

Higher education predicts global cultural similarity to WEIRD countries

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Abstract

Behavioral scientists increasingly recruit participants from less-WEIRD (Western, Educated, Industrialized, Rich, and Democratic) societies, but continue to oversample highly educated people, such as university students and online workers. Here we test how representative highly educated individuals are of the world's cultural diversity. We used the cultural fixation index (CF_{ST}) to measure cultural distance between people with high and low socioeconomic status in 95 countries ($N = 268,992$), across beliefs, values, and behaviors assessed by the World Values Survey (2005–2022). We find that more highly educated people are significantly more culturally similar to WEIRD countries, such as the Anglosphere and Western Europe. Education was not statistically significantly associated with cultural similarities to other large, culturally and politically influential countries, such as China, Russia, and India. Contrary to modernization theories, income and self-reported subjective status did not show the same pattern of WEIRD cultural similarity. Our results suggest that cross-cultural samples of students or university-educated individuals over-represent cultural values that are typical of WEIRD countries.

Introduction

Western, educated, industrialized, rich, and democratic (WEIRD) societies continue to be overrepresented in samples and researchers in the psychological and behavioral science^{1,2}, but in recent years researchers have increasingly begun collecting data with participants from less-WEIRD countries. For example, researchers have compiled many cross-national datasets to investigate cultural variation in personality³, social norms⁴, honesty⁵, values⁶, cognitive styles⁷, and fundamental social motives.⁸ Some of these cross-national comparisons seem to suggest that cultural differences in psychological effects are small. Notably, Klein et al.'s⁹ Many Labs 2 project attempted to test variability in psychological effects across settings by testing 125 samples from 36 countries, and concluded that there was little heterogeneity in effects between more vs. less WEIRD cultures. However, all the cross-cultural studies cited above relied heavily on educated samples, such as university students, which may underrepresent the world's true cultural diversity. In the present study, we use the cultural fixation index (CF_{ST} ¹⁰) to investigate how cross-national cultural differences are associated with individuals' education, income, and subjective perception of status, across 95 nations and a diverse array of cultural traits measured by the World Values Survey.¹¹ We test whether education, income, and status specifically predict cultural values that are more similar to values endorsed in WEIRD countries. Our results reveal that higher levels of education are associated with a pattern of cultural values emblematic of the cultural traits of the United States, Western Europe, and other Anglo-heritage countries, but income and subjective social status are not.

Although we do not know the causal process that explains these patterns, these results are consistent with hypotheses linking formal education to WEIRD culture, that is, those patterns of cognition, attitudes, values, and behaviors that are more common in Western nations compared

to the rest of the world, such as individualism, non-conformity, analytic thinking, and generalized trust.^{10,12,13} The *transmission hypothesis* argues that formal education is an institutionalized means of efficiently transmitting cultural traits¹⁴⁻¹⁷. Sociologists have long argued that formal education is one institution that spreads global cultural values across modern nations.¹⁸ If education is indeed an efficient means of transmitting culture and has contributed to the spread of Western culture specifically, this spread will have been enhanced by truancy laws, which have required children to spend a large part of their day, throughout childhood and adolescence, in classrooms. Children spend their time not only acquiring literacy, numeracy, and discipline, but entire ways of thinking.¹⁹ The curricula of many formal education systems descend from and continue to be influenced by those developed in Western nations, often instituted during periods of European colonial rule.²⁰⁻²³ Moreover, modern educational systems also promote learning through internet-based technologies,²⁴ and thus provide people around the world with skills necessary to access online content which leads to cultural influences beyond one's local community. Thus, education may transmit a broad suite of attitudes, behaviors, and other psychological tendencies that are common in WEIRD countries, and make it easier for people to access cultural outputs from WEIRD countries. If this were true, we would expect more highly educated individuals to be culturally closer to WEIRD countries. In sum, education is a direct means of cultural transmission. Income and subjective social status may also contribute to cultural transmission through the ability to travel, communicate, and otherwise connect to other societies around the world. However, we found no evidence that income or subjective social status decreased cultural distance to WEIRD countries.

Many researchers have argued that socioeconomic status (an emergent property of several dimensions including a person's educational attainment, wealth, and occupational

prestige) is an important dimension of social identity that generates distinct patterns of attitudes, cognition, and behaviors that result in cultural group differences between those high in education, income, and status and those who lack socioeconomic power^{25,26}. For example, those with higher SES have been found, relative to low SES individuals living in the same country, to hold more independent views of themselves, to place less importance on interpersonal relationships and more importance on personal freedoms, and to display more analytic patterns of thinking. These patterns have been documented across several countries including the United States, Russia, China, as well as in multinational comparisons,²⁷⁻³² although with potential evidence of inverse patterns of increased other-orientation among those with high SES in Confucian cultures such as Japan.³⁰ In longitudinal studies within the United States, change in national SES over time predicts subsequent increases in individualism.³³ And in cross-national studies, individuals with higher SES have lower power distance orientation and greater individualism, masculinity, and comfort with ambiguity.³⁴ Parental SES is also associated with the types of traits parents prioritize teaching to their children, such as independence, self-confidence, and uniqueness, in both the United States and in multinational investigations.^{35,36} Unfortunately, the socioeconomic background of participants in psychological studies is rarely reported (let alone meaningfully considered) in top-tier scientific publications.³⁷

As we argued above, of all the different components of socioeconomic status, formal education may be an especially powerful pathway for the transmission of cultural values, as formal educational settings operate with the explicit goal of transmitting socially valued information, skills, cognitive styles, and modes of behavior. There is substantial evidence, primarily from studies of the United States, that educational attainment is associated with within-country variation in cultural traits. For example, there is evidence that individuals with more

education display less racial biases, such as greater support for racial integration, greater awareness of discrimination and rejection of outgroup exclusionism (in both the United States and internationally, e.g., ³⁸⁻⁴²), although this association may be limited to certain contexts or values, see ^{43,44}. Receiving a university education in the United States also predicts scores on tests of moral reasoning styles (e.g., the Defining Issues Test ^{45,46}) and is associated with economic attitudes that are more in line with economists' preferences⁴⁷.

There is also some evidence that higher education predicts lower religious beliefs in U.S. samples, including reduced supernatural and fundamentalist Christian beliefs, ⁴⁸⁻⁵⁰ less certain belief in God, ⁵¹ lower belief in religious evil, ⁵² less belief in divine involvement and control in daily life, ⁵³ and less paranormal belief, ⁵⁴ although other studies have failed to find robust associations with religiosity (e.g., ^{55,56}). Studies across multiple nations have also found that educational attainment also predicts specific attitudes, such as attitudes towards refugees ⁵⁷ and climate change beliefs, ⁵⁸ as well as the likelihood of various sexual behaviors, ^{59,60} in addition to robust effects on intelligence and abstract reasoning. ¹⁴⁻¹⁶ These previous studies suggest that formal education is a viable pathway for shifting cultural values, and we hypothesize that the cultural values of highly educated people will reflect a pattern that is similar to the culture of WEIRD countries.

This evidence indicates that there are noticeable cultural differences between low education and highly educated individuals living in the same country and suggests that these cultural differences may be visible across many countries around the world. However, existing evidence is typically limited by focusing on particular socioeconomic status differences within a single nation or on a limited set of psychological traits.

Therefore, in the present study we conducted a broader test of whether socioeconomic status is associated with a variety of different cultural traits across 95 countries around the world. We apply the cultural fixation index to document patterns of cultural variation between members of different socioeconomic groups living in each country (defined by education, income, or self-perceived status), including the specific hypothesis that people with higher education are more culturally similar to people living in the United States. Processes of colonization, globalization, and the adoption of Western-style institutions for education, religion, and politics has led to the diffusion of WEIRD cultural norms around the world.¹³ As a result, highly educated individuals may not merely be similar to one another overall, but specifically more similar to the pattern of attitudes, traits, and behaviors of WEIRD nations, including Anglosphere countries like the United States, Canada, United Kingdom and Australia, and Western Europe more generally.

Results

Analysis Strategy

To measure cultural similarity between highly-educated groups around the world, we examined patterns of values, attitudes, and behaviors reported in the World Values Survey (WVS). We use the generic term “cultural values” in this paper to refer to responses to all questions within the WVS that could plausibly be culturally transmitted. This includes traits such as participants’ reported moral, political, and religious beliefs, their attitudes towards other people and group memberships, and perspectives on child-rearing, sexuality, law, and economics, which together encompasses a broad range of different behaviors and preferences.

We measured cultural distance using the cultural fixation index (CF_{ST}), which captures the degree of similarity between two different groups in their responses to the set of cultural traits captured by the WVS (see description by Muthukrishna and colleagues¹⁰ for further

statistical information and validation). CF_{ST} reflects the difference between populations in the variance of the distribution of individuals' responses to cultural value questions in the WVS. In population genetics, F_{ST} similarly reflects the difference in variance of the distribution of particular alleles at a particular locus of a genome, such as the variance in eye color between two populations. F_{ST} is theoretically meaningful within population genetics, and evolution more generally, because it measures how genotype frequencies for each subpopulation differ from expectations if there were random mating over the entire population; that is, it measures the degree to which the populations can be considered structured and separate (for example due to geography or mating preferences).^{61,62} Muthukrishna et al.¹⁰ argue that this is directly analogous to between-group differentiation caused by selection, migration, and selective social-learning mechanisms which structure how culture is transmitted. Thus, insofar as cultural evolution offers a compelling explanation for cultural transmission and change, CF_{ST} offers a theoretically informed approach to measuring cultural distance, with a long and established history within the broader biological and evolutionary sciences.

Importantly, CF_{ST} scores are able to measure differences not merely in a single cultural trait, but aggregated across the full set of different cultural value questions contained within the WVS, including traits that are independent from one another or are on different response scales (discrete and continuous). These cultural distance scores thereby index the overall magnitude of cultural differences between groups, across a range of many different cultural traits. Values of CF_{ST} can range from 0 (when the distribution of traits is identical between two populations) to 1 (when equal sized populations have completely different traits, and within-group traits are homogeneous with individuals sharing the same characteristics). Intermediate values indicate the magnitude of cultural differences accounted for by being part of different groups, with larger

CF_{ST} scores indicating greater between-group differences in cultural trait distributions.

Robustness tests showing that CF_{ST} values are not highly sensitive to the specific questions,¹⁰ and remain stable even when half the questions are selected at random, which is not surprising given the tendency for cultures to cluster⁶³ because of transmission mechanisms such as common sources of information and the conformist bias in cultural learning.^{64–66} Prior research has used CF_{ST} to quantify the cultural distance between people living in different countries¹⁰ and with different religious affiliations⁶⁷.

In the present research, we apply the cultural fixation index to document patterns of cultural variation between members of different socioeconomic groups living in each country (defined by education, income, or self-perceived status). We first test whether higher education (and other indicators of SES including income and subjective social status) is associated specifically with cultural traits emblematic of WEIRD nations. Prior to analysis we preregistered the methods and analysis plan on the Open Science Framework (<https://osf.io/d5ze2/>). Our initial preregistered hypothesis built on Muthukrishna and colleagues¹⁰ and specifically predicted cultural distance from the United States, with a placebo test of cultural distance from China, across all traits in the WVS that can plausibly be considered culturally transmitted. After conducting these analyses, we amended the preregistration to also include additional robustness checks, that conducted the same analyses for each separate dimensions of traits in the WVS, predicting that highly-educated non-Americans will be more culturally similar to Americans across many cultural dimensions. There are two main reasons for our focus on the United States: (a) The US is still overrepresented in the psychological literature and the reference group for understanding many psychological effects, and (b) the CF_{ST} WEIRD scale of distance from the United States was shown to be most predictive of cultural and psychological differences in

previous work.¹⁰ However, while Hollywood and American universities have a large influence, this does not necessarily imply that higher education specifically makes people more American, but rather more similar to patterns of WEIRD cultural norms also found in other Western, Anglosphere countries.

Below we conduct further exploratory analyses using each possible country in the dataset as the reference country for comparison, to fully map for whom being highly educated predicts greater cultural similarity. This analysis further bolstered the overall finding that higher education is associated with the culture in WEIRD countries. As preregistered, we also tested whether higher income and subjective social status is associated with cultural distance from the United States, as we did not have a priori predictions that education would matter more than other facets of SES. But we focus our most comprehensive analyses below on differences based on education, as education showed the strongest association with cultural traits. We disclose all data exclusions, alternative and exploratory analyses, and measures (in the article and in the accompanying SI).

Pre-registered analysis: Cultural distance from the United States

Our main analyses tested whether high education, high income, or high subjective status was associated with cultural similarity to people living in WEIRD countries. We begin by looking at cultural distance from the United States, a prototypical WEIRD country. We analyzed the average cultural distance between Americans and non-Americans with high education (i.e., greater than secondary education, such as university degrees or certificates), and compared it to the average cultural distance between Americans and non-Americans with low education (i.e., only primary education). Results indicate that, on average across all non-US countries, more highly educated people, $CF_{ST} = 0.167$, 95% CI [0.152, 0.182], and those with intermediate levels

of education (only secondary education), $CF_{ST} = 0.161$ [0.147, 0.174] were more culturally similar to people in the United States, than those with low levels of education, $CF_{ST} = 0.235$ [0.218, 0.252].

Figure 1 depicts the cultural distance from the United States among highly educated people and people with low education in each country. For example, people in Singapore with low levels of education were quite culturally distant from the United States, $CF_{ST} = 0.241$, but highly educated people in Singapore were much more culturally similar to the United States, $CF_{ST} = 0.059$, more similar in magnitude to the cultural distance between highly-educated people in the Australia and the United States, $CF_{ST} = 0.052$. Likewise, Russians with low levels of education were very culturally distant from the United States, $CF_{ST} = 0.358$, whereas highly educated Russians were much more similar to the United States, $CF_{ST} = 0.086$, more similar in magnitude to the cultural distance between were highly educated people in New Zealand, $CF_{ST} = 0.081$. Looking across all countries (with $n \geq 100$ of both highly-educated and low-educated people for comparison), in 70% of countries, highly-educated people were significantly culturally closer to the United States than people with low education in those same countries, as indicated by non-overlapping 95% confidence intervals between the high- and low-education groups.

These results appear to be specific to education. Cultural distance from the United States did not significantly differ (as indicated by overlapping 95% confidence intervals) between those with high vs. low levels of income, High average $CF_{ST} = 0.217$ [0.199, 0.236], Low average $CF_{ST} = 0.199$ [0.183, 0.214], or between those with high vs. low subjective social status, High average $CF_{ST} = 0.182$ [0.166, 0.198], Low average $CF_{ST} = 0.181$ [0.167, 0.195].

We tested the statistical significance of these effects using mixed-effects regression models that predicted cultural distances to the USA from education group, with random intercepts for each comparison country. We also controlled for several features of the country (national population size, GDP per capita, years of education for citizens older than 15, and continent) which may predict a country's overall similarity to the USA by virtue of also being large, rich, or highly educated overall. (Inspection of plots revealed that data generally met the assumptions of multilevel regression models, such as homogeneity of variance and normality of residuals.) These analyses (Table 1) confirmed that low-education and high-education groups differ in distance from the United States, $t(80.44) = -9.11, p < .001, b = -0.07 [-0.08, -0.05], \beta = -0.83$, but high income groups were actually slightly more distant from the USA, $t(75.17) = 3.02, p = .003, b = 0.01 [0.01, 0.02], \beta = 0.18$, and high-status and low-status groups do not significantly differ in distance from the USA, $t(84.04) = 0.57, p = .57, b = 0.00 [-0.01, 0.01], \beta = 0.03$. The effect of income may be consistent with some new findings arguing that wealthier countries are more likely to endorse distinctive cultural values that diverge from cultural norms elsewhere in the world ⁶⁸.

But what about differences within the United States? Could it simply be that less educated people from less-WEIRD countries are similar to less educated Americans or people from WEIRD countries? To test this possibility, we repeated these analyses using only high education ($n = 2750$), mid education ($n = 3187$), or low education ($n = 98$) Americans as the focus of comparison, rather than the whole American sample. Patterns of results were qualitatively the same when only considering the cultural distance to those with high education in the United States, or to those with mid education in the United States, rather than the whole American sample (although there was no significant difference when comparing non-Americans

to Americans with low levels of education, but this comparison should be interpreted with caution due to this sample size falling slightly below our pre-registered cutoff of $n = 100$ per group for analysis). Income or status again did not show statistically significant cultural differences (see Supplementary Analyses and Results Table S3 for full results).

Robustness checks

These results were also robust to exploratory controls for various features of each country, including average educational attainment, GDP per capita, population size, linguistic distance from the United States, and continent fixed effects (see Table 1). Furthermore, a regression model that simultaneously predicted all cultural distance from the United States scores from level of SES (high vs. low) and type of SES (education, income, or status), found that the education effect was consistently negative, $t(411.25) = -14.50, p < .001, b = -0.07 [-0.08, -0.06]$, and significantly different in magnitude from the effect of status or income level (income x SES level interaction: $t(411) = 12.6, p < .001, b = 0.08 [0.07, 0.10]$; status x SES level interaction: $t(410) = 10.8, p < .001, b = 0.07 [0.06, 0.08]$; see Table S13). To further explore the role of a country's educational system in predicting this variation in cultural values, we compared a country's PISA test scores (as a measure of general quality and extent of formal education within a country) to the cultural distances between countries. When looking at cultural traits for a country as a whole compared to the United States as a whole, there was a strong association showing that countries with higher average PISA scores tended to be much more culturally similar to the United States, $t(53) = 3.69, p < .001, r = -0.45 [-0.64, -0.21]$. However, a country's PISA scores were not significantly correlated with the size of the education effect in each country, $t(42) = 0.20, p = .84, r = 0.032 [-0.26, 0.33]$. That is, more highly educated people were

more culturally similar to the United States, but this was not statistically significantly associated with whether the comparison country had better or worse performing students overall.

Cultural distance from other countries

To test the specificity of this association between high education and cultural similarity to the United States, we repeated the primary analysis comparing high and low education groups to every other country in the dataset. For every country, we computed the average CF_{ST} from highly-educated people in other countries and low-education people in other countries (Figure 2, see Supplementary Data 3 for exact values). The difference between these high- and low-education scores provides an index of the education effect size. When non-USA samples were compared to the USA, highly-educated groups were 0.068 closer to the USA than low education groups. This difference was even larger when using nine other countries as the reference country: In Sweden, Netherlands, Australia, Canada, United Kingdom, New Zealand, Andorra, Norway, Germany, and Switzerland, even more than in the United States, highly educated people outside these countries were more culturally similar than less educated people outside these countries. As such, it is not the case that more education makes you more American, but rather more WEIRD.

As shown in Figure 2, in general, the pattern of greater cultural similarity to highly educated people in foreign countries appears to be present across countries in Northern/Western Europe and the Anglosphere, but was generally not statistically significant in the rest of the Americas, Africa, or most countries in Asia. The same pattern appeared when comparing those with middle levels of education to those with low levels of education, in Europe, North American, and Oceania, whereas mid-education groups did not show the same pattern as high-educated groups when comparing to countries in other world regions. Further exploratory analyses revealed that the size of the difference between high education and low education

groups was significantly correlated with a reference country's PISA scores, $t(54) = 5.97$, $p < .001$, $r = 0.63$, such that being highly educated (vs. low education) was especially associated with cultural similarity to countries with higher PISA scores (which tend to be countries in Europe, North America, or East Asia).

We also conducted a full set of analyses (including testing the statistical significance of the group differences and robustness to demographic and geographic control variables) with three other global superpowers: China, India, and Russia. Results, reported in SI Tables S7 – S12, revealed that being highly educated was not statistically significantly associated with greater cultural similarity to China, India, or Russia, nor was being higher income or higher status (results were either not statistically significant, or in the opposite direction, with high-SES groups being significantly more culturally distant from China, India, and Russia).

Variation across dimensions of cultural values

As a robustness check, we compared the cultural similarity to the United States among highly-educated and less-educated non-Americans, separately for different dimensions of conceptually-related cultural traits contained in the WVS (identified in ¹⁰). These dimensions include cultural traits regarding beliefs, finances, group memberships, law, politics, sexuality, social relationships, and other miscellaneous traits (see Supplementary Data 2 for which variables comprise each dimension). As displayed in Figure 3, across each of these dimensions, highly educated individuals and those with middle levels of education, tended to be more culturally similar to the United States than were those with low education. This effect was statistically significant for all dimensions except for miscellaneous traits, $t(80.83) = -1.82$, $p = .072$, $b = -0.01$ [-0.03, 0.00], and range in size from $t(70.75) = -3.97$, $p < .001$, $b = -0.02$ [-0.03, -0.01], $\beta = -0.33$, for financial attitudes, to $t(77.26) = -6.38$, $p < .001$, $b = -0.15$ [-0.20, -0.10], $\beta = -0.47$, for sexuality. Parallel analyses using income and social status (rather than education) did not result in statistically significant greater cultural similarity to the United States across any dimensions of the WVS (see SI Figure S2 for full estimates, including for mid-SES groups in each comparison).

We also conducted exploratory analyses using each of the other countries as the reference country, separately for each of the dimensions in the WVS, to see whether particular types of cultural values predict cultural distances to specific types of countries. Full results, depicted in SI Figures S4 – S11, indicate that for all cultural dimensions highly-educated people tend to be more culturally-similar not just to Americans, but to other WEIRD Anglo-heritage and European countries, than less educated people in those same countries. Highly-educated people are

generally no more statistically significantly similar to, or even more distant from, most countries in Asia, Central/South America, and Africa. We explore this in fuller detail in the next section.

Differences between high and low education groups, when present, tend to be most pronounced for cultural values related to sexuality (e.g., justifiability of homosexuality and prostitution, perspectives on gender inequalities) and group membership (e.g., acceptability of workplace inequalities based on gender or immigration status). Differences were moderate in size for attitudes about various political issues, social relations, and beliefs (e.g., important qualities to instill in one's child, justifiability of morally-controversial issues, religious beliefs, preferred political systems), and smallest for perspectives on law, financial issues, and other miscellaneous attitudes.

Discussion

These results provide evidence that exposure to formal education predicts global variation across many domains of cultural traits. Highly educated individuals around the world have patterns of attitudes, beliefs, and behaviors that are more WEIRD, as evident by their greater cultural similarity to individuals living in Western European and Anglosphere countries. We find no credible evidence that higher education was associated with similarity to other large, politically influential countries such as China, India, or Russia. However, this pattern did not extend to other elements of high socioeconomic status, such as one's level of income or subjective perceptions of social status, supporting hypotheses that formal education is an especially powerful pathway through which cultural traits are transmitted.

One important implication of these results is that cross-cultural studies that primarily rely on university-educated populations over-represent cultural values that are typical of WEIRD countries; many highly educated samples from countries around the world are as culturally

similar as other WEIRD countries. For example, Russians with lower levels of education had a cultural distance of $CF_{ST} = 0.358$, the cultural distance of highly educated Russians from the United States, $CF_{ST} = 0.086$, is similar in magnitude to the cultural distance between New Zealand and the United States, $CF_{ST} = 0.081$. The finding that education is the key element of socioeconomic status that predicts cultural similarity to WEIRD nations is an important first step in trying to understand how WEIRD culture is spreading around the world.⁶⁹

This overall pattern of higher education predicting cultural similarity to WEIRD nations was robust to several specifications and controls and exists across many different domains of cultural values, but there remains substantial variation across domains and countries that we did not fully explore in the present data. For example, the effect size of education on cultural distance was generally in the same direction for many European and Anglo-heritage countries, but varied in magnitude across different countries. Future research could further investigate whether different clusters of countries are most likely to show an association between higher education and cultural similarity, and clusters for which effects are reduced or even in opposite directions. Future research could investigate whether this variation is predicted by a country's ecological factors or historical circumstances, which may have led to particular social institutions through which education might be shaping cultural values, or led to the transmission of other non-WEIRD cultural traditions through formal education.

We were also limited by our focus on self-reported beliefs and behaviors contained within the World Values Survey. Importantly, these questions cover a wide range of behaviors, attitudes, preferences, and beliefs across many domains of human experience, not merely a subset of moral values or other beliefs that might be of key interest to WEIRD researchers but might under-represent the true plurality of values across different cultures.⁷⁰ Previous research¹⁰

has provided evidence that cross-national variation in cultural distance (CF_{ST}) is correlated with cross-national variation in other psychological measures (both self-reported and behavioral), and thus indexes meaningful cultural differences across many psychological domains. Future research could also test for the robustness of this pattern across different datasets that measured other aspects of cultural values, beliefs, attitudes, cognitive styles, and behaviors. It is also important to remember that the patterns of cultural similarity we document here exists in addition to substantial variation in cultural values within each country, as well as variation between countries (e.g., some countries are more distinct or similar to worldwide averages in cultural values⁶⁸).

Future research is also needed to determine the specific causal mechanisms through which education transmits the cultural values found in WEIRD nations. Importantly, these present effects were unique to education, and did not generalize to merely possessing high income (i.e., richer individuals were not necessarily more similar to rich foreign nations) as modernization theories may predict.^{71,72} Such disparate effects also emphasize the importance of more nuanced theories of cultural diversity, wherein thinking about “WEIRD” cultures is a useful rhetorical tool but not one that should be taken literally to imply that being educated or rich are, on their own, meaningful indicators of cultural similarity.^{73,74} Our results highlight the value of considering the multiple personal, social, and geographic factors that shape culture around the world, and the importance of disentangling various facets of WEIRD cultures. Although the notion of Western, Educated, Industrialized, Rich, and Democratic (WEIRD) cultures may be a useful heuristic for summarizing the unique features of the United States and other countries that diverge from Majority World nations, the idea of “WEIRD cultures” is merely a rhetorical device; empirical evidence is required to establish when and why cultures

differ from one another.^{75,76} For example, the present findings indicate that education, but not being rich in income or social status, significantly predicts cultural similarity to Western industrialized nations (such as Sweden, Australia, or the United Kingdom), but not necessarily similarities to rich industrialized countries in other parts of the world, demonstrating the potential for different aspects of WEIRDness to have divergent impacts on psychological variation.

The present findings also suggest that researchers should be cautious in using “country” as a proxy for cultural groups, when trying to understand diversity in psychological processes around the world.⁷⁷ Research using the CF_{ST} measure indicates that differences between countries are often larger in magnitude than differences between sociodemographic groups within each country^{67,78}, but there is also additional variance^{67,78} within countries that can be understood by looking to someone’s socioeconomic status, economic and ecological conditions, religion, or ethnicity (e.g.,^{25,79,80}). Researchers therefore cannot assume that merely recruiting participants from different countries is always the most meaningful way to assess cross-cultural variability in psychological studies.

What cultural transmission mechanisms are unique to education? One obvious pathway is through school curricula that is designed to transmit skills and knowledge (linguistic and mathematical abilities, analytic and problem-solving strategies, factual knowledge about the world), which might over-represent the skills and knowledge deemed important for success in WEIRD cultural environments. Additional cognitive characteristic of WEIRD psychology may be created by the structure of school environments, such as the directed instruction, delayed gratification, same-age classrooms, and modes of analytic thinking taught as the correct ways to navigate formal educational institutions, and which remain evident in schooled adults’ psychology across many areas of life.¹⁹ In many countries, formal educational institutions may

also have been directly created as part of colonial projects designed to pass the specific values and ways of thinking most prized by reigning elites onto the local populations,²⁰⁻²³ potentially resulting in greater similarities between highly-educated individuals and the culture of former colonizers. Education may also expose people to liberal political ideologies that are more reflective of the dominant cultural norms of WEIRD nations.⁸¹ In our analyses linguistic distance from the United States (a possible proxy measure for shared colonial history) did not significantly predict or explain the education effect, but more direct measures of colonial exposure may reveal clearer associations. For example, countries with a longer history of more direct colonial rule, or those whose education system more closely models Western institutions, might be the most likely to show cultural similarity to WEIRD nations among the highly-educated, whereas countries with less colonial history may have educational institutions that transmit less WEIRD knowledge, abilities, and values.

There may also be indirect channels. For example, individuals with more formal education may have more direct access to WEIRD cultural influences, through relevant English-language or computer-use skills that give them access to American media and industries that may transmit American cultural values. Highly educated, English-speaking individuals may also be more likely to get jobs in international corporations that involve engagement with Western business partners, thereby both exposing them to Western cultural values and reinforcing the perceived value of these Western norms.^{82,83} They may even have traveled to WEIRD countries to attend university, or been educated in schools run by teachers from WEIRD countries (e.g., religious institutions run by international missionaries). Each of these possibilities and others are important avenues for future research, that could not be tested using the present data.

Further longitudinal data (beyond the scope covered by the available WVS data) would also contribute to a richer understanding of the causal process underlying these relationships: If formal education transmits WEIRD cultural values around the world, then expansions in access to formal education should predict subsequent shifts in cultural values. Different rates of change for different cultural traits may also suggest unique causal pathways for different psychological traits. Some elements of WEIRD psychology may have deep origins in the religious, social, and familial institutions of Western nations that predate formal educational systems.^{13,84} Certain cognitive styles may be encouraged by the standard structure of formal education,¹⁴⁻¹⁶ and therefore should be relatively stable among populations experiencing formal education. Other aspects of Western culture, such as progressive, individualistic values, may be transmitted more indirectly as formal education gives people the language skills and social connections through which they learn these cultural values, meaning that changes in progressive, individualistic values in Western cultures over time may be echoed by subsequent changes in these values among highly-educated people in other countries.

Alternatively, expanded access to education might not guarantee that the world as a whole embraces more WEIRD cultural traits, as other trends over time indicate greater divergences in cultural traits over past decades. For example, the increased endorsement of emancipative values in wealthy Western nations is not mirrored by similar increases in emancipative values as non-Western countries become wealthier, and indeed wealth may magnify or reinforce existing cultural values if they are associated with becoming wealthier or by investing in cultural traditions.⁶⁸ Education and income may also allow people to transmit and express other cultural traits that are valued in one's local context, but not necessarily reflective of WEIRD norms (such as greater other-orientation being associated with higher SES in Confucian

countries where interdependence is normative³⁰). While we anticipate the general trend of more WEIRD cultural traits among more educated than less educated people within a given nation will remain robust, expanded access to education does not necessarily imply that the world as a whole will become more psychologically WEIRD, as other cultural forces and competing mechanisms may generate psychological divergences between nations. Longitudinal research would also help to rule out alternative explanations for our effects, such as self-selection if people who are already more WEIRD have a higher probability of choosing to attend school or send their children to school, rather than education being the force that is transmitting these traits and changing individuals' cultural values.

The present findings also have important methodological and theoretical implications for cross-cultural investigations of human cognition and behavior. Psychological studies often investigate cross-cultural variation in effects by recruiting participants living in different countries. Studies that do successfully document cross-national differences are even more compelling when samples are matched on demographic factors (e.g., young university students taking psychology classes). But studies that fail to find cross-national differences in demographically-matched samples may do so because they are underpowered to detect true cultural differences between nations, or they may underestimate the true size of cultural differences. For example, Many Labs 2⁹ tested the replicability of 28 psychological effects run across 125 samples from 36 countries around the world, and investigated whether there was meaningful variation in effects across samples and countries. They reported no evidence of cross-cultural variation in effects. However, the Many Labs 2 studies relied heavily on samples from the United States and university student samples when recruiting from outside the US, and they did not account for the socioeconomic background of the international students, who are

often more highly educated and richer than the majority of people in their country.^{73,75} Our findings demonstrate that when trying to test the generalizability of psychological effects, especially effects that were initially documented in US and other WEIRD samples, relying on university-educated samples is likely to provide a conservative test of cultural differences (and by corollary, a liberal test of psychological universality), because highly-educated individuals respond more similarly (than lower educated individuals) to US and other WEIRD samples across many attitudes, beliefs, and behaviors.

An over-representation of highly educated participants may not only affect the results of psychological studies, but also the types of questions that are asked: The research questions and empirical methods used in psychological science are likely to over-represent the topics most valued and easy to reliably assess in WEIRD samples, while potentially neglecting other interesting dimensions psychological variation between non-WEIRD cultures. More inclusive research methods at all levels of scientific research, not merely in participant sampling, is necessary to create a truly universal understanding of human psychology (for additional examples and recommendation see⁸⁵⁻⁸⁷).

In general, our research offers further evidence that cross-cultural samples employing only student samples may be underpowered to detect true variation in psychological effects across countries and will over-represent cultural values that are typical of WEIRD countries. Theoretically and empirically sound accounts of human psychology that represent the full range of psychology present around the world therefore requires not only going beyond WEIRD samples but also going beyond students and the highly educated.

Methods

This project relies exclusively on publicly-available pre-existing datasets, such as the World Values Survey, for which all participants provided written or oral informed consent to participate in the survey. Therefore as per London School of Economics and Political Science's policy (Research involving secondary analysis of established data sets from which it would not be possible to identify any living or recently deceased person need not be subject to the procedure) no further ethics approval was necessary for conducting the present analyses.

Data source

Cultural traits across countries were taken from the World Values Survey (WVS¹¹), Waves 5 – 7 (2005 – 2022). These datasets contain nationally representative samples from 95 countries (total $N = 268,992$), which we divided into groups based on each respondent's country of origin and their socioeconomic status. Following preregistered criteria to ensure sufficiently large sample sizes for reliable estimates, we excluded from analyses any country/SES groups with fewer than 100 respondents, resulting in somewhat different sample sizes across analyses relying on different splits of the data (e.g., 74 countries with both >100 high education and >100 low education respondents, 74 countries when split on income, 84 countries when split on status). No further data were excluded from analysis. We analyzed data pooled across all three waves in order to increase statistical power by gathering the maximum possible sample of country/SES groups (there were not enough people in most countries to analyze a single wave alone). The preregistered the methods and analysis plan, and all data and code for the present analyses, are available on the Open Science Framework (<https://osf.io/swq5j/>).⁸⁸

Measures of Socioeconomic Status

Participants within each country were grouped into high, middle, and low clusters according to three potential indicators of socioeconomic status: educational attainment, income, and subjective social status. The highest level of education obtained was classified as Low if they had only completed primary education, or had incomplete or no primary education, Middle if they had partially or fully completed secondary education, and High if greater than secondary education (bachelor, master, doctoral, or other post-secondary education or equivalent). Subjective social status was classified as High if they described themselves as belonging to the “Upper class” or “Upper middle class,” Low if they described themselves as “Working class” or “Lower class,” and Middle if they described themselves as “Lower middle class”. Participants also rated their income, relative to people within their country, counting all wages, salaries, pensions, and other income, on a scale ranging from 1 (lowest income group) to 10 (the highest income group). Income was classified as High if subjective income percentile was at the eighth step or above, Low if subjective income percentile was at the third step or below, and Middle if in between (robustness checks with more restrictive or more liberal classifications of the high vs. low income groups revealed similar findings to those reported above). See Supplementary Data 1 for the number of respondents in each group in each country. Respondents’ levels of education, social status, and income were only moderately correlated with each other (education/income $r = .28$, education/status $r = .33$, income/status $r = .49$, $p_s < .001$), therefore we conducted separate analyses for each of the three indicators of SES. Other demographic characteristics of participants (e.g., sex/gender, age, ethnicity) are available in the WVS dataset, which aims to recruit broadly representative samples from each country, but we do not report on them further here due to our focus being on socioeconomic status, not other demographic groupings within

these populations (although it would be interesting for future research to further investigate cultural distances across demographics).

Cultural Values

Cultural distance was based on how participants responded across all values, preferences, beliefs, and self-reported behaviors available in the WVS that could plausibly be considered culturally transmitted (e.g., excluding demographic characteristics, see ⁶¹, and ¹⁰, for a similar approach), and were present consistently across all 3 waves of data collection. These cultural traits include participants' reported moral, political, and religious beliefs, their attitudes towards other people and group memberships, and perspectives on child-rearing, sexuality, law, and economics. While our primary analysis includes all available cultural variables, additional analyses test the robustness across different domains of cultural values, as classified by the WVS itself and as categorized by Muthukrishna et al.¹⁰ by grouping together thematically-similar items and question types available in the WVS (see Supplementary Data 2 for details of all dimensions). Responses to these questions were collapsed into discrete response categories, analogous to alleles in population genetics. Following the procedure adopted by Muthukrishna et al.¹⁰, nominal response options were kept as separate response alleles, and continuous Likert-type scales were collapsed into positive vs. negative response categories (e.g., “strongly agree” and “agree” were grouped into one response category, “disagree” and “strongly disagree” were grouped together, the midpoint “neither” was treated as a third category), in order to avoid cross-cultural differences in response extremity biases ^{89–91} being confounded with cultural distance scores.

Cultural distances between groups were computed using the CF_{ST} metric (and relevant R-code) developed by Muthukrishna et al.¹⁰ to assess cultural distances between groups. This

statistic represents the ratio of between- and within-group variance of responses to each cultural trait question, thus quantifying the overall size of cultural differences between two groups according to their distributions across a range of potentially-independent, discrete cultural traits. Values of CF_{ST} can range from 0 (when two populations have identical distributions of traits) to 1 (when equal sized populations have completely different traits, but within each group traits are largely homogeneous and individuals share the same characteristics). To assess whether relevant CF_{ST} scores significantly differed in magnitude, we computed 95% confidence intervals for all estimates via bootstrapping (following ^{10,61}). Our focal analysis uses the United States as the reference country, against which all other (non-US) country/education groups are compared, but we also conducted parallel analyses with other reference countries to assess the uniqueness of these patterns.

Control variables

In our regression models testing the significance of the difference between high versus low education/income/status groups, we also controlled for GDP per capita, years of education for citizens older than 15, and national population size from the V-Dem Version 10 dataset, ⁹² linguistic distances through the linguistic proximity measure taken from the CEPII Language database, ⁹³ and scores on the Programme for International Student Assessment (PISA) as a measure of overall quality and extent of formal education within the country.⁹⁴

Data availability

All data is available on the Open Science Framework at <https://osf.io/s7hkm/>, DOI: 10.17605/OSF.IO/S7HKM.

Code availability

All code necessary to perform the present analyses is available on the Open Science Framework at <https://osf.io/s7hkm/>, DOI: 10.17605/OSF.IO/S7HKM.

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Author contributions

C.J.M.W.: Conceptualization, Methodology, Software, Formal Analysis, Writing; **M.M.:**

Conceptualization, Methodology, Software, Writing.

Competing Interests Statement

The authors declare no competing interests.

Table 1. Multilevel regression model predicting cultural distance to the United States from non-US samples' education level, income level, or status. SES was defined by either education, income, or status, each in separate models, with level dummy coded (0 = Low, 1 = High). For models with covariates, GDP and population size were log transformed, average educational attainment was standardized, and continent was dummy coded with Europe as the reference group. Models include random intercepts for each country. Each model analyzes all countries with available data, but excludes countries with missing data on required variables, resulting in inconsistent sample sizes across different models. Marginal R² indicates variance explained by fixed effects and conditional R² indicates variance explained by both fixed effects and random intercepts, indicating that substantial variation exists in countries' distances from the USA even after controlling for other predictors. All statistics used two-tailed tests, no corrections were made for multiple comparisons, and full statistical details are available in Supplementary Tables S4 – S5.

Predictors	Education			Income			Status					
	<i>b</i> (95% CI)	<i>p</i>	<i>b</i> (95% CI)	<i>p</i>	<i>b</i> (95% CI)	<i>p</i>	<i>b</i> (95% CI)	<i>p</i>				
Intercept	0.23 (0.22, 0.25)	<.001	0.34 (0.19, 0.49)	<.001	0.2 (0.18, 0.22)	<.001	0.4 (0.23, 0.56)	<.001	0.18 (0.17, 0.20)	<.001	0.32 (0.17, 0.47)	<.001
Low vs. High SES	-0.07 (-0.08, -0.05)	<.001	-0.07 (-0.08, -0.05)	<.001	0.01 (0.01, 0.02)	.003	0.02 (0.01, 0.03)	.001	0.00 (-0.01, 0.01)	.567	0.00 (-0.01, 0.01)	.768
Average Education			0.01 (-0.02, 0.03)	.602			-0.01 (-0.03, 0.02)	.593			0.00 (-0.02, 0.03)	.822
GDP per capita			-0.04 (-0.06, -0.02)	<.001			-0.05 (-0.07, -0.03)	<.001			-0.04 (-0.06, -0.02)	<.001
Population			0.00 (-0.01, 0.01)	.95			-0.01 (-0.01, 0.00)	.23			0.00 (-0.01, 0.01)	.527
Linguistic Distance from USA			0.00 (-0.01, 0.02)	.62			0.01 (-0.01, 0.03)	.355			0.01 (-0.02, 0.03)	.545
Continent: Americas			-0.04 (-0.07, 0.00)	.052			-0.04 (-0.08, 0.01)	.095			-0.03 (-0.07, 0.01)	.166
Continent: Africa			0.02 (-0.03, 0.07)	.511			0.02 (-0.04, 0.08)	.43			0.03 (-0.02, 0.09)	.252
Continent: Asia			0.04 (0.00, 0.07)	.048			0.05 (0.01, 0.09)	.011			0.05 (0.01, 0.09)	.009
Continent: Oceania			-0.06 (-0.13, 0.02)	.133			-0.05 (-0.13, 0.03)	.19			-0.05 (-0.13, 0.02)	.16
N Country	94	67	92	66	91	65						
Marginal R ² / Conditional R ²	0.170 / 0.682	0.525 / 0.616	0.008 / 0.861	0.577 / 0.867	0.000 / 0.860	0.534 / 0.878						

Figures

Figure 1. Cultural distance from the United States, based on education, income, and status. Note: Cultural distance (CF_{ST}) from the United States among people in other countries with high levels of education and low levels of education (left), high and low levels of income (middle), and high and low levels of status (right). Higher scores indicate greater cultural differences from the United States, and smaller scores indicate greater cultural similarity. Color represents the magnitude of the difference, with red indicating countries where highly educated people are more similar to the United States, and blue indicating countries where highly educated people are more culturally different from the United States, compared to low-education people in the same country. Countries with no difference (or countries missing a high or low comparison group) are grey. Dot size corresponds to sample size within each education group.

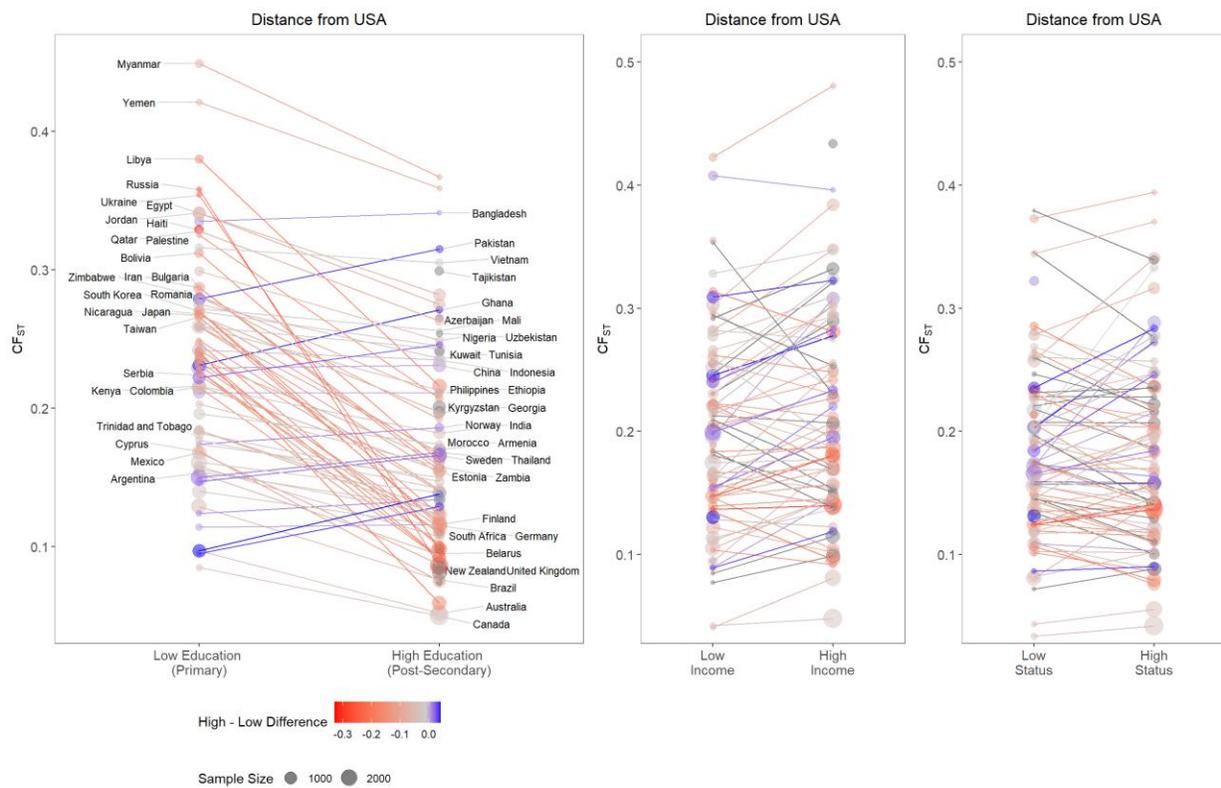


Figure 2. Cultural distance of education groups from all countries. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country. Countries are ordered by the size of the effect, ranging from (top) countries where highly educated non-residents are much closer in cultural values to residents of that country than less educated non-residents are to people of that country, e.g., Japan, to (bottom) countries where highly educated non-residents are much more distant in cultural values and less educated non-residents are more culturally similar to people of that country, e.g., Indonesia.

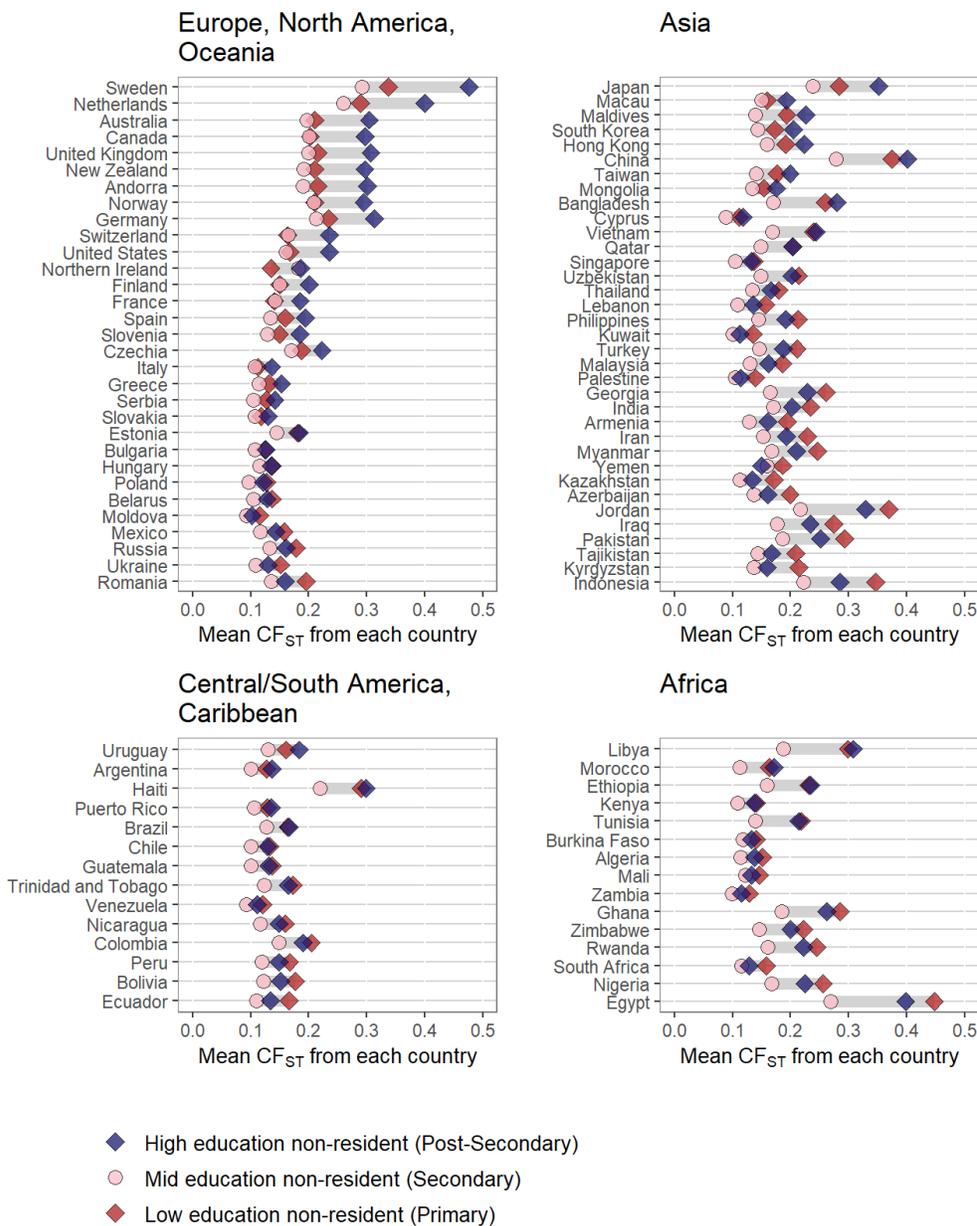
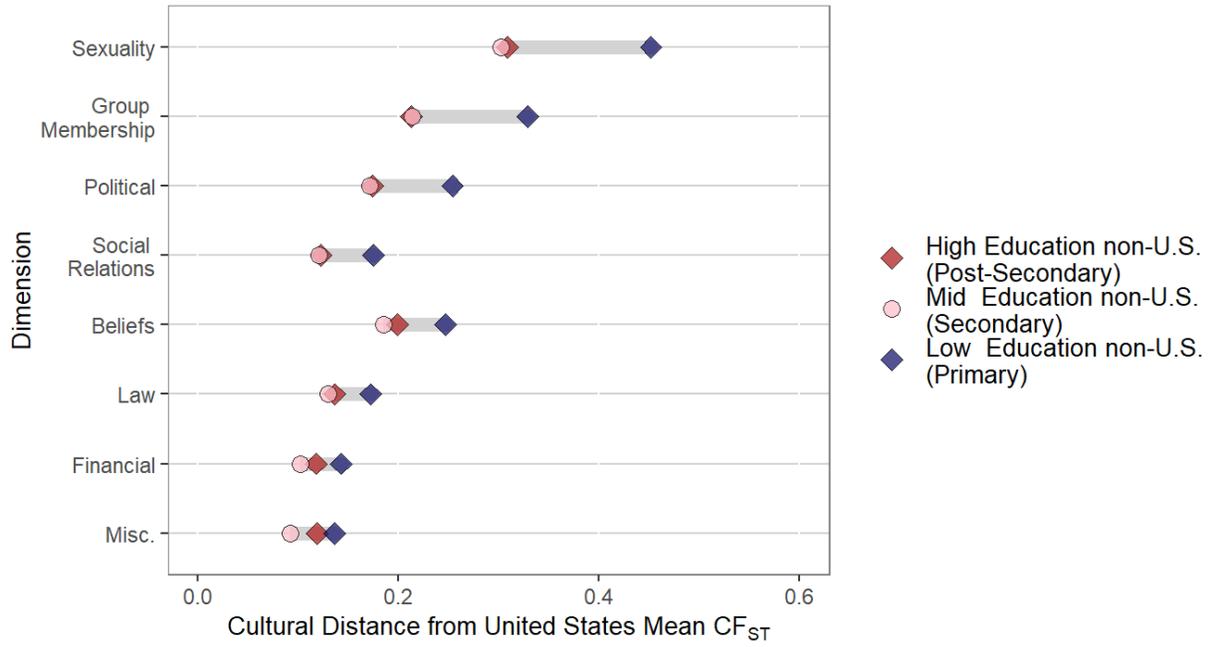


Figure 3. Cultural distance from the United States for each dimension of cultural traits. Mean cultural distance (CF_{ST}), between people in the United States and non-US high education groups (red), between the United States and non-US mid education groups (pink), and between the United States and non-US low education groups (blue), for each dimension of cultural traits.



Supplementary Information for
Higher education predicts global cultural similarity to WEIRD countries

Supplementary Analyses and Results

Robustness check: Similarity to all Americans vs. high-SES Americans

Our primary pre-registered analysis compared non-Americans of different SES levels to a target group consisting of Americans from all SES groups. However, there is also variation in cultural traits across groups of Americans with different education levels, as displayed in Table S2, therefore we also tested whether the pattern of differences between countries varies depending on whether we use high, mid, or low SES Americans as the reference group for comparison. We found a similar pattern, shown in Table S4, when each SES group is compared to only high-SES Americans: Non-Americans with lower education were more culturally distant from Americans with higher education than non-Americans with higher education were from Americans with higher education. A similar pattern is present when each SES group is compared to only mid-SES Americans. When low-SES Americans is used as the reference group, there is no longer any significant difference between the distance from highly educated non-Americans and low education non-Americans, although this effect should be interpreted with caution because the number of low-education Americans ($n = 98$) is slightly below our pre-registered cutoff for group sample sizes. Importantly, this analysis does not find that the pattern reverses when considering distance to low-education Americans (i.e., low-education non-Americans are not more similar than high-education non-Americans), indicating that this pattern is not simply driven by people being similar to those who share their level of SES.

Table S1. Cultural distance (CF_{ST}) between high, mid, and low-SES groups within the United States.

Comparison groups	Education CF_{ST}	Income CF_{ST}	Status CF_{ST}
High - Mid	0.021 [0.019, 0.029]	0.012 [0.012, 0.022]	0.004 [0.004, 0.007]
High - Low	0.145 [0.124, 0.239]	0.016 [0.016, 0.026]	0.014 [0.0126, 0.0175]
Mid - Low	0.049 [0.048, 0.097]	0.007 [0.007, 0.010]	0.004 [0.004, 0.007]

Table S2. Mean cultural distance (CF_{ST}), with bootstrapped 95% CIs, between individuals living in the United States and non-US high, mid, and low SES groups. CI LL = Confidence interval lower limit, CI UL = Confidence interval upper limit.

SES Variable	SES Level	All SES levels in the USA		
		Mean	CI LL	CI UL
Education	High	0.167	0.153	0.182
Education	Mid	0.161	0.148	0.174
Education	Low	0.235	0.218	0.252
Income	High	0.217	0.199	0.236
Income	Mid	0.147	0.134	0.160
Income	Low	0.199	0.185	0.214
Status	High	0.182	0.167	0.199
Status	Mid	0.172	0.158	0.187
Status	Low	0.181	0.168	0.196

Table S3. Mean cultural distance (CF_{ST}), with bootstrapped 95% CIs, between individuals living in the United States who are high, mid, or low in SES, and non-US high, mid, and low SES groups and. *CI LL* = Confidence interval lower limit, *CI UL* = Confidence interval upper limit. Level of SES in the USA was defined using whichever measure (education, income, or status) was the focus of each analysis.

SES Variable	SES Level	High SES in the USA			Mid SES in the USA			Low SES in the USA		
		Mean	CI LL	CI UL	Mean	CI LL	CI UL	Mean	CI LL	CI UL
Education	High	0.139	0.128	0.150	0.170	0.152	0.187	0.197	0.175	0.223
Education	Mid	0.126	0.116	0.136	0.174	0.160	0.189	0.238	0.212	0.266
Education	Low	0.183	0.170	0.196	0.257	0.237	0.275	0.201	0.175	0.228
Income	High	0.133	0.122	0.145	0.214	0.196	0.234	0.149	0.135	0.163
Income	Mid	0.175	0.155	0.197	0.138	0.126	0.150	0.118	0.107	0.129
Income	Low	0.163	0.147	0.182	0.191	0.175	0.206	0.133	0.122	0.144
Status	High	0.154	0.141	0.168	0.146	0.133	0.159	0.133	0.122	0.144
Status	Mid	0.145	0.132	0.159	0.137	0.125	0.150	0.124	0.113	0.135
Status	Low	0.156	0.144	0.168	0.143	0.132	0.156	0.130	0.120	0.140

Table S4. Multilevel regression model predicting cultural distance to the United States from non-US samples' education level, income level, or status.

Predictors	Education			Income			Status					
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>
Intercept	0.23 (0.22, 0.25)	28.75	<0.001	143.52	0.2 (0.18, 0.22)	23.74	<0.001	102.93	0.18 (0.17, 0.20)	24.34	<0.001	103.09
Low vs. High SES	-0.07 (-0.08, -0.05)	-9.11	<0.001	80.45	0.01 (0.01, 0.02)	3.02	0.003	75.17	0.00 (-0.01, 0.01)	0.57	0.568	84.04
N Country				94				92				91
Marginal R ² / Conditional R ²				0.170 / 0.682				0.008 / 0.861				0.000 / 0.860

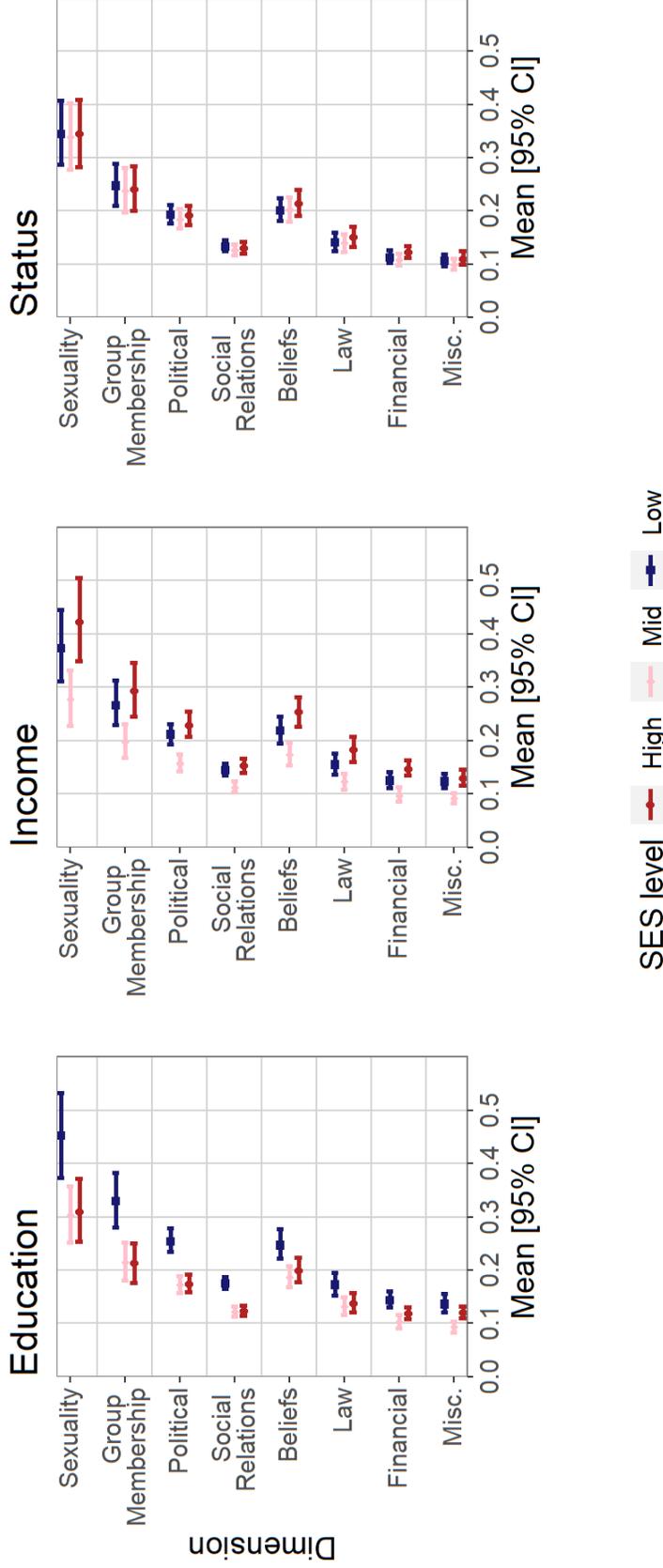
Table S5. Multilevel regression model predicting cultural distance to the United States from non-US samples' education level, income level, or status, controlling for other features of each country.

Predictors	Education			Income			Status			
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>
Intercept	0.34 (0.19, 0.49)	4.49	<0.001	0.4 (0.23, 0.56)	4.72	<0.001	0.32 (0.16, 0.47)	4.13	<0.001	56.17
Low vs. High SES	-0.07 (-0.08, -0.05)	-7.23	<0.001	0.02 (0.01, 0.03)	3.44	0.001	0.00 (-0.01, 0.01)	0.30	0.768	60.28
Average Education	0.01 (-0.02, 0.03)	0.52	0.603	-0.01 (-0.03, 0.02)	-0.54	0.594	0.00 (-0.02, 0.03)	0.23	0.822	56.36
GDP per capita	-0.04 (-0.06, -0.02)	-4.58	<0.001	-0.05 (-0.07, -0.03)	-4.41	<0.001	-0.04 (-0.06, -0.02)	-4.35	<0.001	55.72
Population	0.00 (-0.01, 0.01)	-0.06	0.95	-0.01 (-0.01, 0.00)	-1.21	0.232	0.00 (-0.01, 0.01)	-0.64	0.528	55.82
Linguistic Distance from USA	0.00 (-0.02, 0.03)	0.5	0.621	0.01 (-0.01, 0.03)	0.93	0.356	0.01 (-0.02, 0.03)	0.61	0.546	56.68
Continent: Americas	-0.04 (-0.07, 0.00)	-1.97	0.054	-0.04 (-0.08, 0.01)	-1.69	0.097	-0.03 (-0.07, 0.01)	-1.39	0.169	56.67
Continent: Africa	0.02 (-0.04, 0.07)	0.66	0.512	0.02 (-0.04, 0.09)	0.79	0.432	0.03 (-0.02, 0.09)	1.15	0.254	56.88
Continent: Asia	0.04 (0.00, 0.07)	2.00	0.049	0.05 (0.01, 0.10)	2.60	0.012	0.05 (0.01, 0.09)	2.66	0.01	56.91
Continent: Oceania	-0.06 (-0.13, 0.02)	-1.52	0.134	-0.05 (-0.13, 0.03)	-1.32	0.193	-0.05 (-0.13, 0.02)	-1.41	0.163	55.96
N Country	67			66			65			
Marginal R ² / Conditional R ²	0.525 / 0.616			0.577 / 0.867			0.534 / 0.878			

Robustness check: Variation across dimensions of cultural values

Figure S2. Mean cultural distance (CF_{STJ}), with bootstrapped 95% CIs, between all people in the United States and non-US high, mid, and low SES groups, separately for each dimension of cultural traits and each measure of SES. Colours indicate the comparison group, with red indicating mean cultural distance between people in the United States and non-US high education groups, pink indicating distance between the United States and non-US mid education groups, and blue indicating distance between the United States and non-US low education groups.

The difference between high and low education groups was statistically significant for all dimensions except for miscellaneous traits, $p = .070$, and range in size from $b = -0.02$ [-0.03, -0.01], for financial attitudes, to $b = -0.15$ [-0.20, -0.10], for sexuality, all $ps < .001$. When SES groups are defined by income or status, high SES groups are never significantly closer to the United States, and for some dimensions are even significantly more distant from the United States, bs range from $0.01 - 0.03$, $p \leq .03$ for financial, law, social relations, political, and beliefs dimensions.



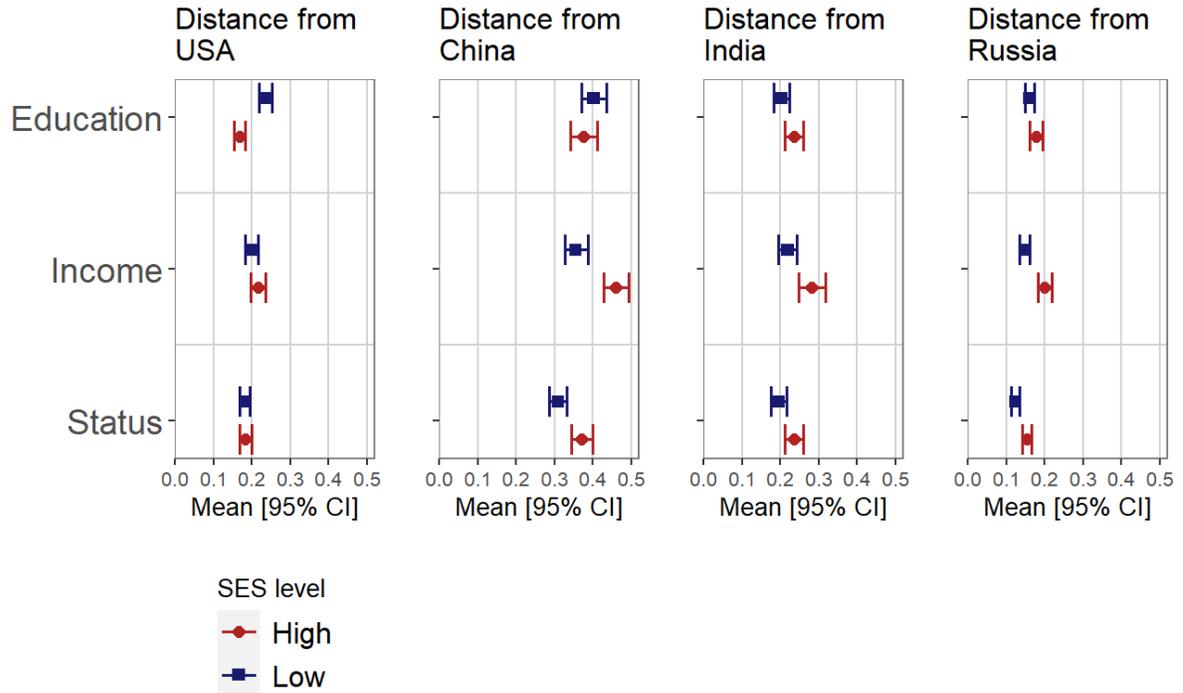
Robustness check: Cultural distance from China, Russia, and India

To further explore the uniqueness of the effect of education on distance from the USA, we conducted the analogous analyses where the focal reference group was other countries besides the USA. The first set of analyses tested the full set of comparisons, across all SES indicators, to three focal groups that represent other world powers that are not prototypically WEIRD nations: China, India, and Russia. Results depicted in Table S6 revealed that being highly educated was not associated with greater cultural similarity to China, India, or Russia, nor was being higher income or higher status.

Table S6. Mean cultural distance (CF_{ST}), with bootstrapped 95% CIs, between individuals living in China, India, or Russia, and high, mid, and low SES groups living in other countries. CI LL = Confidence interval lower limit, CI UL = Confidence interval upper limit.

SES Variable	SES Level	Distance from China			Distance from India			Distance from Russia		
		Mean	CI LL	CI UL	Mean	CI LL	CI UL	Mean	CI LL	CI UL
Education	High	0.374	0.343	0.407	0.235	0.209	0.260	0.178	0.162	0.194
Education	Mid	0.279	0.257	0.303	0.170	0.154	0.187	0.132	0.121	0.143
Education	Low	0.402	0.371	0.436	0.203	0.183	0.223	0.160	0.148	0.173
Income	High	0.459	0.426	0.494	0.281	0.249	0.319	0.199	0.180	0.218
Income	Mid	0.259	0.240	0.277	0.182	0.162	0.202	0.129	0.117	0.141
Income	Low	0.355	0.326	0.387	0.219	0.195	0.245	0.147	0.135	0.161
Status	High	0.369	0.343	0.399	0.235	0.211	0.260	0.153	0.141	0.166
Status	Mid	0.312	0.290	0.336	0.201	0.181	0.222	0.132	0.120	0.144
Status	Low	0.309	0.286	0.333	0.195	0.174	0.219	0.124	0.112	0.135

Figure S3. Mean cultural distance (CF_{ST}), between individuals living in the USA, China, India, and Russia and high, mid, and low SES groups in other countries. Red indicates the cultural distance between highly educated people around the world and the reference country, blue indicates the cultural distance between low education people around the world and the reference country. Error bars represent bootstrapped 95% confidence intervals.



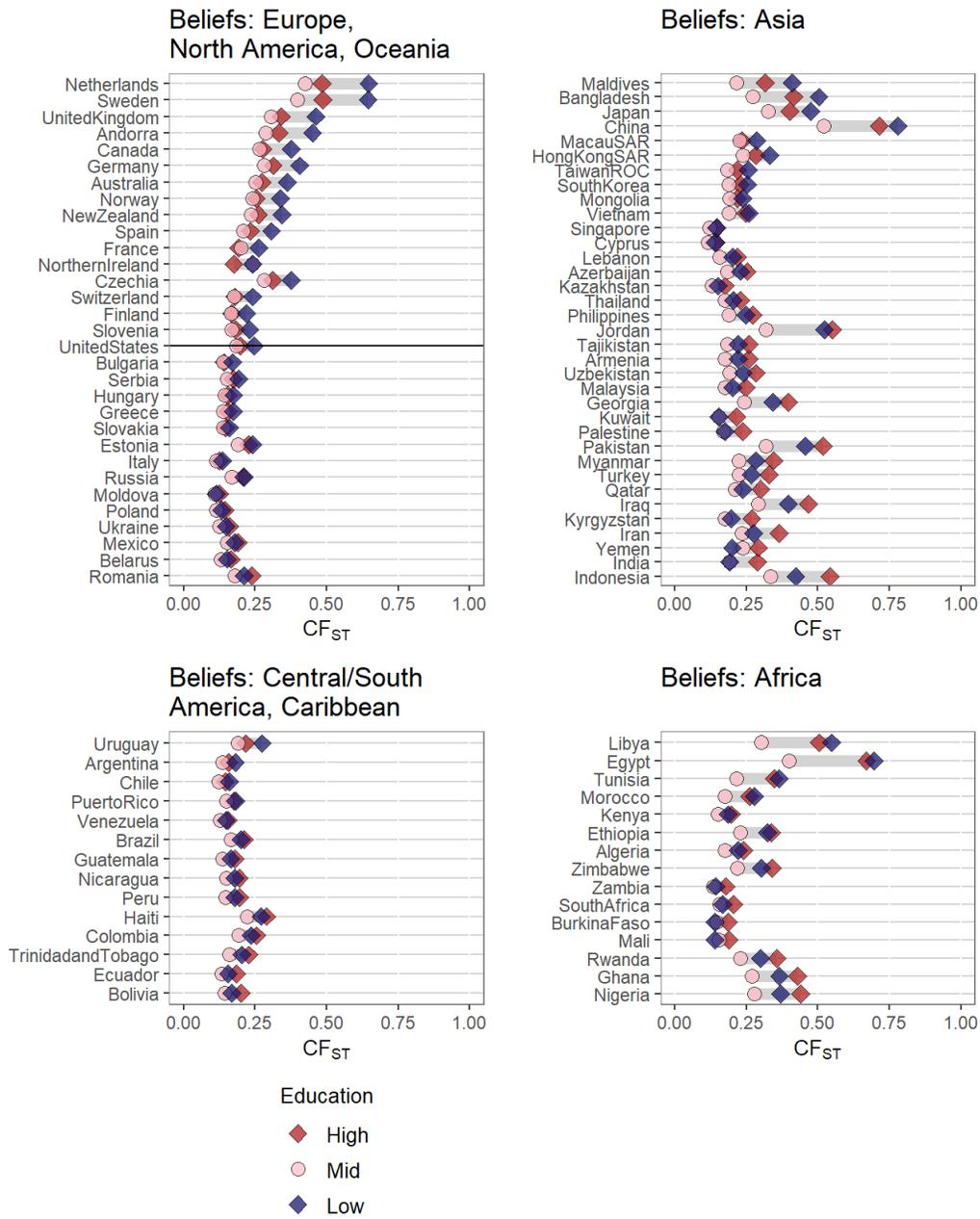
Robustness checks: Cultural similarity to all countries

The second set of analyses focused on the difference between high and low education groups, but examined their similarity to all countries. These analyses focused on similarity to high-SES people within each reference country. For each country, we computed the average CF_{ST} from highly-educated foreigners and low-education foreigners, and the difference between these scores as an index of size of the education effect (see Tables S7).

This value was 0.068 in the USA, and the difference was even larger for nine other WEIRD countries: Sweden, Australia, Canada, Norway, New Zealand, Andorra, Netherlands, Germany, and Switzerland. This suggests that being highly educated predicts greater cultural similarity to highly educated people in highly educated WEIRD countries, of which the USA is one example.

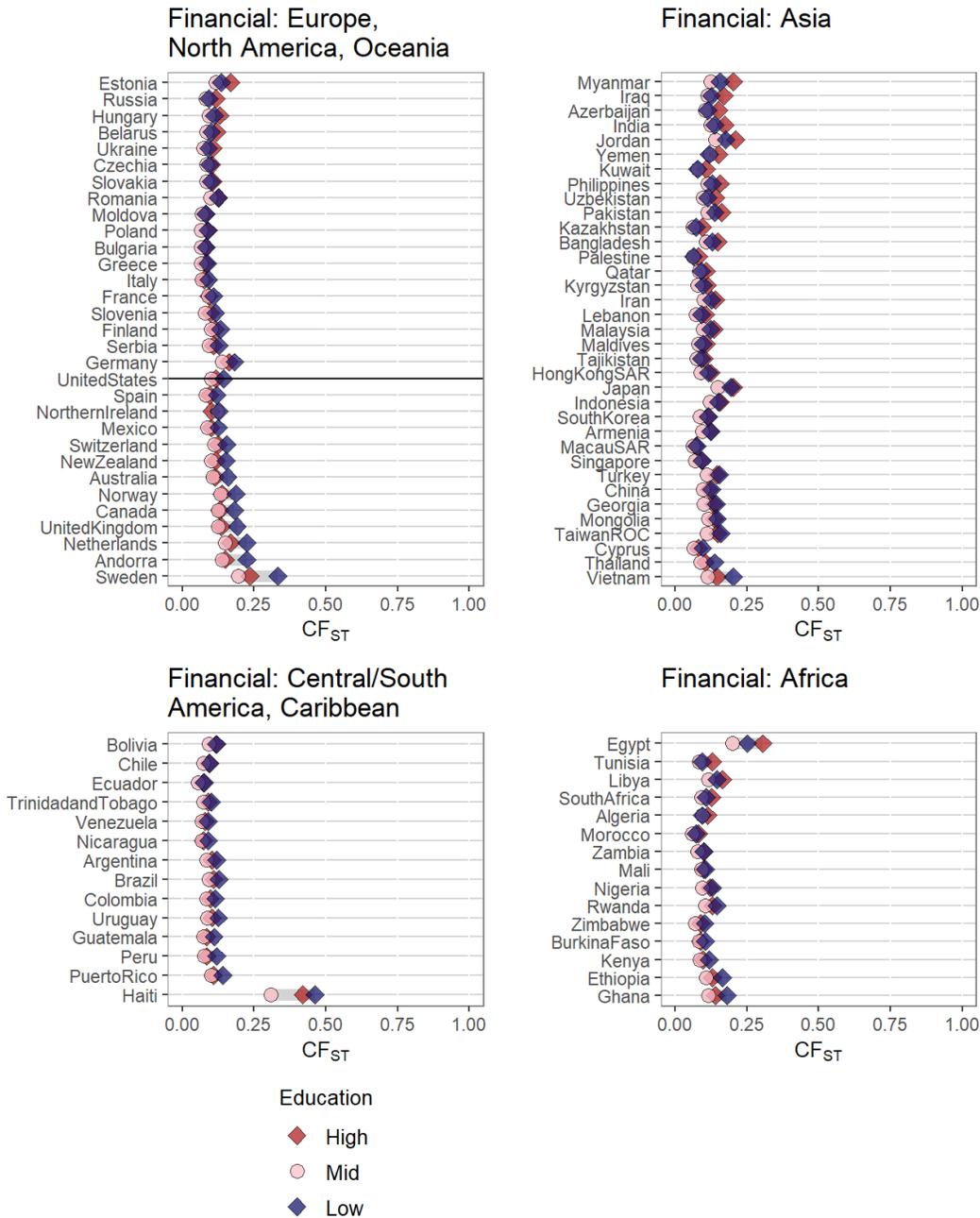
Cultural similarity to all countries: Beliefs

Figure S4. Cultural distance of education groups from all countries, in beliefs dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



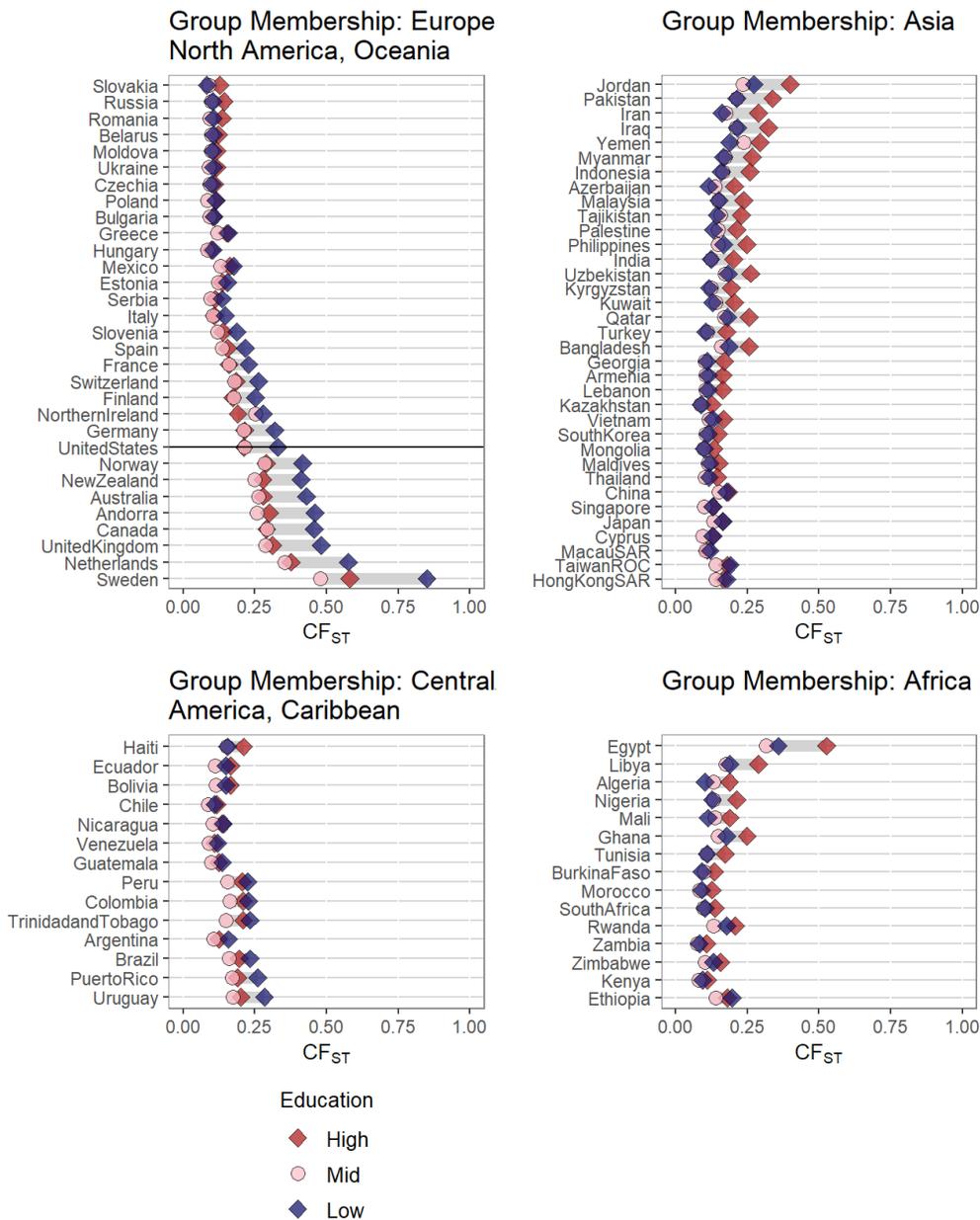
Cultural similarity to all countries: Financial

Figure S5. Cultural distance of education groups from all countries, in financial dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



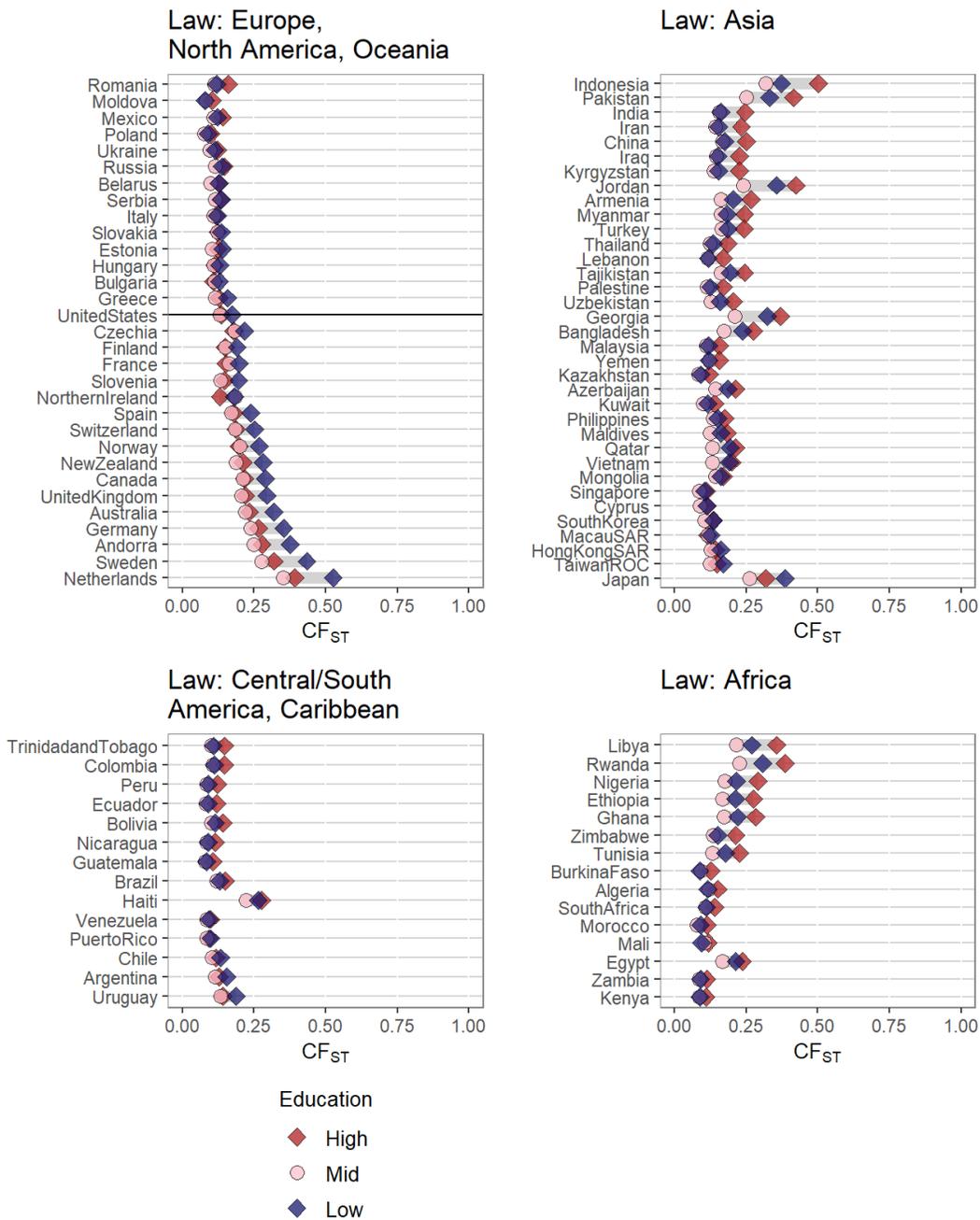
Cultural similarity to all countries: Group Membership

Figure S6. Cultural distance of education groups from all countries, in group memberships dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



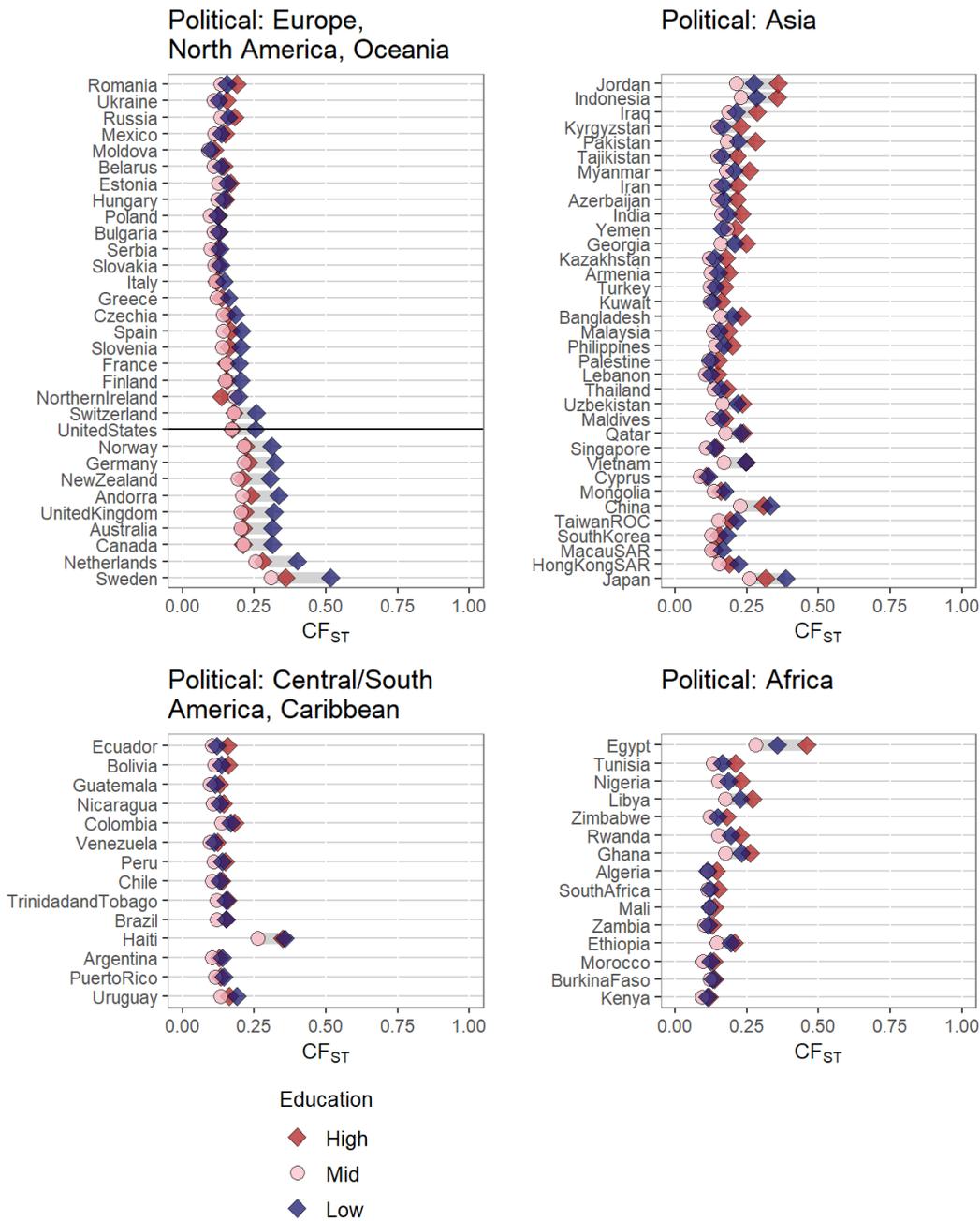
Cultural similarity to all countries: Law

Figure S7. Cultural distance of education groups from all countries, in law dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



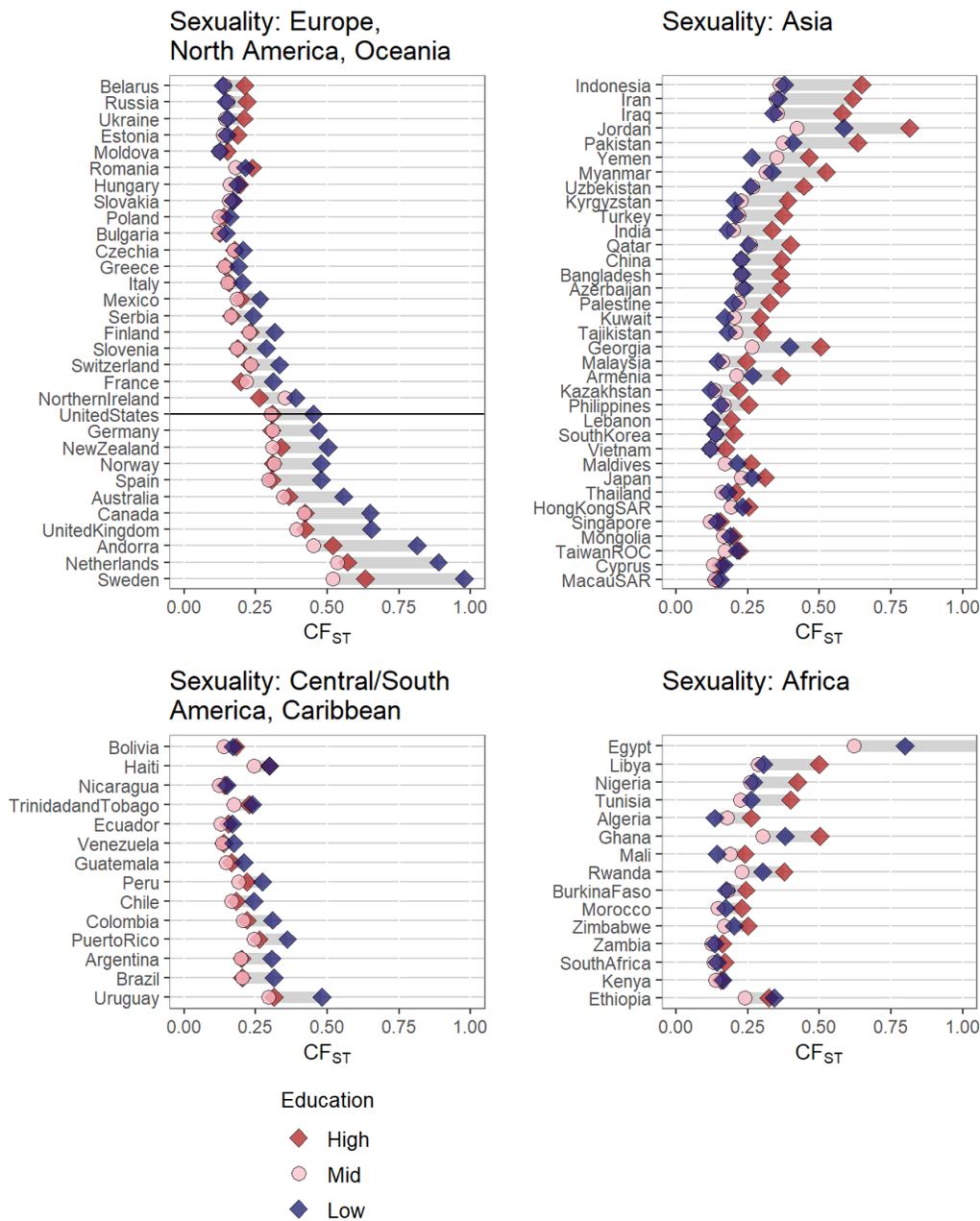
Cultural similarity to all countries: Politics

Figure S8 Cultural distance of education groups from all countries, in political dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



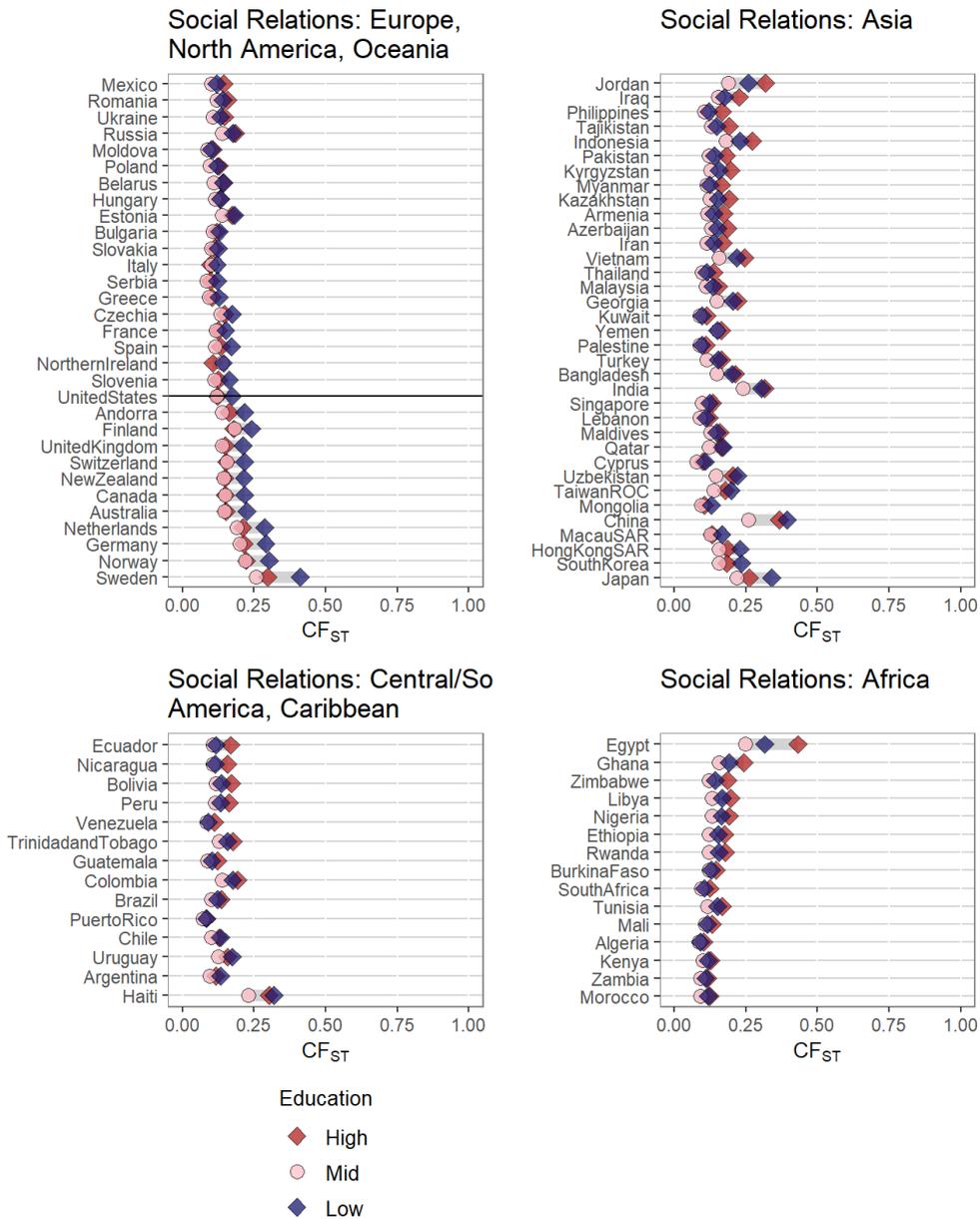
Cultural similarity to all countries: Sexuality

Figure S9 Cultural distance of education groups from all countries, in sexuality dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



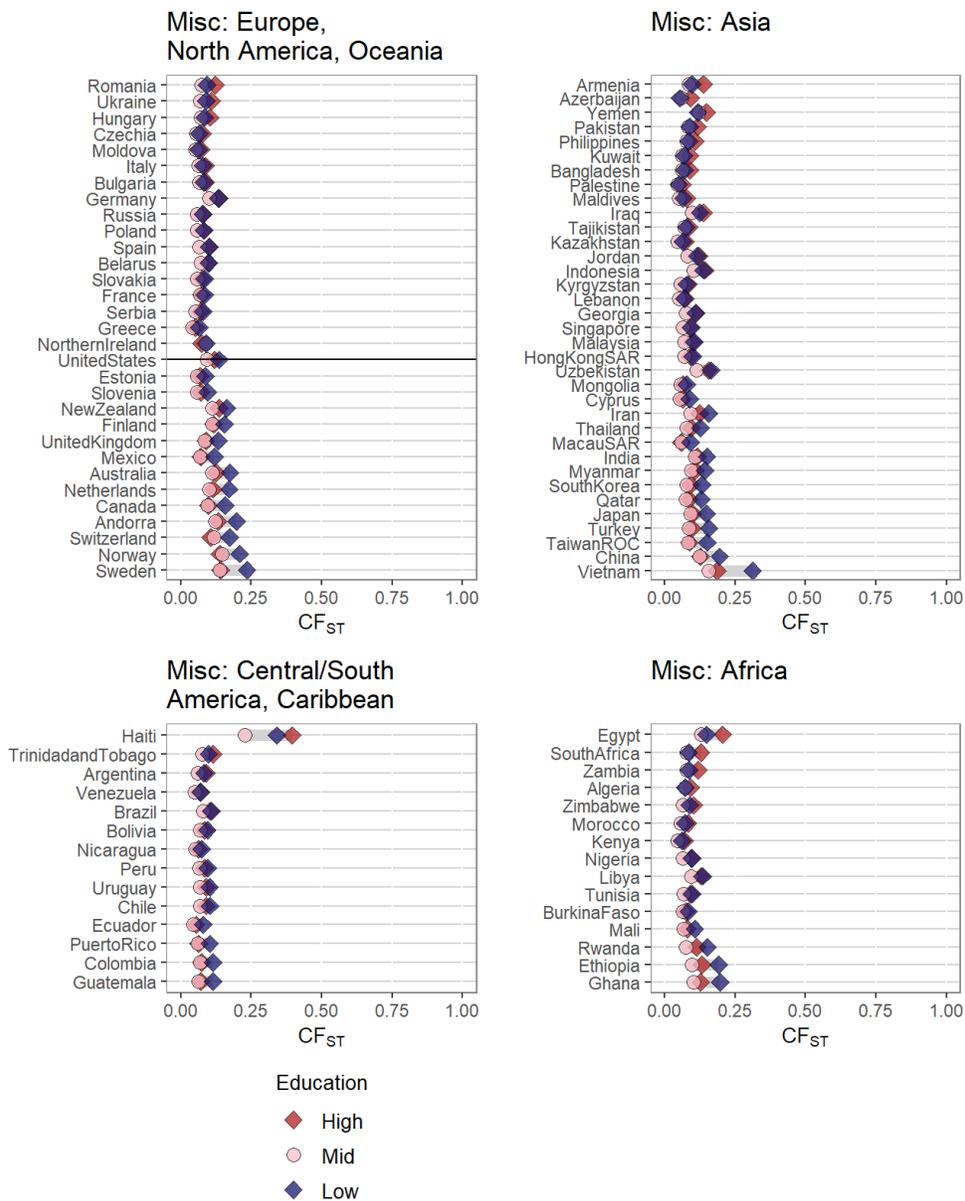
Cultural similarity to all countries: Social Relations

Figure S10. Cultural distance of education groups from all countries, in social relations dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



Cultural similarity to all countries: Miscellaneous

Figure S11 Cultural distance of education groups from all countries, in miscellaneous dimension of cultural traits. For every country, mean cultural distance (CF_{ST}) between people living in that country and people living in other countries with high levels of education (red points), people living in other countries with mid levels of education (pink points), and people living in other countries with low levels of education (blue points). Each row depicts cultural distance between residents and non-residents of a different country, grouped by continent of the reference country.



Regressions testing difference between SES groups

We also tested the statistical significance of these effects using mixed-effects regression models (Tables S8 – S13) that predicted cultural distances from SES group, with random intercepts for each country. SES level was dummy coded (0 = Low, 1 = High), and for models with covariates GDP and population size were log transformed, average educational attainment was standardized, and continent was dummy coded.

Table S7. Regression predicting cultural distance to each reference country from the education level of people in other countries. All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

Predictors	USA			China			India			Russia		
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>
Intercept	0.23 (0.22, 0.25)	28.75	<0.001	0.39 (0.36, 0.43)	22.84	<0.001	0.21 (0.18, 0.23)	16.68	<0.001	0.15 (0.14, 0.17)	19.84	<0.001
Low vs. High Education	-0.07 (-0.08, -0.05)	-9.11	<0.001	-0.02 (-0.05, 0.02)	-0.94	0.352	0.03 (0.01, 0.05)	2.75	0.008	0.02 (0.01, 0.04)	3.37	0.001
N Country	94			94			94			94		
Marginal R ² / Conditional R ²	0.170 / 0.682			0.003 / 0.557			0.015 / 0.689			0.030 / 0.587		

Table S8. Regression predicting cultural distance to each reference country from the education level of people in other countries and control variables. All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

Predictors	USA			China			India			Russia			
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>									
Intercept	0.36 (0.22, 0.50)	5.04	<0.001	0.53 (0.21, 0.85)	3.3	0.001	0.29 (0.05, 0.53)	2.41	0.019	0.13 (-0.06, 0.32)	1.39	0.169	68
Low vs. High Education	-0.06 (-0.08, -0.05)	-7.66	<0.001	-0.01 (-0.05, 0.02)	-0.65	0.519	0.03 (0.00, 0.05)	2.3	0.025	0.03 (0.01, 0.04)	2.93	0.005	60
Average Education	0.01 (-0.01, 0.03)	0.66	0.514	-0.01 (-0.06, 0.03)	-0.61	0.546	0.02 (-0.01, 0.06)	1.31	0.196	-0.02 (-0.05, 0.00)	-1.73	0.088	65
GDP	-0.04 (-0.06, -0.02)	-4.21	<0.001	-0.05 (-0.09, -0.01)	-2.47	0.016	0.00 (-0.03, 0.03)	-0.07	0.944	0.01 (-0.02, 0.03)	0.55	0.583	64
Population	0.00 (-0.01, 0.01)	-0.47	0.64	0.00 (-0.02, 0.02)	-0.09	0.925	0.00 (-0.01, 0.01)	-0.06	0.955	0.00 (-0.01, 0.01)	0.29	0.775	63
Continent: Americas	-0.03 (-0.07, -0.00)	-2	0.049	0.00 (-0.07, 0.08)	0.12	0.905	-0.09 (-0.15, -0.03)	-3.15	0.003	-0.04 (-0.09, 0.01)	-1.72	0.09	61
Continent: Africa	0.01 (-0.03, 0.06)	0.64	0.523	0.05 (-0.04, 0.14)	1.11	0.27	-0.12 (-0.19, -0.05)	-3.29	0.002	-0.01 (-0.07, 0.05)	-0.47	0.642	61
Continent: Asia	0.03 (0.00, 0.07)	2.22	0.03	-0.03 (-0.10, 0.04)	-0.89	0.377	-0.14 (-0.19, -0.09)	-5.42	<0.001	-0.05 (-0.09, -0.01)	-2.44	0.017	67
Continent: Oceania	-0.06 (-0.14, 0.01)	-1.82	0.072	-0.01 (-0.16, 0.14)	-0.13	0.896	-0.08 (-0.19, 0.04)	-1.31	0.195	0.00 (-0.09, 0.09)	0.05	0.964	72
N Country	76			75			75			75			
Marginal R ² / Conditional R ²	0.498 / 0.618			0.301 / 0.463			0.413 / 0.648			0.136 / 0.551			

Table S9. Regression predicting cultural distance to each reference country from the income level of people in other countries. All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

Predictors	USA			China			India			Russia			
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>									
Intercept	0.20 (0.18, 0.22)	23.74	<0.001	0.36 (0.33, 0.39)	23.14	<0.001	0.22 (0.19, 0.25)	15.11	<0.001	0.15 (0.13, 0.16)	20.16	<0.001	110
Low vs. High Income	0.01 (0.01, 0.02)	3.02	0.003	0.1 (0.07, 0.12)	7.8	<0.001	0.07 (0.05, 0.09)	7.63	<0.001	0.05 (0.04, 0.06)	9.21	<0.001	77
N Country	92			92			92			92			
Marginal R ² / Conditional R ²	0.008 / 0.861			0.100 / 0.750			0.059 / 0.847			0.104 / 0.814			

Table S10. Regression predicting cultural distance to each reference country from the income level of people in other countries and control variables. All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

Predictors	USA			China			India			Russia		
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>
Intercept	0.43 (0.27, 0.58)	5.49	<0.001	0.56 (0.23, 0.89)	3.38	0.001	0.30 (-0.02, 0.63)	1.85	0.068	0.16 (-0.06, 0.37)	1.46	0.148
Low vs. High Income	0.02 (0.01, 0.03)	3.68	<0.001	0.11 (0.09, 0.14)	9.55	<0.001	0.07 (0.05, 0.09)	7.57	<0.001	0.05 (0.04, 0.06)	8.93	<0.001
Average Education	0.00 (-0.03, 0.02)	-0.29	0.771	-0.03 (-0.07, 0.02)	-1.17	0.246	0.02 (-0.03, 0.07)	0.93	0.356	-0.02 (-0.05, 0.01)	-1.2	0.236
GDP	-0.05 (-0.07, -0.02)	-4.22	<0.001	-0.03 (-0.07, 0.01)	-1.43	0.158	0.02 (-0.03, 0.06)	0.7	0.488	0.01 (-0.02, 0.04)	0.38	0.707
Population	-0.01 (-0.02, 0.00)	-1.64	0.106	-0.01 (-0.03, 0.01)	-0.96	0.342	0.00 (-0.02, 0.02)	-0.31	0.76	0.00 (-0.01, 0.01)	-0.06	0.949
Continent: Americas	-0.04 (-0.08, 0.00)	-1.83	0.071	0.02 (-0.06, 0.10)	0.45	0.657	-0.1 (-0.18, -0.02)	-2.56	0.013	-0.05 (-0.10, 0.01)	-1.76	0.083
Continent: Africa	0.01 (-0.04, 0.06)	0.44	0.662	0.06 (-0.04, 0.16)	1.12	0.267	-0.14 (-0.24, -0.03)	-2.63	0.011	-0.01 (-0.08, 0.06)	-0.28	0.782
Continent: Asia	0.05 (0.01, 0.08)	2.79	0.007	0.01 (-0.06, 0.08)	0.2	0.844	-0.14 (-0.22, -0.07)	-4.08	<0.001	-0.04 (-0.09, 0.01)	-1.61	0.113
Continent: Oceania	-0.07 (-0.14, 0.00)	-1.89	0.063	-0.01 (-0.16, 0.14)	-0.11	0.911	-0.03 (-0.19, 0.12)	-0.45	0.657	0.02 (-0.08, 0.12)	0.38	0.705
N Country	75			74			74			74		
Marginal R ² / Conditional R ²	0.543 / 0.865			0.391 / 0.780			0.417 / 0.859			0.176 / 0.841		

Table S11. Regression predicting cultural distance to each reference country from the subjective status level of people in other countries. All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

Predictors	USA			China			India			Russia			
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>df</i>
Intercept	0.18 (0.17, 0.20)	24.34	<0.001	0.31 (0.28, 0.33)	24.31	<0.001	0.20 (0.17, 0.22)	16.48	<0.001	0.12 (0.11, 0.14)	20.6	<0.001	102
Low vs. High Status	0.00 (-0.01, 0.01)	0.57	0.568	0.06 (0.04, 0.08)	6.32	<0.001	0.04 (0.03, 0.05)	6.43	<0.001	0.03 (0.02, 0.04)	9.76	<0.001	84
N Country	91			91			91			91			
Marginal R ² / Conditional R ²	0.000 / 0.860			0.059 / 0.750			0.032 / 0.868			0.066 / 0.883			

Table SI2. Regression predicting cultural distance to each reference country from the subjective status level of people in other countries and control variables. All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

Predictors	USA			China			India			Russia		
	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>	<i>b</i> (95% CI)	<i>t</i>	<i>p</i>
Intercept	0.35 (0.20, 0.49)	4.82	<0.001	0.44 (0.17, 0.70)	3.27	0.002	0.29 (0.01, 0.57)	2.04	0.045	0.15 (-0.03, 0.33)	1.69	0.096
Low vs. High Status	0.00 (-0.01, 0.01)	0.49	0.628	0.07 (0.05, 0.09)	6.55	<0.001	0.04 (0.03, 0.06)	6.53	<0.001	0.03 (0.02, 0.04)	8.90	<0.001
Average Education	0.00 (-0.02, 0.02)	0.21	0.832	-0.01 (-0.05, 0.03)	-0.64	0.522	0.02 (-0.02, 0.06)	0.95	0.345	-0.02 (-0.04, 0.01)	-1.17	0.246
GDP	-0.04 (-0.06, -0.02)	-4.07	<0.001	-0.03 (-0.07, 0.00)	-1.85	0.069	0.01 (-0.03, 0.04)	0.39	0.699	0.00 (-0.02, 0.03)	0.3	0.766
Population	0.00 (-0.01, 0.00)	-1.1	0.277	0.00 (-0.02, 0.01)	-0.52	0.608	0.00 (-0.02, 0.01)	-0.3	0.767	0.00 (-0.01, 0.01)	-0.27	0.786
Continent: Americas	-0.03 (-0.07, 0.01)	-1.59	0.116	0.03 (-0.03, 0.10)	1.07	0.29	-0.09 (-0.16, -0.02)	-2.55	0.013	-0.03 (-0.08, 0.01)	-1.44	0.155
Continent: Africa	0.02 (-0.03, 0.06)	0.7	0.487	0.05 (-0.03, 0.13)	1.13	0.261	-0.12 (-0.21, -0.03)	-2.78	0.007	-0.01 (-0.06, 0.05)	-0.19	0.848
Continent: Asia	0.04 (0.01, 0.08)	2.82	0.006	-0.01 (-0.07, 0.04)	-0.4	0.689	-0.12 (-0.18, -0.06)	-4.10	<0.001	-0.03 (-0.07, 0.01)	-1.59	0.117
Continent: Oceania	-0.06 (-0.13, 0.01)	-1.84	0.071	0.02 (-0.10, 0.14)	0.27	0.791	-0.02 (-0.15, 0.11)	-0.29	0.773	0.02 (-0.07, 0.10)	0.37	0.712
N Country	74			73			73			73		
Marginal R ² / Conditional R ²	0.490 / 0.865			0.320 / 0.708			0.396 / 0.893			0.141 / 0.899		

Table S13. Regression predicting cultural distance to the United States simultaneously from non-US samples' level of SES (low = 0, high = 1), and type of SES indicator (education, income, or status). All statistics used two-tailed tests, and no corrections were made for multiple comparisons.

<i>Predictors</i>	<i>b (95% CI)</i>	<i>t</i>	<i>p</i>	<i>df</i>	<i>b (95% CI)</i>	<i>t</i>	<i>p</i>	<i>df</i>
Intercept	0.24 (0.22, 0.25)	29.37	<0.001	131	0.4 (0.25, 0.55)	5.30	<0.001	58
SES type: Income vs. Education	-0.03 (-0.04, -0.03)	-7.32	<0.001	410	-0.04 (-0.05, -0.03)	-6.41	<0.001	292
SES type: Status vs. Education	-0.06 (-0.07, -0.05)	-12.04	<0.001	411	-0.06 (-0.07, -0.04)	-9.51	<0.001	292
Low vs. High SES	-0.07 (-0.08, -0.06)	-14.5	<0.001	411	-0.07 (-0.08, -0.06)	-11.82	<0.001	292
SES type: Income × SES level	0.08 (0.07, 0.10)	12.6	<0.001	411	0.09 (0.07, 0.10)	10.88	<0.001	292
SES type: Status × SES level	0.07 (0.06, 0.08)	10.8	<0.001	410	0.07 (0.05, 0.09)	8.79	<0.001	291
Average Education					0.00 (-0.02, 0.02)	0.07	0.941	58
GDP per capita					-0.05 (-0.06, -0.03)	-4.73	<0.001	58
Population					0.00 (-0.01, 0.00)	-0.90	0.373	58
Linguistic distance from USA					0.01 (-0.01, 0.03)	0.81	0.422	58
Continent: Americas					-0.03 (-0.07, 0.01)	-1.69	0.096	58
Continent: Africa					0.03 (-0.03, 0.08)	0.93	0.357	58
Continent: Asia					0.05 (0.01, 0.09)	2.82	0.007	59
Continent: Oceania					-0.05 (-0.12, 0.02)	-1.47	0.147	58
N Country	94				67			
Marginal R ² / Conditional R ²	0.086 / 0.858				0.552 / 0.843			

Average cultural distance with high-SES and low-SES groups around the world

We also investigated whether people living in different countries are more similar overall (not merely similar to the USA), if their share similar levels of education, income or status. One possibility is that high-SES individuals living in different countries may be culturally similar to one another due to the cultural transmission of particular values or ways of thinking during education, or due to shared access to an elite global culture. Higher education and income may grant high-SES individuals access to media, technology, international travel, and employment at international corporations, that would allow them to engage with other wealthy, educated people around the world and thereby participate in a shared culture spread through globalization. Low-SES individuals may be more influenced by local conditions and traditional cultural norms, and as such may be very different from low-SES individuals in other regions of the world that were subject to very different heritage cultures.

An alternative possibility may be that low-SES individuals are instead more similar to other low-SES individuals around the world. The constraints of low education or low income may evoke common psychological beliefs and behaviors, whereas high-SES may allow the generation of greater diversity in cultural traits between individuals and nations. Prior research indicates that higher SES is associated with both a greater valuation of pursuing one's own personal preferences and goals² and with possessing economic resources that allow people to actually achieve one's individual goals and preferences. As a result, higher-SES individuals may display a greater diversity of cultural traits, whereas lower SES may be associated with more similar traits between individuals across nations. Certain traits that are characteristic of low SES, such as interdependence and deference to authority, may be recurrent across low SES groups around the world due to the adaptive benefits of these traits allowing people to survive and

achieve their goals despite lacking power and resources.³ Indeed, within the United States, heritability is higher among high SES individuals compared to low SES individuals, though notably this difference is not observed in Europe or Australia. Uchiyama et al. and have argued that this is a result of greater variability in education among poorer Americans.^{4,5}

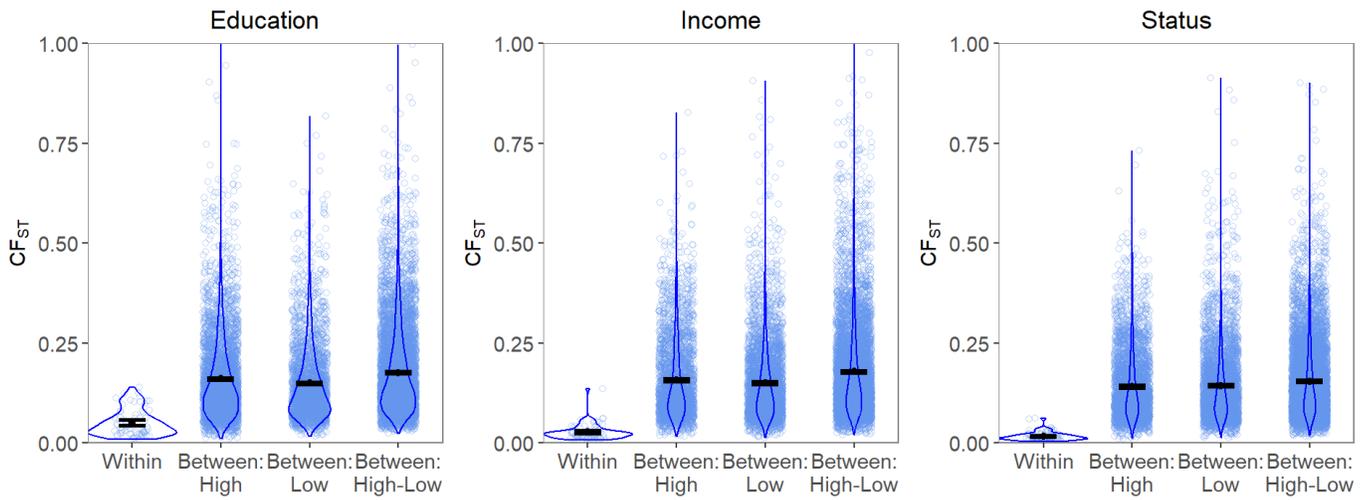
To test these ideas, we compared the cultural traits of high and low SES individuals within and between countries. Looking within countries (Figure S12) indicated that education was also uniquely associated with differences in cultural values among people living within the same nation. Within each country, individuals were significantly more culturally distant if they were high vs. low in education, $CF_{ST} = 0.050$, 95% CI [0.043, 0.058], than if they were high vs. low in income, $CF_{ST} = 0.027$ [0.023, 0.031], or subjective perceptions of their social status, $CF_{ST} = 0.016$ [0.014, 0.019], effects which are similar to the difference in overall CF_{ST} between the United States and Great Britain ($CF_{ST} = 0.048$) versus the United States and Canada ($CF_{ST} = 0.030$). All of these differences within-country differences were quite small compared to the average cultural distance between people living in different countries, $CF_{ST} = 0.135$ (collapsed across all SES levels).

We then tested whether individuals living in different countries were more similar to one another if they shared high-SES than if they shared-low SES, by computing the average distance across countries between only high-SES groups and then between only low-SES groups. As displayed in Figure S5, the average distance between countries was generally quite similar among low-SES groups and between high-SES groups, although there were small differences between groups defined by education and income. The average distance among high-education groups living in different countries, $CF_{ST} = 0.160$ [0.157, 0.163], was slightly larger than the average distance among low-education groups living in different countries, $CF_{ST} = 0.149$ [0.146, 0.153], as indicated by their non-overlapping 95% confidence intervals. The average distance among

high-income groups living in different countries, $CF_{ST} = 0.158$ [0.154, 0.161], was also slightly larger than the average distance among low-income groups living in different countries $CF_{ST} = 0.149$ [0.146, 0.153]. There were no significant differences when we defined groups by their social status rather than education level, High $CF_{ST} = 0.141$ [0.138, 0.144] vs. Low $CF_{ST} = 0.143$ [0.140, 0.146]. That is, there was more variation across those with high SES living around the world as there was variation across those with low SES living around the world.

Furthermore, the full range of cultural differences encompasses an even greater range, such that people tend to be the most different if they hold both different nationalities and different levels of education, $CF_{ST} = 0.176$ [0.173, 0.178], levels of income, $CF_{ST} = 0.176$ [0.176, 0.181], or levels of social status, $CF_{ST} = 0.154$ [0.152, 0.157]. Only sampling highly-educated groups would reduce the range of cultural distance from many WEIRD countries and indeed, only sampling low or high education would underestimate the true variation that exists within a population that can only be captured by sampling across the population SES range. This result further indicates the specificity of our finding that higher-education predicts cultural similarity to WEIRD countries, not merely similar to any other highly-educated group in a foreign country. There remains as much or more variation between highly-educated people living in different countries than between those with low education, but this range of highly-educated people tends to be shifted towards the cultural values of WEIRD nations; the range of less-educated people is smaller but is more distant from the cultural values of WEIRD nations. Thus sampling low educated groups is not the solution to measuring a broader swathe of human cultural diversity (though it will lead to larger cultural distances compared to WEIRD countries) and instead, the solution is sampling a broader diversity of educational groups within each country.

Figure S12. Distance between people who (a) differ in their SES (high vs. low) but live within the same countries, (b) share high SES but live in different countries, and (c) share low SES but live in different countries, for three different indicators of socioeconomic status (education, income, and subjective status). Blue points represent each pairwise distance (CF_{ST}) with a within-country or between-country comparison, and the black point and error bars represent the mean and bootstrapped 95% confidence intervals across all pairwise CF_{ST} scores.



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