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**1. Manipulation Check: Job Ads**

As a manipulation check, we showed English versions of the two ads in a random order to 85 participants on MTurk and asked them to rate their impressions of the ads. This sample size had over 90% statistical power to detect a medium effect size (*d* = 0.40). Because the comparison is within participants, the sample gives higher power than between-participant comparisons.

We asked, "Does the ad appeal to a sense of wanting to enjoy life, have fun, have free time, and take it easy?" Participants rated the ads from 1 (*Does not appeal at all to indulgence*) to 4 (*Strongly appeals to indulgence*). We also asked, " Does the job posting appeal to a sense of prioritizing the long term over the short term; restraining immediate desires in exchange for security, safety, and stability?" We also asked if the ad would appeal to people who want indulgence from 1 (*not appeal at all to people wanting indulgence*) to 4 (*strongly appeal to people wanting indulgence*) or people who "prioritize long-term thinking" from 1 (*not appeal at all to people who prioritize long-term thinking*) to 4 (*strongly appeal to people who prioritize long-term thinking*).

Participants rated the startup ad as appealing more to indulgence (*M* = 2.81, *SD* = 0.88) than the stable job (*M* = 1.42, *SD* = 0.75), *t*(84) = 11.38, *p* < .001, *d* = 1.24. They also rated the startup job as appealing more to people who want indulgence (*M* = 2.99, *SD* = 0.81) than the stable job ad (*M* = 1.59, *SD* = 0.83), *t*(84) = 11.93, *p* < .001, *d* = 1.29.

Participants rated the stable job posting (*M* = 3.26, *SD* = 0.92) as appealing more to long-term orientation than the startup job posting (*M* = 1.75, *SD* = 0.86), *t*(84) = 10.78, *p* < .001, *d* = 1.17. They also rated the stable job posting (*M* = 3.22, *SD* = 0.85) as more appealing to people who prioritize the long-term than the startup job posting (*M* = 1.82, *SD* = 0.89); *t*(84) = 10.20, *p* < .001, *d* = 1.11.

In sum, people perceived the two ads in the ways that we intended. However, one limitation is that we ran the manipulation check on MTurk in English. Results could be different with participants in Iran. However, we think participants from Iran would give similar ratings because (1) the ads use words that are directly tied to the concepts, lending face validity and (2) the rating differences were large. All the rating differences were larger than a full standard deviation. Thus, it strikes us as unlikely that such a large difference would fail to be significant in Iran.

**2. Measuring Freshwater Resources**

The United Nations Food and Agriculture Organization describes the measurement of renewable freshwater resources as:

Renewable water resources (internal and external) include average annual flow of rivers and recharge of aquifers generated from endogenous precipitation, and those water resources that are not generated in the country, such as inflows from upstream countries (groundwater and surface water), and part of the water of border lakes and/or rivers. Non-renewable water includes groundwater bodies (deep aquifers) that have a negligible rate of recharge on the human time-scale.

In other words, this measure takes into account whether the water resource is renewable or not. It is possible for people in some areas to overuse their supply of underground water in an unsustainable way. This measure accounts for whether the water supply is renewable and therefore more accurately represents long-run historical availability of water. However, one limitation of using this measure to represent long-run historical water availability is that this measure does not attempt to model long-run changes in historical climate, such as "the Great Warming" (Fagan, 2008).

**3. Historical Warfare Data**

To measure historical warfare, we used the [International Crisis Behavior](https://sites.duke.edu/icbdata/data-collections/) 1918-2013 dataset. This dataset categorizes conflicts into different levels of severity under the variable name “gravty.” We were interested in serious conflicts. Thus, we included conflicts categorized as 3 (territorial threats), 5 (threats of grave damage, such as mass bombings), or 6 (threat to existence). We did not include threats to influence (4), economic threats (0), limited military damage (1), political threats (2), or other (7). The [codebook](https://sites.duke.edu/icbdata/data-collections/) for the project contains descriptions and examples of these categories. To count the conflicts, we simply tallied up the number of conflicts for each country.

**4. Economic Development Data**

In the international data, the measures of long-term orientation and indulgence come from World Values Survey administered from 1995 to 2008 (Hofstede et al., 2005). For countries surveyed in multiple years, Hofstede and colleagues took the average. For countries that had data from just one year, they used that year alone. For that reason, there is not an obvious answer for which year of economic development data we should control for.

The main analyses use data from the year 2000, during the time period of the surveys. However, there is some evidence that historical GDP predicts cultural differences better than current GDP (Gelfand et al., 2011; Talhelm et al., 2014). Thus, we also tested historical GDP per capita data from 1950 (results: Table S5, data source: Table S4). In that data, we used data from Russia for countries that were a part of the Soviet sphere at the time, such as Lithuania. Because Iceland was missing data in 1950, we imputed data from Denmark, which had recently ruled Iceland.

Controlling for historical GDP, freshwater remained significant (Table S5). Was historical GDP a stronger predictor than modern GDP? Both were nonsignificant for long-term orientation, although historical GDP was slightly stronger. Both were significant for indulgence, and historical GDP had a larger *t* value (modern: 2.63, historical: 3.82).

One weakness of the year 2000 data was that it was missing three countries that had long-term orientation data. To test whether this missing data was influencing the results, we re-ran the main analyses with year 2011 GNI per capita data. The data from 2011 had the downside of being shortly after the surveys were completed, but it had the benefit of covering more countries. Freshwater remained significant (Table S5). In sum, freshwater was robust to different methods of accounting for economic resources.

**5. Calculating HLM Effect Sizes**

The LMER program in R does not provide standardized effect sizes. To give readers an idea of effect sizes, we used the *t* value and degrees of freedom to convert to Cohen's *d.* We also used residual variance in models with and without the key predictor in HLMs to estimate changes in R squared. We then converted these to correlation effect sizes. The original code for this is in our R code on the Open Science Framework.

**6. Historical GDP per Capita**

Table S5 tests historical GDP per capita. This is important for testing (and controlling for the idea that GDP causes long-term orientation and indulgence. If so, it is likely that there is a time lag between wealth and cultural change. Historical GDP data comes from [Maddison's project](https://www.rug.nl/ggdc/historicaldevelopment/maddison/?lang=en) to estimate historical GDP.

**7. Study 3 Attention Check**

In Study 3, we excluded 2 participants who failed the attention check. However, we unintentionally created ambiguity in the pre-registration by declaring that we would exclude participants based on the attention check but then listing a separate comprehension check question. The final experiment included an attention check question (where the correct answer is to select “somewhat agree”) and a comprehension question (asking participants about the article they read).

Because the pre-registration stated we would use the attention check, we used the attention check in the main text. However, to be transparent, we also report the results using the comprehension check instead of the attention check. Table S6 reports the *t-*test comparisons between all conditions with the attention check versus comprehension check. Table S7 reports the main effect of the priming conditions in one-way ANOVAs for both the attention check and the comprehension check.

Overall, results were similar with either exclusion criterion. Differences between priming conditions were slightly smaller using the comprehension check exclusion, perhaps because the comprehension check excluded more people (*N* = 20) than the attention check (*N* = 2). For long-term orientation, the one-way ANOVA went from significant with the attention check (*p* = .015) to marginally significant with the comprehension check (*p* = .053). However, the *t*-test comparing the water scarcity versus the abundance conditions remained significant with the attention check (*p* = .006) and the comprehension check (*p* = .022). In sum, results were largely similar with either type of check question.

**8. Life Expectancy**

We analyzed data on nations’ years of life expectancy at birth compiled by the World Bank (more data source details are in Table S4). Table 5 presents the results. Water remained significant after controlling for life expectancy.

For life expectancy itself, the zero-order correlation was significant for long-term orientation *r*(85) = .43, *p* < .001 but not indulgence *r*(80) = .03, *p* = .796. In the full models, life expectancy was significant for indulgence but not for long-term orientation. The variable pattern is probably because life expectancy is correlated with other elements of instability already in the model, such as natural disasters (*r* = -.35) and corruption (*r* = -.68).

Are water resources merely picking up on differences in life expectancy? The data suggests no. Water resources are uncorrelated with life expectancy *r*(86) = .02, *p* = .832. In addition, the fact that water remained significant after controlling for life expectancy in Table 5 suggests that water is separate from life expectancy. In sum, water seems to be important for long-term orientation beyond differences in life expectancy.

**9. Scale Reliabilities**

An anonymous reviewer brought up the question of scale reliabilities. This is a tricky question for most of the measures we used in this study because these measures are group-level constructs, and group-level constructs do not always have the same structure at the individual level (Hofstede 2003; Na et al., 2010). A common mistake is to think that the same metrics that apply to individual participants should apply the same way to groups.

There are examples of concepts that cohere at the group level but not the individual level. One example is holistic thought. Researchers gave participants in the US 10 tasks that measure interdependence across cultures and 10 tasks that measure holistic versus analytic thought across cultures (Na et al., 2010). The 10 interdependence measures correlated with each other *r* = .008 on average. The 10 thought style tasks correlated with each other *r* = .038 on average.

Despite these low correlations at the individual level, the measures cohere at the cultural level. This is counter-intuitive. Na and colleagues (2010) explain in more detail how measures can be uncorrelated at the individual level and yet still cohere at the group level. They show graphs that break out individual-level and group-level correlations to illustrate how there can be different patterns at the two levels.

A few specific examples can make it clearer to see the flaw in logic of assuming that variables should correlate similarly at the group level and individual level. One example is obesity. For individuals, studies have found that obesity is correlated with lower lifespans (Peeters et al., 2003). Yet nations with higher obesity rates have longer lifespans, *r* = .54, *p* < .001 (Table 2, You et al., 2022).

Another example is a study of professional qualifications and supervisory duties (Lincoln & Zeitz, 1980). The researchers gathered data on 548 employees at 20 social welfare agencies in the US. At the individual level, qualifications and supervisory duties were positively correlated. This makes sense because people with more qualifications (such as degrees and training certifications) are more likely to be supervisors.

But at the level of agencies, the correlation was negative. Agencies that had employees with more qualifications had fewer supervisors. This makes sense because employees who have more qualifications are presumably more experienced and better trained. Thus, they need less supervision.

The appropriate way to test reliability in group-level constructs is to test it at the group level. The challenge is that, to do that, we need many groups. This is possible in large-scale international surveys that have enough groups to calculate reliability at the group level (Hofstede, 2003; House et al., 2004). In the main text, we report reliabilities from prior studies that had large enough samples to calculate group-level reliabilities for long-term orientation (alpha = .74), indulgence (alpha = .79), and future orientation (alpha = .80).

Unfortunately, in our studies, we are comparing only a limited number of groups. We compare two groups in Study 1 (Yazd versus Shiraz) and three groups in Study 3 (water scarcity, water abundance, and control conditions). That leaves us with too few groups to calculate group-level reliability.

Although we believe it is incorrect to expect group-level constructs to always cohere at the level of individuals, we report the individual-level alphas here. We do this for any researchers who might be interested in treating these as individual-difference variables. Note that we do not treat these as individual-level constructs in this paper. Instead, we compare groups (Yazd and Shiraz in Study 1; experimental priming groups in Study 3; and countries in Study 4). Thus, it is important to avoid concluding that these scales are invalid for group comparison if they have low reliability at the individual level.

At the individual level, Cronbach’s alpha was -.67 for long-term orientation in Study 1 and .04 in Study 3. The alpha for indulgence was .24 in Study 1 and -.06 in Study 3. For the future orientation scale, the individual-level reliability was .49 in Study 3.

One exception is the frugality scale. Researchers created this scale as an individual-level construct and validated it at the individual level (Lastovicka et al., 1999). Thus, it is appropriate to expect that it should show high reliability at the individual level. Thus, we reported the individual-level alpha for frugality in the main text.

**10. Zoroastrian Religious History**

One early reader asked whether the Zoroastrian religion might differ between the two cities. If so, the difference must be historical, because Zoroastrians are rare in Iran. The CIA World Factbook reports that Iran is 99.4% Muslim and does not even list a percentage of Zoroastrians (CIA, 2021). We could not find historical estimates of regional differences in Zoroastrians in Iran, so we used the number of temples per capita as a proxy. Shiraz and Yazd were similar, with 2.3 temples per million in Shiraz and 2.6 in Yazd. This suggests the historical influence of Zoroastrianism was similar in both places.

**Table S1**

*Job Applicants from the Two Cities Did Not Differ Significantly on Demographics*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Yazd | Shiraz | *t* test/χ2 | *p* |
| Years of Work Experience | 1.63 | 1.58 | 0.27 | .788 |
| SD | 1.34 | 1.30 |  |  |
| Age | 25.02 | 25.22 | -0.31 | .759 |
| SD | 4.36 | 4.15 |  |  |
| Education | 1.22 | 1.16 | 0.57 | .573 |
| SD | 0.73 | 0.70 |  |  |
| % Married | 22.2% | 18.5% | 0.50 | .479 |
| % Female | 49.2% | 47.1% | 0.08 | .783 |

Note: Education is coded from 0 (*high school* *diploma*) to 3 (*PhD*).

**Table S2**

*Fresh Water Availability is Robust to Historical War (Left), Disease (Second), Excluding East Asia (Third), and Alternative Datasets (Right)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Historical War | | | | Communicable Disease | | | | Excluding East Asia | | | | Robustness: Original Hofstede Study | | | |
| DV |  | *B* | SE | *t* | *p* | *B* | SE | *t* | *p* | *B* | SE | *t* | *p* | *B* | SE | *t* | *p* |
| Long-term orientation | Average Temperature | -1.80 | 0.55 | -3.28 | .002 | -1.85 | 0.57 | -3.26 | .002 | -1.73 | 0.58 | -2.97 | .004 | -1.90 | 0.69 | -2.74 | .009 |
| Real Population Density | 3.23 | 7.18 | 0.45 | .654 | 4.16 | 7.07 | 0.59 | .559 | 3.25 | 7.06 | 0.46 | .647 | 2.49 | 7.54 | 0.33 | .743 |
| Natural Disaster Vulnerability | -0.47 | 0.53 | -0.89 | .380 | -0.42 | 0.52 | -0.79 | .430 | -0.68 | 0.56 | -1.20 | .233 | -0.74 | 0.57 | -1.28 | .208 |
| Corruption | -0.10 | 0.14 | -0.70 | .490 | -0.09 | 0.14 | -0.63 | .534 | -0.12 | 0.14 | -0.86 | .394 | -0.06 | 0.19 | -0.31 | .756 |
| % Agricultural Land | 0.33 | 8.83 | 0.04 | .971 | -2.18 | 8.72 | -0.25 | .804 | 2.21 | 8.95 | 0.25 | .806 | -20.46 | 13.29 | -1.54 | .131 |
| GNI per Capita | -2.66 | 3.38 | -0.79 | .434 | -1.04 | 3.50 | -0.30 | .767 | -3.83 | 3.47 | -1.10 | .275 | -6.63 | 5.14 | -1.29 | .204 |
| Distance from Equator | -0.01 | 0.002 | -2.28 | .026 | -0.01 | 0.002 | -2.28 | .026 | -0.005 | 0.002 | -2.16 | .035 | 0.00 | 0.003 | -1.17 | .247 |
| Freshwater per Capita | -2.92 | 1.22 | -2.40 | .020 | -3.52 | 1.25 | -2.82 | .007 | -2.81 | 1.20 | -2.35 | .022 | -5.16 | 1.69 | -3.05 | .004 |
| Historical War | 0.22 | 0.39 | 0.57 | .570 |  |  |  |  |  |  |  |  |  |  |  |  |
| Communicable Disease |  |  |  |  | 26.87 | 16.77 | 1.60 | .114 |  |  |  |  |  |  |  |  |
|  | *R2* marginal (conditional) | 0.10 (0.69) | | | | 0.11 (0.74) | | | | 0.12 (0.61) | | | | 0.24 (0.70) | | | |
| Indulgence | Average Temperature | -0.19 | 0.64 | -0.30 | .767 | 0.20 | 0.66 | 0.31 | .756 | 0.31 | 0.70 | 0.45 | .656 | -0.30 | 0.68 | -0.43 | .667 |
| Real Population Density | -11.77 | 7.97 | -1.48 | .145 | -10.34 | 7.84 | -1.32 | .193 | -11.63 | 8.14 | -1.43 | .159 | -12.31 | 7.24 | -1.70 | .097 |
| Natural Disaster Vulnerability | 0.29 | 0.63 | 0.46 | .649 | 0.61 | 0.63 | 0.97 | .338 | 0.63 | 0.68 | 0.94 | .353 | 0.79 | 0.57 | 1.39 | .173 |
| Corruption | -0.23 | 0.17 | -1.42 | .162 | -0.32 | 0.16 | -1.99 | .051 | -0.34 | 0.17 | -2.07 | .043 | 0.07 | 0.18 | 0.38 | .703 |
| % Agricultural Land | 25.83 | 10.40 | 2.48 | .016 | 21.70 | 10.42 | 2.08 | .042 | 21.48 | 10.84 | 1.98 | .052 | 37.28 | 13.05 | 2.86 | .007 |
| GNI per Capita | 9.26 | 3.72 | 2.49 | .016 | 12.99 | 4.04 | 3.22 | .002 | 10.99 | 3.95 | 2.78 | .007 | 22.37 | 4.90 | 4.56 | < .001 |
| Distance from Equator | -0.01 | 0.003 | -1.60 | .115 | 0.00 | 0.003 | -1.52 | .134 | -0.004 | 0.003 | -1.45 | .152 | 0.00 | 0.003 | -1.17 | .248 |
| Freshwater per Capita | 4.71 | 1.41 | 3.35 | .001 | 4.68 | 1.42 | 3.29 | .002 | 5.10 | 1.43 | 3.58 | < .001 | 4.73 | 1.67 | 2.83 | .007 |
| Historical War | -1.05 | 0.48 | -2.18 | .034 |  |  |  |  |  |  |  |  |  |  |  |  |
| Communicable Disease |  |  |  |  | 31.39 | 18.82 | 1.67 | .101 |  |  |  |  |  |  |  |  |
|  | *R2* marginal (conditional) | 0.39 (0.57) | | | | 0.42 (0.58) | | | | 0.41 (0.60) | | | | 0.46 (0.66) | | | |

Note: The left analysis controls for historical warfare, which comes from the International Crisis Behavior Project. The project codes conflict into different categories of severity. This analysis includes territorial threats, threats of grave damage (such as large casualties or mass bombing), and threats to existence. Communicable disease comes from the World Health Organization's 2000 report estimating disability-adjusted life years lost to communicable disease. The third analysis tests whether the results are robust to excluding East Asia, which scores high on long-term orientation (Figlio et al., 2019). The right-side analyses test whether the findings are robust to excluding the countries added to the Hofstede dataset after the original study. This shrinks the sample size for long-term orientation from 85 to 63 countries and the sample size for indulgence from 80 to 62. GNI and water are logged. Analyses are hierarchical linear models with countries nested in world regions (Schmitt, 2004). *R2* estimates come from the MuMIn package in R. Marginal effect *R2* is for fixed effects alone; *R2* conditional adds in random effects (in this case, continents).

**Table S3**

*Precipitation and Water per Land Area Are Weaker Predictors than Water per Capita*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DV |  | *B* | SE | *t* | *p* | *B* | SE | *t* | *p* |
| Long-term orientation | Average Temperature | -1.60 | 0.53 | -3.01 | .004 | -1.39 | 0.56 | -2.49 | .016 |
| Real Population Density | -4.08 | 7.53 | -0.54 | .590 | -0.24 | 7.57 | -0.03 | .975 |
| Natural Disaster Vulnerability | -0.32 | 0.56 | -0.56 | .575 | -0.45 | 0.57 | -0.79 | .434 |
| Corruption | -0.08 | 0.14 | -0.53 | .598 | -0.10 | 0.15 | -0.65 | .518 |
| % Agricultural Land | 1.77 | 8.81 | 0.20 | .841 | 5.06 | 9.06 | 0.56 | .579 |
| GNI per Capita | -1.44 | 3.35 | -0.43 | .669 | -1.77 | 3.45 | -0.51 | .609 |
| Distance from Equator | -0.01 | 0.002 | -2.09 | .040 | -0.005 | 0.003 | -1.99 | .051 |
| Water per Land Area | -0.09 | 0.05 | -1.87 | .066 |  |  |  |  |
| Precipitation |  |  |  |  | -0.003 | 0.004 | -0.70 | .489 |
|  | *R2* marginal (conditional) | 0.07 (0.71) | | | | 0.05 (0.69) | | | |
| Indulgence | Average Temperature | -0.57 | 0.68 | -0.84 | .404 | -0.36 | 0.68 | -0.52 | .604 |
| Real Population Density | -2.63 | 8.98 | -0.29 | .771 | -2.44 | 8.76 | -0.28 | .781 |
| Natural Disaster Vulnerability | 0.38 | 0.72 | 0.53 | .599 | 0.42 | 0.71 | 0.60 | .551 |
| Corruption | -0.33 | 0.18 | -1.88 | .066 | -0.34 | 0.18 | -1.87 | .066 |
| % Agricultural Land | 20.78 | 11.21 | 1.85 | .069 | 15.84 | 11.23 | 1.41 | .164 |
| GNI per Capita | 7.93 | 4.08 | 1.95 | .056 | 8.35 | 4.05 | 2.06 | .044 |
| Distance from Equator | -0.01 | 0.003 | -1.98 | .052 | -0.005 | 0.003 | -1.58 | .120 |
| Water per Land Area | 0.09 | 0.06 | 1.38 | .172 |  |  |  |  |
| Precipitation |  |  |  |  | 0.007 | 0.005 | 1.47 | .147 |
|  | *R2* marginal (conditional) | 0.24 (0.53) | | | | 0.27 (0.53) | | | |

Note: Unlike the main analyses, the left-side analyses here test fresh water *per land area*, without taking into account population. The right-hand side analyses test precipitation, without considering freshwater resources not directly linked to precipitation. Although these two indicators predict in the same direction as the main analysis (Table 4), they are weaker. This result suggests that freshwater per capita is the measure of water availability that best explains cultural differences. GNI is logged. Analyses are hierarchical linear models with countries nested in world regions (Schmitt, 2004). *R2* estimates come from the MuMIn package in R. Marginal effect *R2* is for fixed effects alone; *R2* conditional adds in random effects (in this case, continents).

**Table S4**

*Measures, Sources, and Theoretical Rationale for All National Variables*

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Measure | Source | Rationale |
| Long-Term Orientation | Three survey items | World Values Survey 95-08 | Psychological outcome validated in prior research (Hofstede et al., 2005) |
| Indulgence | Three survey items | World Values Survey 95-08 | Psychological outcome validated in prior research (Hofstede et al., 2005) |
| Freshwater per Capita | Renewable freshwater m3 /population 1962 (log) | [United Nations Food and Agriculture Organization](https://data.worldbank.org/indicator/ER.H2O.INTR.PC?end=2017&start=1962&view=chart&year=2013) | Lack of water could foster long-term orientation to conserve resources, avoid waste. |
| Temperature | Average temperature 1961-1990 | Climatic Research Unit, 2011 | Researchers have argued that temperature affects culture (Kashima & Kashima, 2003). Water availability may also be correlated with temperature. |
| Distance from Equator | Km from center of country to equator | [Distance Calculator](https://www.distance.to/) | Studies have found distance from the equator is predicts cultural dimensions separate from temperature (Van de Vliert & Van Lange, 2019). |
| Real Pop. Density | Hectares arable land/person | [UNFAO](https://data.worldbank.org/indicator/AG.LND.ARBL.HA.PC?locations=AL) | Dense societies tend to follow "slow" life history strategies (Sng et al., 2017). |
| Natural Disaster Vulnerability | World Risk Index of 28 risks, e.g., earthquakes, volcanoes, storms, floods | United Nations University Institute for Environment and Human Security | Like warfare, frequent natural disasters could lead people to pursue a "fast" (short-term) life history strategy. On the other hand, people could attempt to prepare for that vulnerability by focusing on the long term. |
| Corruption | Surveys of experts and businesspeople | [Transparency International](https://www.transparency.org/en/cpi/2020) | Corruption could plausibly lead people to focus on the short term because corruption makes it more difficult to save for future. |
| % Agricultural Land | Ag. land/land area, 2015 | [UNFAO](https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?view=map) | Farming predicts long-term orientation (Galor & Özak, 2016). This measure covers all agriculture (e.g., livestock); yield (below) gauges farming suitability. |
| Env. Potential Agricultural Yield | 10 mill. calories per hectare per yield | UNFAO, [Galor & Özak](https://www.aeaweb.org/articles?id=10.1257/aer.20150020) | Galor and Özak (2016) found that agricultural societies (measured by potential caloric return to growing crops) have more long-term orientation. |
| GNI per Capita | GNI per capita 2000 (PPP current international $) | [The World Bank](https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD?locations=AL&year=2011) | Wealth could give people the basic security to be able to focus on the long term. Long-term orientation could also make countries wealthier. |
| Language with Strong Future Time Reference | Binary coding of language | [Eur. Sci. Foundation Typology of Languages](https://www.anderson.ucla.edu/faculty_pages/keith.chen/datafilm.htm) | Chen (2013) found that societies with languages that make less distinction between present and future save more money and make healthier choices. |
| Water per Land Area | Freshwater m3/Land km2 | [UNFAO](https://data.worldbank.org/indicator/ER.H2O.INTR.K3)/AQUASTAT | Table S3 tests whether freshwater per area or per capita is a better predictor. |
| Precipitation | Average precipitation per year 1962-2014 (mm) | [The World Bank](https://data.worldbank.org/indicator/AG.LND.PRCP.MM) | Table S3 tests whether precipitation is a better predictor than freshwater, which includes sources like rivers and underground aquifers. |
| % Muslim | Muslim population/total population | *The Future of the Global Muslim Population*, [Pew](https://features.pewforum.org/muslim-population/) | Many majority Muslim countries are dry, so Islam could be confounded with water. Islam's prohibitions on alcohol, music, and sex might lower indulgence. |
| Historical War | Number of conflicts coded as 3, 5, or 6 | [*International Crisis Behavior*](https://sites.duke.edu/icbdata/data-collections/) *1918-2013* | Fischer (1991) argued that warfare causes short-term orientation. People pursue short-term strategies in places with high death rates (Sng et al., 2017). |
| Communicable Disease | Disability-adj. life years lost to comm. disease | World Health Organization, 2000 ([file archive](https://osf.io/n3aj7/?view_only=255831f675f7494fa561ccb75db5cbe3)) | Life history strategy research argues that populations with high rates of disease should show less long-term orientation (Sng et al., 2017, p. 45). |
| Climatic Variability | Temp. variation 500-1900 | Giuliano & Nunn, 2020 | Climatic variability may be more important than the average. |
| Life Expectancy | Years life expect. at birth | World Bank, 2020 | Long-lived societies may be more long-term oriented (Low et al., 2008). |

**Table S5**

*Fresh Water Availability is Robust Controlling for Historical and Modern GNI per Capita*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Long-Term Orientation | | | | Indulgence | | | |
|  |  | *B* | SE | *t* | *p* | *B* | SE | *t* | *p* | |
| GDP 1950 | Average Temperature | -1.78 | 0.53 | -3.37 | .001 | 0.06 | 0.61 | 0.11 | .916 | |
| Real Population Density | 4.25 | 6.97 | 0.61 | .544 | -14.31 | 7.66 | -1.87 | .067 | |
| Natural Disaster Vulnerability | -0.58 | 0.49 | -1.18 | .241 | 0.42 | 0.58 | 0.72 | .477 | |
| Corruption | -0.08 | 0.11 | -0.66 | .512 | -0.24 | 0.14 | -1.74 | .087 | |
| % Agricultural Land | 0.59 | 8.01 | 0.07 | .941 | 18.80 | 9.57 | 1.96 | .054 | |
| GDP per Capita 1950 | -5.81 | 3.50 | -1.66 | .102 | 15.34 | 4.02 | 3.82 | < .001 | |
| Distance from Equator | -0.005 | 0.002 | -2.09 | .041 | -0.005 | 0.003 | -1.85 | .070 | |
| Freshwater per Capita | -2.70 | 1.14 | -2.37 | .021 | 4.11 | 1.35 | 3.06 | .003 | |
|  | *R2* marginal (conditional) | 0.13 (0.68) | | | | 0.47 (0.57) | | | |
| GNI 2011  GNI2011 | Average Temperature | -1.86 | 0.53 | -3.51 | < .001 | 0.18 | 0.66 | 0.28 | .781 | |
| Real Population Density | 3.44 | 6.98 | 0.49 | .624 | -12.82 | 8.30 | -1.54 | .128 | |
| Natural Disaster Vulnerability | -0.47 | 0.52 | -0.90 | .370 | 0.22 | 0.64 | 0.35 | .728 | |
| Corruption | -0.04 | 0.12 | -0.31 | .761 | -0.37 | 0.15 | -2.39 | .020 | |
| % Agricultural Land | 0.66 | 8.12 | 0.08 | .935 | 22.57 | 10.27 | 2.20 | .032 | |
| GNI per Capita | -1.94 | 3.54 | -0.55 | .586 | 8.11 | 4.29 | 1.89 | .064 | |
| Distance from Equator | -0.005 | 0.002 | -2.26 | .027 | -0.004 | 0.003 | -1.41 | .164 | |
| Freshwater per Capita | -3.04 | 1.15 | -2.63 | .011 | 4.75 | 1.43 | 3.32 | .002 | |
| *R2* marginal (conditional) | 0.11 (0.70) | | | | 0.31 (0.56) | | | |
| Climate Variability | Average Temperature | -1.75 | 0.53 | -3.28 | .002 | -0.01 | 0.66 | -0.02 | .986 | |
| Real Population Density | -0.16 | 7.26 | -0.02 | .982 | -12.12 | 8.62 | -1.41 | .164 | |
| Natural Disaster Vulnerability | -0.63 | 0.52 | -1.21 | .230 | 0.43 | 0.65 | 1.67 | .506 | |
| Corruption | -0.08 | 0.14 | -0.56 | .575 | -0.30 | 0.17 | -1.80 | .077 | |
| % Agricultural Land | -1.33 | 8.61 | -0.15 | .877 | 26.56 | 10.77 | 2.47 | .016 | |
| GNI per Capita | -4.29 | 3.37 | -1.27 | .207 | 9.93 | 3.98 | 2.49 | .015 | |
| Distance from Equator | -0.006 | 0.002 | -2.44 | .017 | -0.005 | 0.003 | -1.63 | .108 | |
| Climate Variability | 44.93 | 23.81 | 1.89 | .635 | 3.30 | 31.08 | 0.11 | .916 | |
| Freshwater per Capita | -3.24 | 1.18 | -2.75 | .008 | 5.04 | 1.45 | 3.46 | < .001 | |
| *R2* marginal (conditional) | 0.14 (0.72) | | | | 0.36 (0.57) | | | |

Note: GNI and GDP are logged. Analyses are hierarchical linear models with countries nested in world regions (Schmitt, 2004). Table S4 lists variables sources and theoretical rationales. *R2* estimates come from the MuMIn package in R. Marginal effect *R2* is for fixed effects alone; *R2* conditional adds in random effects (in this case, continents).

**Table S6**

*Results of Priming Study Are Similar Excluding Participants Based on the Attention (Left) vs. Comprehension (Right) Check Questions*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Excluding Based on Attention Check | | | |  | Excluding Based on Comprehension Check | | | |
| Water Scarcity vs. Water Abundance | | | |  | Water Scarcity vs. Water Abundance | | | |
|  | *t* | *p* | *d* |  |  | *t* | *p* | *d* |
| Indulgence | -2.01 | .047 | -0.34 |  | Indulgence | -1.34 | .183 | -0.25 |
| Long-term orientation | 2.82 | .006 | 0.48 |  | Long-term orientation | 2.33 | .022 | 0.43 |
| Frugality | 1.73 | .087 | 0.29 |  | Frugality | 1.33 | .186 | 0.25 |
| Future orientation | 4.20 | < .001 | 0.76 |  | Future orientation | 3.71 | < .001 | 0.68 |
| Water Scarcity vs. Control Condition | | | |  | Water Scarcity vs. Control Condition | | | |
| Indulgence | -1.05 | .294 | -0.18 |  | Indulgence | -0.44 | .660 | -0.08 |
| Long-term orientation | 1.35 | .178 | 0.23 |  | Long-term orientation | 1.47 | .144 | 0.27 |
| Frugality | 1.99 | .049 | 0.34 |  | Frugality | 1.85 | .067 | 0.33 |
| Future orientation | 0.74 | .463 | 0.13 |  | Future orientation | 0.38 | .705 | 0.07 |
| Water Abundance vs. Control Condition | | | |  | Water Abundance vs. Control Condition | | | |
| Indulgence | 0.82 | .416 | 0.14 |  | Indulgence | 0.90 | .369 | 0.15 |
| Long-term orientation | -1.63 | .105 | -0.27 |  | Long-term orientation | -1.16 | .247 | -0.20 |
| Frugality | 0.38 | .708 | 0.06 |  | Frugality | 0.58 | .560 | 0.10 |
| Future orientation | -3.30 | .001 | -0.55 |  | Future orientation | -3.33 | .001 | -0.57 |

*Note:* We erroneously pre-registered that we would exclude participants based on an attention check question but then listed a comprehension question. To be transparent, we present analyses both ways.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S7**  *Results of Priming Study Are Similar Excluding Participants Based on the Attention (Left) vs. Comprehension (Right) Check Questions*   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Excluding Based on Attention Check | | | |  | Excluding Based on Comprehension Check | | | | |  | *F* | *p* | *f* |  |  | *F* | *p* | *f* | | Indulgence | 1.84 | .161 | 0.02 |  | Indulgence | 0.85 | .429 | 0.01 | | Long-term orientation | 4.28 | .015 | 0.04 |  | Long-term orientation | 2.98 | .053 | 0.03 | | Frugality | 2.30 | .103 | 0.02 |  | Frugality | 1.78 | .172 | 0.02 | | Future orientation | 9.55 | < .001 | 0.09 |  | Future orientation | 7.98 | < .001 | 0.08 | | *Note:* We erroneously pre-registered that we would exclude participants based on an attention check question but then listed a comprehension question. To be transparent, we present analyses both ways. Sample sizes: excluding based on attention check *N* = 209, excluding based on comprehension question *N* = 191. These analyses are one-way ANOVA testing the main effect of priming condition (water scarcity, control condition, or water abundance). | | | | | | | | | |

**Table S8**

*Analyses Suggest Long-Term Orientation Is Separate from the Need for Certainty*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Uncertainty Avoidance**  Hofstede | | | | **Uncertainty Avoidance**  GLOBE Practices | | | | | **Uncertainty Avoidance**  GLOBE Ideals | | | | |
|  | *B* | *SE* | *t* | *p* | *B* | *SE* | *t* | *p* | *B* | | *SE* | *t* | *p* | | |
| Muslim | 8.80 | 8.51 | 1.04 | .305 | 0.13 | 0.260 | 0.48 | .632 | -0.03 | | 0.182 | -0.16 | .877 | | |
| Crop Yield | 1.53 | 0.88 | 1.74 | .864 | -0.03 | 0.031 | 0.98 | .335 | -0.04 | | 0.020 | -2.01 | .053 | | |
| Average Temperature | -0.73 | 0.68 | -1.08 | .285 | -0.01 | 0.022 | -0.28 | .784 | 0.03 | | 0.014 | 1.87 | .070 | | |
| Distance from Equator | 0.00 | 0.003 | 0.16 | .872 | -0.0001 | 0.0001 | -1.00 | .322 | 0.0004 | | 0.0001 | 0.55 | .589 | | |
| Real Population Density | 6.77 | 8.56 | 0.79 | .432 | -0.32 | 0.211 | -1.52 | .137 | -0.20 | | 0.137 | -1.50 | .145 | | |
| Natural Disaster Vulnerability | 0.13 | 0.66 | 0.20 | .842 | -0.02 | 0.018 | -0.82 | .418 | -0.01 | | 0.012 | -0.97 | .342 | | |
| Corruption | 0.57 | 0.17 | 3.29 | .002 | -0.03 | 0.005 | -6.27 | < .001 | 0.03 | | 0.004 | 6.93 | < .001 | | |
| % Agricultural Land | 4.03 | 11.90 | -0.34 | .736 | 0.25 | 0.349 | 0.73 | .471 | 0.28 | | 0.237 | 1.18 | .246 | | |
| GNI per Capita | 5.88 | 3.96 | 1.48 | .143 | -0.27 | 0.122 | -2.22 | .034 | 0.04 | | 0.094 | 0.44 | .665 | | |
| Water Resources | -2.49 | 1.48 | -1.68 | .096 | 0.02 | 0.043 | 0.47 | .643 | 0.02 | | 0.029 | 0.68 | .501 | | |
| *R2* marginal (conditional) | 0.21 (0.40) | | | | 0.57 (0.57) | | | | 0.76 (0.88) | | | | |

Note: This table helps test whether long-term orientation is separate from the need for certainty. For example, could the lack of water merely make people want more certainty over their future? We tested this by running models with water resources predicting three different measures of uncertainty avoidance across cultures. The results (highlighted in orange) show that water resources do not significantly predict uncertainty avoidance. The left-side model uses Hofstede’s measure of uncertainty avoidance. This suggests that the relationship between water and long-term orientation is different from the need for certainty. The left-side model uses Hofstede’s measure of uncertainty avoidance. The middle model uses the GLOBE study’s measure of uncertainty avoidance where participants rate their society’s current practices. The right-side model uses the GLOBE’s measures where participants rate what their ideal is for their society, how it “should be.” Models are hierarchical linear models with cultures nested in continents. (Schmitt, 2004). *R2* estimates come from the MuMIn package in R. Marginal effect *R2* is for fixed effects alone; *R2* conditional adds in random effects (in this case, continents).

**Table S9**

*Water Resources Continue to Predict Long-Term Orientation After Controlling for Three Measures of Uncertainty Avoidance*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Uncertainty Avoidance**  Hofstede | | | | **Uncertainty Avoidance**  GLOBE Practices | | | | **Uncertainty Avoidance**  GLOBE Ideals | | | |
|  | *B* | *SE* | *t* | *p* | *B* | *SE* | *t* | *p* | *B* | *SE* | *t* | *p* |
| Muslim | 4.94 | 6.59 | 0.75 | .456 | 1.34 | 9.73 | 0.14 | .891 | -4.80 | 9.88 | -0.49 | .631 |
| Crop Yield | 2.27 | 0.70 | 3.27 | .002 | 4.62 | 1.19 | 3.88 | .0005 | 3.62 | 1.18 | 3.07 | .004 |
| Average Temperature | -2.05 | 0.52 | -3.92 | .0002 | -2.99 | 0.78 | -3.85 | .0006 | -3.28 | 0.80 | -4.09 | < .001 |
| Distance from Equator | -0.00 | 0.002 | -2.10 | .040 | -0.01 | 0.003 | -1.98 | .057 | -0.01 | 0.003 | -2.50 | .018 |
| Real Population Density | -0.17 | 6.81 | -0.02 | .981 | 0.30 | 7.86 | 0.04 | .970 | -0.26 | 7.69 | -0.03 | .973 |
| Natural Disaster Vulnerability | -0.42 | 0.50 | -0.84 | .400 | -0.24 | 0.62 | -0.38 | .707 | -0.54 | 0.64 | -0.84 | .406 |
| Corruption | -0.09 | 0.14 | -0.60 | .549 | 0.03 | 0.28 | 0.14 | .891 | -0.16 | 0.31 | -0.51 | .613 |
| % Agricultural Land | -12.41 | 9.05 | -1.37 | .175 | -34.53 | 13.85 | -2.49 | .018 | -25.09 | 13.22 | -1.90 | .067 |
| GNI per Capita | -0.61 | 3.23 | -0.19 | .851 | -2.80 | 5.43 | -0.52 | .609 | -3.23 | 5.15 | -0.63 | .535 |
| Uncertainty Avoidance (H) | 0.05 | 0.09 | 0.57 | .569 |  |  |  |  |  |  |  |  |
| Uncertainty Avoidance (P) |  |  |  |  | 6.66 | 5.97 | 1.12 | .274 |  |  |  |  |
| Uncertainty Avoidance (V) |  |  |  |  |  |  |  |  | 0.88 | 9.41 | 0.09 | .926 |
| Water Resources | -2.84 | 1.16 | -2.44 | .017 | -3.25 | 1.58 | -2.05 | .049 | -3.46 | 1.59 | -2.18 | .037 |
| *R2* marginal (conditional) | 0.23 (0.69) | | | | 0.42 (0.68) | | | | 0.40 (0.73) | | | |

Note: This table helps test whether water resources predict long-term orientation in a way that is distinct from the need for certainty. The results (highlighted in orange) show that water resources continue to predict long-term orientation across cultures even after taking into account different measures of uncertainty avoidance. The left-side model uses Hofstede’s measure of uncertainty avoidance. The middle model uses the GLOBE study’s measure of uncertainty avoidance where participants rate their society’s current practices. The right-side model uses the GLOBE’s measures where participants rate what their ideal is for their society, how it “should be.” Models are hierarchical linear models with cultures nested in continents. Models are hierarchical linear models with cultures nested in continents. (Schmitt, 2004). R2 estimates come from the MuMIn package in R. Marginal effect R2 is for fixed effects alone; R2 conditional adds in random effects (in this case, continents).

**Table S10**

*Checks for Multicollinearity Were All Well Below Suggested Limit*

|  |  |  |  |
| --- | --- | --- | --- |
| Variance Inflation Factors for Long-Term Orientation (Table 5, Model 1) | | | |
| Temperature | Pop. Density | Natural Disasters | Corruption |
| 2.97 | 1.19 | 1.36 | 2.25 |
| % Agric. Land | GNI per Capita | Distance from Equator | % Muslim |
| 1.61 | 2.46 | 2.75 | 1.20 |
| Crop Yield | Life Expectancy | Freshwater per Capita |  |
| 1.59 | 2.06 | 1.40 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Variance Inflation Factors for Indulgence (Table 5, Model 3) | | | |
| Temperature | Pop. Density | Natural Disasters | Corruption |
| 4.16 | 1.24 | 1.47 | 2.45 |
| % Agric. Land | GNI per Capita | Distance from Equator | % Muslim |
| 1.54 | 3.04 | 4.06 | 1.44 |
| Crop Yield | Life Expectancy | Freshwater per Capita |  |
| 1.59 | 2.68 | 1.41 |  |

Note: These variance inflation factors are for Table 5 for long-term orientation (top) and indulgence (bottom). These are below a recommended limit of 10 for multicollinearity (Vittinghoff et al., 2006). Variance inflation factors above 10 are considered problematic. The fact that the factors were all well below 10 suggests that multicollinearity is not a problem in these analyses.

**Table S11**

*Correlations Between Long-Term Orientation, Future Orientation, Indulgence, and Frugality Individual Scale Items (Study 3)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LTO 2 | LTO 3\* | LTO 4 | Indul 1 | Indul 2\* | Indul 3 | Indul 4\* | FO 1 | FO 2\* | FO 3 | FO 4 | Frug 1 | Frug 2 | Frug 3 | Frug 4 | Frug 5 | Frug 6 | Frug 7 | Frug 8 | Frug Total | LTO Total | Indul Total | FO Total |
| LTO 1# | -.142\* | .298\*\* | -.212\*\* | -.017 | .111 | .032 | .097 | .211\*\* | .009 | .158\* | -.035 | -.038 | -.107 | -.159\* | -.100 | -.161\* | -.121 | .031 | -.057 | -.127 | .608\*\* | .125 | -.136 |
| LTO 2 |  | -.072 | .353\*\* | .173\* | -.259\*\* | -.014 | -.039 | -.187\*\* | -.109 | -.221\*\* | -.213\*\* | .339\*\* | .368\*\* | .385\*\* | .340\*\* | .326\*\* | .380\*\* | .368\*\* | .349\*\* | .501\*\* | .568\*\* | -.091 | .291\*\* |
| LTO 3# | -.072 |  | -.171\* | -.039 | .049 | -.408\*\* | .068 | -.012 | -.047 | -.098 | -.053 | -.057 | -.061 | -.078 | -.132 | -.115 | -.078 | .046 | -.091 | -.100 | .474\*\* | -.175\* | .081 |
| LTO 4 | .353\*\* | -.171\* |  | .144\* | -.014 | .080 | -.140\* | -.185\*\* | .103 | -.181\*\* | -.190\*\* | .256\*\* | .265\*\* | .226\*\* | .328\*\* | .307\*\* | .357\*\* | .162\* | .248\*\* | .376\*\* | .324\*\* | .005 | .183\*\* |
| Indul 1 | .173\* | -.039 | .144\* |  | -.001 | .174\* | .058 | .144\* | .229\*\* | .059 | -.112 | .178\*\* | .140\* | .022 | .053 | .118 | .272\*\* | .038 | .082 | .154\* | .120 | .511\*\* | -.125 |
| Indul 2# | -.259\*\* | .049 | -.014 | -.001 |  | .019 | .045 | -.053 | .124 | -.032 | .032 | .061 | -.003 | -.196\*\* | .046 | -.062 | .095 | -.042 | .085 | -.008 | -.062 | .523\*\* | -.027 |
| Indul 3 | -.014 | -.408\*\* | .080 | .174\* | .019 |  | -.301\*\* | .166\* | .078 | .211\*\* | .204\*\* | -.008 | -.075 | .096 | .108 | .083 | .057 | -.060 | -.001 | .038 | -.116 | .442\*\* | -.262\*\* |
| Indul 4# | -.039 | .068 | -.140\* | .058 | .045 | -.301\*\* |  | -.064 | .081 | -.029 | -.120 | .131 | .124 | -.026 | .112 | .042 | .092 | .127 | .079 | .116 | .021 | .497\*\* | .055 |
| FO 1 | -.187\*\* | -.012 | -.185\*\* | .144\* | -.053 | .166\* | -.064 |  | .022 | .462\*\* | .383\*\* | -.113 | -.111 | -.139\* | -.220\*\* | -.201\*\* | -.076 | -.093 | -.156\* | -.196\*\* | -.035 | .081 | -.754\*\* |
| FO 2# | -.109 | -.047 | .103 | .229\*\* | .124 | .078 | .081 | .022 |  | -.032 | .041 | .048 | .026 | -.155\* | -.013 | .011 | .079 | -.075 | .013 | -.016 | -.041 | .240\*\* | -.401\*\* |
| FO 3 | -.221\*\* | -.098 | -.181\*\* | .059 | -.032 | .211\*\* | -.029 | .462\*\* | -.032 |  | .267\*\* | -.047 | -.188\*\* | -.183\*\* | -.140\* | -.239\*\* | -.140\* | -.114 | -.100 | -.205\*\* | -.120 | .106 | -.665\*\* |
| FO 4 | -.213\*\* | -.053 | -.190\*\* | -.112 | .032 | .204\*\* | -.120 | .383\*\* | .041 | .267\*\* |  | -.102 | -.171\* | -.039 | -.166\* | -.157\* | -.183\*\* | -.129 | -.173\* | -.195\*\* | -.226\*\* | .011 | -.686\*\* |
| Frug 1 | .339\*\* | -.057 | .256\*\* | .178\*\* | .061 | -.008 | .131 | -.113 | .048 | -.047 | -.102 |  | .573\*\* | .313\*\* | .472\*\* | .361\*\* | .558\*\* | .459\*\* | .451\*\* | .717\*\* | .230\*\* | .174\* | .088 |
| Frug 2 | .368\*\* | -.061 | .265\*\* | .140\* | -.003 | -.075 | .124 | -.111 | .026 | -.188\*\* | -.171\* | .573\*\* |  | .471\*\* | .513\*\* | .495\*\* | .529\*\* | .508\*\* | .459\*\* | .789\*\* | .204\*\* | .087 | .177\* |
| Frug 3 | .385\*\* | -.078 | .226\*\* | .022 | -.196\*\* | .096 | -.026 | -.139\* | -.155\* | -.183\*\* | -.039 | .313\*\* | .471\*\* |  | .453\*\* | .496\*\* | .344\*\* | .309\*\* | .233\*\* | .645\*\* | .161\* | -.049 | .202\*\* |
| Frug 4 | .340\*\* | -.132 | .328\*\* | .053 | .046 | .108 | .112 | -.220\*\* | -.013 | -.140\* | -.166\* | .472\*\* | .513\*\* | .453\*\* |  | .712\*\* | .400\*\* | .393\*\* | .312\*\* | .748\*\* | .186\*\* | .172\* | .217\*\* |
| Frug 5 | .326\*\* | -.115 | .307\*\* | .118 | -.062 | .083 | .042 | -.201\*\* | .011 | -.239\*\* | -.157\* | .361\*\* | .495\*\* | .496\*\* | .712\*\* |  | .457\*\* | .382\*\* | .276\*\* | .739\*\* | .139\* | .087 | .233\*\* |
| Frug 6 | .380\*\* | -.078 | .357\*\* | .272\*\* | .095 | .057 | .092 | -.076 | .079 | -.140\* | -.183\*\* | .558\*\* | .529\*\* | .344\*\* | .400\*\* | .457\*\* |  | .467\*\* | .533\*\* | .744\*\* | .225\*\* | .238\*\* | .129 |
| Frug 7 | .368\*\* | .046 | .162\* | .038 | -.042 | -.060 | .127 | -.093 | -.075 | -.114 | -.129 | .459\*\* | .508\*\* | .309\*\* | .393\*\* | .382\*\* | .467\*\* |  | .431\*\* | .691\*\* | .300\*\* | .039 | .164\* |
| Frug 8 | .349\*\* | -.091 | .248\*\* | .082 | .085 | -.001 | .079 | -.156\* | .013 | -.100 | -.173\* | .451\*\* | .459\*\* | .233\*\* | .312\*\* | .276\*\* | .533\*\* | .431\*\* |  | .644\*\* | .209\*\* | .120 | .168\* |
| Frug Sum | .501\*\* | -.100 | .376\*\* | .154\* | -.008 | .038 | .116 | -.196\*\* | -.016 | -.205\*\* | -.195\*\* | .717\*\* | .789\*\* | .645\*\* | .748\*\* | .739\*\* | .744\*\* | .691\*\* | .644\*\* |  | .288\*\* | .147\* | .245\*\* |
| LTO Sum | .568\*\* | .474\*\* | .324\*\* | .120 | -.062 | -.116 | .021 | -.035 | -.041 | -.120 | -.226\*\* | .230\*\* | .204\*\* | .161\* | .186\*\* | .139\* | .225\*\* | .300\*\* | .209\*\* | .288\*\* |  | -.036 | .168\* |
| Indul Sum | -.091 | -.175\* | .005 | .511\*\* | .523\*\* | .442\*\* | .497\*\* | .081 | .240\*\* | .106 | .011 | .174\* | .087 | -.049 | .172\* | .087 | .238\*\* | .039 | .120 | .147\* | -.036 |  | -.171\* |
| FO Sum | .291\*\* | .081 | .183\*\* | -.125 | -.027 | -.262\*\* | .055 | -.754\*\* | -.401\*\* | -.665\*\* | -.686\*\* | .088 | .177\* | .202\*\* | .217\*\* | .233\*\* | .129 | .164\* | .168\* | .245\*\* | .168\* | -.171\* |  |

Frug = frugality; LTO = long-term orientation; Indul = indulgence; FO = future orientation; \**p* < .05, *\*\*p* < .01, \*\*\**p* < .001, #We recoded this item so that all items are in the same direction. For example, all LTO items are coded so higher scores represent more LTO.

**Figure S1**

*Water Scarcity Prime in Study 3*



Note: Participants saw the English version and a Farsi version.

**Figure S2**

*Water Abundance Prime in Study 3*



Note: Participants saw the English version and a Farsi version.

**Appendix 1**

*GLOBE Future Orientation Scale (Study 3)*

Please indicate the extent to which you agree with each of the phrases.

1: Plan ahead 7: Take life events as they occur

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I believe that people who are successful should | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |

1: Live for the present 7: Live for the future

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I believe that people should | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |

1: Planned well in advance (2 or more weeks in advance) 7: Spontaneous (planned less than an hour in advance)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I believe that social gatherings should be | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |

1: Plan for the future 7: Accept the status quo

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I believe that the accepted norm in this society should be to | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |

Note: Participants completed the scale in Farsi.

**Appendix 2**

*Frugality Scale (Study 3)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly disagree | Disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Agree | Strongly agree |
| Making better use of my resources makes me feel good. | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |
| I believe in being careful how I spend my money. | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |
| I discipline myself to get the most from my money. | 🔿 | 🔿 |  | 🔿 | 🔿 | 🔿 | 🔿 |
| There are things I resist buying today so I can save for tomorrow. | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |
| I am willing to wait on a purchase I want so that I can save money. | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |
| If you take good care of your possessions, you will definitely save money in the long run. | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |
| If you can reuse an item you already have, there’s no sense in buying something new. | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |
| There are many things that are normally thrown away that are still quite useful | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 | 🔿 |

Note: Participants completed the scale in Farsi.

**Appendix 3**

*Hofstede’s Long-Term Orientation and Indulgence Questions (Study 3)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Scale** | **Item** | **Reverse Coded?** | **Rate** |
| **Long-Term Orientation** | 1. Respect for tradition preservation of face-fulfilling social obligations | Reverse | Importance |
| 2. Thrift (not spending more than needed) |  | Importance |
| 3. I am proud to be a citizen of my hometown | Reverse | Agreement |
| 4. Persistent efforts are the surest way to results |  | Agreement |
| **Indulgence** | 5. Keeping time free for fun |  | Importance |
| 6. Moderation: having few desires | Reverse | Importance |
| 7. I am a happy person |  | Agreement |
| 8. People or circumstances never prevent you from doing what you really want to | Reverse | Agreement |

Note: Participants completed the scale in Farsi. “Reverse” items are reverse coded. For each scale, participants rate the importance of the first two items and their agreement with the second two items. Participants rated the items from 1 to 7. Hofstede used these formulas to calculate sum scores: LTO = 40\*Item 2 - 40\*Item 1 + 25\*Item 4 - 25\*Item 3. Indulgence= 35\*Item 5 - 35\*Item 6 + 40\*Item 7 - 40\*Item8. Previous studies have found acceptable culture-level reliability for Hofstede’s measures of long-term orientation (alpha = .74) and indulgence (alpha = .79).

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