RESEARCH ARTICLE SUMMARY

PSYCHOLOGY

The Church, intensive kinship, and global psychological variation

Jonathan F. Schulz*, Duman Bahrami-Rad, Jonathan P. Beauchamp, Joseph Henrich

INTRODUCTION: A growing body of research suggests that populations around the globe vary substantially along several important psychological dimensions and that populations characterized as Western, Educated, Industrialized, Rich, and Democratic (WEIRD) are particularly unusual. People from these societies tend to be more individualistic, independent, and impersonally prosocial (e.g., trusting of strangers) while revealing less conformity and in-group loyalty. Although these patterns are now well documented, few efforts have sought to explain them. Here, we propose that the Western Church (i.e., the branch of Christianity that evolved into the Roman Catholic Church) transformed European kinship structures during the Middle Ages and that this transformation was a key factor behind a shift towards a WEIRDer psychology.

RATIONALE: Our approach integrates three insights. First, anthropological evidence suggests that diverse kin-based institutions—our species's most fundamental institutions—have been the primary structure for organizing social life in most societies around the world and back into history. With the origins of agriculture, cultural evolution increasingly favored intensive kinship norms related to cousin marriage, clans, and co-residence that fostered social tightness, interdependence, and in-group cooperation. Second, psychological research reveals that people's motivations, emotions, and perceptions are shaped by the social norms they encounter while growing up. Within intensive kin-based institutions, people's psychological processes adapt to the collectivistic demands of their dense social networks. Intensive kinship norms reward greater conformity, obedience, and in-group loyalty while discouraging individualism, independence, and impersonal motivations for fairness and cooperation. Third, historical research suggests that the Western Church systematically undermined Europe's intensive kin-based institutions during the Middle Ages (for example, by banning cousin marriage). The Church's family policies meant that by 1500 CE, and likely centuries earlier in some regions, Europe lacked strong kin-based institutions and was instead dominated by relatively independent and isolated nuclear or stem families.

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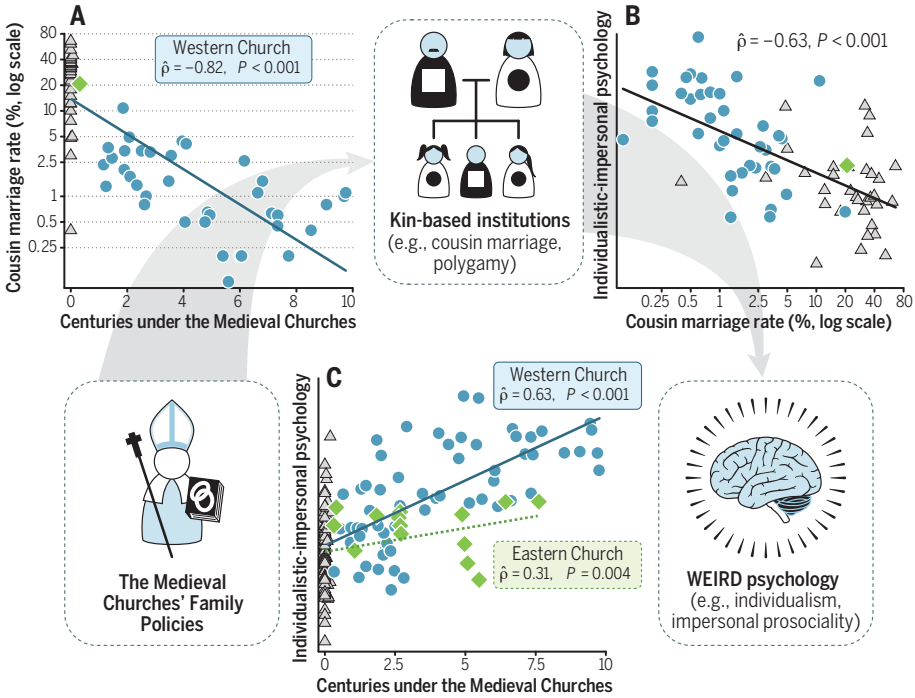
Our theory predicts that populations with (i) a longer historical exposure to the medieval Western Church or less intensive kin-based institutions will be more individualistic, less conforming, and more impersonally prosocial today; and (ii) longer historical exposure to the Western Church will be associated with less-intensive kin-based institutions.

RESULTS: We test these predictions at three levels. Globally, we show that countries with longer historical exposure to the medieval Western Church or less intensive kinship (e.g., lower rates of cousin marriage) are more individualistic and independent, less conforming and obedient, and more inclined toward trust and cooperation with strangers (see figure). Focusing on Europe, where we compare regions within countries, we show that longer exposure to the Western Church is associated with less intensive kinship, greater individualism, less conformity, and more fairness and trust toward strangers. Finally, comparing only the adult children of immigrants in European countries, we show that those whose parents come from countries or ethnic groups that historically experienced more centuries under the Western Church or had less intensive kinship tend to be more individualistic, less conforming, and more inclined toward fairness and trust with strangers.

CONCLUSION: This research suggests that contemporary psychological patterns, ranging from individualism and trust to conformity and analytical thinking, have been influenced by deep cultural evolutionary processes, including the Church's peculiar incest taboos, family policies, and enduring kin-based institutions. ■



Cross-country relationship between exposure to the medieval churches, kin-based institutions, and psychology. As predicted by our theory, countries with a longer exposure to the medieval Western Church have lower rates of cousin marriage (**A**); countries with lower rates of cousin marriage have a more individualistic and impersonally prosocial psychology (**B**); and countries with a longer exposure to the medieval Western Church have a more individualistic and impersonally prosocial psychology (**C**). Blue dots, green diamonds, and gray triangles denote countries primarily exposed to the Western Church, to the Eastern Church, and with no church exposure, respectively. ρ̂ denotes Spearman correlation.

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RESEARCH ARTICLE

PSYCHOLOGY

The Church, intensive kinship, and global psychological variation

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Recent research not only confirms the existence of substantial psychological variation around the globe but also highlights the peculiarity of many Western populations. We propose that part of this variation can be traced back to the action and diffusion of the Western Church, the branch of Christianity that evolved into the Roman Catholic Church. Specifically, we propose that the Western Church's transformation of European kinship, by promoting small, nuclear households, weak family ties, and residential mobility, fostered greater individualism, less conformity, and more impersonal prosociality. By combining data on 24 psychological outcomes with historical measures of both Church exposure and kinship, we find support for these ideas in a comprehensive array of analyses across countries, among European regions, and among individuals from different cultural backgrounds.

A growing body of research suggests that populations around the globe vary substantially along several important psychological dimensions and that people from societies characterized as Western, Educated, Industrialized, Rich, and Democratic (WEIRD) are particularly unusual (*1*–*3*). Often occupying the extremes of global distributions, Western Europeans and their cultural descendants in North America and Australia tend to be more individualistic, independent, analytically minded, and impersonally prosocial (e.g., trusting of strangers) while revealing less conformity, obedience, in-group loyalty, and nepotism (*3*–*12*). Although these patterns are now well documented, efforts to explain this variation from a cultural-evolutionary and historical perspective have just begun (*12*–*16*). In this study, we develop and test a cultural evolutionary theory that aims to explain a substantial portion of this psychological variation, both within and across nations.

Our approach begins by considering how religions have evolved in ways that shape people's institutions, social practices, economic outcomes, and psychology (*17*–*22*). Research in this area has, for example, documented the effect of Christian missions on both formal schooling and economic prosperity in places as diverse as Africa, China, and South America (*23*–*26*). Here, highlighting a less conspicuous channel, we go deeper into history and test the theory that the Western Catholic Church, primarily through its influence on marriage and family structures during the Middle Ages, had an important impact on psychological variation.

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Not only does our approach contribute to explaining why European and European-descent societies so often occupy the tail ends of global psychological distributions, it also helps explain variation within Europe—among countries, across regions within countries, and among individuals in the same country and region but with different cultural backgrounds.

To develop these ideas, our theory integrates three insights, drawing principally on anthropology, psychology, and history (*27*). First, anthropological research suggests that kin-based institutions represent the most fundamental of human institutions and have long been the primary framework for organizing social life in most societies (*28*–*31*). These institutions are composed of culturally transmitted norms that influence a broad range of social relationships by endowing individuals with sets of obligations and privileges with respect to their communities (supplementary text, section S1). Many kinship systems, for example, extend our species's innate aversion to inbreeding (incest) to create taboos on marriage to more distant relatives, usually including particular types of cousins (*32*). By shaping patterns of marriage, residence, relatedness, and alliance formation, these norms organize interpersonal interactions and configure social networks in ways that profoundly influence social incentives and behavior (*27*, *33*–*35*).

Although all premodern societies are organized primarily by kin-based institutions, evidence suggests that the character of these diverse institutions has been substantially influenced by ecological, climatic, and geographic factors (*28*, *30*, *33*, *34*, *36*–*38*). For instance, among mobile hunter-gatherers, cultural evolution has responded to ecological risk by favoring "extensive" kin ties, which create sprawling relational networks that can be tapped when local disasters strike (*30*, *37*, *39*). However, with the emergence of food production roughly 12,000 years ago, cultural evolution increasingly favored "intensive" kin-based institutions that permitted communities to unify larger groups to defend territories and organize production (*30*, *40*–*43*). By constructing denser, tighter, and more interdependent social networks, these kin-based institutions intensified in-group loyalty, conformity, obedience to elders, and solidarity. For example, instead of favoring marriages to distant kin, cultural evolution often favored some form of cousin marriage, which tightened existing bonds among families (*28*). Cultural evolution thus led to a diversity of intensive kin-based institutions, including clans and kindreds (*28*, *32*, *44*), which dramatically restructured people's social environments (*27*, *45*, *46*).

Our second insight, drawing on psychology and neuroscience, recognizes how aspects of our cognition, emotions, perceptions, thinking styles, and motivations adapt—often over ontogeny—to the normative demands, reputational incentives, and values of the interdependent social networks threaded together by kin-based institutions (*3*, *13*, *27*, *47*–*52*). In particular, within intensive kin-based institutions, people's psychological processes adapt to the collectivistic demands and the dense social networks in which they are enmeshed (*53*, *54*). These institutions, thus, incentivize the cultivation of greater conformity, obedience, nepotism, deference to elders, holistic-relational awareness, and in-group loyalty but discourage individualism, independence, and analytical thinking (*55*). Because the sociality of intensive kinship is based on interpersonal embeddedness, adapting to these institutions reduces people's inclinations toward impartiality, universal (nonrelational) moral principles, and impersonal trust, fairness, and cooperation; these institutions instead foster a contextually sensitive morality rooted in in-group loyalty.

Finally, drawing on historical research, our third insight incorporates the role of religion and its influence on kin-based institutions (*27*). By the start of the Common Era (CE), universalizing religions with powerful moralizing gods (or cosmic forces), universal ethical codes, and contingent afterlife beliefs had emerged across the Old World. However, these competing religions varied greatly in how their religious beliefs and practices shaped kin-based institutions (*20*, *56*). In Persia, for example, Zoroastrians glorified the marriage of close relatives, including siblings, and encouraged widespread cousin marriage. Later, Islam curbed polygynous marriage (limiting a man to no more than four wives) but also adopted inheritance customs that promoted a nearly unique form of cousin marriage in which a daughter marries her father's brother's son—patrilineal clan endogamy (*57*–*59*). Beginning

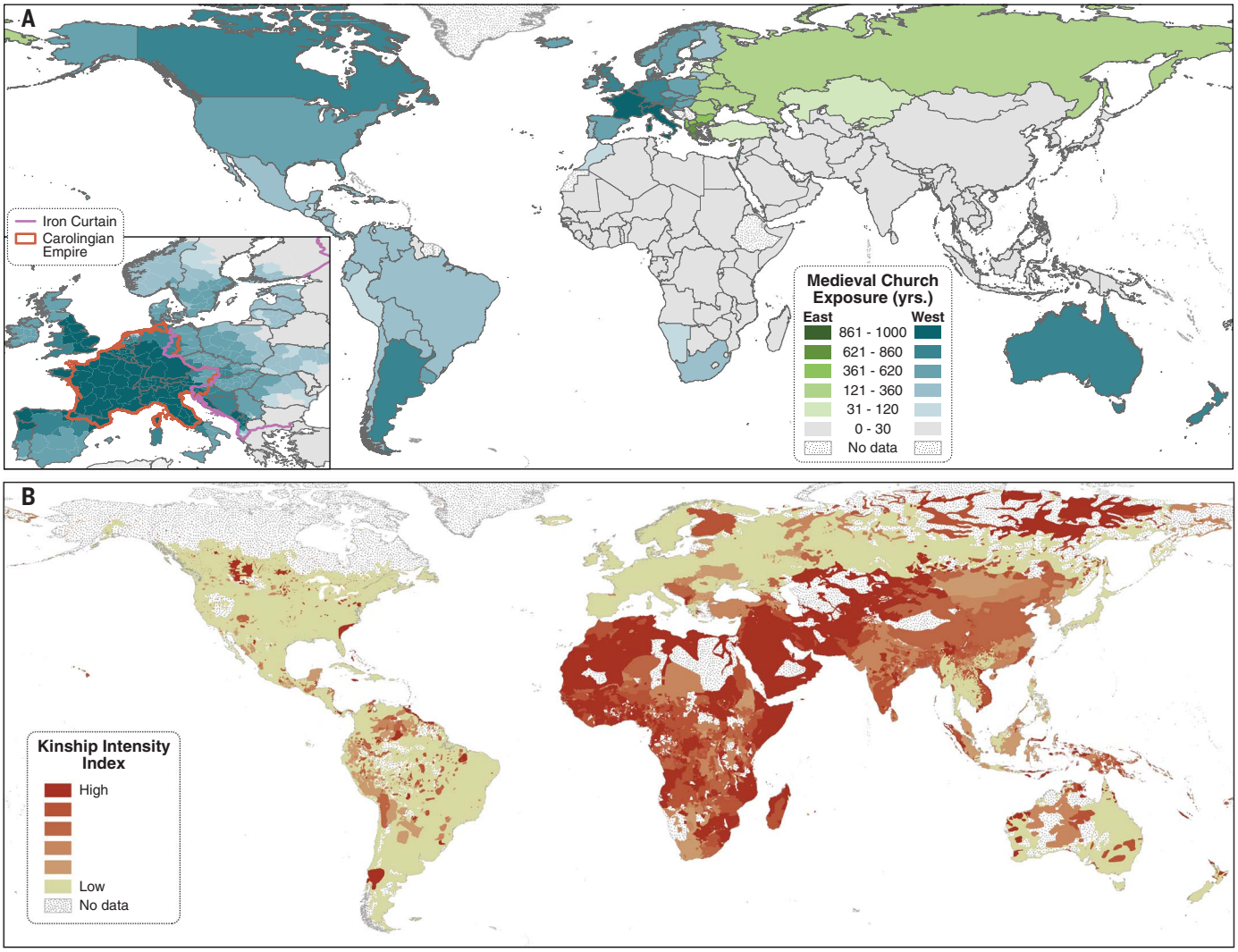

Fig. 1. Church exposure and kinship intensity around the world. (**A**) Exposure to the medieval Western (blue shading) and Eastern (green shading) Churches at the country level. The inset shows the Western Church exposure for regions within Europe based on the diffusion of bishoprics between 550 and 1500 CE (blue shading). The map delineates the boundaries of the Carolingian Empire (orange line) and the divide between Western and socialist Europe (pink line; after Churchill's Iron Curtain speech). (**B**) The kinship intensity index (KII) for ethnolinguistic groups around the world.

in Late Antiquity, the branch of Christianity that eventually evolved into the Roman Catholic Church—hereafter, the Western Church or simply the Church—systematically undermined Europe's intensive kin-based institutions through a combination of religious prohibitions and prescriptions (*46*, *59*–*62*). Prior to the Church's efforts, the kin-based institutions of most European populations looked much like other agricultural societies and included patrilineal clans, kindreds, cousin marriage, polygyny, ancestor worship, and corporate ownership (*27*, *59*, *60*, *63*–*73*). Meanwhile, although the branch of Christianity based in Constantinople that eventually evolved into the Orthodox Church—the Eastern Church—did adopt some of the same prohibitions as the Western Church, it never endorsed the Western Church's broad taboos on cousin marriage, was slow to adopt many policies, and was unenthusiastic about enforcement.

The Western Church's policies, which we call the Marriage and Family Program (MFP) (*27*), began with targeted bans on certain marriage practices used to sustain alliances between families (e.g., levirate marriage); however, by the Early Middle Ages, the Church had become obsessed with incest and began to expand the circle of forbidden relatives, eventually including not only distant cousins but also step-relatives, in-laws, and spiritual kin. Early in the second millennium, the ban was stretched to encompass sixth cousins, including all affines. At the same time, the Church promoted marriage "by choice" (no arranged marriages) and often required newly married couples to set up independent households (neolocal residence). The Church also forced an end to many lineages by eliminating legal adoption, remarriage, and all forms of polygamous marriage, as well as concubinage, which meant that many lineages began literally dying out due to a lack of legitimate heirs. As a result of the MFP, by 1500 CE (and centuries earlier in some regions), much of Europe was characterized by a virtually unique configuration of weak (nonintensive) kinship marked by monogamous nuclear households, bilateral descent, late marriage, and neolocal residence (*59*–*62*, *64*, *74*, *75*).

Our theory, by synthesizing these insights, predicts that populations with a longer exposure to the medieval Western Church or less-intensive kin-based institutions will be less conforming but more individualistic and impersonally prosocial. At the same time, longer exposure to the Western Church should be

associated with less intensive kin-based institutions. Of course, our theory does not preclude the existence of other important contributors to psychological variation, such as influences from the Church via channels other than kin-based institutions.

We emphasize that, in the absence of a decisive natural experiment in history, it is difficult to establish unassailable causal links between the Church's MFP, kin-based institutions, and psychology (supplementary text S3). Our empirical approach has been to select both our psychological outcomes and explanatory variables ex ante on the basis of our theoretical predictions and then to repeatedly test for the expected relationships at different levels of analysis while controlling for an extensive battery of individual, regional, and historical covariates.

Results at three levels of analysis

To test our theory, we developed three types of variables (see Materials and methods summary and supplementary text S1 and S2). First, we assembled a database (*76*) on the diffusion of the medieval Eastern and Western Churches and calculated the duration of exposure to each for every country in the world (accounting for population migrations after 1500 CE) (Fig. 1A); using more detailed data, we also calculated the duration of exposure to the Western Church for 440 subnational European regions (Fig. 1A, inset). Second, to measure the intensity of kin-based institutions—kinship intensity—we both created a Kinship Intensity Index (KII) using anthropological data for the world's major ethnolinguistic groups and compiled rates of cousin marriage for countries and European regions (Fig. 1B). The KII is an omnibus measure for kinship intensity that captures the presence of cousin-marriage preferences, polygamy, co-residence of extended families, clan organization, and community endogamy. Third, drawing on existing data sources, we assembled 24 different psychological outcomes on the basis of laboratory experiments, validated psychological scales, survey questions, and observational data that focus on psychological proclivities toward individualism and independence, conformity and obedience, and cooperation and fairness with strangers (Table 1). Using these variables, we test the above predictions at three analytical levels: (i) across countries, (ii) among individuals from different subnational European regions, and (iii) among second-generation immigrants from diverse backgrounds living in the same European countries.

Psychological variation across countries

At the country level, our psychological outcomes are generally highly correlated in the predicted directions with Western Church exposure. To parsimoniously illustrate our cross-national findings, Fig. 2A shows a Spearman correlation (ρ) of 0.63 between Western Church exposure and our Individualistic-Impersonal Psychology Scale. This scale aggregates all 17 of our cross-country psychological outcomes (see starred outcomes in Table 1) with reverse scaling, when necessary, so the predicted direction is always positive (see Materials and methods summary). For each of our psychological outcomes, figs. S4.1 to S4.4 and Table 2 show that longer exposure to the Western Church predicts greater individualism and independence (with $|\rho|$ ranging from 0.61 to 0.79), less conformity and obedience (with $|\rho|$ ranging from 0.01 to 0.51), and greater impersonal prosociality (with $|\rho|$ ranging from 0.43 to 0.69). For only one of our psychological variables, proper behavior in our conformity and obedience package, is there no evidence of a relationship with Western Church exposure or any of our key theoretical predictors (Table 2 and fig. S4.2B). We conservatively report significance levels (*P* values) on the basis of two-tailed tests throughout, even though our theory makes clear directional predictions.

In comparison to the Western Church, the relationships between our psychological outcomes and exposure to the Eastern Church are substantially weaker and sometimes do not go in the predicted direction (Fig. 2, Table 2, and figs. S4.1 to S4.4). Overall, the weaker and inconsistent impacts of the Eastern Church support our theoretical emphasis on the centrality of the Western Church's MFP (but fewer countries were exposed to the Eastern Church, which limits statistical power).

Turning to kinship intensity, Fig. 2B and Table 2 show the relationships between our psychological outcomes and both cousin marriage and the KII. Figure 2B shows that greater kinship intensity predicts lower values on our Individualistic-Impersonal Psychology Scale. Separately, for each of our psychological outcomes (figs. S4.1 to S4.4), Table 2 shows that lower kinship intensity predicts greater individualism and independence ($|\rho|$ ranging from 0.10 to 0.66), less conformity and obedience ($|\rho|$ ranging from 0.12 to 0.72, excluding proper behavior), and greater impersonal prosociality ($|\rho|$ ranging from 0.26 to 0.98). In total, 33 of the 34 correlations go in the predicted direction, and 29 are significant at conventional levels ($P < 0.05$). The correlations that are not significant (analytical thinking, tightness, and particularism) are based on small samples dominated by European countries, which show little variation in the KII, so imprecise estimates are not surprising. Overall, although not quite as strong as the results for the Western Church above, these correlations do support a role for kinship intensity.

To further stress-test these relationships, we estimated a battery of regression models for our Individualistic-Impersonal Psychology Scale and for each of the 10 psychological outcomes with samples containing at least 40 observations. In our baseline model, we separately regressed each outcome on (i) Eastern and Western Church exposure measures (both in the same regression); (ii) the KII; or (iii) cousin marriage prevalence along with four geographic control variables—agricultural suitability, absolute latitude, mean distance to waterways, and average terrain ruggedness (supplementary text S4). Each of these controls has previously been associated with economic development, colonial expansion, or productivity.

Table 3 presents the results for the baseline models (omitting proper behavior, for which there is no association). For each psychological outcome, the table shows the four relevant coefficients from three separate regression models (separated by solid horizontal lines). The analyses show that, holding the four geographic controls constant, 29 of the 30 theoretically relevant coefficients go in the predicted direction, 26 are significant at conventional levels ($P < 0.05$), and two more are marginally significant ($P < 0.10$). The effect sizes are moderate to large. For example, an additional 500 years of Western Church exposure is associated with a change of between 0.80 and 1.15 standard deviations in embeddedness, tradition, creativity, and out-in-group trust. In contrast, for the Eastern Church, the relationships between our psychological outcomes and church exposure evaporate. Similarly, a one-standard-deviation increase in the KII is associated with a change of between 23 and 61% of a standard deviation in embeddedness, tradition, creativity, and out-in-group trust (all in the predicted direction).

In addition to these baseline models, supplementary text S4 explores the robustness of these results in several ways. By separately adding control variables to our baseline models, tables S4.1 to S4.5 examine the effect of (i) parasite stress and tropical regions, (ii) irrigation potential, (iii) suitability for oats and rye, (iv) time since the origins of agriculture and genetic heterogeneity (expected heterozygosity), (v) major religious traditions (e.g., Catholicism, Protestantism, Islam, Hinduism, Buddhism, etc.), (vi) religiosity, and (vii) continental fixed effects. Next, to address the non-independence of national-level observations, table S4.6 uses Conley standard errors (*77*) to account for spatial proximity and shared genetic/cultural history. These analyses confirm that the relationships are generally robust, although see supplementary text S4.1 for a discussion of the impact of controlling for irrigation potential on the results.

If kinship intensity is indeed a primary channel for the Church's influence, then we should expect greater Church exposure to predict less-intensive kinship at the national level. Indeed, our analyses confirm that national populations

Table 1. Psychological and behavioral measures. The 24 measures are grouped into three packages for expositional convenience. The notation "std" indicates that a variable has been standardized, and a percent sign indicates that a variable is expressed as a percent. An asterisk identifies those variables that were used to compute our Individualistic-Impersonal Scale. WVS, World Values Survey (*95*); ESS, European Social Survey (*96*); WHO, World Health Organization; UN, United Nations; Lab exp., laboratory experiment; Obs., observation.

	Variable	Type	Analysis	N	Description
			Individualism and independence		
1	*Individualism (std)	Scale	Countries	102	Hofstede's widely used scale integrates questions about goals, achievement-orientation, and family ties (*97*).
2	*Creativity (std)	Survey	Countries	78	Asks how important it is to "think up new ideas and be creative; to do things one's own way" (WVS).
3	*Embeddedness	Survey	Countries	68	Psychological scale capturing an individual's commitment to stable social relationships and the existing social order (*98*, *99*).
4	*Analytical thinking (%)	Task	Countries	31	Online task to assess analytical versus holistic thinking (*100*). In a series of triads, participants are asked whether a target, such as a rabbit, goes with either an analytical option (categories, such as a dog) or a holistic or relational option (e.g., a carrot).
5	Individualism-independence (std)	Survey	Regions/migrants	>13K	A two-question index on the importance of individualism and independence (ESS).
			Conformity and obedience		
6	*Tightness (std)	Scale	Countries	32	Scale measuring people's perceptions of how closely norms in their society are monitored and enforced through social pressures and reputational judgments (*47*).
7	*Asch conformity (%)	Lab exp.	Countries	16	Line judgment task based on a meta-analysis of 133 studies (see text) (*11*, *101*).
8	*Tradition (std)	Survey	Countries	78	Asks people about the importance of tradition (WVS).
9	*Obedience (%)	Survey	Countries	109	A binary measure on the importance of inculcating obedience in children (WVS).
10	*Proper behavior (std)	Survey	Countries	78	Asks people about the importance of behaving properly and avoiding behavior that others say is wrong (WVS).
11	Conformity-obedience (std)	Survey	Regions/migrants	>13K	Index based on four questions about the importance of conformity and obedience (ESS).
			Impersonal prosociality: Impartiality		
12	*UN diplomatic tickets	Obs.	Countries	149	The number of unpaid New York City parking tickets per diplomat, accumulated by UN delegations under immunity (*85*).
13	*Nepotism (std)	Survey	Countries	117	Based on interviews with top executives at the World Economic Forum regarding the degree to which their senior executives were relatives (*102*).
14	*Particularism (std)	Vignette survey	Countries	43	Based on a vignette called the passenger's dilemma, this is the percentage of people who endorse lying in court to help a friend whose reckless driving killed a pedestrian (*103*).
15	*Honesty dice game (% high claims)	Lab exp.	Countries	23	Students report die rolls of a six-sided die and are paid according to their reported rolls (*6*). The percent of high-paying claims indicate dishonesty.
			Impersonal prosociality: Impersonal cooperation and trust		
16	*Public Goods Game (PGG) first-round contributions (% endowment)	Lab exp.	Countries	15	First-round contributions in a 10-round laboratory PGG as a percentage of the endowment (*4*). Participants were placed in groups with three strangers and interacted anonymously. In each round, they were endowed with a fixed sum and permitted to contribute any portion to a group project. Contributions were increased by 60% and distributed equally among the four members.
17	*PGG with punishment, average contributions	Lab exp.	Countries	15	Mean contributions over 10 rounds in a laboratory PGG with punishment (% of endowment) (*4*). In this PGG, participants faced the same situation as above, except that they could pay to take money away from (i.e., punish) other players.
18	*Blood donations (per 1000 people)	Obs.	Countries/Italian provinces	169/92	Frequency of voluntary, unpaid, anonymous blood donations from countries (WHO) and Italian provinces (*104*).
19	*Out-in-group trust (std)	Survey	Countries	77	A six-question index that contrasts trust in family, friends, and neighbors to foreigners, strangers, and religious outsiders (WVS).
20	General trust (std)	Survey	Regions/migrants	>15K	Asks whether "most people can be trusted" or "you can't be too careful" (ESS).
21	General fairness (std)	Survey	Regions/migrants	>15K	Asks whether most people will treat you fairly (ESS).
22	Use of checks	Survey	Italian regions	>32K	Binary variable indicating whether a household uses checks (*104*).
23	Loans from family/friends	Survey	Italian regions	>32K	Binary variable indicating whether a household has loans from friends or families (*104*).
24	% of wealth in cash	Survey	Italian regions	>32K	Percentage of a household's financial wealth that is kept in cash versus other assets (*104*).

that had more centuries of exposure to the medieval Western Church evince (on average) lower KII values and reduced rates of cousin marriage (table S4.8). Each additional 500 years under the Western Church is associated with a reduction of 1.2 standard deviations in the KII and a 91% decline in cousin marriage rates. These results are robust to controlling for our baseline geographic controls and for the seven additional sets of variables described above.

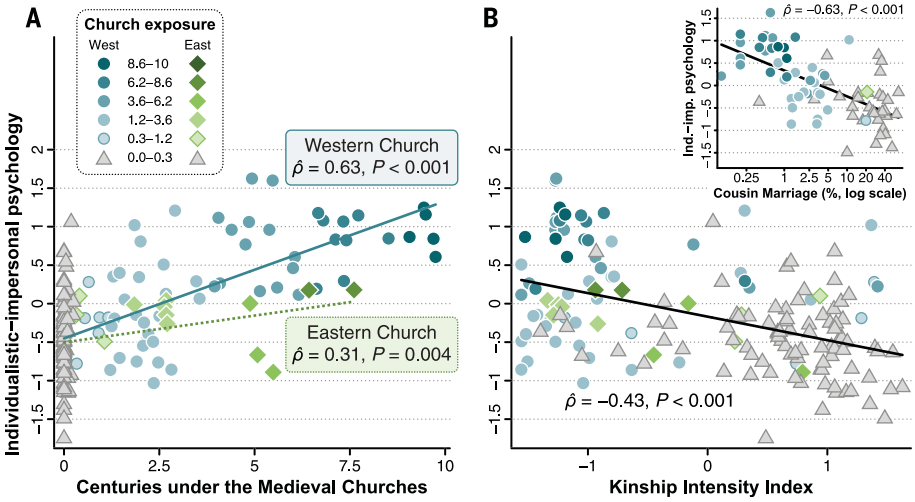

Fig. 2. Medieval Church exposure, kinship intensity, and psychological variation. Cross-country relationship between our Individualistic-Impersonal Psychological Scale and (**A**) medieval Church exposure and (**B**) kinship intensity. The inset in (B) shows the relationship for cousin marriage rates, while the main plot shows the relationship with the KII. Countries primarily exposed to the Western Church are identified with a dot (blue solid best-fit lines), and countries primarily exposed to the Eastern Church are identified by a diamond (green short-dashed best-fit lines). Triangles denote minimal church exposure (i.e., an exposure of <0.3 centuries). Color coding refers to the duration of Eastern (green) and Western (blue) Church exposure. The reported correlation coefficients for the Western (Eastern) Church were computed after excluding the Eastern (Western) Church–exposed countries.

Table 2. Cross-country Spearman correlations between psychological outcomes and Western and Eastern Church exposure, the Kinship Intensity Index (KII), and the rate of cousin marriage.
The cell shading indicates sample size: $N \geq 40$, white; $20 < N < 40$, light blue; $N \leq 20$, darker blue. Correlations that are significant at the 10% level are bolded.

Psychological and behavioral measures	W. Church exp.	E. Church exp.	KII	Cousin marriage (%, log)
Individualism and independence				
Individualism	**0.61*****	0.26	**−0.26*****	**−0.47*****
Creativity	**0.63*****	−0.04	**−0.37*****	**−0.59*****
Embeddedness	**−0.79*****	**−0.41***	**0.66*****	**0.59*****
Analytic thinking	**0.70*****	−0.48	−0.10	**−0.49***
Conformity and obedience				
Asch's conformity	**−0.51**†	0.00	**0.72****	**0.61***
Tightness	**−0.43***	**−0.62**†	0.12	**0.53****
Obedience	**−0.41*****	**−0.35***	**0.24***	**0.46*****
Tradition	**−0.32***	**0.37***	**0.23***	**0.52*****
Proper behavior	0.01	0.10	0.04	−0.06
Impersonal prosociality				
Honesty dice game (% high claims)	**−0.69*****	−0.10	**0.63****	**0.61***
UN diplomatic tickets (per diplomat)	**−0.47*****	**−0.37****	**0.39*****	**0.33****
Nepotism	**−0.43*****	**0.38****	**0.25****	**0.51*****
Particularism	**−0.69*****	−0.02	0.26	**0.63*****
PGG 1st round contributions	**0.56**†	0.34	**−0.65****	**−0.83***
PGG with punishment, avg. cont'ns.	0.53	−0.32	**−0.54***	**−0.98*****
Blood donations	**0.55*****	**0.35****	**−0.40*****	**−0.57*****
Out-in-group trust	**0.57*****	0.06	**−0.40*****	**−0.51*****

Significance levels (based on two-tailed tests): $^{\dagger}P \leq 0.1$, $^{*}P \leq 0.05$, $^{**}P \leq 0.01$, $^{***}P \leq 0.001$.

Moreover, Church exposure accounts for a substantial part of the variation in the KII (coefficient of determination R^2 = 40%) and cousin marriage rates (R^2 = 62%). Incremental coefficients of determination underscore this: Adding Church exposure to regressions of either the KII or cousin marriage rates increases the variance explained by ~20% above that accounted for by our baseline geographic controls.

These cross-country analyses highlight the breadth of global psychological variation and reveal broad statistical patterns that are consistent with our theory. However, such analyses are potentially fraught with confounds, including differences in endogenous variables such as national wealth (table S4.7), effective governments, and the rule of law. To better map the causal pathways involved, we now zoom in on Europe.

Psychological variation within Europe

To help explain the psychological variation within Europe, we link our four survey-based psychological measures to our regional measure of Church exposure and then to regional cousin marriage rates.

Using our full sample of 440 regions in 36 European countries and individual-level data on four psychological outcomes, we regressed each psychological outcome on regional Church exposure across 10 different models. Table 4 presents two of these models for each of our psychological outcomes. The first model includes our four baseline geographic controls, individual demographics (age, age^2, and sex), and both country and survey-wave fixed effects. The second model adds individual-level measures of religiosity and denomination. These models show that Europeans from regions that were under the sway of the Western Church for longer reveal greater individualism-independence, less conformity-obedience, and more impersonal trust and fairness. Considering that Europe was fully Christianized by 1500 CE, these effects are large: an additional millennium under the Western Church is associated with increases in these psychological outcomes of roughly one-tenth of a standard deviation. These effects hold or increase in magnitude when religiosity and denomination are statistically held constant, which is consistent with our theoretical emphasis on the medieval Western Church's marriage and family policies (as opposed to the contemporary Western Church's particular supernatural beliefs or ritual practices).

Although the expansion of the Church across Europe involved historical contingencies that induced a substantial degree of random variation (supplementary text S3), we cannot fully mitigate concerns that the Church may have expanded selectively or that it carried along other important factors besides the MFP. To control for plausible alternative causal pathways,

Table 3. Baseline cross-country regressions for psychological outcomes. Country-level regressions of psychological outcomes with observations from >40 countries on Western and Eastern Church exposure, the KII, and log % cousin marriage. Outcome variables were standardized (*z*-scores), unless otherwise indicated. All regressions include the set of baseline controls: ruggedness, mean distance to waterways, caloric suitability, and absolute latitude. Robust standard errors are reported in parentheses. Significance levels are based on two-tailed tests.

Predictors	Imp.-ind. psychology scale	Individualism and independence			Conformity and obedience		Impersonal prosociality			
		Individualism	Creativity	Embeddedness	Obedience (%)	Tradition	UN tickets (logged)	Nepotism	Blood donation (per 1K)	Out-in-group trust
W. Church exp.	0.13***	0.14***	0.21***	−0.18***	0.11	−0.16**	−0.13*	−0.13**	2.77***	0.18***
(in 100 years)	(0.02)	(0.03)	(0.04)	(0.03)	(0.55)	(0.05)	(0.06)	(0.04)	(0.46)	(0.04)
E. Church exp.	−0.00	−0.08	0.07	-0.04	0.56	0.15	-0.01	0.09	1.24	0.01
(in 100 years)	(0.04)	(0.06)	(0.12)	(0.07)	(1.14)	(0.14)	(0.14)	(0.07)	(1.45)	(0.06)
N	147	92	68	68	92	68	137	104	135	67
KII	−0.21***	−0.15*	−0.37**	0.61***	2.90*	0.23*	0.52***	0.15†	−2.84**	−0.40**
	(0.05)	(0.07)	(0.13)	(0.08)	(1.44)	(0.11)	(0.13)	(0.09)	(1.06)	(0.12)
N	151	93	71	71	96	71	141	108	138	70
Cousin marriage	−0.15***	−0.14†	−0.23*	0.19*	1.63	0.18*	0.31*	0.23**	−2.06*	−0.32**
(%, log)	(0.04)	(0.07)	(0.08)	(0.08)	(1.16)	(0.07)	(0.15)	(0.08)	(0.91)	(0.11)
N	69	57	44	44	56	44	64	55	62	44

†$P \leq 0.1$, *$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.001$

Table 4. Regression of psychological outcomes on exposure to the medieval Western Church. Individual-level ordinary least squares (OLS) regressions of ESS-based psychological outcomes on Western Church exposure. Outcome variables were standardized (*z*-scores). The basic controls are country and survey-wave fixed effects, individual characteristics (gender, age, and age^2), and basic geographic controls (agricultural suitability, absolute latitude, mean distance to the sea, and average terrain ruggedness). Robust standard errors clustered for the 440 regions are reported in parentheses. Significance levels are based on two-tailed tests.

Predictors	Individualism-independence		Conformity-obedience		Generalized trust		Generalized fairness	
Church exposure	0.009*	0.011*	−0.015**	−0.018**	0.012***	0.012***	0.012***	0.012***
(in 100 years)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
N	208,587	208,587	208,587	208,587	228,844	228,844	227,388	227,388
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Religiosity and denomination	No	Yes	No	Yes	No	Yes	No	Yes

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.001$

the analyses in table S5.1 examine the effects of including additional covariates. At the individual level, these models control for formal education, income, and employment. At the regional level, they include an additional battery of geographic, climatic, and agricultural controls (e.g., irrigation potential), as well as variables that capture a region's integration into the Roman Empire (based on Roman roads), the presence of medieval universities and monasteries, population density in 500 CE (capturing economic development at the onset of the MFP), and incorporation within either the Carolingian Empire (814 CE) or the Soviet Bloc (1948 CE). These controls mitigate concerns that the Church's impacts might result from its promulgation of Roman political institutions, its current or historical emphasis on schooling, its association with historical economic prosperity, its impact on people's current income and employment, or any selective movements into ecologically well-endowed regions. Across 40 models, all coefficients on regional Church exposure go in the predicted direction, 34 are significant at conventional levels, and 3 more are marginally significant (table S5.1).

We also conducted several additional analyses to further confirm the robustness of the findings presented in Table 4 (supplementary text S5). First, these results are robust to estimating the models using only the 191 regions in Europe's formerly socialist countries, which confirms our findings in a part of Europe with a very different history. Second, we verified that our results are robust to alternative codings of our regional Church exposure measure. Third, we verified that our results are robust to using an alternative proxy for Church exposure: whether a region was in the Carolingian Empire in 814 CE (the year of Charlemagne's death), after the Frankish rulers had teamed up with the Church to enforce the MFP. Supplementary text S5 provides additional checks.

Next, moving to the relationships between kinship intensity and psychology, we examined the relationships between our psychological outcomes and cousin marriage rates in regions of Italy, Spain, France, and Turkey. As shown in Fig. 3, these relationships are all in the expected direction and are significant, with correlations ranging from 0.24 to 0.77 in magnitude.

To scrutinize these relationships, we regressed each of these four psychological outcomes on

rates of cousin marriage in specifications with our baseline geographic controls, individual demographics (age, age^2, and sex), and country and survey-wave fixed effects, as well as a suite of other controls (table S5.2). Country fixed effects absorb all the variation among countries and allow us to compare only individuals within the same countries, which ensures that our results are not biased by unobserved country-level factors such as shared national identity, wealth (gross domestic product per capita), history, or government institutions. For trust, fairness, and conformity-obedience, the coefficients on cousin marriage across 27 specifications are all in the predicted direction, 19 are significant at conventional levels, and 4 more are marginally significant. These results are generally robust to controlling for individual-level variables such as income, education, religiosity, and religious denomination, as well as controls that capture a region's integration into the Roman Empire, economic prosperity in 500 CE (population density), and the historical presence of medieval universities and monasteries—all of which again mitigates concerns about alternative causal pathways. For the remaining outcome, individualism-independence, eight out of nine coefficients on the prevalence of cousin marriage go in the predicted direction, but they are not significant at conventional levels. The uncertainty here is due to the use of country fixed effects, which absorb much of the variation in cousin marriage.

Linking Church exposure to kinship intensity, we show in table S5.3 that Church exposure explains ~77% of the variation in cousin marriage across the regions of Turkey, Spain, France, and Italy. If Turkey is dropped, Church exposure still captures ~41% of the variation. The association between Church exposure and cousin marriage holds when we compare only regions within countries and when controlling for a wide range of geographic and ecological variables as well as our measures of Roman influence, economic prosperity in 500 CE, and both medieval universities and monasteries.

Zooming in on Italy, where cousin marriage data exist for 92 provinces, we analyze one measure of impersonal cooperation at the provincial level—voluntary, unpaid blood donations per 1000 people—and the following three real-world measures of impersonal trust at the individual level (n > 30,000): (i) loans from friends and family (as opposed to financial institutions), (ii) use of personal checks (versus cash), and (iii) the percentage of financial wealth kept in cash (versus in other assets). For blood donations, cousin marriage rates alone explain about a third of the variation (fig. S6.1). A doubling of the rate of cousin marriages is associated with a reduction in blood donations of ~8 collection bags per 1000 people, which is substantial given that the mean donation is only ~28 bags per 1000 people. This relationship is robust to controlling for the average years of schooling across provinces as well as for our battery of ecological controls (e.g., irrigation potential) and the historical boundaries of the kingdoms of Naples and Sicily—so we are not simply capturing a difference between north and south (table S6.1).

For our individual-level measures of impersonal trust, Italians from provinces with higher rates of cousin marriage take more loans from family and friends (instead of from banks), use fewer checks (preferring cash), and keep more of their wealth in cash instead of in banks, stocks, or other financial assets (table S6.1). These effects are large: For example, going from the provinces with the most cousin marriage to those with close to none is associated with a rise in the use of checks from <30% to >60% and a drop in the percentage of wealth kept in cash from ~40% to <15%. These results are generally robust to controlling for our baseline geographic controls as well as for individual-level measures of education, income, and wealth (table S6.1).

The children of immigrants

For second-generation immigrants born in Europe, whose parents immigrated from countries around the globe, we link our four survey-based psychological outcomes to Church exposure and kinship intensity measures for their parents' countries of origin (supplementary text S7). Then, by regressing each outcome on our theoretical predictors while controlling for residence-country fixed effects, we effectively compare only individuals who grew up in the same country. By analyzing the psychological impacts of kin-based institutions only through second-generation immigrants, we can exclude the influence of all factors except those operating through some form of intergenerational transmission.

Table 5, panel 1, reports the key coefficients from our baseline models, which link each respondent to their mother's native country, and controls for individual-level demographics as well as residence-country and wave fixed effects. The models also include our basic set of four geographic controls for the mother's native country. All 12 of the key coefficients are significant and go in the predicted direction. Given that we are effectively comparing only individuals born in the same European country (based on their mother's native country), the effects are large. An additional millennium under the Western Church is associated with a change of between 16 and 29% of a standard deviation across our four psychological measures. Similarly, individuals whose mothers arrived from countries with less intensive kinship show greater individualism-independence, less conformity-obedience, and more impersonal trust and fairness. For example, a one-standard-deviation increase in the KII is associated with a change of 8 to 12% of a standard deviation in our psychological measures.

The results in Table 5, panel 1, are robust to numerous checks (supplementary text S7). First, additional controls: To the baseline models, we added controls for religious denomination and religiosity as well as a slate of other individual-level variables, including income, marital status, educational attainment, employment, and feelings of discrimination. Second, alternative approaches to linking to ancestral origins: Instead of using the mother's native country to assign Church exposure, KII values, and cousin marriage rates to respondents, we reestimated our main regressions using either the father's country of origin or the average of both parents' countries of origin. Third, two-way clustering: We clustered our standard errors at the level of both the respondent's country of residence and mother's country of origin. Fourth, regional and community size fixed effects (e.g., big city, suburb, farm, etc.), which allowed us to compare only individuals living in the same subnational regions and in similarly sized communities.

To verify that our prediction about the relationship between kinship intensity and psychology holds independent of the Church's enduring influence, we reran the analyses in panel 1 in a non-MFP sample, which includes only individuals whose ancestral countries experienced <120 years of the MFP (Table 5, panel 2, and table S7.1). This criterion excludes almost all countries in which >10% of the population is of European descent. The coefficients are similar in magnitude to those from the full sample, although they are less precisely estimated owing to the reduced sample size. Overall, this analysis suggests that the relationship between kinship intensity and psychology holds more broadly, independent of Church exposure and the European experience. This mitigates concerns that the Church's influence might not operate via kinship intensity or that we are capturing some third variable.

Using another approach, we also created ancestral links for assigning KII values to individuals by using the languages spoken in their homes (Table 5, panel 3). This permitted us to compare only individuals who both trace their ancestry to the same country (but were from different ethnic groups) and are currently living in the same European nation. Furthermore, in addition to our usual control battery, this specification controls for the historical socioeconomic complexity of each ethnicity using measures of settlement complexity, jurisdictional hierarchy, and the importance of irrigation—existing research links traditional jurisdictional hierarchy to contemporary economic growth (78). Despite the reduced sample, the results hold and are quite robust across

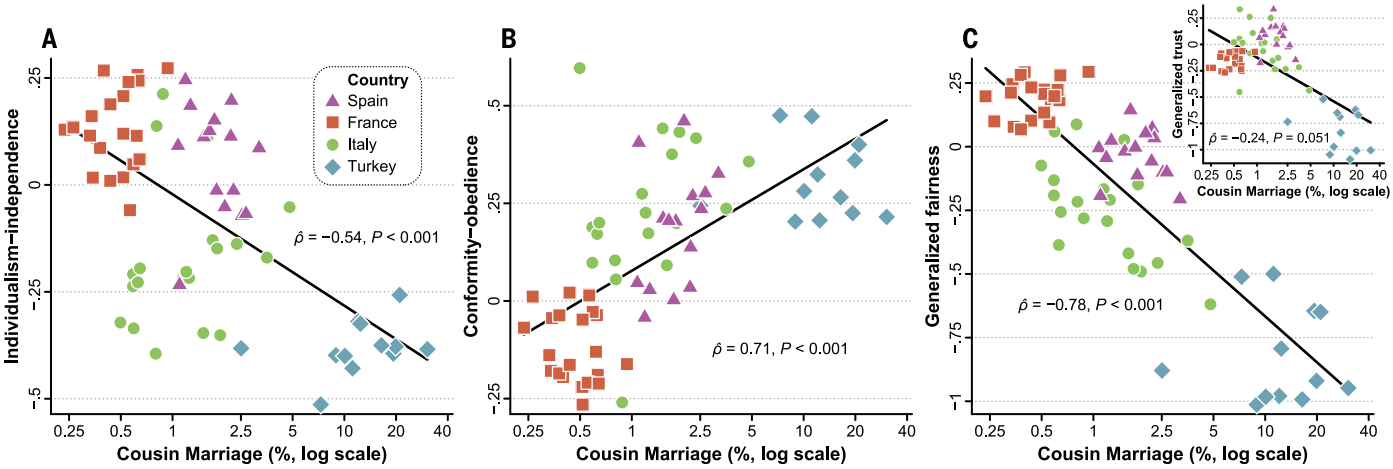

Fig. 3. Cousin marriage and psychology in European regions. Relationships between regional cousin marriage and (**A**) individualism-independence, (**B**) conformity-obedience, and (**C**) impersonal prosociality [generalized fairness and trust (in the inset)]. In each panel, linear best-fit lines are displayed along with Spearman's ρ and their associated significance levels. The shape and color of each data point indicate the corresponding region's country.

specifications (table S7.2). This approach mitigates concerns about the influence of national-level factors such as wealth (GDP per capita) for both the country of residence and country of parental origins as well as those related to the economic prosperity and social complexity of historical ethnicities.

Finally, to examine the extent to which the influence of the medieval Western Church operates via its impact on kinship intensity, we conducted mediation analyses (supplementary text S9). The results of the analyses with the second-generation immigrant data indicate that a substantial part of the Church's effect on psychological variation operates via its effect on kinship intensity (table S9.1). We also conducted mediation analyses with our cross-country and European regional datasets. Here, the results are generally consistent with our theory but are not precisely estimated, which is unsurprising given that mediation analyses demand particularly large samples for adequate statistical power (*79*).

Cultural evolutionary psychology

To explain part of the psychological differences now documented around the globe, we hypothesize that Western Christianity, beginning around 500 CE, gradually implemented a set of policies about marriage and the family that critically contributed to the dissolution of intensive kin-based institutions in much of Europe; in adapting to the new social world created by independent, nuclear families, people increasingly became more individualistic, analytically oriented, and impersonally prosocial while growing less conforming toward peers, obedient to elders/authorities, and sensitive to relational/particularistic moral contexts. Across countries, among European regions, and using second-generation immigrants, our analyses of 24 psychological and behavioral outcomes and one aggregate scale provide support for this theory.

At the same time, we find little evidence for alternative causal channels that might explain the consistent relationships we observe between our psychological outcomes and our measures of Church exposure and kinship intensity, including factors related to religion, Roman influence, agricultural productivity, ecology, and both historical and individual-level measures of education, income, and prosperity. Supplementary text S3 synthesizes the evidence on these alternative channels.

The psychological variation documented here may arise from the action of a combination of facultative, developmental, and cultural-evolutionary mechanisms. It is also possible that stable institutions may favor particular genetic variants that promote success in these institutional environments (*80*). Our findings are largely agnostic regarding the relevance of these different mechanisms. However, the fact that we can detect the influence of historical kin-based institutions on psychology even decades or generations after those institutions have disappeared suggests a role for inheritance, either cultural or genetic. But the fact that we can relate psychological differences among European populations to relatively recent historical events such as MFP and then explain variation even within subnational regions suggests a central role for cultural transmission.

By integrating anthropological, psychological, and historical evidence into a unified evolutionary framework, our approach illuminates a previously unexplored way to understand and theorize contemporary behavioral variation (*27*). This is important because most efforts to understand human behavior presume either that little important psychological variation exists across populations or that any variation that does exist represents merely shallow responses to current material incentives, governmental institutions, or ecological conditions (*81*, *82*). Our work, by contrast, suggests that contemporary psychological patterns, ranging from individualism and trust to conformity and analytical thinking, have been influenced by enduring family structures, particular religious prohibitions, and deep cultural-evolutionary processes. Beyond their scientific interest, these insights may have broader implications because some of these psychological differences have been deployed to explain global variation in innovation (*83*, *84*), the effectiveness of formal institutions (*6*, *76*, *85*, *86*), and economic prosperity (*83*, *87*).

Materials and methods summary

Below, we first summarize the construction of our key variables and then present our analytical approach.

Explanatory variables

To measure the intensity of kin-based institutions, we developed two kinds of measures. First, as an omnibus measure for the overall strength of kin-based institutions, we created the Kinship Intensity Index (KII) on the basis of data from the Ethnographic Atlas (*88*, *89*). Drawing on both anthropological and historical studies, the Atlas quantifies observations from 1291 populations prior to the impacts of industrialization (with the average observation occurring around 1900 CE). Thus, the KII is a "deep" historical measure that aims to capture enduring kinship practices before modernization. By standardizing and then averaging the information for each population, we constructed the KII using the five measures that capture most of the key dimensions of kin-based organizations (supplementary text S1.1):

1) Cousin marriage preference captures the intensity of the norms about marrying cousins.

Table 5. The children of immigrants in Europe: Regression of psychological outcomes on Church exposure, the KII, and cousin marriage. Panel 1 reports our OLS regressions of the four psychological outcomes on mother's origin country's Western and Eastern Church exposure (in 100 years), KII, and log % cousin marriage. An observation is a respondent with an immigrant mother. All regressions control for standard demographic variables (age, age^2, gender), ESS wave and residence-country fixed effects, and origin-country baseline geographic controls (absolute latitude, ruggedness, caloric suitability for agriculture, and mean distance to waterways). Panel 2 mirrors panel 1, except that these regressions were estimated in a non-MFP sample—i.e., the subsample of individuals whose mother's country of origin experienced <120 years of the MFP. Panel 3 also mirrors panel 1 but reports regressions of the psychological outcomes on the KII of ancestral ethnicity, and with origin-country fixed effects instead of origin-country baseline geographic controls; these regressions also include ethnicity-level controls for settlement complexity, jurisdictional hierarchy, reliance on fishing, animal husbandry, agriculture as means of subsistence, and use of irrigation. Robust standard errors clustered at the resident-country level are reported in parentheses. Significance levels are based on two-tailed tests.

Predictors	Individualism-independence	Conformity-obedience	Generalized trust	Generalized fairness
Panel 1: Kinship intensity and church exposure of the mother's country of origin (full sample)				
Western Church exposure	0.024**	−0.029**	0.020**	0.016*
	(0.007)	(0.010)	(0.006)	(0.006)
Eastern Church exposure	0.035**	−0.053***	0.025†	0.002
	(0.012)	(0.012)	(0.015)	(0.011)
N	13,389	13,389	14,627	14,567
KII	−0.075*	0.123***	−0.099***	−0.080***
	(0.028)	(0.032)	(0.015)	(0.012)
N	13,815	13,815	15,092	15,030
Cousin marriage (%, log)	−0.067***	0.089***	−0.071***	−0.076***
	(0.012)	(0.018)	(0.014)	(0.010)
N	8,208	8,208	8,943	8,919
Panel 2: Kinship intensity of the mother's country of origin (non-MFP sample)				
KII	−0.073	0.075*	−0.107**	−0.090
	(0.045)	(0.034)	(0.034)	(0.056)
N	3,706	3,706	4,073	4,058
Cousin marriage (%, log)	−0.093**	0.118**	−0.058	−0.096**
	(0.030)	(0.035)	(0.036)	(0.029)
N	3,289	3,289	3,630	3,620
Panel 3: Kinship intensity of the ancestral ethnicity, with origin-country fixed effects				
KII	−0.109*	0.169***	−0.067†	−0.105†
	(0.042)	(0.046)	(0.039)	(0.056)
N	3,078	3,078	3,325	3,306

†$P \leq 0.1$, *$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.001$

Greater cousin marriage inhibits the formation of extensive ties among previously unconnected or distant families and clans, encourages the creation of additional family ties, and generates greater genetic relatedness among already related families and households.

2) Polygynous marriage norms permit men to have multiple wives. This results in larger and more extended households while introducing social and economic interdependence among co-wives and half-siblings. At a societal level, polygynous marriage norms result in fewer fathers, larger reproductive skews (inequality), and greater genetic relatedness.

3) Co-residence of extended families captures the degree to which several generations of a family, each with their own spouses and children, co-reside. Such residential norms create stronger bonds and economic interdependence among co-residents. This contrasts with the neo-local nuclear family, where only the conjugal couple and their children live together.

4) Lineage organization captures the norms for assigning descent and personal identity. In unilineal societies, descent is traced either primarily through the mother's or the father's side; stronger membership on one side determines social identity, increases cohesion, and tightens interdependence within the lineage. This contrasts with bilateral descent, where membership is nonexclusive and everyone has a unique combination of relatives, resulting in more diverse and diffuse kin networks and lower kinship intensity.

5) Community organization captures whether clans and extended family members reside in a localized area (e.g., a neighborhood) within a settlement and whether there is communal-level endogamy (e.g., people can only marry co-villagers). Localization decreases the interaction with outsiders while endogamous communities form denser clusters (no outsiders can join the community through marriage), thereby increasing kinship intensity.

To extend the KII values derived from the Ethnographic Atlas around the globe (Fig. 1C), we linked them via language phylogenies to the 7651 ethnolinguistic populations (*90*) in the Ethnologue (supplementary text S10). To create country-level KII measures, we aggregated up from the ethnolinguistic populations, weighted by their population sizes, in each country [fig. S1.1; for a similar approach see (*51*)].

To complement this historical index, our second approach to measuring kinship intensity derives from quantitative estimates from the 20th century for the prevalence of cousin marriage, both across countries and within Europe (hereafter, cousin marriage prevalence; supplementary text S1.2). Cross-nationally, we incrementally augmented an existing database (*91*) of the marriage rates among couples who were second cousins or closer relatives (fig. S1.2). We compiled estimates of the rates of first-cousin marriage for regions in Italy, Spain, and France during the 20th century on the basis of requests for papal dispensations (i.e., permission to marry cousins). To place these estimates in a broader context, we added rates of first-cousin marriage from contemporary Turkey. As the bridge between Europe and the Middle

East, Turkey is interesting because it was never under the Western Church, so rates of cousin marriage remain much higher there than in Europe.

As an alternative measure of kinship intensity, the prevalence of cousin marriage complements the KII in four ways. First, unlike the qualitative observations used to fashion the KII, cousin marriage prevalence provides a statistic about what was actually happening on the ground only decades before our psychological outcomes were measured. This allows us to both verify our findings with a more contemporary measure and to demonstrate the persistence of kinship intensity through time (supplementary text S1.2). Second, cousin marriage is a particularly important aspect of intensive kinship—it creates thick family networks—so using a quantitative measure of it reenforces our results with the KII. Third, cousin marriage represents the most important difference between the Western and Eastern Churches in their family policies, with the medieval Western Church energetically implementing and enforcing its extensive incest prohibitions. Finally, using cousin marriage both cross-nationally and among European regions adds uniformity to our array of analyses.

To assess the historical exposure of countries and regions to the churches' MFP, we calculated the duration of exposure to the church in two ways. At the country level, drawing on Schulz (*76*), we created a measure that captures the number of centuries that each contemporary national population was under the sway of either the Western or the Eastern Church prior to 1500 CE (Fig. 1A). We limit ourselves to medieval church exposure for two reasons (supplementary text S2). First, although many marriage and family policies did continue after 1500 CE, this was the period of greatest intensity, during which time the concern about kin marriages (incest) became an "obsession" (*52*) in the Western Church, and secular authorities were enlisted to implement and police these practices. Second, ending at 1500 CE is practical because we can use existing historical data sources and tools (*92*) to adjust for population movements and migrations around the globe between 1500 and 2000 CE. This allows us to calculate country-level exposure measures for both the medieval Western and Eastern Churches on the basis of contemporary population distributions.

We examine exposure to the Eastern Church to provide a parallel case with which to compare the impacts of the Western Church. Crucially, while the Eastern Church did adopt some of the same policies as the Western Church, it never endorsed the Western Church's extensive prohibitions on cousin marriage, adopted many policies only later, and was unenthusiastic about enforcement. Thus, we expect similar but substantially weaker effects for the Eastern Church. Other sects of Christianity adopted even less of the MFP. Nestorian and Coptic Christians, for example, continued marrying their cousins for at least another millennium.

Within Europe, we calculated a similar exposure measure for 440 regions on the basis of the diffusion of bishoprics—administrative centers in the Western Church's hierarchy—through space and time (Fig. 1B and fig. S2.3). To calculate regional Church exposure, we first divided Europe's surface into pixels (0.125 decimal degrees × 0.125 decimal degrees, or around 14 km × 7 km at the latitude of Stockholm). Then, for every pixel and for every half-century from 550 to 1500 CE, we coded a binary variable as 1 if there was an active bishopric within 100 km [~2 to 3 days travel (*93*)] of the pixel's centroid. Finally, we calculated each region's medieval Western Church exposure by taking the mean across all the pixels in the region and across all half-centuries. In supplementary text S5, we show that our results are robust to using radii that are smaller and larger than 100 km.

Psychological outcomes (dependent variables)

To capture the theoretically relevant psychological dimensions, we compiled existing data on 24 variables. We group these 24 variables into three packages for expositional convenience: (i) individualism and independence, (ii) conformity and obedience, and (iii) impersonal prosociality. Table 1 lists the variables by package. Here, we supplement the descriptions in Table 1 with more detail for certain variables, but supplementary section S11 provides complete descriptions.

Our individualism and independence package includes data from two survey questions along with Hofstede's measure of individualism, Schwartz's measure of embeddedness, and a task that uses triads to assess people's reliance on analytical versus holistic thinking. Our conformity and obedience package includes existing data from three survey measures, one psychological scale for tightness, and the Asch conformity experiment. The tightness scale captures people's perceptions about the degree to which the norms of their society are monitored and enforced by others. In the Asch task, undergraduates were asked to judge, during a series of trials, which of a set of lines was longest. During certain critical trials, participants heard their peers, who were actually experimental confederates, give the same incorrect judgment just before their turn. Because these judgments are easy—97% or more of participants get them correct by themselves—the average percentage of incorrect responses in each country provides a measure of peer conformity.

Our impersonal prosociality package comprises two subcategories, one focused on impartiality and the other on impersonal cooperation and trust. Of the impartiality measures, only the honesty dice game requires more explanation. In this experiment, students were isolated in a cubicle and asked to anonymously report their roll of a six-sided die. For rolls from one to five, they were paid in proportion to their reported roll, with five making the most money. A roll of six, however, was worth zero. At the country level, the percentage of people claiming a high roll (i.e., three, four, or five) provides a measure of impersonal dishonesty, which correlates strongly with country-level measures of corruption and tax evasion (*6*).

For impersonal cooperation and trust, we analyzed two laboratory experiments derived from versions of the public goods game (PGG), one real-world measure of public goods contributions based on voluntary blood donations (to anonymous strangers) and six survey questions about trust and fairness. Because our theory suggests that the fault lines created by intensive kinship lie between out-groups or strangers and the binding interpersonal ties of one's in-group, we follow other researchers (*51*, *94*) in constructing a measure of impersonal trust using six questions from the World Values Survey (WVS). To construct this out-in-group trust measure, we first created an in-group measure of trust by averaging people's reported trust toward (i) their families, (ii) their neighbors, and (iii) people they know. We then subtracted this in-group measure from an out-group measure of trust that we created by averaging people's trust in (i) foreigners, (ii) people they have met for the first time, and (iii) people from other religions (supplementary section S11.1).

To succinctly illustrate our cross-national findings, we created the Individualistic-Impersonal Psychology Scale, which aggregates all 17 of our cross-country outcomes. The scale was computed by standardizing the 17 outcomes and taking the average (with reverse scaling, when necessary, so the predicted direction is always positive). This aggregation is justified by the strong correlations among all our psychological outcomes (supplementary section S4.2 for a principal components analysis) as well as consistent correlations between our separate psychological outcomes and our explanatory variables. Theoretically, these intercorrelations are unsurprising because the cultural-evolutionary process we describe should, over time, bring otherwise disparate aspects of psychology into correlation.

Analytical approach

Three features characterize our analytical approach. First, we selected the psychological outcomes and constructed the explanatory variables ex ante—i.e., before conducting our analyses—on the basis of the outcomes' importance in the social science literature, the availability of the data, its relevance to our

theory and by various anthropological and historical considerations. Second, we tested our theory at different, complementary levels of analysis (e.g., across countries, across European regions, and among second-generation immigrants). Third, we "tied our hands" by estimating parallel sets of specifications with the same controls across dependent and independent variables as well as across levels of analysis. Whenever possible, we also analyzed similar dependent and explanatory variables across levels of analysis. Throughout, we included numerous control variables and conducted extensive robustness checks to control for plausible alternative causal pathways that have been advanced in the literature and might account for our results. The resulting exercise involves hundreds of analyses, whose results we transparently report.

Our analyses focus on testing three relationships predicted by our theory: between (i) Church exposure and psychology, (ii) kinship intensity and psychology, and (iii) Church exposure and kinship intensity. This means that we generally expect each of the analyses to confirm our theoretical expectations (even though there may be a few failures due to statistical noise and sample limitations). Of course, this is the opposite of situations in which either multiple different hypotheses are tested or only some analyses are selectively reported—such situations require corrections for repeated testing.

Our supplementary text further details our analytical approach and presents robustness checks and other supporting analyses. Supplementary section S3 begins by laying out our approach, discussing alternative hypotheses, and addressing concerns about causal inference. Supplementary sections S4 to S9 report the detailed results of these analyses as follows: Supplementary section S4 analyzes the cross-country data, where we can observe the largest number of psychological outcomes. This illustrates the broad global patterns. Supplementary section S5 analyzes individuals in European regions and exploits variation within countries. This rules out estimation bias resulting from unobserved factors that vary at the country level. Supplementary section S6 shows that ecologically relevant dependent variables (e.g., blood donations) are significantly and robustly associated with kinship intensity within a single country (Italy). Supplementary section S7 compares the psychological outcomes of second-generation immigrants in Europe and links these to the kin-based institutions of their ancestral communities. By focusing on the adult children of immigrants within European countries and predicting aspects of their psychology on the basis of the kinship intensity and the Church exposure of their parents' home countries or ancestral populations, we eliminate many alternative explanations, including those based on evoked reactions or rational responses to their current or childhood environment. Supplementary section S8 compares ethnolinguistic populations within countries, which provides an additional test of the theory. Supplementary section S9 reports the mediation analysis that seeks to examine the degree to which the association between Western Church exposure and psychology is mediated by kinship intensity.

REFERENCES AND NOTES

1. J. Henrich, S. J. Heine, A. Norenzayan, The weirdest people in the world? *Behav. Brain Sci.* **33**, 61–83 (2010). doi: 10.1017/S0140525X0999152X; pmid: 20550733
2. A. Falk *et al.*, Global evidence on economic preferences. *Q. J. Econ.* **133**, 1645–1692 (2018). doi: 10.1093/qje/qjy013
3. S. J. Heine, *Cultural Psychology* (W. W. Norton & Company, ed. 3, 2016).
4. B. Herrmann, C. Thöni, S. Gächter, Antisocial punishment across societies. *Science* **319**, 1362–1367 (2008). doi: 10.1126/science.1153808; pmid: 18323447
5. I. Bohnet, F. Greig, B. Herrmann, R. Zeckhauser, Betrayal aversion: Evidence from Brazil, China, Oman, Switzerland, Turkey, and the United States. *Am. Econ. Rev.* **98**, 294–310 (2008). doi: 10.1257/aer.98.1.294
6. S. Gächter, J. F. Schulz, Intrinsic honesty and the prevalence of rule violations across societies. *Nature* **531**, 496–499 (2016). doi: 10.1038/nature17160; pmid: 26958830
7. S. Kitayama, H. Park, A. T. Sevincer, M. Karasawa, A. K. Uskul, A cultural task analysis of implicit independence: Comparing North America, Western Europe, and East Asia. *J. Pers. Soc. Psychol.* **97**, 236–255 (2009). doi: 10.1037/a0015999; pmid: 19634973
8. C. Kanagawa, S. E. Cross, H. R. Markus, "Who am I?" The cultural psychology of the conceptual self. *Pers. Soc. Psychol. Bull.* **27**, 90–103 (2001). doi: 10.1177/0146167201271008
9. K. R. Scherer, H. G. Wallbott, Evidence for universality and cultural variation of differential emotion response patterning. *J. Pers. Soc. Psychol.* **66**, 310–328 (1994). doi: 10.1037/0022-3514.66.2.310; pmid: 8195988
10. H. Clark Barrett *et al.*, Small-scale societies exhibit fundamental variation in the role of intentions in moral judgment. *Proc. Natl. Acad. Sci. U.S.A.* **113**, 4688–4693 (2016).
11. R. Bond, P. B. Smith, Culture and conformity: A meta-analysis of studies using Asch's (1952b, 1956) line judgement task. *Psychol. Bull.* **119**, 111–137 (1996). doi: 10.1037/0033-2909.119.1.111
12. T. Talhelm *et al.*, Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science* **344**, 603–608 (2014). doi: 10.1126/science.1246850; pmid: 24812395
13. A. K. Uskul, S. Kitayama, R. E. Nisbett, Ecocultural basis of cognition: Farmers and fishermen are more holistic than herders. *Proc. Natl. Acad. Sci. U.S.A.* **105**, 8552–8556 (2008). doi: 10.1073/pnas.0803874105; pmid: 18552175
14. G. Tabellini, Culture and institutions: Economic development in the regions of Europe. *J. Eur. Econ. Assoc.* **8**, 677–716 (2010). doi: 10.1111/j.1542-4774.2010.tb00537.x
15. A. Greif, G. Tabellini, The clan and the corporation: Sustaining cooperation in China and Europe. *J. Comp. Econ.* **45**, 1–35 (2017). doi: 10.1016/j.jce.2016.12.003
16. E. Spolaore, R. Wacziarg, How deep are the roots of economic development? *J. Econ. Lit.* **51**, 325–369 (2013). doi: 10.1257/jel.51.2.325
17. J. Rubin, *Rulers, Religion, and Riches: Why the West Got Rich and the Middle East Did Not* (Cambridge Univ. Press, 2017).
18. R. J. Barro, R. M. McCleary, Religion and economic growth across countries. *Am. Sociol. Rev.* **68**, 760–781 (2003). doi: 10.2307/1519761
19. N. Nunn, in *Africa's Development in Historical Perspective*, E. Akyeampong, R. Bates, N. Nunn, J. Robinson, Eds. (Cambridge Univ. Press, 2014), pp. 489–512.
20. A. Norenzayan *et al.*, The cultural evolution of prosocial religions. *Behav. Brain Sci.* **39**, e1 (2016). doi: 10.1017/S0140525X14001356; pmid: 26785995
21. M. Lang *et al.*, Moralizing gods, impartiality and religious parochialism across 15 societies. *Proc. Biol. Sci.* **286**, 20190202 (2019). doi: 10.1098/rspb.2019.0202; pmid: 30836871
22. D. Xygalatas *et al.*, Extreme rituals promote prosociality. *Psychol. Sci.* **24**, 1602–1605 (2013). doi: 10.1177/0956797612472910; pmid: 23740550
23. F. Valencia Caicedo, The mission: Human capital transmission, economic persistence, and culture in South America. *Q. J. Econ.* **134**, 507–556 (2018). doi: 10.1093/qje/qjy024
24. Y. Bai, J. K. S. Kung, Diffusing knowledge while spreading God's message: Protestantism and economic prosperity in China, 1840-1920. *J. Eur. Econ. Assoc.* **13**, 669–698 (2015). doi: 10.1111/jeea.12113
25. J. Cagé, V. Rueda, The long-term effects of the printing press in sub-Saharan Africa. *Am. Econ. J. Appl. Econ.* **8**, 69–99 (2016). doi: 10.1257/app.20140379
26. F. A. Gallego, R. D. Woodberry, Christian missionaries and education in former African colonies: How competition mattered. *J. Afr. Econ.* **19**, 294–329 (2010). doi: 10.1093/jae/ejq001
27. J. Henrich, *The WEIRDest People in the World: How Westerners Became Psychologically Peculiar and Particularly Prosperous* (Farrar, Straus and Giroux, 2020).
28. R. Fox, *Kinship and Marriage: An Anthropological Perspective* (Penguin, 1967).
29. C. Lévi-Strauss, *The Elementary Structures of Kinship* (Beacon Press, 1969).
30. G. P. Murdock, *Social Structure* (Macmillan, 1949).
31. B. Chapais, *Primeval Kinship: How Pair-Bonding Gave Birth to Human Society* (Harvard Univ. Press, 2009).
32. R. S. Walker, D. H. Bailey, Marrying kin in small-scale societies. *Am. J. Hum. Biol.* **26**, 384–388 (2014). doi: 10.1002/ajhb.22527; pmid: 24677264
33. R. A. McNamara, J. Henrich, Kin and kinship psychology both influence cooperative coordination in Yasawa, Fiji. *Evol. Hum. Behav.* **38**, 197–207 (2017). doi: 10.1016/j.evolhumbehav.2016.09.004
34. M. Alvard, Genetic and cultural kinship among the Lamaleran whale hunters. *Hum. Nat.* **22**, 89–107 (2011). doi: 10.1007/s12110-011-9104-x; pmid: 22388802
35. L. Edlund, Cousin marriage is not choice: Muslim marriage and underdevelopment. *AEA Pap. Proc.* **108**, 353–357 (2018). doi: 10.1257/pandp.20181084
36. L. R. Binford, *Constructing Frames of Reference: An Analytical Method for Archaeological Theory Building Using Ethnographic and Environmental Data Sets* (Univ. of California Press, 2001).
37. D. Jones, The matrilocal tribe: An organization of demic expansion. *Hum. Nat.* **22**, 177–200 (2011). doi: 10.1007/s12110-011-9108-6; pmid: 22388807
38. H. S. Kaplan, P. L. Hooper, M. Gurven, The evolutionary and ecological roots of human social organization. *Philos. Trans. R. Soc. Ser. B* **364**, 3289–3299 (2009). doi: 10.1098/rstb.2009.0115; pmid: 19805435
39. P. Wiessner, "Taking the risk out of risky" in *Risky Transactions: Trust, Kinship, and Ethnicity*, F. K. Salter, Ed. (Berghahn Books, 2002).
40. A. Johnson, T. Earle, *The Evolution of Human Societies* (Stanford Univ. Press, ed. 2, 2000).
41. S. Bowles, J.-K. Choi, Coevolution of farming and private property during the early Holocene. *Proc. Natl. Acad. Sci. U.S.A.* **110**, 8830–8835 (2013). doi: 10.1073/pnas.1212149110; pmid: 23671111
42. K. Flannery, J. Marcus, *The Creation of Inequality: How Our Prehistoric Ancestors Set the Stage for Monarchy, Slavery, and Empire* (Harvard Univ. Press, 2012).
43. G. K. Dow, L. Mitchell, C. G. Reed, The economics of early warfare over land. *J. Dev. Econ.* **127**, 297–305 (2017). doi: 10.1016/j.jdeveco.2017.04.002
44. R. S. Walker *et al.*, Living with kin in lowland horticultural societies. *Curr. Anthropol.* **54**, 96–103 (2013). doi: 10.1086/668867
45. J. M. Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (W.W. Norton & Co., 1997).
46. F. Fukuyama, *The Origins of Political Order: From Prehuman Times to the French Revolution* (Farrar, Straus and Giroux, ed. 1, 2011).
47. M. J. Gelfand *et al.*, Differences between tight and loose cultures: A 33-nation study. *Science* **332**, 1100–1104 (2011). doi: 10.1126/science.1197754; pmid: 21617077
48. R. E. Nisbett, *The Geography of Thought: How Asians and Westerners Think Differently...and Why* (The Free Press, 2003).

49. H. A. Witkin, J. J. W. Berry, Psychological differentiation in cross-cultural perspective. *J. Cross Cult. Psychol.* **6**, 4–78 (1975). doi: 10.1177/002202217500600102
50. S. Kitayama, J. Park, Cultural neuroscience of the self: Understanding the social grounding of the brain. *Soc. Cogn. Affect. Neurosci.* **5**, 111–129 (2010). doi: 10.1093/scan/nsq052; pmid: 20592042
51. B. Enke, Kinship, cooperation, and the evolution of moral systems. *Q. J. Econ.* **134**, 953–1019 (2019). doi: 10.1093/qje/qjz001
52. E. Todd, *Explanation of Ideology: Family Structure and Social System* (Blackwell, 1985).
53. A. F. Alesina, P. Giuliano, Culture and institutions. *J. Econ. Lit.* **53**, 898–944 (2015). doi: 10.1257/jel.53.4.898
54. J. Moscona, N. Nunn, J. A. Robinson, Keeping it in the family: Lineage organizations and the scope of trust in Sub-Saharan Africa. *Am. Econ. Rev.* **107**, 565–571 (2017). doi: 10.1257/aer.p20171088
55. M. E. W. Varnum, I. Grossmann, S. Kitayama, R. E. Nisbett, The origin of cultural differences in cognition: Evidence for the social orientation hypothesis. *Curr. Dir. Psychol. Sci.* **19**, 9–13 (2010). doi: 10.1177/0963721409359301; pmid: 20234850
56. W. H. McNeill, *The Rise of the West: A History of the Human Community* (Univ. of Chicago Press, 1991).
57. M. Mitterauer, Kontrastierende heiratsregeln: Traditionen des Orients und Europas im interkulturellen Vergleic. *Hist. Sozialkd.* **41**, 4–16 (2011).
58. M. Mitterauer, in *Populations, connections, droits fondamentaux: mélanges pour Jean-Paul Lehners*, T. Kolnberger, N. Franz, P. Péporté, Eds. (Mandelbaum Verlag, 2015), pp. 37–60.
59. M. Mitterauer, *Why Europe? The Medieval Origins of Its Special Path* (Univ. of Chicago Press, 2010).
60. K. Ubl, *Inzestverbot und Gesetzgebung. Die Konstruktion eines Verbrechens (300-1100)* (Walter de Gruyter, 2008).
61. J. Goody, *The Development of the Family and Marriage in Europe: Past and Present Publications* (Cambridge Univ. Press, 1983).
62. A. Greif, Family structure, institutions, and growth: The origins and implications of western corporations. *Am. Econ. Rev.* **96**, 308–312 (2006). doi: 10.1257/000282806777212602
63. J. Witte, *The Western Case for Monogamy Over Polygamy* (Cambridge Univ. Press, 2015).
64. D. Herlihy, *Medieval Households* (Harvard Univ. Press, 1985).
65. J. Goody, *The Development of the Family and Marriage in Europe* (Cambridge Univ. Press, 1983).
66. G. Ausenda, in *The Visigoths from the Migration Period to the Seventh Century: An Ethnographic Perspective*, P. Heather, Ed. (The Boydell Press, 1999), pp. 129–190.
67. M. C. Ross, Concubinage in Anglo-Saxon England. *Past Present* **108**, 3–34 (1985). doi: 10.1093/past/108.1.3
68. R. T. Anderson, *Changing Kinship in Europe* (Univ. of California, Berkeley, 1956).
69. H. J. Berman, *Law and Revolution: The Formation of the Western Legal Tradition* (Harvard Univ. Press, 1983).
70. T. M. Charles-Edwards, Kinship, status and the origins of the hide. *Past Present* **56**, 3–33 (1972). doi: 10.1093/past/56.1.3
71. A. Greif, *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade* (Cambridge Univ. Press, 2006).
72. P. J. Heather, *The Visigoths from the Migration Period to the Seventh Century: An Ethnographic Perspective* (Boydell Press, 1999).
73. R. M. Karras, Concubinage and slavery in the Viking age. *Scand. Stud.* **62**, 141–162 (1990).
74. P. Laslett, *The World We Have Lost: Further Explored* (Scribner, ed. 3, 1984).
75. A. MacFarlane, *The Origins of English Individualism: The Family, Property and Social Transition* (Blackwell, 1978).
76. J. F. Schulz, "Kin-Networks and Institutional Development," SSRN Working Paper (2019); https://dx.doi.org/10.2139/ssrn.2877828.
77. T. G. Conley, GMM estimation with cross sectional dependence. *J. Econom.* **92**, 1–45 (1999). doi: 10.1016/S0304-4076(98)00084-0
78. S. Michalopoulos, E. Papaioannou, Pre-colonial ethnic institutions and contemporary African development. *Econometrica* **81**, 113–152 (2013). doi: 10.3982/ECTA9613; pmid: 25089052
79. M. S. Fritz, D. P. Mackinnon, Required sample size to detect the mediated effect. *Psychol. Sci.* **18**, 233–239 (2007). doi: 10.1111/j.1467-9280.2007.01882.x; pmid: 17444920
80. P. J. Richerson, R. Boyd, J. Henrich, Colloquium paper: Gene-culture coevolution in the age of genomics. *Proc. Natl. Acad. Sci. U.S.A.* **107** (suppl. 2), 8985–8992 (2010). doi: 10.1073/pnas.0914631107; pmid: 20445092
81. D. Acemoglu, J. Robinson, *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* (Random House Digital, Inc., 2012).
82. C. L. Fincher, R. Thornhill, D. R. Murray, M. Schaller, Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. *Proc. Biol. Sci.* **275**, 1279–1285 (2008). doi: 10.1098/rspb.2008.0094; pmid: 18302996
83. Y. Gorodnichenko, G. Roland, Culture, institutions, and the wealth of nations. *Rev. Econ. Stat.* **99**, 402–416 (2017). doi: 10.1162/REST_a_00599
84. J. Mokyr, *A Culture of Growth: The Origins of the Modern Economy* (Princeton Univ. Press, 2016).
85. R. Fisman, E. Miguel, Corruption, norms, and legal enforcement: Evidence from diplomatic parking tickets. *J. Polit. Econ.* **115**, 1020–1048 (2007). doi: 10.1086/527495
86. M. Akbari, D. Bahrami-Rad, E. O. Kimbrough, Kinship, fractionalization and corruption. *J. Econ. Behav. Organ.* **166**, 493–528 (2019). doi: 10.1016/j.jebo.2019.07.015
87. Y. Algan, P. Cahuc, Trust and growth. *Annu. Rev. Econ.* **5**, 521–549 (2013). doi: 10.1146/annurev-economics-081412-102108
88. K. R. Kirby *et al*., D-PLACE: A global database of cultural, linguistic and environmental diversity. *PLOS ONE* **11**, e0158391 (2016). doi: 10.1371/journal.pone.0158391; pmid: 27391016
89. G. P. Murdock, Ethnographic Atlas. *Ethnology* **6**, 109–236 (1967). doi: 10.2307/3772751
90. M. P. Lewis, *Ethnologue: Languages of the World* (SIL International, ed. 16, 2009); http://www.ethnologue.com/16.
91. A. H. Bittles, M. L. Black, Evolution in health and medicine Sackler colloquium: Consanguinity, human evolution, and complex diseases. *Proc. Natl. Acad. Sci. U.S.A.* **107** (suppl. 1), 1779–1786 (2010). doi: 10.1073/pnas.0906079106; pmid: 19805052
92. L. Putterman, D. N. Weil, Post-1500 population flows and the long-run determinants of economic growth and inequality. *Q. J. Econ.* **125**, 1627–1682 (2010). doi: 10.1162/qjec.2010.125.4.1627; pmid: 24478530
93. K. L. Reyerson, in *The New Cambridge Medieval History V*, D. Abulafia, Ed. (Cambridge Univ. Press, 1999), pp. 50–70.
94. C. Thöni, "Trust and cooperation: Survey evidence and behavioral experiments" in *Trust in Social Dilemmas*, P. A. M. Van Lange, B. Rockenbach, T. Yamagishi, Eds. (Oxford Univ. Press, 2017), ch. 9.
95. R. Inglehart *et al*., Eds. 2014. World Values Survey: All Rounds - Country-Pooled Datafile 1981-2014. Version: http://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp. Madrid: JD Systems Institute.
96. European Social Survey Rounds 1 to 7 Data, Data file edition 1.0. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC (2014).
97. G. Hofstede, *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations* (Sage, 2001).
98. S. H. Schwartz, in *Handbook of the Economics of Art and Culture*, V. A. Ginsburgh, D. Throsby, Eds. (Elsevier, ed. 1, 2014), vol. 2, pp. 547–586.
99. S. H. Schwartz, A theory of cultural value orientations: Explication and applications. *Comp. Sociol.* **5**, 137–182 (2006). doi: 10.1163/156913306778667357
100. T. Talhelm, J. Graham, J. Haidt, "The budding collectivism revolution," chaired symposium, Society for Personality and Social Psychology, Atlanta, GA, March 2018.
101. S. E. Asch, "Effects of group pressure on the modification and distortion of judgments" in *Groups, Leadership and Men: Research in Human Relations*, H. Guetzkow, Ed. (Carnegie Press, 1951), pp. 177–190.
102. E. Van de Vliert, Climato-economic habitats support patterns of human needs, stresses, and freedoms. *Behav. Brain Sci.* **36**, 465–480 (2013). doi: 10.1017/S0140525X12002828; pmid: 23985270
103. A. Trompenaars, C. Hampden-Turner, *Riding the Waves of Culture: Understanding Cultural Diversity in Global Business* (McGraw Hill, ed. 2, 1998).
104. L. Guiso, P. Spanienza, L. Zingales, The role of social capital in financial development. *Am. Econ. Rev.* **94**, 526–556 (2004). doi: 10.1257/0002828041464498
105. J. Schulz, D. Bahrami Rad, J. Beauchamp, J. Henrich, Replication datasets for The Church, Intensive Kinship, Global Psychological Variation, Version 2, Dryad (2019); https://datadryad.org/stash/dataset/doi:10.5061/dryad.2rbnzs7hs.

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SUPPLEMENTARY MATERIALS

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Supplementary Text
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The Church, intensive kinship, and global psychological variation

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Cultural evolution

There is substantial variation in psychological attributes across cultures. Schulz *et al.* examined whether the spread of Catholicism in Europe generated much of this variation (see the Perspective by Gelfand). In particular, they focus on how the Church broke down extended kin-based institutions and encouraged a nuclear family structure. To do this, the authors developed measures of historical Church exposure and kin-based institutions across populations. These measures accounted for individual differences in 20 psychological outcomes collected in prior studies.

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