0.34*
F198 × institutional integrity				0.01	(0.00)	0.17*

Values are unstandardized (b) and standardized (β) coefficients and robust SEs. P values: *** $P \leq 0.001$, ** $P \leq 0.01$, * $P \leq 0.05$. The bracketed letter–number strings represent the item names in the WVS.

Table S8. Descriptive statistics

Variable name	Mean	SD	Minimum	Maximum
Individual-level variables				
Free will beliefs	6.63	2.04	1	10
Intolerance for unethical behavior	8.65	1.75	1	10
Support for criminal punishment	7.52	2.75	1	10
Gender (1 = female, 0 = male)	0.52		0	1
Age	41.94	16.47	18	98
Highest education level completed:				
Primary or less	0.45		0	1
Secondary	0.41		0	1
Postsecondary	0.14		0	1
General happiness	3.07	0.72	1	4
Importance of religion	2.22	0.85	1	4
Country-level variable				
Institutional integrity index	5.35	1.67	3.14	8.86

Source: World Values Survey, 2005–2009 (n = 65,111 adults in 46 countries) (13).

Table S9. Scale items and factor loadings

Variables and scale items from the WVS survey question	Factor loading
Individual-level variables	
Free will beliefs (two items; Cronbach's α = 0.39)	
Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "none at all" and 10 means "a great deal" to indicate how much freedom of choice and control you feel you have over the way your life turns out. [A173]	0.79
Some people believe that individuals can decide their own destiny, while others think that it is impossible to escape a predetermined fate. Please tell me which comes closest to your view on this scale where 1 means "everything in life is determined by fate" and 10 means that "people shape their fate themselves." [F198]	0.79
Intolerance for unethical behaviors (four items; Cronbach's α = 0.80)	
Please tell me for each of the following statements whether you think it can be justified, never be justified, or something in between. (1= never justifiable, 10 = always justifiable)*	
Claiming government benefits to which you are not entitled [F114]	0.76
Avoiding a fare on public transport [F115]	0.80
Cheating on taxes if you have a chance [F116]	0.83
Someone accepting a bribe in the course of their duties [F117]	0.79
Support for criminal punishment (one item)	
Please tell me how essential of a characteristic of democracy is it that criminals are severely punished. Use this scale where 1 means not an essential characteristic of democracy and 10 means it definitely is an essential characteristic of democracy. [E231]	
Country-level variable	
Institutional integrity index (two items; Cronbach's α = 0.83)	
World Governance Indicators composite score	0.96
Corruption Perceptions Index	0.96

The bracketed letter–number strings represent the item names in the WVS.

*The WVS had respondents indicate their attitudes on a scale where higher values indicated that the behavior was more justifiable, which we rescored so that higher values indicated the behavior was less justifiable.