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Historical Prevalence of Infectious Diseases Within 230 Geopolitical Regions: A Tool for Investigating Origins of Culture

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Abstract

Regional differences in disease prevalence are associated with a wide array of cross-cultural differences. However, the complex relationships among culture, disease, and other ecological variables remain underinvestigated. Future research into the origins of cultural differences will benefit from the availability of a numerical index identifying the extent to which infectious diseases have been historically prevalent within regions defined by geopolitical borders. This article introduces such an index. This index is based on disease prevalence data obtained from old epidemiological atlases and is calculated for 230 geopolitical regions (mostly nations) around the world.

Keywords

culture, disease, pathogen prevalence, personality, values

Human cultures differ along many psychological dimensions, including basic perceptual capacities, personality profiles, and complex value systems. These cultural differences and their implications can be studied productively, regardless of whether cultures are defined according to ethnographic methods (e.g., differences between isolated small-scale societies) or according to contemporary geopolitical boundaries (e.g., differences between people living in different countries). Now that the presence of cultural differences is well established, it is important to understand how and why those cultural differences may have emerged in the first place.

Many speculative answers have been provided, along with a burgeoning empirical literature (Cohen, 2001; Gangestad, Haselton, & Buss, 2006; Kitayama, Ishii, Imada, Takamura, & Ramaswamy, 2006; Uskul, Kitayama, & Nisbett, 2008, Van de Vliert, 2009). One body of evidence suggests that regional variation in the prevalence of infectious diseases may have played an important role in the origin of many different kinds of cross-cultural differences. Analyses of small-scale societies implicate disease prevalence as a correlate of cross-cultural differences in mating structures and parenting practices (Low, 1990; Quinlan, 2007). Other studies have defined

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cultures according to contemporary geopolitical boundaries and have found that disease prevalence is associated with cross-cultural differences in culinary practices (Sherman & Billing, 1999), mate preferences (Gangestad & Buss, 1993; Gangestad et al., 2006), collectivistic value systems (Fincher, Thornhill, Murray, & Schaller, 2008), and personality traits such as extraversion and openness to experience (Schaller & Murray, 2008). Indeed, cultural diversity itself is associated with the prevalence of infectious diseases within an ecological region (Fincher & Thornhill, 2008).

Exactly *why* might disease prevalence have implications for these cultural outcomes? Each specific finding can be explained conceptually by considering how disease prevalence influences the relative costs and benefits associated with specific behaviors. For example, the use of culinary spices can be costly (e.g., because their cultivation consumes resources that could otherwise be devoted to more nutritional foodstuffs), but spices are also powerful antibiotics and so confer health benefits accordingly. The benefits of spices are especially likely to outweigh their costs under conditions in which bacterial infestation of food is especially problematic (Sherman & Billing, 1999). Thus, spices are more likely to be used in regions with relatively higher prevalence of infectious diseases. A cost–benefit analysis can also be applied toward the prediction of cross-cultural differences in extraversion. Extraversion can have beneficial consequences (e.g., extraverts are more likely to develop and maintain wide-ranging social networks), but extraversion is also associated with increased risk of exposure to socially transmitted pathogens. These costs of extraversion are likely to be higher and therefore more likely to outweigh the benefits under circumstances in which the actual prevalence of infectious diseases is also higher. To the extent that individual behavior—and cultural norms prescribing behavior—are responsive to these relative costs and benefits, it follows that disease prevalence will be inversely related to extraversion (Schaller & Murray, 2008). Similar cost–benefit analyses have been employed to predict relations between disease prevalence and other cross-cultural differences (e.g., Fincher et al., 2008).[1]

Relations between disease prevalence and cultural outcomes emerge even when statistically controlling for a variety of other variables that are correlated with disease prevalence and that also might be expected to independently predict particular cross-cultural differences. For example, regional differences in disease prevalence correlated with cross-cultural differences in personality even when controlling for a series of variables that included absolute latitude, temperature, life expectancy, and GDP per capita (Schaller & Murray, 2008). Similarly, disease prevalence correlated with cross-cultural differences in mate preferences and in individualism–collectivism even when controlling for plausible confounds (Fincher et al., 2008; Gangestad et al., 2006). Emerging from this body of research is the intriguing possibility that ecological variation in the prevalence of infectious diseases has implications for the origins of many different kinds of cross-cultural differences.

Several of these studies (Fincher et al., 2008; Schaller & Murray, 2008) have compared the extent to which contemporary cross-cultural differences were correlated with contemporary disease prevalence versus historical disease prevalence. Results revealed that the historical prevalence of infectious diseases is the stronger correlate. These findings implicate disease prevalence as a plausible cause, rather than a consequence, of contemporary cross-cultural differences. They also highlight the scientific utility that will be served if researchers have access to a reliable, valid, and comprehensive index of historical disease prevalence. An index pertaining specifically to 186 small-scale societies is widely available to researchers within the Standard Cross-Cultural Sample data set (Murdock & White, 1969, 2006), but its utility is limited to analyses of the ethnographic record. No comparable comprehensive index is available to researchers whose cross-cultural inquiries require comparisons among countries and other contemporary geopolitical entities. Here, we provide just such a measure.

Employing methods adapted from previous inquiries (in which disease prevalence indices were computed for limited samples of geopolitical entities; Fincher et al., 2008; Gangestad & Buss, 1993), we assessed the historical prevalence of infectious diseases in 230 geopolitical regions worldwide.

Method and Results

Gangestad and Buss (1993) employed old epidemiological atlases to rate the prevalence of seven different kinds of disease-causing pathogens and combined these estimates into a single measure indicating the historical prevalence of pathogens in each of 29 countries. More recently, we used a similar procedure to rate the prevalence of nine infectious diseases in each of 100 geopolitical regions (71 of these regions were included in analyses reported by Schaller & Murray, 2008; 97 of these regions were included in analyses reported by Fincher et al., 2008). We extended that procedure (and rated anew even those regions that had been the focus of prior investigations) in an attempt to assess the prevalence of those nine diseases within a comprehensive set of 230 geopolitical regions worldwide. The majority of these regions are nations (e.g., Albania, Zimbabwe); others are territories or protectorates (e.g., Falkland Islands, New Caledonia) or culturally distinct regions within a nation (e.g., Hawaii, Hong Kong).[2]

The nine diseases coded were leishmanias, schistosomes, trypanosomes, leprosy, malaria, typhus, filariae, dengue, and tuberculosis. Epidemiological atlases were used to estimate the prevalence of each of these nine diseases in each region. For eight of these diseases (all but tuberculosis), prevalence of each disease was based primarily on epidemiological maps provided in Rodenwaldt and Bader's (1952-1961) *World-Atlas of Epidemic Diseases* and in Simmons, Whayne, Anderson, and Horack's (1944) *Global Epidemiology*. A 4-point coding scheme was employed: 0 = *completely absent or never reported*, 1 = *rarely reported*, 2 = *sporadically or moderately reported*, 3 = *present at severe levels or epidemic levels at least once*. In the rare cases in which these two epidemiological sources provided contradictory information, priority was placed on data provided by the older source (Simmons et al., 1944). In cases in which the relevant maps were unavailable (this was especially true for leprosy) or insufficiently detailed (this was especially true for many of the Pacific island nations), prevalence ratings were informed also by verbal summaries found in Simmons et al. The prevalence of tuberculosis was based on a map contained in the National Geographic Society's (2005) *Atlas of the World*, which provided incidence information in each region for every 100,000 people. Prevalence of tuberculosis was coded according to a 3-point scheme: 1 = *3–49,* 2 = *50–99,* 3 = *100 or more.*

For 160 geopolitical regions, we were able to estimate the prevalence of all nine diseases. The remaining 70 regions typically lacked historical data on the prevalence of either tuberculosis or leprosy; 6 of these regions lacked data on malaria as well. Therefore, in addition to creating a nine-item index of disease prevalence (computed for 160 regions), we also created a seven-item index (excluding both leprosy and tuberculosis; computed for 224 regions) and a six-item index (excluding leprosy, tuberculosis, and malaria; computed for all 230 regions).

To ensure that our different disease prevalence indices were computed on a common scale of measurement, all nine disease prevalence ratings were standardized by converting them to z scores. Each overall disease prevalence index was then computed as the mean of z scores of the items included in the index. Thus, for each overall index (whether based on six, seven, or nine items), the mean is approximately 0; positive scores indicate disease prevalence that is higher than the mean, and negative scores indicate disease prevalence that is lower than the mean.

There is abundant evidence that pathogenic diseases are generally more prevalent in the tropics compared to more temperate zones (Epstein, 1999; Guernier, Hochberg, & Guégan, 2004). Consistent with this fact, the nine disease prevalence ratings were all positively correlated, and

Table 1. Correlations Between Nine-, Seven-, and Six-Item Disease Prevalence Scores and Specific Cross-Cultural Outcome Variables That Have Been Linked to Disease Prevalence in Previously Published Work

	Index of Historical Disease Prevalence		
Cross-Cultural Outcome Variable	9 Items	7 Items	6 Items
Individualism (Hofstede, 2001)	–.68	–.65	–.63
Individualism (Suh, Diener, Oishi, & Triandis, 1998)	–.70	–.63	–.61
Collectivism (Gelfand, Bhawuk, Nishii, & Bechtold, 2004)	.68	.68	.67
Collectivism (E. S. Kashima & Kashima, 1998)	.62	.61	.59
Extraversion	–.51	–.46	–.50
Openness to experience	–.43	–.37	–.36
Female sociosexuality	–.60	–.59	–.57
Use of spices in food preparation	.58	.58	.59
Restriction of rights and civil liberties	.55	.50	.47
Democratization	–.65	–.57	–.53

Note: All *r* values are statistically significant, $p < .05$. See text for references to previously published work on cross-cultural outcome variables, and refer to those prior publications for complete details on samples and methods used to assess outcome variables.

all composite indices are internally reliable. As would be expected, the nine-item index shows the highest internal reliability: Cronbach's alpha is .84. For the seven-item index alpha is .75, and for the six-item index alpha is .70.

The reliability and validity of each index can also be assessed by examining correlations of each index with the disease prevalence index computed by Gangestad and Buss (1993), who used a similar rating procedure to estimate the overall historical prevalence of seven diseases in 29 countries. Gangestad and Buss's index correlates very highly with all three of the indices we computed: *r* values range from .87 to .90. In addition, the indices are highly correlated with a measure of *contemporary* parasite prevalence (computed for 225 of these geopolitical regions from recent epidemiological data; Fincher & Thornhill, 2008): *r* values range from .81 to .84.

We examined the extent to which each of these three indices correlated with cross-cultural differences that have previously been linked to the historical prevalence of infectious diseases. Fincher et al. (2008) reported strong correlations between a computationally similar nine-item disease prevalence index and four different regional indicators of individualism or collectivism (absolute values of these *r* values ranged from .63 to .73; *N* values ranged from 58 to 70). Schaller and Murray (2008) reported negative correlations (r values = –.51 and –.44) between a nine-item disease prevalence index and multisample composite indicators of two personality traits (extraversion, openness to experience) across 38 regions. Schaller and Murray also reported a negative correlation ($r = –.62$) between this index and female sociosexuality assessed across 48 regions. (In all cases, these correlations remained statistically significant even when controlling for plausible confounding variables.) For comparison, Table 1 reports correlations indicating the association between each of these cross-cultural outcome variables and each of the three disease prevalence indices computed here. As these results reveal, each disease prevalence index produces results that replicate those reported previously. The nine-item index typically produces the strongest correlations (values that are virtually identical to those reported in the previous studies).

In addition, we examined the extent to which these three indices correlated with additional cross-cultural differences that have previously been predicted by somewhat different indicators of disease prevalence. Sherman and Billing (1999) reported a significant positive correlation between mean annual temperature (which served as a proxy for the prevalence of pathogens) and the extent to which spices are used in food preparation (r = .57, N = 34). Thornhill, Fincher, and Aran (2009) reported that a measure of *contemporary* pathogen prevalence correlated positively with restrictions placed on political rights and civil liberties (r = .45, N = 192) and negatively with an index of democratization (r = –.52, N = 170). (Both correlations remained significant when controlling for additional confounding variables.) For comparison, Table 1 reports correlations between each of these cross-cultural outcome variables and each of the three indices of historical disease prevalence computed here. The notable finding is that our three indices of historical disease prevalence correlate with cross-cultural outcomes at least as strongly (and in some cases *more* strongly) than the measures employed in the original studies.

The overall implication is that these indices of historical disease prevalence are useful for investigating cross-cultural differences. The nine-item index is the most highly reliable and generally offers the greatest utility as a statistical predictor of cross-cultural differences. (For example, the nine-item index typically produces the strongest correlations, such as those indicated in Table 1, which remain significant even when controlling for confounding variables identified in previous studies on the topic.)

Statistical prediction does not equate causal explanation, of course. As evidence accumulates that identifies historical disease prevalence as a correlate of cross-cultural differences, it becomes increasingly important to conduct additional empirical research that probes more deeply into possible underlying explanations. That endeavor may be aided by the indices computed here.

The appendix lists each of the 230 geopolitical regions, accompanied by its score on the seven-item index of historical disease prevalence index (for six of these regions, however, the seven-item index could not be computed, and so the indicated score is derived from the six-item index instead; these six scores are identified with a superscript *a*). For 160 of these regions, the appendix also provides a score on the more highly reliable nine-item index of historical disease prevalence.

Discussion

It is no easy task to develop a reliable and valid index indicating the historical prevalence of infectious diseases in a particular region. For many regions, relevant data are scant. The authors of the epidemiological sources employed here (e.g., Simmons et al., 1944) explicitly acknowledge the difficulties of precisely estimating disease prevalence rates within specific regions. Despite these measurement issues, composite indices of historical disease prevalence can be created that are both reliable and also highly correlated with cross-cultural differences. Previous studies have computed such indices for relatively limited samples of geopolitical regions (e.g., Fincher et al., 2008; Gangestad & Buss, 1993; Schaller & Murray, 2008). This article provides, for the first time, indices for a comprehensive set of geopolitical regions around the world.

Many inquires into the origins of cross-cultural differences are likely to focus on data obtained from within the 160 regions for which it was possible to estimate the prevalence of nine different diseases. For such inquiries, the nine-item index appears to offer the best available measure of historical disease prevalence. For researchers whose data set includes additional geopolitical regions (those for which data on one or more of the specific diseases were unavailable), it may be more appropriate to employ the abbreviated index instead. This index too has acceptable levels of reliability, has considerable predictive utility, and (although less ideal than the nine-item index) can still provide a useful tool for testing hypotheses about disease prevalence and cross-cultural differences.

Any researcher employing one of these indices is advised to also assess, and consider the causal implications of, additional variables that may correlate with disease prevalence. Many specific cross-cultural differences are correlated with latitude and associated meteorological variables as well as with economic variables and other aspects of the local social ecology (e.g., Cohen, 2001;

Y. Kashima & Kashima, 2003; Uskul et al., 2008; Van de Vliert, 2009; Van de Vliert, Schwartz, Huismans, Hofstede, & Daan, 1999). Disease prevalence is correlated with many of these variables (Schaller & Murray, 2008). Therefore, compelling conclusions about the effects of disease prevalence on cultural differences can be drawn only if the effects of disease prevalence persist even after controlling for these potential confounds (e.g., Fincher et al., 2008; Fincher & Thornhill, 2008; Gangestad et al., 2006; Schaller & Murray, 2008; Thornhill et al., 2009).

The reverse is true as well. Any researcher wishing to rigorously test the predictive effects of other variables on cross-cultural outcomes would be wise to account for the effects of disease prevalence. Case in point: Cross-cultural differences in sociosexuality are correlated with average life expectancy (Schmitt, 2005), but this relationship essentially disappears when controlling for disease prevalence (Schaller & Murray, 2008). Similarly, across cultures there is a correlation between individualistic value systems and mean levels of extraversion (Hofstede & McCrae, 2004); this association also disappears when statistically controlling for disease prevalence (Fincher et al., 2008; Schaller & Murray, 2008). Correlations between economic wealth (e.g., GDP) and cultural differences also tend to be sharply reduced—although they do not always disappear entirely—when controlling for disease prevalence (Fincher et al., 2008; Schaller & Murray, 2008).

These indices of disease prevalence should also prove useful to researchers who attempt to articulate the complex causal relations between multiple ecological variables that predict cross-cultural differences. For example, although simple regression analyses reveal that both disease prevalence and GDP are uniquely related to cross-cultural differences in individualism–collectivism (Fincher et al., 2008), these variables are likely to be causally linked in more complex ways than previously identified. Given the profound implications that disease prevalence has on regional economic outcomes (e.g., Sachs & Malaney, 2002), for instance, the unique direct effects of economic wealth may actually reflect an additional indirect effect of disease prevalence. Similarly, given the profound implications that meteorological conditions have for the survival and transmission of disease-causing pathogens (Epstein, 1999; Guernier et al., 2004), disease prevalence may be a conceptually important mediating variable that helps to explain the many important relations that exist between climate and cultural practices (Van de Vliert, 2009). Moderator variables must also be explored. Some relations between climate and culture are moderated by economic variables (Van de Vliert, 2009). The possible causal implications of disease prevalence might also be moderated by regional differences in economic wealth or other variables. Conversely, the cultural implications of other ecological variables might be moderated by regional differences in the prevalence of disease. Thus, not only does a comprehensive index of historical disease prevalence provide an essential empirical tool to researchers testing hypotheses about the cultural consequences of disease, it also provides a useful tool to researchers who wish to more deeply inquire into the specific causal mechanisms through which ecological variables contribute to cross-cultural differences.

Appendix

Indices of Historical Disease Prevalence for All of the 230 Geopolitical Regions

Region	9 Items	7 Items	Region	9 Items	7 Items
Afghanistan	0.23	0.15	Cyprus	–0.34	–0.25
Albania	–0.25	0.03	Czech Republic	–0.87	–0.78
Algeria	0.47	0.63	Denmark	–0.98	–0.91
Andorra	–1.08	–1.05	Djibouti	0.49	0.50
Angola	0.95	0.93	Dominica	—	–0.02
Anguilla	—	–0.27	Dominican Republic	—	–0.13
Antigua	—	–0.27	East Timor	0.24	0.01
Argentina	–0.12	0.03	Ecuador	0.34	0.30
Armenia	0.10	0.15	Egypt	0.44	0.76
Aruba	—	–0.28	El Salvador	0.30	0.42
Australia	–0.25	–0.14	England	–1.01	–0.78
Austria	–0.77	–0.65	Equatorial Guinea	0.96	0.93
Azerbaijan	0.33	0.29	Eritrea	0.52	0.37
Azores	—	–0.73[a]	Estonia	–0.62	–0.78
Bahamas	—	–0.51	Ethiopia	0.71	0.77
Bahrain	0.10	0.15	Falkland Islands	—	–1.18
Bangladesh	0.62	0.66	Fiji	–0.07	–0.39
Barbados	—	–0.15	Finland	–0.75	–0.78
Belarus	–0.75	–0.78	France	–0.46	–0.40
Belgium	–1.00	–0.78	French Guiana	—	0.92
Belize	—	0.28	French Polynesia	—	–0.67
Benin	0.93	1.07	Gabon	1.04	1.19
Bermuda	—	–0.63	Gambia	0.94	0.92
Bhutan	0.44	0.27	Georgia	0.10	0.16
Bolivia	0.34	0.30	Germany	–0.87	–0.78
Bosnia and Herzegovina	0.00	0.03	Ghana	1.16	1.19
Botswana	0.41	0.39	Gibraltar	—	–0.50
Brazil	0.93	1.06	Greece	0.08	0.29
Brunei	–0.01	0.00	Greenland	—	–1.18
Bulgaria	–0.35	–0.10	Grenada	—	–0.53
Burkina Faso	1.16	1.19	Guadeloupe	—	–0.15
Burundi	1.06	1.07	Guam	–0.17	–0.52
Cambodia	0.45	0.28	Guatemala	0.42	0.56
Cameroon	1.17	1.20	Guinea	1.06	1.06
Canada	–1.31	–1.18	Guinea-Bissau	1.06	1.06
Canary Islands	—	–0.23	Guyana	—	0.64
Cape Verde	—	–0.26	Haiti	—	–0.01
Cayman Islands	—	–0.65	Hawaii	—	–0.52
Central African Republic	1.16	1.19	Honduras	—	0.16
Chad	1.04	1.04	Hong Kong	0.27	0.37
Chile	–0.45	–0.22	Hungary	–1.00	–0.78
China (PRC)	1.03	1.03	Iceland	–1.19	–1.18
Christmas Island	—	–1.04[a]	India	0.94	0.91
Colombia	0.27	0.53	Indonesia	0.63	0.51
Comoros	—	–0.25	Iran	–0.15	–0.16
Congo, Democratic Republic	0.97	0.95	Iraq	0.54	0.40
Congo, Republic	1.16	1.19	Ireland	–0.45	–0.23
Cook Islands	—	–0.93	Israel	0.52	0.53
Costa Rica	0.12	0.18	Italy	0.16	0.40
Cote d'Ivoire	1.06	1.06	Jamaica	0.18	0.25
Croatia	–0.44	–0.38	Japan	0.43	0.25
Cuba	—	0.00	Jordan	0.16	0.39

(continued)

Appendix (continued)

Region	9 Items	7 Items	Region	9 Items	7 Items
Kazakhstan	—	–0.38	Oman	–0.14	0.00
Kenya	0.95	0.92	Pakistan	0.02	–0.12
Kiribati	—	–0.53	Palau	—	–0.38
Korea, North	0.12	–0.14	Panama	0.09	0.31
Korea, South	–0.11	–0.28	Papua New Guinea	—	0.15
Kuwait	–0.34	–0.25	Paraguay	—	0.17
Kyrgyzstan	—	–0.38	Peru	0.23	0.16
Laos	0.45	0.28	Philippines	0.50	0.51
Latvia	–0.62	–0.78	Pitcairn Islands	—	–1.18
Lebanon	0.36	0.65	Poland	–0.87	–0.78
Lesotho	0.01	–0.13	Portugal	0.47	0.63
Liberia	0.73	0.80	Puerto Rico	0.07	0.12
Libya	0.04	0.24	Qatar	—	–0.25
Liechtenstein	–1.08	–1.05	Reunion	—	–0.25
Lithuania	–0.75	–0.78	Romania	–0.18	–0.37
Luxembourg	–1.11	–0.91	Russia	–0.39	–0.64
Macau	0.10	–0.01	Rwanda	1.05	1.05
Macedonia	–0.25	0.03	Samoa	—	–0.41
Madagascar	0.63	0.51	Samoa (U.S.)	—	–0.41
Malawi	0.73	0.64	San Marino	–0.46	–0.25
Malaysia	0.50	0.51	Sao Tome and Principe	—	–0.19
Maldives	—	–0.90[a]	Saudi Arabia	0.04	0.24
Mali	1.04	1.04	Scotland	–1.31	–1.18
Malta	–0.41	–0.50	Senegal	0.72	0.78
Marshall Islands	—	–0.25	Serbia	–0.23	–0.11
Martinique	—	0.24	Seychelles	—	–0.63
Mauritania	0.31	0.26	Sierra Leone	0.94	0.92
Mauritius	—	0.11	Singapore	0.31	0.26
Mexico	0.28	0.56	Slovakia	–1.00	–0.78
Micronesia	—	–0.11	Slovenia	–0.87	–0.78
Moldova	–0.31	–0.37	Solomon Islands	—	–0.12
Monaco	–0.77	–0.65	Somalia	0.61	0.64
Mongolia	—	–0.78	South Africa	0.11	0.00
Montserrat	—	–0.02	Spain	–0.05	0.13
Morocco	0.59	0.62	Sri Lanka	0.64	0.52
Mozambique	0.83	0.93	St. Helena	—	–1.04[a]
Myanmar (Burma)	0.64	0.53	St. Kitts	—	–0.15
Namibia	–0.09	–0.25	St. Lucia	—	–0.15
Nauru	—	–0.80	St. Vincent	—	–0.28
Nepal	0.14	–0.12	Sudan	1.00	1.15
Netherlands	–0.87	–0.78	Surinam	0.63	0.67
Netherlands Antilles	—	–0.28	Swaziland	0.08	0.13
New Caledonia	—	–0.53	Sweden	–0.98	–0.91
New Zealand	–0.98	–0.91	Switzerland	–1.08	–1.05
Nicaragua	—	0.16	Syria	0.30	0.41
Niger	0.51	0.52	Taiwan	0.30	0.25
Nigeria	1.16	1.19	Tajikistan	—	0.02
Niue	—	–0.93	Tanzania	0.75	0.66
Norfolk Island	—	–1.04[a]	Thailand	0.64	0.52
Northern Ireland	–0.87	–0.78	Togo	1.16	1.19
Northern Mariana Islands	—	–0.52	Tokelau	—	–0.93
Norway	–0.85	–0.91	Tonga	—	–0.67

(continued)

Appendix (continued)

Region	9 Items	7 Items	Region	9 Items	7 Items
Trinidad	–0.03	–0.01	Uzbekistan	–0.44	–0.37
Tunisia	0.81	0.90	Vanuatu	—	–0.13
Turkey	0.16	0.40	Venezuela	0.48	0.80
Turkmenistan	0.00	0.02	Vietnam	0.61	0.64
Turks and Caicos Islands	—	–0.39	Virgin Islands (U.K.)	—	–0.27
Tuvalu	—	–0.93	Virgin Islands (U.S.)	—	–0.15
Uganda	1.05	1.05	Wake Island	—	–1.04[a]
Ukraine	–0.40	–0.64	Western Sahara	—	–0.26
United Arab Emirates	–0.45	–0.39	Yemen	0.41	0.23
United States of America	–0.89	–0.64	Zambia	0.64	0.52
Uruguay	0.39	0.53	Zimbabwe	0.64	0.53

a. Score based on a 6-item index of historical disease.

Declaration of Conflicting Interests

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Notes

1. These cost–benefit analyses do not imply that individuals must rationally weigh the costs and benefits associated with these behaviors when choosing how to act. The predictions arise from a logical consideration of the consequences, rather than the causes, of individual actions.
2. This set of 230 geopolitical regions includes nations and territories from each of the six major world cultural regions identified by Murdock (1949). The number of coded geopolitical regions within each of these major regions is as follows: Africa = 57, Insular Pacific = 33, North America = 22, South America = 28, Eastern Eurasia = 24, Western Eurasia = 66.

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