National Happiness and Genetic Distance

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Eugenio Proto[a,*], Andrew J. Oswald[a,b]

[a]CAGE Centre and Department of Economics, University of Warwick,

Coventry, CV4 7AL, United Kingdom.

[b]IZA Institute, Schaumburg-Lippe Str., 53072 Bonn, Germany

[*]Corresponding author. Phone: +44 (0) 2476 523523; Fax: +44 (0) 2476 523523; email:

e.proto@warwick.ac.uk

Abstract

Some nations report particularly high well-being. Denmark and the Netherlands regularly top the league table of happiness, psychological well-being, and life-satisfaction; Great Britain and the US enter further down; France and Italy do relatively poorly. The explanation for this ranking, which holds after adjustment for GDP, remains unclear. Using data on 131 countries, we document evidence for the idea that certain nations may have a genetic advantage in psychological well-being. The estimated effect-size is substantial, even after adjustment for socioeconomic covariates, including welfare-state variables. Confounding potentially remains a possibility. Our study should be treated cautiously and viewed as exploratory.

1. Introduction

Research into the determinants of human well-being -- by economists and many kinds of behavioral and health scientists -- has become prominent and is beginning to shape policy-making in the public sphere (Stiglitz et al. 2009).[1] There is also increasing evidence for the validity of subjective measures.[2] However, a fundamental lacuna exists in this literature. A famous cross-country pattern in international happiness remains largely unexplained.

Since the work of Edward Diener in the early 1990s, it has been known, and constantly found in replication studies, that nations like Denmark and the Netherlands regularly head the league table of international life-satisfaction, whereas certain other countries, including high-GDP European countries such as France and Italy, come surprisingly low down in an international ranking. The reasons for this international ranking are currently not fully understood (though Senik 2011 provides an analysis of the French case). It is not because of elementary forms of measurement error: an equivalent cross-country pattern has been found in reported hypertension and psychiatric health (Blanchflower and Oswald 2008, Ploubidis and Grundy 2009). Although the existence of a stable international pattern in well-being would be expected if countries' wealth and institutions matter and are slow-changing, the intellectual difficulty is that it has proved impossible in that way to account for the empirical cross-national variation.

There is some evidence that part of the long-observed ranking can be attributed to GDP levels, the quality of government, and certain welfare-state characteristics. However, even after adjusting for a range of such factors, the

[1] Diener et al. (1995), Easterlin (2013), Helliwell (2003), Alesina et al. (2004), Oswald and Wu (2011), Ott (2011), and Stevenson and Wolfers (2008).
[2] Oswald and Wu (2010).

underlying league-table pattern, with Denmark at or near the top in the world happiness ranking, remains in the data. There is recent evidence that, as a statistical matter, Denmark's secret may be related to an avoidance of extreme unhappiness in its citizens (Biswas-Diener et al. 2010). Nevertheless, the substantive reason for that, if it is to be part of a full explanation, is itself unknown; so that in turn merely pushes the level of explanation back one layer.

We consider an avenue that we originally found implausible. Somewhat to our surprise, we uncover evidence tentatively consistent with a genetic explanation. The key variable in the later analysis is a measure of genetic distance between countries' populations. We show that this variable is correlated with international well-being differences, and that the correlation seems not to because of omitted variables for factors such as economic prosperity, culture, religion, and geographical position in the world. By using regression equations, we attempt to control for the potential confounding[3] that geneticists sometimes refer to as the 'chopsticks problem' or 'social stratification'.

Our work relates to a modern -- not uncontroversial -- literature on depression and happiness levels in individuals that documents statistical evidence for an association between mental well-being and (a mutation of) the length variation in the serotonin-transporter-gene-linked polymorphic region (5-HTTLPR); the protein-encoded serotonin transporter gene influences the reuptake of serotonin, which is known to be implicated in human mood. To our knowledge, we are the first to consider this avenue as a possible way to explain the well-being patterns at a national

[3] Loosely, the chopsticks problem is that it would be possible spuriously to identify a gene that appeared to cause the use of chopsticks (whereas the deeper explanation was that cultural factors caused the chopsticks use and those were merely correlated with genetics). For this reason, papers by economists on genetic data, such as Ashraf and Galor (2013), sometimes provoke fierce responses from geneticists. However, both economists and geneticists are well aware of the problem of confounding, and both disciplines attempt to guard against it, if in different ways and using different jargon.

level. Because depression and mental disorder in people has multiplied 'externality' effects on the happiness of others, through families and friendship networks, it is to be expected that the effect of a genotype that influences individual well-being could have larger effects in community-level data than individual data.

We would like to acknowledge that we build heavily upon earlier scholars' ideas. We have been especially influenced by the important research of Spolaore and Wacziarg (2009). Like them, we employ genetic distance data from Cavalli-Sforza, Menozzi, and Piazza (1994), where the focus is the set of 42 world populations for which they report bilateral distances computed from 120 alleles. These populations are aggregated from subpopulations characterized by high genetic similarity. More broadly, our well-being research follows in a tradition exemplified by scholars such as DiTella et al. (2003), Helliwell (2003), and Wolfers and Stevenson (2008). Our work also relates to a stream of genetic research (Bejamin et al. 2012, Canli et al. 2005, Caspi et al. 2003, Chen et al. 2013, Chiao and Blizinsky 2010, Clarke et al. 2010, De Neve 2011, De Neve et al. 2012, Fox et al. 2009, Gigantesco et al. 2011, Kuhnen et al. 2013, Lesch et al. 1996, Risch et al. 2009, Sen et al. 2004, Stubbe et al. 2005, Szily et al. 2008, Weiss et al. 2002, 2008).

For the later analysis, we need two steps. The first is to calculate genetic differences across nations. The second is to calculate whether those differences might have any statistical explanatory power in a regression framework in which cross-country well-being is the dependent variable.

Conceptually, the genetic nature of a nation Y can be thought of as a vector of allele characteristics, y. We wish to be able to measure the distance between this nation and another country, X, with allele characteristics x. Genetic distance, g, has to be captured in our empirical analysis by a scalar. Hence in the case of two countries X and Y we need to define some form of mapping:

$$M(g, y, x) = 0$$

where g is a scalar for genetic distance, y is a vector of genetic characteristics of country Y, and x is a vector of genetic characteristics of country X. Genetic distance can be thought of as the genetic divergence between different species and their populations. Because there is no unique mathematical way to calculate the distance between two vectors, we follow an approach from within the existing literature. We adopt 'Nei's genetic distance' which can be viewed as the appropriate distance measure when genetic variants come about by genetic drift and mutations. Reassuringly, it is known that the Nei measure is correlated with other distance measures (Nei 1972, Spolaore and Wacziarg 2009).

2. Is There Evidence of a Link Between Genes and Well-being?

This study draws upon a number of international random-sample surveys and uses those to examine the relationship between well-being differences and genetic distance. The data sources include the Gallup World Poll, the World Values Surveys, the Eurobarometer Surveys, and the European Quality of Life Surveys. Although these data sets together provide information on hundreds of thousands of randomly selected individuals, we are inevitably restricted, in a cross-country analysis, in effective statistical power. The sample size for countries in this paper never exceeds 143 nations.

The first evidence is depicted in Figure I. Here we plot cross-national data on genes and well-being. The source is data from the Gallup World Poll. On the y-axis of Figure I is a variable for (low) psychological well-being in a country. It is 'Struggling', as defined by Gallup rather than by us, which is a cross-national variable for the percentage of individuals in the country who report that their present life situation is between 5 and 7 on a ten-point scale and who report the perceived quality of their future life as between a 5 and an 8. On the x-axis, we plot Nei's genetic distance measure, which is defined here as distance from Denmark, DK. There is a statistically significant positive correlation. In Figure I, the greater is a nation's genetic distance from Denmark, the lower is the reported well-being of that nation (that is, the greater their population's level of struggling).

Notable countries in the data set include the high well-being nations of Netherlands and Sweden depicted in the south-west corner of the graph. These, perhaps unsurprisingly, given their geographical proximity, have the closest genetic similarity to Denmark. Particularly unhappy countries in Figure I include nations such as Ghana and Madagascar; these have the least genetic similarity to Denmark. Figure II extends the well-being measures. 'Thriving' is defined as present life situation of 7 or better and expectations of the next five years as 8 and above; 'Suffering' is defined as present situation and the next five years below 5; high life satisfaction is defined as life satisfaction exceeding 7 on a ten-point scale. In Figure II, in each case, there is an association between greater well-being and having a genetic stock closer in nature to that of Denmark. In both Figures I and II, it is possible to reject the null of zero on each of the five best-fitting lines at the 99.9% confidence level. Figure III plots the raw data for each continent.

There is an obvious conceptual difficulty with these simple plots. By their nature, Figures I and II cannot control for a number of important confounding variables. To economists and economic geographers, the most obvious of these are the economic prosperity of the countries and the geographical position of the nations. Hence Table I switches to regression equations. In this way, it is possible to examine the robustness of the elementary bivariate correlation between nations' well-being and genes. The five columns of Table I report regression equations in which the sample size is 131 and the dependent variable is Struggling. Column 1 replicates the pattern of Figure I. Column 2 of Table I then introduces one extra control variable, namely, the PPP-adjusted Gross Domestic Product of each country. The GDP variable is expressed per head of population and, to match the nature of the genetic distance variable, is entered as the absolute difference from Denmark's GDP. As in much previous well-being research, GDP enters strongly positively in column 2 of Table I. The poorer the country (as captured by the distance from Danish Gross Domestic Product), the greater the degree of psychological struggling. In this case the coefficient on GDP is 5.63 with a small standard error of 1.05. As would be expected, when moving from column 1 of Table I to its column 2, the coefficient on Nei Genetic Distance falls substantially. However, the Nei coefficient remains substantial and well-defined statistically. Later columns of Table I add further controls to account for other possible confounders. In column 3, the larger is the geographical distance from Denmark, the greater is the level of Struggling. Its coefficient in the equation is -4.14 with a standard error of 1.72. The Nei coefficient on Struggling continues to be positive, at 5.46 with a standard error of 1.58. It is also positive when dummy variables are included for the different continents. However, the level of statistical significance falls slightly below the 5% cut-off in column 4 of Table I once the specification includes all of Nei distance, GDP, geographical distance, and continent dummies. In column 5 of Table I, the Nei genetic distance measure has a coefficient of 3.61 and a standard error of 1.27.

Table II switches to a different well-being variable, namely, that of Thriving. Consistent with the prior patterns, the correlation between Thriving and genetic distance is negative. It is possible to reject the null of zero at the 99% confidence level for each of the five specifications within Table II. Table III, for the same group of 131 countries, replicates the equivalent finding by using a Suffering dependent variable. Tables I, II and III thus suggest the same conclusion as the early elementary bivariate graphs.

Tables IV and V adopt traditional well-being variables and necessarily have smaller samples. Both tables use information from the World Values Survey. In the fullest specification, that of column 4 in each table, the same result on countries is found again. Table IV takes as its dependent variable a high level of life satisfaction (numbers over 7 out of 10) whereas Table V's dependent variable is mean life satisfaction. For both tables, the larger the divergence of the genetic stock from that of Denmark, the lower is the country's life satisfaction. Column 5 in each of Tables IV and V sees a drop in the significance of the Nei Genetic Distance coefficient. That might at a glance be thought a weakness in the argument. However, the data favour the column 4 specifications, which have greater explanatory power. In the fullest specification of Table IV, for instance, the coefficient on Nei distance is -5.20 with a standard error of 2.26.

It is natural to consider what a coefficient of more than 5 on the Nei coefficient, in this best-fitting specification, implies about effect sizes. The standard deviation of Log Nei Distance is slightly greater than 1, and the standard deviation of High Life Satisfaction is approximately 12. Hence one standard deviation in genetic distance is associated with approximately one third of a standard deviation in national well-being.

Countries differ in ways more subtle than differences in GDP. That leads to other likely sources of confounding. To allow a broader measure of societal prosperity to be included as a control variable, Table VI examines what happens if GDP is replaced by the Human Development Index (HDI) as defined by the United Nations. The level of HDI for a country is an average of its GDP, its educational level, and its average length of life. This could be seen as a fairly severe test for the data to pass. The reason is that HDI could itself be viewed as a measure of human well-being, so some of the variation in the dependent variable itself in a well-being regression equation is being picked up, it might be argued, by having HDI as a control within a subjective well-being equation. Nevertheless, in columns 2 to 5 of Table VI there continues to be evidence of a link between genetic makeup and the happiness of the country.

A possible concern is that the high life-satisfaction level observed in Nordic countries is due predominantly to the generosity [4] of their welfare states. The HDI variable implicitly includes education and health levels, so in part provide a control for this as well. Nevertheless, in column 3 we introduce transfers in terms of social benefits (always in logarithmic distance from Denmark) in order to provide a fuller control for the effects of the welfare state. The social-benefits variable is based on World Bank data. The correlation with the Nei variable, however, is unaffected by the inclusion of the social-benefits variable. In columns 4 and 5 of Table VI, continent dummies are introduced; the well-being link with the Nei variable remains. An appendix presents similar tables for other measures.

Other confounders are possible. For example, nations vary also in their religious views and cultural values. To attempt to check whether genetic distance might be standing in erroneously for such influences, Tables VII to IX reveal, for a

[4] This was our own presumption before we obtained any genetic data. Di Tella et al (2003) documents evidence that unemployment-benefit generosity affects national well-being. Related arguments about the welfare state were proposed by Richard Easterlin in a 2013 public lecture at Oxford University.

set of thriving, struggling and suffering equations, that the Nei variable continues to be statistically significant after controlling for four cultural variables -- religious adherence, colonial origins, language distance, and Hofstede's cultural-dimensions variable. For example, considering column 4 of Table VII, the coefficient on Nei is -7.25 with a standard error of 2.61. In these tables, the coefficient on genetic difference is largely unchanged after adding cultural variables. This suggests that, even if, as seems likely, our cultural variables are imperfect, the relationship between genetic diversity and subjective wellbeing is not solely explained by cultural distance.

Caution remains advisable: regression equations of this sort have to be treated carefully because Table VII enters a larger number of independent variables than -- for reasons of statistical power -- is ideal with small sample sizes. Such difficulties are inherent in cross-country research.

A final possibility is that Nordic countries have better institutions in a wide-ranging sense. Recently, Helliwell and Wang (2013) calculated the residual life satisfaction (measured with the Gallup Cantrill Ladder) after controlling for the quality of countries' institutions and culture, with variables measuring: perception of corruption, healthy life expectancy, GDP per capita, freedom to make a choice, social support and generosity (in terms of culture for charitable donations). In Table X we use this unexplained satisfaction as a dependent variable and show that they correlate with our index of genetic distance from Denmark, after controlling for geographic variables. Table X then does similar exercises, in columns 2 and 3, for unexplained cross-country variation in well-being using instead data from Jan Ott and John Hudson. Again, evidence of a correlation with Nei distance remains.

3. An Alternative Measure: Well-being and a 5-HTT Polymorphism

Because they leave the detailed nature of any genetic effect unexplained, the previous results suffer from the weakness that they are in the nature of black-box findings. In this second part of the paper, we use a different data source to explore simple evidence about the possible role of 5-HTTLPR, which is a polymorphism that has already been studied -- at the individual rather than national level -- in the mental health and well-being literature. Prior research suggests that the short and long variants of 5-HTTLPR may have different effects on economic behavior. In particular, the short allele has been associated with higher scores on neuroticism and harm avoidance, stronger attentional bias towards negative stimuli, and lower life satisfaction. Our evidence suggests there may be a statistical association between lower happiness of nations and the proportion of their population who have the short allele version of the 5-HTTLPR polymorphism, which we will refer to for brevity as (S)5-HTT. Intriguingly, among the developed nations in our data, it is Denmark and the Netherlands that have the lowest percentage of people with (S)5-HTT. Our results should be treated as tentative and exploratory, because when dealing with the countries for which we have 5-HTT data there is a marked shortage of statistical power.

Across the 30 nations on which we have information in Figure IV, the mean of (S) 5-HTT is 49.63 with a standard deviation of 13.09. The short allele is thus found in approximately half the population.

For those West European nations on which we have data, the scatter plot in Figure IV depicts the cross-sectional correlation between life-satisfaction and the percentage of citizens in that nation with the (S)5-HTTpolymorphism. A negative relationship exists. Denmark has the highest recorded level of satisfaction with life and the lowest % of citizens with (S)5-HTT. Italy has the lowest recorded level of satisfaction with life and the highest % of (S)5-HTT. In Figure IV, the first set of well-being data are drawn from the Eurobarometer Surveys. Figure IV also gives an equivalent cross-sectional correlation between mean happiness and the percentage of citizens in that nation with the (S)5-HTT polymorphism. Here the data are drawn from the European Quality of Life Surveys. Figure V uses data on life satisfaction taken from the World Values Survey. This plot expands the previous list of countries to the so-called Western Offshoots and includes New Zealand, the USA, and Australia; for historical reasons these nations are genetically, economically, and politically similar to the Western European countries. The correlation remains negative and significant. Figure AI in the appendix switches to an alternative well-being measure on the y-axis. It uses a 'ladder of life' well-being question due to Cantril; the exact wording is explained below. Here the statistical result is the same as in the earlier figures. A similar graph can be produced using a so-called Daily Experience index developed by Gallup.

Because our variable (S)5-HTT measures the proportion of individuals with the S allele of 5-HTT, it is perhaps natural to correlate this with a measure of well-being that relates to proportions of individuals rather than to averages (like the mean of life satisfaction, happiness or the Cantril ladder-based index). Figure AII in the Appendix thus refines the Cantril measure to the struggling variable used earlier. This is the proportion of people who are classified by Gallup as having low well-being scores, as assessed by the ladder, both currently and prospectively (for more details see the appendix), in this figure we include all countries a measure of the (S)5-HTT share is available. Consistent with the earlier figures, there is a strong correlation between the percentage of people struggling psychologically in a nation and the percentage of the nation's population who have the short allele of 5-HTT. An equivalent figure can be produced if we consider as an alternative a thriving variable based on the same principles as struggling.

In order to check the consistency of these data with those from the World Values Survey, Figure AIII of the Appendix shows the relationship between (S)5-HTT and an index ‘Very Satisfied’ which is a measure of the proportion of individuals reporting life satisfaction larger than 8. A similar pattern emerges if we take instead the proportion of individuals reporting life satisfaction larger than 7 (although the p-value on the gradient is then right at the border of the 0.05 cut-off).

Table XI presents simple regression equations for this reduced sample. Here the dependent variable is the percentage of citizens who are defined by Gallup as ‘struggling’, and the main explanatory variable is the share of the (S)5-HTT polymorphism, which here, to be consistent with the above analysis, is expressed in terms of log of the absolute distance from the values in Denmark. There are only 28 observations, one for each country, so it is necessary to be sparing with the number of independent variables included in these regressions. In column 1, we extend the previous bivariate correlation of the figures by including a variable for Nei genetic distance. It enters with a coefficient of 1.69, with a large standard error of 2.35. Interestingly, in column 1 of Table XI it is the 5-HTT distance variable that is now significant, so a ‘horse-race’ test, admittedly of a simple kind, implies it is a more important explanatory factor than Nei distance per se. Column 2 of Table XII continues to suggest that. In column 3, the 5-HTT variable survives the inclusion of GDP and geographical distance. Broadly equivalent findings are reported in Table XII, where we used thriving as a dependent variable. It should be said that, with 4 variables and 28 observations, the regression equations in the last two tables are potentially over-fitted. Hence they are meant here simply as robustness checks.

4. Conclusions

This study explores a long-standing puzzle in quantitative social science. For some decades, a famous cross-country pattern of happiness and well-being -- with nations like Denmark at or near to the top -- has remained largely unexplained. We have shown here that it is correlated with countries' genetic differences. The implied effect-size is not minor. The right-hand columns of Table II, for example, reveal that a one standard deviation in genetic distance is associated with an approximately one third of a standard deviation in country well-being. Contrary to our own initial presumptions, there are thus reasons to believe that genetic data may help researchers to understand international well-being levels. If true, this suggests that, as implied by the iconoclastic ideas of Spolaore and Wacziarg (2009), economists may need to pay greater heed to the role of genetic variation across national populations.

We find that the closer a nation is to the genetic makeup of Denmark the happier is the country. As a raw correlation, this result is not a particularly persuasive one. However, the correlation survives adjustment in the regression equations for key confounding variables. It is robust to the inclusion of controls for

- (i) the GDP of the country,
- (ii) the level of the Human Development Index of the country,
- (iii) the geographical distance of the country from Denmark,
- (iv) a range of cultural and religious variables,
- (v) separate dummy variables for each continent,
- (vi) indices of nations' institutions and the extent of their welfare states.

Hence the relationship between well-being and genetic distance is not caused merely by inherent differences between continents nor by the obvious fact that, for example, African nations are poor and have different genetic characteristics than rich European countries.

Whatever their possible merits, our results should be treated with extreme caution. It is necessary to recall the general strictures of Benjamin et al. (2012) and in particular three concerns: statistical power; the multiple comparisons problem; the comparatively small differences in genetic makeup and (S)5-HTT in industrialized countries. First, and most seriously, the largest data set at our disposal has 143 cross-national observations. As is true in all social science on the study of different countries, more statistical power would be desirable. An important avenue for future research will be to check that the results can be replicated in other ways -- perhaps across regions within nations. Second, it is known in the field of genetics that the search for patterns can routinely lead to the discovery of illusory Type-I-error associations. The first section of the paper examines many possible confounders. To try further to guard against the problem, (i) we followed the lead, in the second part of the paper, of an established literature that previously found at the level of the individual there is evidence to implicate (S)5-HTT polymorphisms in the causes of happiness and depression, and (ii) we documented evidence that that variable goes some way to explaining the statistical significance of the genetic distance variable used in the first part of the paper. Third, the findings in the second section of the paper imply that noticeable well-being differences across countries can be linked to fairly small differences in the proportion of their populations with the short allele version of 5-HTT. At a glance, that appears paradoxical. One explanation could lie in a form of happiness multiplier within a society. If the happiness of an individual is magnified by social contact with other happy people -- as has been demonstrated by researchers Nicholas Christakis and James Fowler (2008) and is intuitively clear from observation of emotional externalities upon members within a family where someone has clinical depression -- then it is straightforward to write down models in which small differences in starting happiness can have larger, multiplied effects throughout a society. A mathematical framework of a related kind has been developed for social-science settings (Clark and Oswald 1998). The broad idea of matrix multipliers in social science is an old one and goes back, in a different substantive setting, to the work on input-output theory by the late Wassily Leontief (1936). Here, let h be a vector of happiness levels in the population (where the length of the vector is the number of individuals), A be a matrix of coefficients of happiness interdependence, and e be a vector of genetic endowments of happiness. Then the happiness vector in a society is a fixed-point solution given by equation:

$$h = Ah + e$$

$$= (I - A)^{-1} e$$

Happiness vector = multiplier matrix * genetic happiness-endowment vector

where I is the identity matrix. In this framework, a greater genetic endowment of happiness would have magnified effects in society, and these would work through a multiplier matrix given by the inverse of (I – A).

The paper's empirical results are exploratory and should be treated cautiously. Much remains to be understood, at the interesting border between the social and natural sciences, about international well-being.

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Data Appendix

Table AIII summarizes the main variables.

For the second section of the analysis, we examined associations between nations' well-being and the prevalence of the short (S) allele of the 5-HTTLPR. Because a cross-national study has relatively few degrees of freedom, we focused on the single hypothesis of a linear relationship between well-being and the proportion of individuals in the population with the short allele 5-HTT. Throughout, significance tests were two-tailed and alpha was set at 0.05.

Our data draw upon painstaking data collection by Joan Chiao and Katherine Blizinsky on allelic frequency of 5-HTTLPR among 50135 individuals living in 29 nations + Taiwan (Argentina, Australia, Austria, Brazil, Denmark, Estonia, Finland, France, Germany, Hungary, India, Israel, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Poland, People's Republic of China, Russia, South Africa, Slovenia, Singapore, Spain, Sweden, Taiwan, Turkey, UK and USA). Their data set was compiled from 124 peer-reviewed publications.

We combined this genetic information with well-being data taken from various social-science sources. In most cases, we used the original surveys ourselves to calculate the well-being scores. Some of our well-being measures, however, were developed by Gallup, based on the Cantril Self-Anchoring Striving Scale. The Cantril Self-Anchoring Scale consists of the following: *Please imagine a ladder with steps numbered from zero at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? (ladder-present) On which step do you think you will stand* *about five years from now? (ladder-future).* Based on statistical studies of the ladder-present and ladder-future scales, Gallup formed an index called Thriving -- well-being that is strong, consistent, and progressing. These respondents have positive views of their present life situation (7+) and have positive views of the next five years (8+). Another index is Struggling -- well-being that is moderate or inconsistent. These respondents have moderate views of their present life situation OR moderate OR negative views of their future; they are either struggling in the present or expect to struggle in the future. The exact cut-offs are that Gallup classifies people in this way if they report current life to be between a 5 and a 7 and their future life between a 5 and an 8. Finally, Suffering include the individual rate both their current and their future satisfaction levels equal or less than 4

We complement Gallup data by using life satisfaction data from the World Values Survey (WVS) for both the analysis of 30 countries and the smaller sample of European nations. In the WVS the variable used to assess personal satisfaction is the answer to the question: "*All things considered, how satisfied are you with your life as a whole these days?*" which is coded on a scale from 1 (dissatisfied) to 10 (satisfied). We consider the data from the two last waves: 1999-2004 and 2005-2008; and we use the proportion of individuals declaring level of life satisfaction equal to 9, 10 and 8,9,10.

Finally, we also use data on life satisfaction in 2010 from the Eurobarometer Surveys (The Eurobarometer asks: *'On the whole how satisfied are you: very satisfied(=4); fairly satisfied (=3); not very satisfied (=2) or not at all satisfied (=1) with the life you lead?'*) and data on self-reported happiness from the European Quality of Life Survey, 2007 (*Taking all things together on a scale of 1 to 10, how happy would you say you are? Here 1 means you are very unhappy and 10 means you* *are very happy*), taken from the coefficients in earlier work on European well-being patterns by Blanchflower and Oswald (2008, Table 4).

Another index of well being we considered is the residual of the Gallup Cantrill ladder after controlling for healthy life expectancy, perception of corruption, GDP per capita, freedom to make a choice, social support, generosity, developed by Heliwell and Wang (2013).

The country per-capita GDP data are taken from the World Bank World Development Indicators data set and relate to year 2005; they are PPP adjusted and are expressed in constant US Dollars. The social-benefit variable, expressed as a percentage of GDP, relates to year 2008 and is from the World Bank World Development Indicators data set. The United Nation HDI (Human Development Index) relates to 2005.

The cultural variables we considered include the well-known Hofstede cultural-dimensions variable at the country level.[5] The religion adherence data are from Barro (2003). The index of linguistic distance from Danish follows Fearon (2003) [6] and the data on colonial origins are from the CEPII dataset (http://www.cepii.fr/CEPII/en/bdd_modele/bdd.asp) and are expressed as dummy variables indicating, in the case of each country, the long-term colonizer.

For Table XIII, the happiness of individuals born in the United States is available from the General Social Survey database (GSS). This data source covers the period 1972-2012 and provides information on the birth place and the country of origin of the respondent's forebears since 1977. The GSS variable for the country of

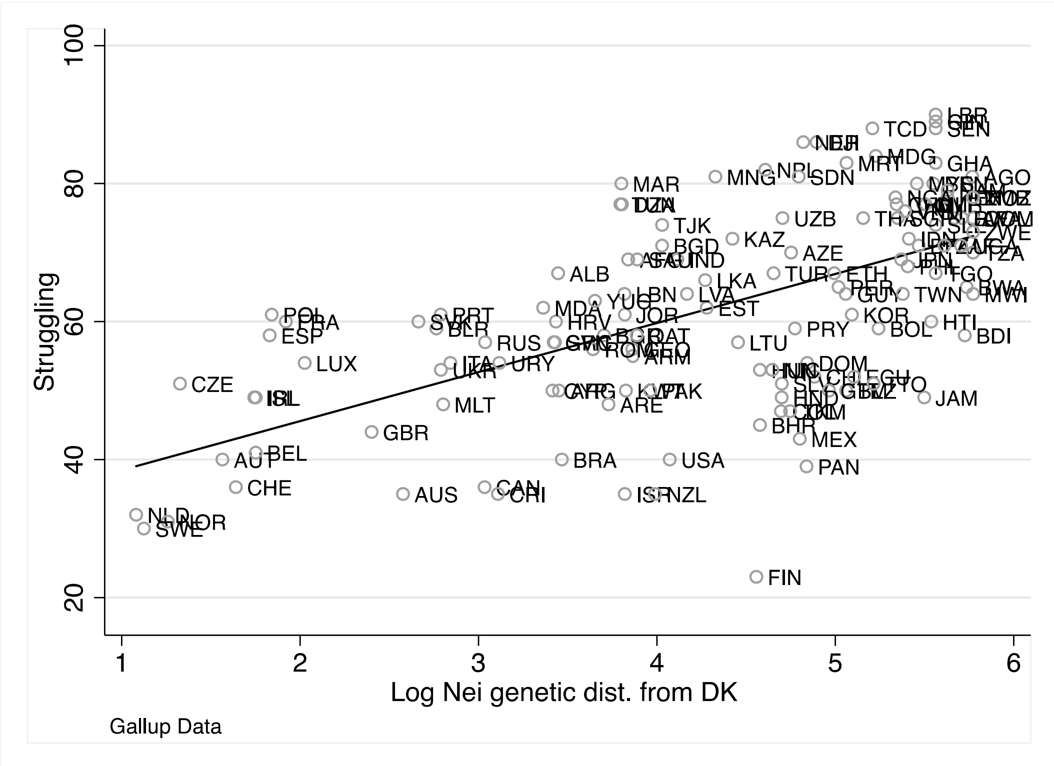
[5] They were developed by Hofstede from surveys of IBM employees in approximately 60 countries.
[6] Fearon used data from Ethnologue to create linguistic trees, classifying languages into common families and displaying graphically the degree of relatedness of world languages. The linguistic tree in this data set contains up to 15 nested classifications. If two languages share many common nodes in the tree, these languages are more likely to trace their roots to a more recent common ancestor language. The number of common nodes in the linguistic tree, then, is a measure of linguistic similarity.

origin reads as follows: From what countries or part of the world did your ancestors come? We use answers to that question as a marker of (at least some degree of) genetic influence from that country.

FIGURES

Figure I

A Multi-Country Scatter Plot of the Relationship Between Psychological 'Struggling' and Genetic Distance



Here, and in later figures and tables, the genetic distance variable is calculated with respect to Denmark (denoted DK) as the base.

The genetic distance measure here uses the definition due to Masatoshi Nei.

Nei M. Interspecific gene differences and evolutionary time estimated from electrophoretic data on protein identity. *Amer. Naturalist* **105**:385-98, 1971.

Nei's distance measure $\boldsymbol{D = -\ln I}$

where $\boldsymbol{I = \Sigma x_i y_i / (\Sigma x_i^2 \; \Sigma y_i^2)^{0.5}}$

Figure II

Multi-country Scatter Plots of the Relationship Between a Variety of Well-being Variables and the Genetic Distance from Denmark

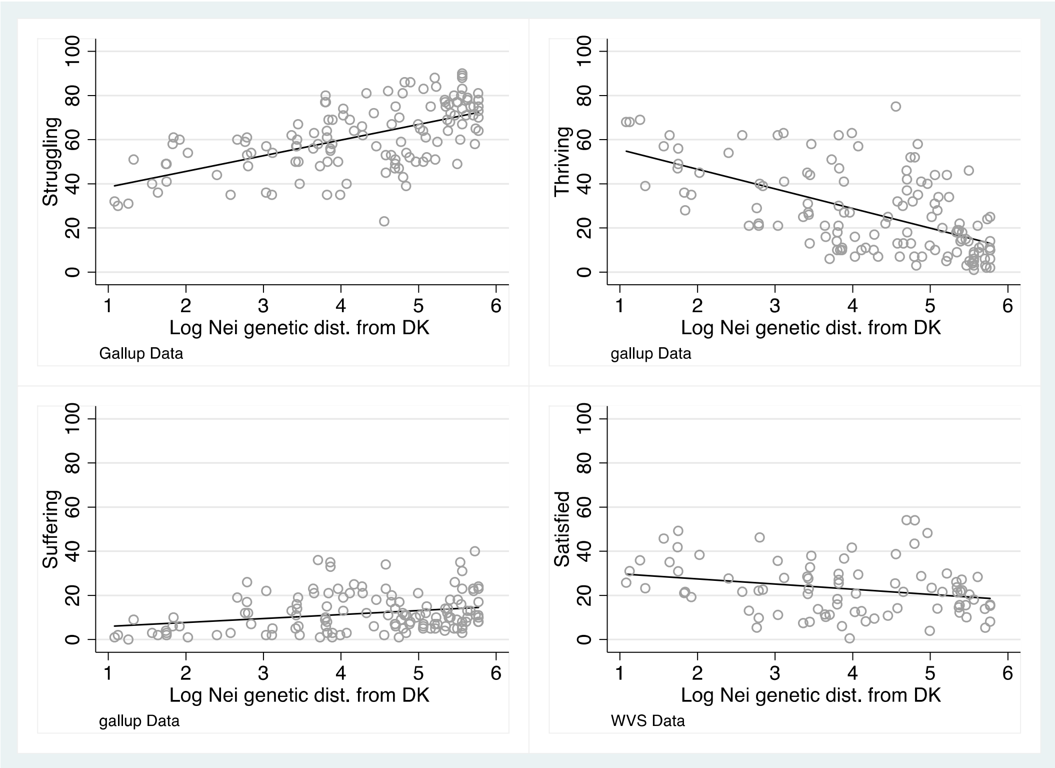
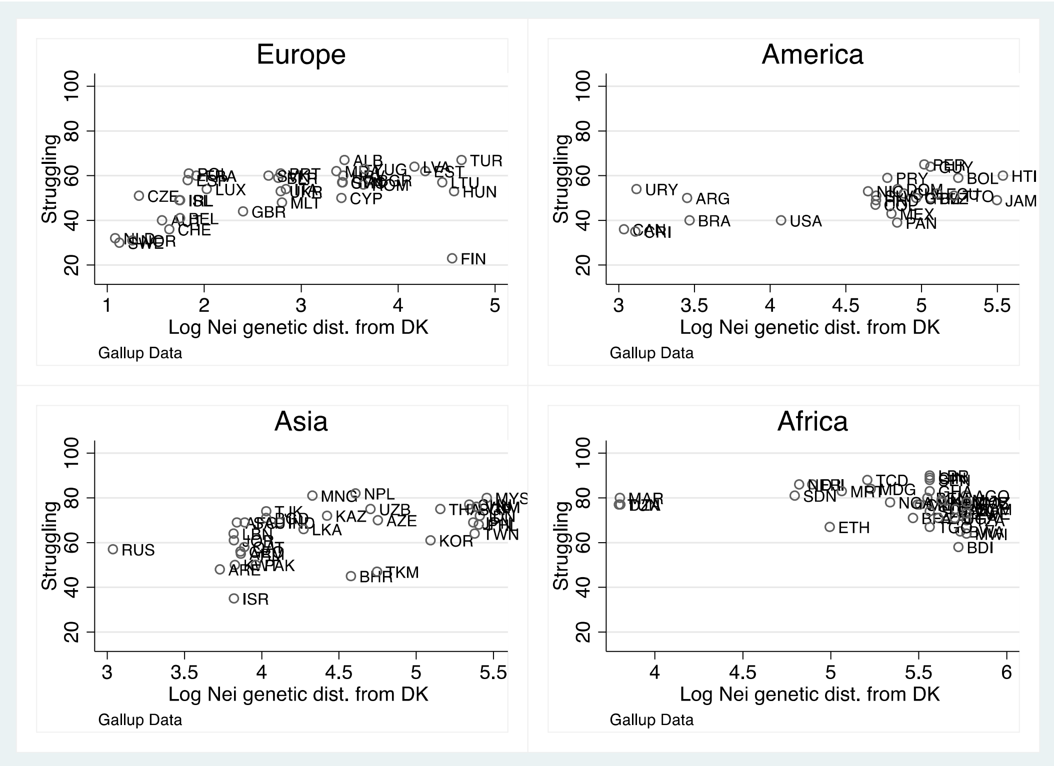


Figure III

The Raw Data, for Each Continent, for 'Struggling' and the Genetic Distance from Denmark



If best-fitting lines are estimated for each of these continents, the lines for Europe, America and Asia have a positive and statistically significant slope (at 95% on a two-tailed test), and the line for Africa has a negative and non-significant slope.

Figure IV. The Correlation Between Life Satisfaction and Happiness and (S)5-HTT in the West European Countries (from Eurobarometers in 1a and EQLS in 1b)

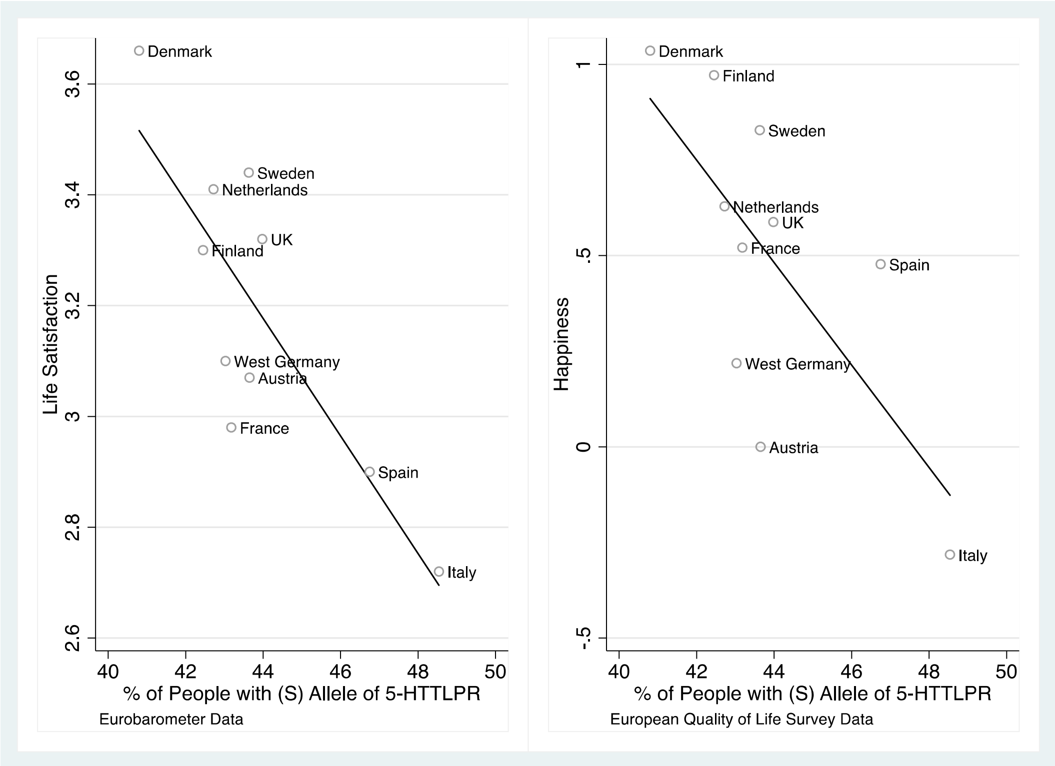
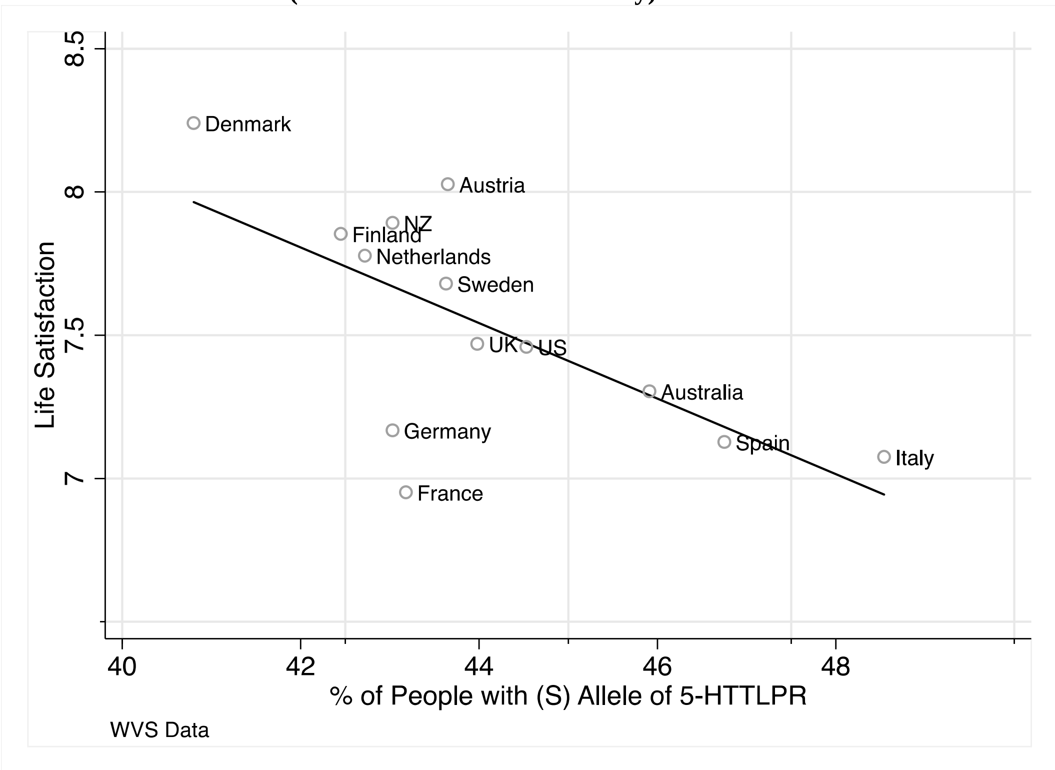


Figure V. The Correlation Between Life Satisfaction and (S)5-HTT in the West European Countries and Western Offshoots (from the World Values Survey)



TABLES

TABLE I

Psychological Struggling Equations for a Sample of 131 Nations

(DK here is Denmark. 'Struggling' is defined as present life situation between 5 and a 7 and future life between a 5 and an 8. Gallup data.)

VARIABLES	(1) Struggling	(2) Struggling	(3) Struggling	(4) Struggling	(5) Struggling
Log Nei genetic dist. from DK	7.11***	3.22***	5.46***	2.49*	3.61***
	(0.68)	(1.01)	(1.58)	(1.49)	(1.27)
GDP difference from DK		5.63***	5.46***	3.24***	3.27***
		(1.05)	(1.13)	(0.98)	(1.00)
Log geographic dist. from DK			-4.14**	4.52*	
			(1.72)	(2.51)	
Africa				2.67	7.18*
				(4.60)	(3.85)
America				-19.1***	-11.6***
				(4.33)	(3.04)
Asia				-1.70	3.39
				(3.85)	(3.19)
Oceania				-29.0***	-17.3***
				(6.02)	(2.97)
Constant	31.4***	37.8***	63.0***	11.3	39.9***
	(2.98)	(3.17)	(10.6)	(16.4)	(3.47)
Observations	131	131	131	131	131
R-squared	0.359	0.500	0.529	0.682	0.672

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE II

Thriving Equations for a Sample of 131 Nations

(‘Thriving’ is defined as present life situation (7+) and the next five years (8+). Gallup data)

VARIABLES	(1) Thriving	(2) Thriving	(3) Thriving	(4) Thriving	(5) Thriving
Log Nei genetic dist. from DK	-8.90***	-3.30**	-8.08***	-6.17***	-6.26***
	(0.87)	(1.27)	(2.04)	(2.18)	(1.71)
GDP diff from DK		-8.12***	-7.74***	-7.08***	-7.08***
		(1.19)	(1.30)	(1.09)	(1.09)
Log geographic dist. from DK			8.81***	-0.34	
			(2.25)	(3.74)	
Africa				8.28	7.94
				(5.96)	(5.36)
America				24.2***	23.7***
				(6.22)	(4.28)
Asia				4.81	4.42
				(5.53)	(4.43)
Oceania				27.2***	26.3***
				(9.57)	(5.13)
Constant	64.4***	55.2***	1.64	60.1**	57.9***
	(4.08)	(4.23)	(14.1)	(24.1)	(4.58)
Observations	131	131	131	131	131
R-squared	0.350	0.532	0.616	0.706	0.706

DK here, and in later tables, is Denmark.

Table III

Suffering Equations for a Sample of 131 Nations

('Suffering' is defined as a present life situation less than 7 and the perceived next five years of less than 8. Gallup data.)

VARIABLES	(1) Suffering	(2) Suffering	(3) Suffering	(4) Suffering	(5) Suffering
Log Nei genetic dist. from DK	1.80***	0.12	2.62***	3.66***	2.65***
	(0.49)	(0.60)	(0.90)	(0.99)	(0.86)
GDP diff from DK		2.43***	2.24***	3.75***	3.73***
		(0.74)	(0.74)	(0.82)	(0.83)
Log geographic dist. from DK			-4.61***	-4.11**	
			(1.05)	(2.06)	
Africa				-10.8***	-14.8***
				(3.42)	(3.13)
America				-5.10	-11.9***
				(4.00)	(2.28)
Asia				-3.06	-7.70***
				(3.69)	(2.81)
Oceania				1.68	-8.97***
				(5.84)	(2.55)
Constant	4.15*	6.93***	35.0***	28.3**	2.18
	(2.12)	(2.09)	(6.86)	(13.4)	(2.14)
Observations	131	131	131	131	131
R-squared	0.067	0.143	0.250	0.333	0.309

TABLE IV

High -Life-Satisfaction Equations for a Sample of 86 Nations

('Lfsato8910' is defined here as life satisfaction between 8 and 10. WVS data)

VARIABLES	(1) Lfsato8910	(2) Lfsato8910	(3) Lfsato8910	(4) Lfsato8910	(5) Lfsato8910
Log Nei genetic dist. from DK	-5.40***	-0.90	-5.69***	-5.20**	-3.34*
	(1.14)	(1.45)	(2.07)	(2.26)	(1.80)
GDP diff from DK		-8.35***	-7.98***	-8.56***	-8.38***
		(1.54)	(1.66)	(1.80)	(1.77)
Log geographic dist. from DK			8.56***	7.44*	
			(2.27)	(4.24)	
Africa				4.58	11.3*
				(6.96)	(6.58)
America				9.72	22.5***
				(8.22)	(4.72)
Asia				-4.09	4.61
				(6.37)	(5.05)
Oceania				-6.26	13.0*
				(12.9)	(7.09)
Constant	62.7***	56.6***	5.55	12.6	59.7***
	(4.83)	(4.84)	(14.3)	(26.9)	(5.33)
Observations	86	86	86	86	86
R-squared	0.153	0.355	0.462	0.521	0.499

TABLE V

Life-Satisfaction Equations for a Sample of 86 Nations

(Life satisfaction here is defined as average life satisfaction. WVS data)

VARIABLES	(1) Lfsato	(2) Lfsato	(3) Lfsato	(4) Lfsato	(5) Lfsato
Log Nei genetic dist. from DK	-0.28***	0.014	-0.30***	-0.31***	-0.16*
	(0.070)	(0.074)	(0.10)	(0.11)	(0.095)
Log GDP diff. from DK		-0.54***	-0.52***	-0.52***	-0.50***
		(0.083)	(0.087)	(0.100)	(0.097)
Log geographic dist. from DK			0.57***	0.57***	
			(0.12)	(0.22)	
Africa				0.017	0.53
				(0.41)	(0.40)
America				0.36	1.35***
				(0.44)	(0.25)
Asia				-0.16	0.51*
				(0.38)	(0.30)
Oceania				-0.75	0.73*
				(0.68)	(0.38)
Constant	7.66***	7.26***	3.85***	3.86***	7.48***
	(0.28)	(0.25)	(0.76)	(1.42)	(0.28)
Observations	86	86	86	86	86
R-squared	0.121	0.375	0.520	0.554	0.515

TABLE VI

Struggling Equations for a Sample of 128 Nations (with the HDI Human Development Index and social benefits as control variables)

(Gallup data)

VARIABLES	(1) Struggling	(2) Struggling	(3) Struggling	(4) Struggling	(5) Struggling
Log Nei genetic dist. from DK	7.11***	3.07**	3.78**	3.61**	2.96**
	(0.68)	(1.45)	(1.54)	(1.53)	(1.40)
Log HDI diff. with DK		5.87***	4.79***	3.71***	4.56***
		(1.63)	(1.55)	(1.34)	(1.38)
Log soc. benefits diff. from DK			0.99	0.92	
			(1.21)	(0.77)	
Africa				8.66**	6.64**
				(3.39)	(3.02)
America				-12.7***	-13.5***
				(2.69)	(2.51)
Asia				3.51	3.13
				(3.10)	(2.79)
Oceania				-16.0***	-15.5***
				(2.50)	(2.32)
Constant	31.4***	60.0***	51.3***	50.0***	58.1***
	(2.98)	(8.91)	(10.6)	(8.28)	(7.40)
Observations	131	128	92	92	128
R-squared	0.359	0.492	0.466	0.712	0.713

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table VII

Thriving Equations for a Sample of 131 Nations (with culture and religion variables as controls)

VARIABLES	(1) Thriving	(2) Thriving	(3) Thriving	(4) Thriving
Log Nei genetic dist. from DK	-6.46***	-7.56***	-7.84***	-7.25***
	(1.75)	(1.52)	(1.48)	(2.61)
Log GDP diff. from DK	-5.87***	-5.67***	-5.62***	-5.95*
	(1.05)	(1.01)	(1.03)	(2.93)
Log geographic dist. from DK	1.38	2.03	2.03	0.77
	(3.41)	(3.10)	(3.41)	(7.92)
Differences in the % of				
Catholics	14.0**	12.5	11.4	23.6*
	(5.44)	(7.86)	(8.14)	(13.1)
Protestants	-42.4***	-50.7***	-52.0***	-59.8***
	(12.1)	(11.7)	(12.9)	(19.0)
Other Chr.	32.5***	28.5***	28.7***	14.5
	(8.77)	(10.6)	(10.7)	(20.0)
Orthodoxs	6.57	8.90	8.46	21.2
	(7.31)	(8.85)	(8.99)	(19.8)
Jews	48.9***	45.9***	45.9***	46.9**
	(4.87)	(7.33)	(7.36)	(21.4)
Muslims	15.7***	15.7**	15.6**	22.8
	(5.73)	(7.58)	(7.77)	(14.7)
Buddists	10.1	14.2	14.3	23.2*
	(6.97)	(11.7)	(11.6)	(13.1)
Hinduists	2.15	1.55	1.74	3.80
	(5.68)	(9.23)	(8.97)	(13.4)
Others	24.1***	25.5**	27.2**	37.1
	(8.55)	(10.8)	(11.5)	(67.3)
Language dist.			-1.74	-3.65
			(3.37)	(4.29)
Log Differences in Hofstede index of				
Individualism				-2.22
				(3.05)
Power distance				-2.53
				(4.49)
Uncertainty avoidance				-2.94
				(4.22)
Masculinity				-1.36
				(2.08)
Constant	69.0***	74.4***	77.4***	113**
	(20.6)	(19.3)	(23.5)	(43.6)
Colonial origin	No	Yes	Yes	Yes
Observations	131	131	124	60
R-squared	0.808	0.855	0.850	0.903

Table VIII

Suffering Equations for a Sample of 131 Nations (with culture and religion variables as controls)

VARIABLES	(1) Suffering	(2) Suffering	(3) Suffering	(4) Suffering
Log Nei genetic dist. from DK	3.82***	4.28***	4.28***	4.54**
	(1.03)	(1.23)	(1.16)	(1.85)
Log GDP diff. from DK	3.17***	3.11***	3.08***	5.70**
	(0.94)	(0.89)	(0.92)	(2.29)
Log geographic dist. from DK	-4.66**	-6.22**	-7.49***	-6.14
	(1.94)	(2.43)	(2.53)	(4.79)
Differences in the % of				
Catholics	5.68	7.38	8.29	-7.47
	(4.51)	(4.94)	(5.15)	(7.16)
Protestants	1.97	6.34	6.07	13.9
	(6.06)	(5.42)	(5.87)	(9.21)
Other Chr.	-7.55	-6.37	-6.31	-1.29
	(6.98)	(7.48)	(7.58)	(10.9)
Orthodoxs	16.6**	16.7**	17.1**	-4.25
	(6.59)	(7.19)	(7.05)	(13.6)
Jews	-7.60*	-6.55	-8.01	-22.5
	(4.03)	(4.90)	(5.02)	(14.8)
Muslims	-3.14	-0.46	-0.77	-13.1
	(4.60)	(4.75)	(4.85)	(10.3)
Buddists	-2.77	-0.94	0.16	-18.9**
	(9.15)	(11.2)	(11.1)	(8.88)
Hinduists	-0.62	-0.67	-1.02	-3.67
	(7.63)	(9.41)	(9.27)	(10.1)
Others	-6.84	1.70	4.11	-46.6
	(9.44)	(9.49)	(9.20)	(35.5)
Language dist.			-0.40	-1.30
			(1.90)	(2.67)
Log Differences in Hofstede index of				
Individualism				0.69
				(2.00)
Power distance				-1.14
				(2.79)
Uncertainty avoidance				4.50
				(3.37)
Masculinity				0.23
				(1.10)
Constant	26.2**	32.5**	41.4**	20.8
	(12.5)	(14.8)	(17.4)	(29.1)
Colonial origin	No	Yes	Yes	Yes
Observations	131	131	124	60
R-squared	0.472	0.554	0.560	0.776

Table IX

Struggling Equations for a Sample of 131 Nations (with culture and religion variables as controls)

VARIABLES	(1) Struggling	(2) Struggling	(3) Struggling	(4) Struggling
Log Nei genetic dist. from DK	2.63**	3.26***	3.53***	2.81**
	(1.12)	(0.94)	(0.95)	(1.35)
Log GDP diff. from DK	2.63***	2.48***	2.45***	0.25
	(0.92)	(0.82)	(0.82)	(2.26)
Log geographic dist. from DK	3.32	4.29**	5.55**	5.08
	(2.26)	(2.13)	(2.17)	(4.42)
Differences in the % of				
Catholics	-19.7***	-19.6***	-19.4***	-15.1*
	(5.19)	(5.30)	(5.34)	(8.60)
Protestants	40.5***	43.9***	45.5***	45.5***
	(8.64)	(8.76)	(9.52)	(12.1)
Other Chr.	-25.3***	-21.8**	-22.1**	-12.4
	(8.54)	(8.54)	(8.71)	(14.1)
Orthodoxs	-23.4***	-25.1***	-25.0***	-16.8
	(5.58)	(5.51)	(5.63)	(11.3)
Jews	-41.4***	-39.1***	-37.6***	-23.7*
	(4.50)	(5.56)	(5.58)	(13.3)
Muslims	-12.7**	-15.1***	-14.7**	-9.14
	(5.28)	(5.44)	(5.64)	(8.30)
Buddists	-7.37	-13.0*	-14.3**	-3.85
	(5.97)	(6.70)	(6.94)	(9.85)
Hinduists	-1.48	-0.30	-0.12	0.24
	(6.56)	(6.30)	(6.21)	(10.6)
Others	-17.5*	-27.4***	-31.5***	11.4
	(10.3)	(10.3)	(10.3)	(44.0)
Language dist.			2.12	4.85
			(2.46)	(2.90)
Log Differences in Hofstede index of				
Individualism				1.49
				(1.74)
Power distance				3.80
				(3.08)
Uncertainty avoidance				-1.71
				(2.47)
Masculinity				0.95
				(1.40)
Constant	4.59	-7.30	-19.2	-31.1

	(13.7)	(13.7)	(14.2)	(24.4)
Colonial origin	No	Yes	Yes	Yes
Observations	131	131	124	60
R-squared	0.792	0.845	0.850	0.905

Table X. A Check that the Nei Measure Correlates with Adjusted Well-being Rankings in the Existing Published Literature

VARIABLES	(1) Residual_Helliwell	(2) Residual_Ott	(3) Residual_Hudson
Log Nei genetic dist. from DK	-0.15***	-0.17***	-0.26***
	(0.047)	(0.062)	(0.070)
Log geographic dist. from DK	0.24***	0.36***	0.53***
	(0.069)	(0.091)	(0.13)
Constant	0.63	-2.28***	-3.40***
	(0.43)	(0.55)	(0.82)
Observations	143	91	24
R-squared	0.078	0.177	0.472

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The dependent variables in the three columns are unexplained country residuals from well-being equations in the work of, respectively, John Helliwell, Jan Ott, and John Hudson. We are deeply grateful to these scholars for their assistance and for providing their data so generously.

See Ott's dissertation, chapter 14.

Table XI

Struggling Equations for a Sample of 28 Nations (with HTTLPR5 as a control)

VARIABLES	(1) Struggling	(2) Struggling	(3) Struggling	(4) Struggling
Log Nei genetic dist. from DK	1.69	5.20***	2.60	4.88*
	(2.35)	(1.63)	(2.55)	(2.76)
Log HTTLPR5 dist.	7.57**		9.07***	
	(3.19)		(2.62)	
Log GDP diff from DK			6.24***	8.10**
			(2.21)	(3.32)
Log geographic dist. from DK			-5.35***	-2.17
			(1.63)	(2.94)
Constant	32.0***	33.3***	65.1***	47.0**
	(5.89)	(6.08)	(12.8)	(18.7)
Colonial Origin	No	Yes	Yes	Yes
Observations	28	28	28	28
R-squared	0.422	0.239	0.575	0.361

Table XII

Thriving Equations for a Sample of 28 Nations (with HTTLPR5 as a control)

VARIABLES	(1) Thriving	(2) Thriving	(3) Thriving	(4) Thriving
Log Nei genetic dist. from DK	-4.85	-7.45***	-6.40	-8.46**
	(3.92)	(1.95)	(4.23)	(3.69)
Log HTTLPR5 dist.	-5.61		-8.18*	
	(5.90)		(4.61)	
Log GDP diff from DK			-11.5***	-13.2***
			(3.13)	(4.11)
Log geographic dist. from DK			9.46***	6.59
			(2.68)	(3.95)
Constant	66.5***	65.5***	8.05	24.3
	(7.26)	(7.35)	(18.4)	(24.6)
Observations	28	28	28	28
R-squared	0.304	0.252	0.559	0.470

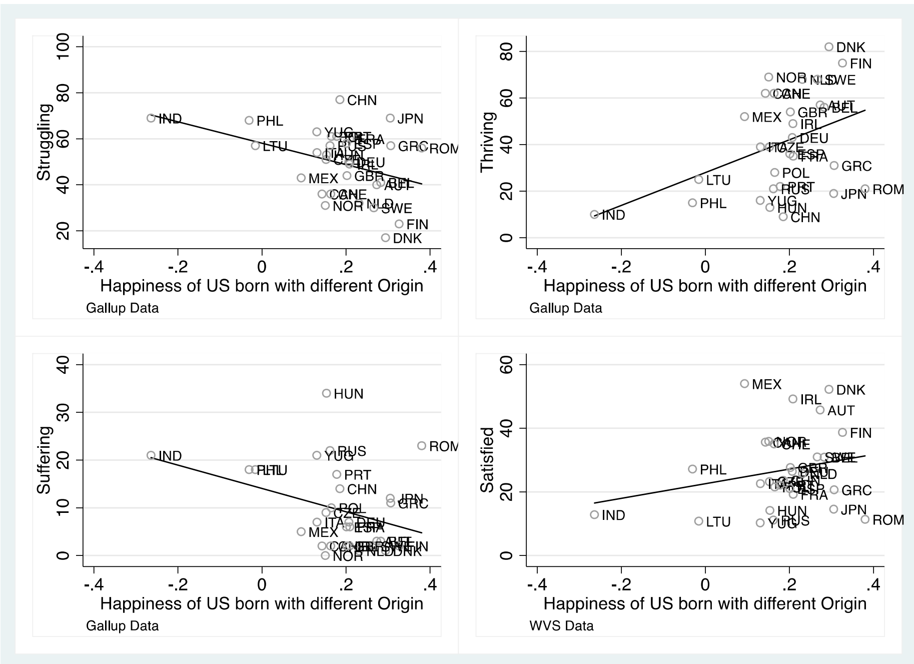
Table XIII

A Check on Whether the Current Well-being of Nations is Correlated with the Reported Well-being of Americans with Ancestors from that Nation.

Source of data on American happiness: General Social Surveys.

VARIABLES	(1) Struggling	(2) Thriving	(3) Suffering	(4) Lfsato8910
Happiness of US-born with different origins	-46.5**	70.4***	-24.4**	62.9**
	(16.8)	(25.1)	(10.1)	(24.6)
Constant	58.1***	27.9***	14.1***	38.8***
	(2.63)	(4.18)	(2.01)	(4.82)
Observations	29	29	29	29
R-squared	0.154	0.165	0.121	0.184

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1



APPENDIX FIGURES AND TABLES

Figure AI. The Correlation Between Answers to the Cantril Well-being Ladder and (S)5-HTT in the West European Countries and Western Offshoots (from Gallup Data)

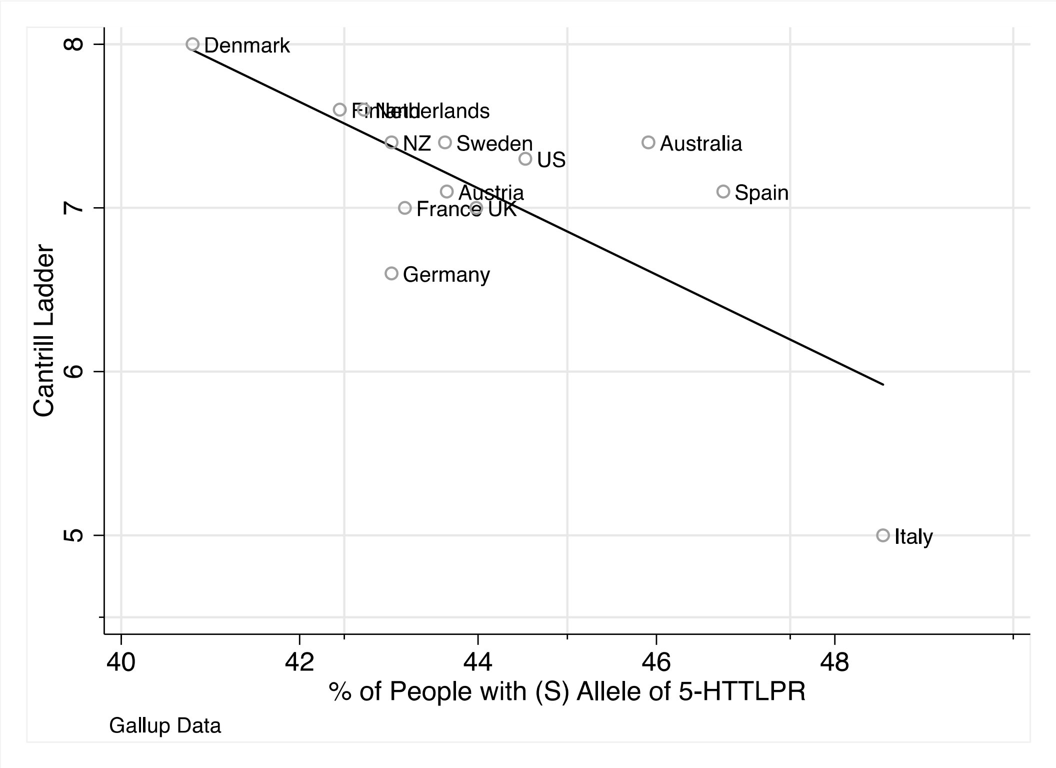


Figure AII. The Correlation Between Psychological 'Struggling' and (S)5-HTT in 30 Countries (from Gallup Data)

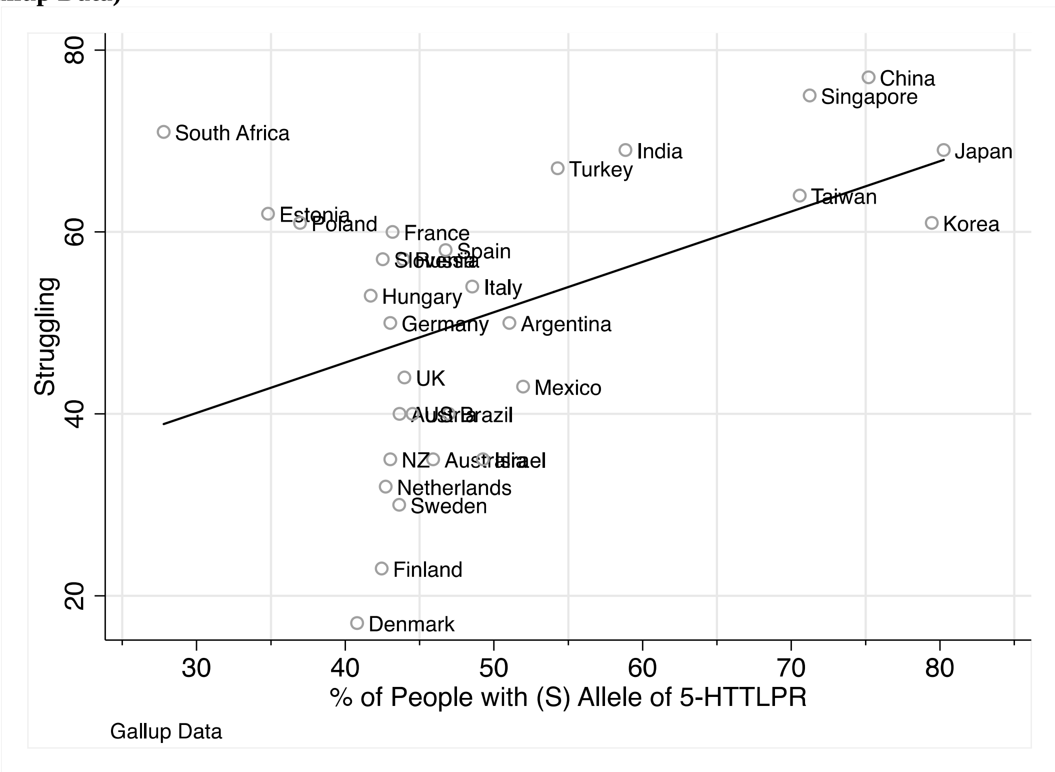


Figure AIII. The Correlation Between Very Satisfied % and (S)5-HTT in 30 Countries (from WVS Data)

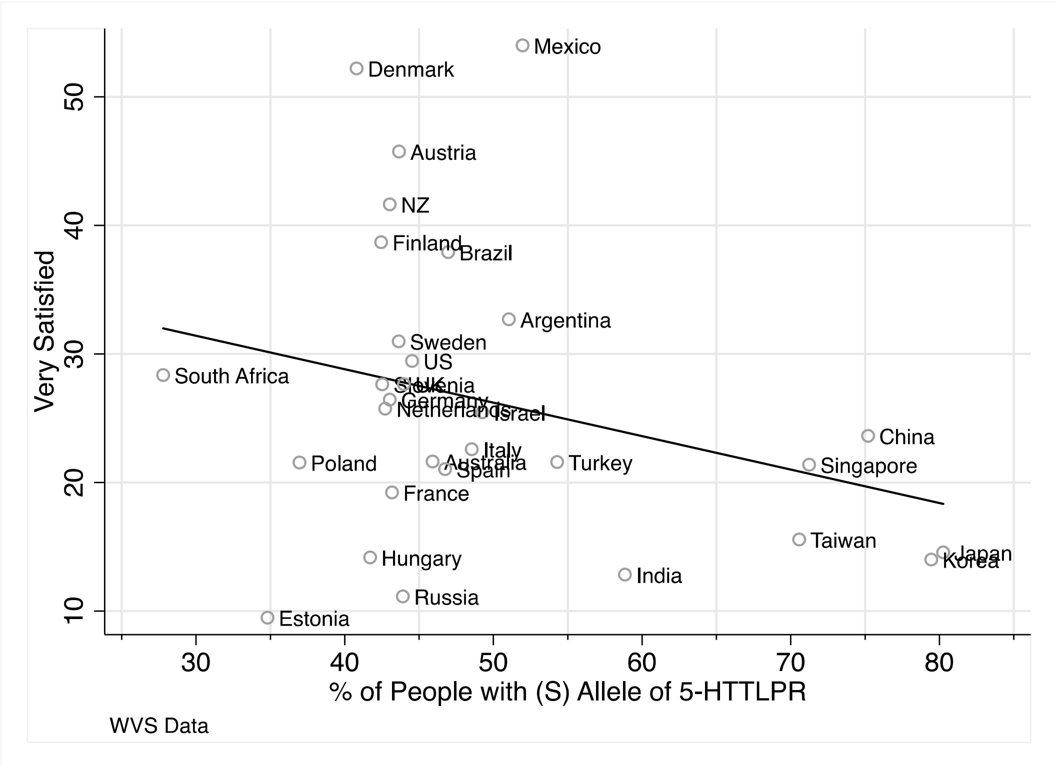


Table AI

High-Life-Satisfaction Equations for a Sample of 85 Nations (with the HDI and Social Benefits as controls)

VARIABLES	(1) Lfsato8910	(2) Lfsato8910	(3) Lfsato8910	(4) Lfsato8910	(5) Lfsato8910
Log Nei genetic dist. from DK	-5.40***	-0.94	-1.41	-2.88	-2.51
	(1.14)	(1.75)	(1.91)	(1.88)	(1.82)
Log HDI diff. with DK		-7.44***	-7.27***	-7.69***	-7.45***
		(1.82)	(1.78)	(1.60)	(1.75)
Log soc. benefits diff. from DK			-0.45	-1.89	
			(2.18)	(2.32)	
Africa				6.64	4.70
				(5.72)	(5.30)
America				22.7***	25.0***
				(5.16)	(4.70)
Asia				-2.05	2.62
				(4.94)	(4.86)
Oceania				11.0***	11.7***
				(3.70)	(4.11)
Constant	62.7***	27.9**	30.8**	36.5***	28.8***
	(4.83)	(10.7)	(14.5)	(13.6)	(9.78)
Observations	86	85	74	74	85
R-squared	0.153	0.335	0.358	0.529	0.527

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table AII

High-Life-Satisfaction Equations for a Sample of 131 Nations (with culture and religion variables as controls)

VARIABLES	(1) Lfsato8910	(2) Lfsato8910	(3) Lfsato8910	(4) Lfsato8910
Log Nei genetic dist. from DK	-4.83***	-3.85	-3.97*	-2.42
	(1.65)	(2.33)	(2.29)	(3.40)
Log GDP diff. from DK	-6.95***	-7.55***	-7.65***	-7.22
	(2.03)	(2.32)	(2.37)	(4.32)
Log geographic dist. from DK	7.51**	4.46	4.73	1.31
	(3.47)	(5.03)	(5.36)	(7.91)
Differences in the % of				
Catholics	19.3	8.13	5.44	19.8
	(11.6)	(13.1)	(12.9)	(12.6)
Protestants	-41.7***	-36.2**	-37.9**	-28.8
	(12.8)	(15.6)	(16.1)	(20.6)
Other Chr.	10.3	-2.89	-3.25	-15.9
	(16.8)	(18.8)	(18.9)	(24.2)
Orthodoxs	-2.77	-7.66	-7.95	4.89
	(13.7)	(15.1)	(14.7)	(18.8)
Jews	15.3	-1.40	-0.089	16.1
	(9.90)	(11.4)	(11.0)	(28.5)
Muslims	12.1	1.97	2.39	6.70
	(11.0)	(13.0)	(12.2)	(13.4)
Buddists	24.4*	18.9	17.5	31.2*
	(14.4)	(18.7)	(18.0)	(15.8)
Hinduists	-15.8	-29.3*	-27.4*	-14.3
	(12.6)	(15.6)	(14.8)	(18.1)
Others	29.7	18.0	25.5	25.8
	(26.4)	(28.0)	(30.2)	(62.7)
Language dist.			-1.20	0.44
			(3.25)	(5.23)
Log Differences in Hofstede index of				
Individualism				0.055
				(3.03)
Power distance				-2.66
				(5.73)
Uncertainty avoidance				-9.15
				(6.23)
Masculinity				-0.16
				(2.56)
Constant	31.7	54.0*	54.9	104**
	(21.9)	(30.0)	(33.5)	(48.2)
Observations	85	85	82	58
R-squared	0.702	0.769	0.758	0.803

Table AIII

Descriptive Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Struggling (Gallup)	133	61.33083	15.34587	17	90
Thriving (Gallup)	133	26.90977	19.44162	1	82
Suffering (Gallup)	133	11.74436	8.760841	0	40
Life satisfaction >8 (WVS)	88	23.37193	12.38959	.5316007	54.07555
Life satisfaction (WVS)	88	6.602505	1.063827	3.856764	8.307819
Ladder_residuals (Gallup)	154	1.969286	.5319533	.474	3.233
Log Nei genetic dist. from DK	170	4.469969	1.199524	1.080822	5.771932
Log HTTLPR5 dist. from DK	30	1.290266	3.087548	-14.08609	3.675034
HTTLPR5	30	49.63233	13.09076	27.79	80.25
Log GDP diff. from DK	172	8.645212	1.337195	5.221976	11.13045
Africa	172	.2965116	.4580527	0	1
America	172	.1918605	.3949136	0	1
Asia	172	.2383721	.4273319	0	1
Pacific	172	.0523256	.2233329	0	1
Log geographic dist. from DK	170	8.427093	.8635883	6.184798	9.811757
Log HDI diff. with DK	170	-1.915703	1.764283	-18.82479	-.4541303
Log soc. benefits diff. from DK	115	2.85587	1.351087	-5.295423	4.185104

Observations here are individual countries. Different data sets offer different numbers of countries. For example, people in 133 countries report their level of 'struggling' to Gallup survey interviewers.

The reason that there appear to be 172 nations in Africa, etc, is that these are one-zero variables so most of these cells are zeroes.