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GLOBAL EVIDENCE ON ECONOMIC PREFERENCES*

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This article studies the global variation in economic preferences. For this purpose, we present the Global Preference Survey (GPS), an experimentally validated survey data set of time preference, risk preference, positive and negative reciprocity, altruism, and trust from 80,000 people in 76 countries. The data reveal substantial heterogeneity in preferences across countries, but even larger within-country heterogeneity. Across individuals, preferences vary with age, gender, and cognitive ability, yet these relationships appear partly country specific. At the country level, the data reveal correlations between preferences and biogeographic and cultural variables, such as agricultural suitability, language structure, and religion. Variation in preferences is also correlated with economic outcomes and behaviors. Within countries and subnational regions, preferences are linked to

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individual savings decisions, labor market choices, and prosocial behaviors. Across countries, preferences vary with aggregate outcomes ranging from per capita income, to entrepreneurial activities, to the frequency of armed conflicts. *JEL* Codes: D01, D03, F00.

I. Introduction

Many theories of human behavior, in economics and neighboring disciplines, assume that a set of preferences drives individual decision making. This includes preferences about risk, the timing of rewards, and in the social domain, reciprocity, altruism, and trust. Given the importance of preferences in economists' conceptual framework, a substantial empirical literature has focused on understanding the potential determinants and consequences of preference variation. Although this literature has produced many insights about individual-level heterogeneity in preferences in certain populations, less is known about the global variation in preferences. This partly reflects the lack of a global data set, representative at the country level, with measures specifically designed to capture economic preferences.

This article introduces such a data set, the Global Preference Survey (GPS). The empirical analysis is motivated by a set of questions about the extent and nature of global preference heterogeneity, at different levels of aggregation: Do countries differ in terms of average preferences? Are certain preferences correlated, leading to preference bundles? How large is cross-country variation in preferences relative to within-country variation? Regarding the potential determinants of preference heterogeneity, do the GPS preference measures vary with individual characteristics like gender, age, and cognitive ability? To what extent are these differences universal or more country specific? Are country-level preference profiles related to differences in geography, culture, language, or religion? Turning to the relationship between preferences and outcomes, how does individual-level heterogeneity in financial, labor market, or prosocial choices vary with preferences around the world? Are differences in aggregate preference profiles correlated with the cross-country variation in outcomes such as economic development, charitable activities, or violent conflict?

This article explores these questions by making use of the core features of the GPS: (i) coverage of 76 countries that represent approximately 90% of the world population; (ii) representative population samples within each country for a total of 80,000

respondents; (iii) measures designed to capture time preference, risk preference, altruism, positive reciprocity, negative reciprocity, and trust, based on an ex ante experimental validation procedure (Falk et al. 2016) as well as pretests in culturally heterogeneous countries; (iv) standardized elicitation and translation techniques through the pre-existing infrastructure of a global polling institute, Gallup. These data are publicly available at https://www.briq-institute.org/global-preferences/home. The data on individual preferences are complemented by a comprehensive set of covariates provided by the Gallup World Poll 2012.

The analysis begins by describing the nature of the heterogeneity in preferences, both across and within countries. Many of the world's most patient populations are located in Europe or the English-speaking world, while risk taking is particularly prevalent in Africa and the Middle East. Prosocial preferences are particularly pronounced throughout Asia and relatively weak in sub-Saharan Africa. The various preference measures are also correlated, giving rise to distinct "preference profiles" of groups of countries: Patience and willingness to take risks are one pair of positively correlated preferences, and the prosocial traits of positive reciprocity, altruism, and trust form another grouping. Although the between-country variation in preferences is substantial, within-country variation is larger, suggesting that individual characteristics are even more important for explaining preference differences than national borders.

The analysis then turns to a more systematic, regression-based analysis of potential determinants of preference variation. The results establish that at the individual level, preferences vary systematically with gender, cognitive ability, and age. For example, women are more impatient, less risk-tolerant, and more prosocial than men. Cognitive skills are uniformly positively linked to patience, risk taking, and social preferences, and all preferences are subject to age patterns. At the same time, the relationships between sociodemographics and preferences hide considerable heterogeneity across countries: while some relationships, such as between risk aversion and gender, go in the same direction in almost all countries, others, such as the age profile for patience, appear to depend on the level of development.

Prior research has articulated and tested various hypotheses about how (population-level) preference profiles might be determined by geographic or cultural variables, including a "culture of honor," a "Protestant ethic," a "savings-linguistics" hypothesis,

or relationships between agricultural conditions and preferences (e.g., Weber 1930; Nisbett and Cohen 1996; Tabellini 2008; Chen 2013; Galor and Özak 2016; Galor, Özak, and Sarid 2016; Litina 2016). The GPS allows investigation of the correlations between all preferences and such geographic and cultural variables. Regarding biological and geographic conditions, patience, trust, and negative reciprocity are all significantly positively correlated with absolute latitude and the presence of large domesticable animals, the latter result broadly in line with the culture of honor hypothesis. Trust is significantly decreasing in different measures of agricultural suitability. Turning to cultural variables, patience is strongly and significantly correlated with a set of variables that may be summarized under the umbrella of a spirit of capitalism, that is, Protestantism and different measures of individualism. Thus, patience is positively related to a set of variables that have previously been linked to comparative development.

In a next step, we explore the relationships between preferences and individual-level behaviors and outcomes that economists have emphasized as being potentially driven by risk, time, and social preferences. The data show that patient individuals are more likely to save and have higher educational attainment; more risk-tolerant individuals are more likely to be self-employed and to be smokers; and social preferences are predictive of a broad range of prosocial behaviors and outcomes, such as donating, volunteering time, assisting strangers, helping friends and relatives, or family structure. These relationships of preferences with outcomes are qualitatively similar across almost all countries, which provides an additional out-of-context check of the ability of the GPS measures to capture behaviorally relevant heterogeneity across a wide range of cultures.

Finally, the article studies the correlations between-country-level preferences and a selected set of aggregate outcome variables that previous literatures have suggested may be related to preferences. In a first step, we focus on the relationship between preferences and economic development. An extensive line of work has studied the relationship between trust and per capita income (e.g., Knack and Keefer 1997; Algan and Cahuc 2010), and a considerable theoretical literature has emphasized the role of time preference for development. In the GPS data, trust is significantly correlated with development; at the same time, the relationship between patience and income is much stronger, in terms of both quantitative magnitude and statistical significance. For example,

when both patience and trust are inserted into a joint regression, trust loses significance. Moving to additional aggregate outcomes, we establish that risk taking is significantly correlated with proxies for entrepreneurial activities, in line with the within-country correlation between risk taking and self-employment. Average social preferences correlate with donations and volunteering across countries, again akin to the corresponding within-country results. Finally, average negative reciprocity in a country is strongly correlated with the frequency of armed conflicts.

The findings of this article tie into several different literatures in behavioral and experimental economics, cultural economics, and long-run development. Within behavioral and experimental economics, researchers have investigated potential individual-level determinants and outcomes of preference variation, though typically in smaller and more specialized samples. Work on potential determinants includes Barsky et al. (1997), Frederick (2005), Dohmen et al. (2008, 2010, 2011), and Croson and Gneezy (2009), while research on outcomes has been conducted by Barsky et al. (1997), Ventura (2003), Kirby and Petry (2004), Eckel, Johnson, and Montmarquette (2005), Bonin et al. (2007), Chabris et al. (2008), Guiso and Paiella (2008), Dohmen et al. (2009), Meier and Sprenger (2010), Rustagi, Engel, and Kosfeld (2010), Tanaka, Camerer, and Nguyen (2010), Sutter et al. (2013), Golsteyn, Grönqvist, and Lindahl (2014), Kosfeld and Rustagi (2015), and Åkerlund et al. (2016). This article speaks to open questions in the literature, for example, whether certain gender differences in preferences are relatively universal or specific to certain cultures or development levels or perhaps the product of publication bias (Gneezy, Leonard, and List 2009; Niederle 2014).

In cultural economics and political economy, this article is most closely related to research that has measured variation in preferences across societies by focusing on small selected groups, such as small scale societies or university students (Henrich et al. 2001, 2006, 2010; Apicella et al. 2014; Rieger, Wang, and Hens 2014; Talhelm et al. 2014; Vieider et al. 2015a). The GPS has the potential to open up research agendas on the cultural origins of preference variation, something that has been difficult thus far given the absence of representative cross-country data on preferences. Another related literature has investigated the role of culture or geography in shaping economic behavior, but focusing on variables such as women's labor force participation, fertility,

individualism, and future orientation (Giuliano 2007; Fernández and Fogli 2009; Gorodnichenko and Roland 2011; Alesina and Giuliano 2013; Chen 2013; Alesina et al. 2015; Galor and Özak 2016). Finally, the results on the cross-country relationships between preferences and outcomes naturally tie into the literature on comparative development, which makes increasing use of arguments about cultural variation (Ashraf and Galor 2013; Spolaore and Wacziarg 2013; Galor and Özak 2016). Although this literature has largely focused on trust, the GPS data may open up the investigation of additional hypotheses.

The remainder of the article proceeds as follows. Section II provides details on the GPS data set and compares the data with other commonly available data sources. Section III presents descriptives on the global preference variation. Section IV studies the relationship between preferences and potential determinants of preference variation at the individual and country levels. Section V investigates the relationships between preferences and economic outcomes, and Section VI concludes.

II. Data Set

II.A. General Data Characteristics

The GPS data were collected within the framework of the 2012 Gallup World Poll, a survey that includes representative population samples in a large number of countries and asks about social and economic issues on an annual basis. This section discusses some noteworthy characteristics of the data. In addition, Online Appendix A contains an extensive documentation of the data-collection process and details on the construction of the preference measures.

One important feature of the GPS data is that it measures preferences for a nationally representative sample for each of the 76 countries covered. Thus, it is possible to study how preferences vary within the population of a given country and construct country-level averages, shedding light on how preferences vary across countries. The median sample size was 1,000 participants per country.[1] Respondents were selected through probability sampling; ex post representativeness of the data can be achieved using

1. Notable exceptions include China (2,574 observations), Haiti (504 observations), India (2,539 observations), Iran (2,507 observations), Russia (1,498 observations), and Suriname (504 observations).

weights provided by Gallup. In total, the sample involves preference measures for more than 80,000 participants worldwide.

The countries included in the GPS constitute a geographically and culturally diverse set of nations. They were chosen with the aim of providing a globally representative sample. The collection of countries spans all continents, various cultures, and different levels of development. Specifically, it includes 15 countries from the Americas, 25 from Europe, 22 from Asia and the Pacific, as well as 14 African countries, 11 of which are sub-Saharan. This set of countries covers about 90% of both the world population and global income.

Another feature of the GPS data is a standardized data collection protocol across countries, achieved through several steps. Before the 2012 World Poll, Gallup conducted pretests of the GPS survey items in 22 countries of various cultural heritage. This was to ensure the implementability of the preference module in the available survey time of seven to eight minutes and to test whether respondents of culturally and economically heterogeneous backgrounds understand and interpret the items adequately (see Online Appendix AC for details). For all countries, there was a translation of all survey items from the original language to the local language and back again in an iterative process; this is Gallup's regular translation scheme, to ensure comparable meaning of the questions across languages. Monetary values used in the survey questions were also calibrated according to median household income for each country, so as to hold monetary stakes constant.[2] Finally, most of the interviews for the World Poll 2012 took place using the same response mode across individuals and countries—face-to-face interviews—although in 18 countries, telephone interviews were also used. Table 11 in Online Appendix A shows the countries included in the GPS, along with numbers of observations and the survey mode.

2. As a benchmark, we used the monetary amounts in euros that were offered in the validation study in Germany. Since monetary amounts used in the validation study with the German sample were round numbers to facilitate easy calculations (e.g., the expected return of a lottery with equal chances of winning and losing) and to allow for easy comparisons (e.g., 100 euro today versus 107.50 in 12 months), we also rounded monetary amounts in all other countries to the next "round" number. Although this necessarily resulted in some (minor) variations in the real stake size between countries, it minimized cross-country differences in the understanding of the quantitative items due to difficulties in assessing the monetary amounts involved.

II.B. Preference Measures

The GPS was designed to measure a set of preferences that play a central role in economic theory. Although economic models abstract away from many details of preferences, they explicitly model preferences over certain attributes—timing, risk, and payoffs of others—that are typically relevant for the trade-offs involved in economic decisions. Accordingly, the GPS includes measures of time preference, risk preference, and three conceptually distinct types of social preferences: unconditional altruism, positive reciprocity, and negative reciprocity. The GPS also includes a novel measure of trust.[3]

The GPS preference measures are based on 12 survey items, which were selected in an initial survey validation study (see Falk et al. 2016 for details). The validation procedure involved conducting multiple incentivized choice experiments for each preference and testing the relative abilities of a wide range of different question wordings and formats to predict behavior in these choice experiments. The particular items used to construct the GPS preference measures were selected based on optimal performance out of menus of alternative items (for details, see Falk et al. 2016). Experiments provide a valuable benchmark for selecting survey items, because they can approximate the ideal choice situations, specified in economic theory, in which individuals make choices in controlled decision contexts. Experimental measures are very costly, however, to implement in a globally representative sample, whereas survey measures are much less costly.[4] Selecting survey measures that can stand in for incentivized revealed preference measures leverages the strengths of both approaches.

The survey items are summarized in Table I. For most preferences the optimization procedure resulted in a combination of two survey items, involving one qualitative item, which is more abstract, and one quantitative item, which puts the respondent

3. Although at least partly a belief rather than a preference, trust has also been argued to be fundamental for a wide range of economic transactions (e.g., Arrow 1972).

4. For example, the measure should ideally involve large menus of choices, to give tight identification of preferences, but this is costly in terms of time. Also, to allow real choices, experiments should involve real stakes, but this is financially costly on a large scale. Data sets that contain experimental preference measures for several countries typically come from small- or medium-scale experiments and are based on student or other convenience samples (e.g., Rieger, Wang, and Hens 2014; Vieider et al. 2015a, b).

TABLE I
SURVEY ITEMS OF THE GPS

Preference	Item description	Weight
Patience	Intertemporal choice sequence using staircase method	0.712
	Self-assessment: willingness to wait	0.288
Risk taking	Lottery choice sequence using staircase method	0.473
	Self-assessment: willingness to take risks in general	0.527
Positive reciprocity	Gift in exchange for help	0.515
	Self-assessment: willingness to return a favor	0.485
Negative reciprocity	Self-assessment: willingness to take revenge	0.374
	Self-assessment: willingness to punish unfair behavior toward self	0.313
	Self-assessment: willingness to punish unfair behavior toward others	0.313
Altruism	Donation decision	0.635
	Self-assessment: willingness to give to good causes	0.365
Trust	Self-assessment: people have only the best intentions	1

Notes. See Online Appendix AF for the wording of the questions and Online Appendix AI for a discussion of the weights.

into a precisely defined hypothetical choice scenario. The quantitative items more closely resemble the choice-based experiment measures, in that they hold stakes, probabilities, and relevant information conditions constant, helping deliver comparable measures across different individuals and cultures. At the same time, the qualitative items have explanatory power for behavior in the experiments.

For each preference, the survey items are combined into a single preference measure using the weights that (endogenously) emerged from this experimental validation procedure. In particular, the experimental validation procedure allows an analysis of which linear combination of survey items performs best in predicting the corresponding experimental behavior. These weights are used to compute the final preference measures, in line with the goal of constructing variables that have experimental counterparts. At the same time, future research using the GPS may wish to focus on selected subsets of our items by, say, focusing attention on the quantitative survey formats.

Finally, for ease of interpretation, each preference measure is standardized at the individual level, so that, by construction, each preference has a mean of zero and a standard deviation of one in the individual-level world sample.

1. Time Preference. The measure of time preference is derived from the combination of responses to two survey measures,

one with a quantitative and one with a qualitative format. The quantitative survey measure consists of a series of five interdependent hypothetical binary choices between immediate and delayed financial rewards, a format commonly referred to as a "staircase" (or "unfolding brackets") procedure (Cornsweet 1962). In each of the five questions, participants had to decide between receiving a payment today or larger payments in 12 months:

> Suppose you were given the choice between receiving a payment today or a payment in 12 months. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months is different in every situation. For each of these situations we would like to know which one you would choose. Please assume there is no inflation, i.e., future prices are the same as today's prices. Please consider the following: Would you rather receive amount x today or y in 12 months?

The immediate payment x remained constant in all four subsequent questions, but the delayed payment y was increased or decreased depending on previous choices (see Online Appendix AF.1 for an exposition of the entire sequence of binary decisions). In essence, by adjusting the delayed payment according to previous choices, the questions "zoom in" around the respondent's point of indifference between the smaller immediate and the larger delayed payment and make efficient use of limited and costly survey time. The sequence of questions has 32 possible ordered outcomes. In the international survey, monetary amounts x and y were expressed in the respective local currency, scaled relative to median household income in the given country.

The qualitative measure of patience is given by the respondents' self-assessment regarding their willingness to wait on an 11-point Likert scale, asking "how willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?" As Table I indicates, the quantitative item has a weight of 71% in the time preference measure.

2. Risk Preference. Risk preferences were also elicited through a series of related quantitative questions as well as one qualitative question. Just as with patience, the quantitative measure consists of a series of five binary choices. Choices were between a fixed lottery, in which the individual could win x or zero, and varying sure payments, y:

> Please imagine the following situation. You can choose between a sure payment of a particular amount of money, or a draw, where you

would have an equal chance of getting amount x or getting nothing. We will present to you five different situations. What would you prefer: a draw with a 50% chance of receiving amount x, and the same 50% chance of receiving nothing, or the amount of y as a sure payment?

Choice of the lottery resulted in an increase of the sure amount being offered in the next question, and vice versa, thereby zooming in around the individual's certainty equivalent. Online Appendix AF.2 contains an exposition of the entire sequence of survey items. The qualitative item asks for the respondents' self-assessment of their willingness to take risks on an 11-point scale ("In general, how willing are you to take risks?"). This qualitative subjective self-assessment has previously been shown to be predictive of risk-taking behavior in the field in a representative sample (Dohmen et al. 2011) as well as of incentivized experimental risk taking across countries in student samples (Vieider et al. 2015a). The qualitative item and the outcome of the quantitative staircase measure were combined through roughly equal weights (Table I).

3. Positive Reciprocity. Respondents' propensities to act in a positively reciprocal way were measured using one quantitative item and one qualitative question. First, respondents were presented a choice scenario in which they were asked to imagine that they got lost in an unfamiliar area and that a stranger—when asked for directions—offered to take them to their destination. Respondents were then asked which out of six presents (worth between 5 and 30 euros, or the respective country-specific equivalents) they would give to the stranger as a "thank you." Second, respondents were asked to provide a self-assessment about how willing they are to return a favor on an 11-point Likert scale. These two items receive roughly equal weights (Table I).

4. Negative Reciprocity. Negative reciprocity was elicited through three self-assessments. First, respondents were asked how willing they are to take revenge if they are treated very unjustly, even if doing so comes at a cost (0—10). The second and third items probed respondents about their willingness to punish someone for unfair behavior, either toward themselves or toward a third person.[5] This last item captures prosocial punishment and

5. In the original survey design exercise, the second and third items were collapsed into one question that asked people how willing they are to punish others,

hence a concept akin to norm enforcement. These three items receive weights of about one third each (Table I).

5. Altruism. Altruism was measured through a combination of one qualitative and one quantitative item, both of which are related to donations. The qualitative question asked respondents how willing they would be to give to good causes without expecting anything in return on an 11-point scale. The quantitative scenario depicted a situation in which the respondent unexpectedly received 1,000 euros and asked them to state how much of this amount they would donate (Table I).

6. Trust. The trust measure is based on one item, which asked respondents whether they assume that other people only have the best intentions (Likert scale, 0—10). The item was a strong predictor of trusting behavior in incentivized trust games, in the survey design stage. Time constraints and the fact that there already exists a global measure of trust in the World Values Survey (WVS) data set determined the choice to have only one item measuring trust (Table I).

II.C. Further Variables of Interest

The Gallup World Poll includes a wide range of individual-level background variables, such as (i) extensive sociodemographic information (e.g., age, gender, family structure, religious affiliation, location of residence, or migration background including country of origin); (ii) a variety of self-reported behaviors and economic outcome variables including income, educational attainment, savings, labor market decisions, health, and behavior in social interactions; and (iii) opinions and attitudes about issues such as local and global politics, local institutional quality, economic prospects, safety, or happiness. The data contain regional identifiers (usually at the state or province level), allowing for cross-regional analyses within countries. The GPS survey module also elicited a self-reported proxy for cognitive skills by asking people to assess themselves regarding the statement "I am good

without specifying who was treated unfairly (Falk et al. 2016). However, in the pilot in 22 countries, a number of respondents indicated that this lack of specificity confused them, so we broke this survey item up into two questions. Accordingly, the weights for deriving an individual-level index of negative reciprocity are determined by dividing the OLS weight for the original item by 2.

at math" on an 11-point Likert scale. The publicly available GPS dataset includes all preference measures as well as information on respondents' cognitive skills and country of residence. In addition, the data contain Gallup's individual-level identifier, so that the preference measures can be matched to Gallup's entire World Poll dataset.

II.D. The GPS as a Complement to Existing Global Surveys

Questions in existing global surveys, although designed for other purposes, could potentially serve as proxies for the set of preferences measured in the GPS. This could arise from happenstance or because a question was designed to measure a trait studied in another discipline, which has some conceptual overlap with the notion of preferences as defined in economic theory. However, distinguishing weak from strong proxies is a challenge when relying on intuition. One way that the GPS complements existing surveys is by providing a new source of data to assess the validity of potential preference proxies.

This subsection presents results from such a validation exercise, for measures in the WVS and the data of Hofstede (2001), two widely used global surveys designed to measure traits that might be related to preferences: attitudes, beliefs, and personality traits.[6] The WVS provides individual-level responses for representative samples from a wide range of countries, whereas the Hofstede data include measures for a similar range of countries but at the country level, and based on nonrepresentative samples (mainly IBM employees).

Identifying candidate preference proxies in these data sets involved looking for keywords and types of trade-offs that seemed plausibly related to a respective preference. This initial identification was necessarily based on intuition. The procedure did not yield any WVS questions or Hofstede cultural dimensions that asked about something that seemed related to positive or negative reciprocity. It did lead to identifying measures that might possibly proxy for the other preferences, with varying degrees of plausibility.

6. There are various regional surveys, including the Barometer surveys of different world regions, and the European Values Survey, which have similar features to the WVS. The former mainly contain various measures of trust, whereas the latter is basically a regional version of the WVS, and thus includes similar measures to those that we analyze in the WVS. These surveys have a more limited geographic coverage than the WVS.

In the WVS, the question that seems most closely related to time preference is an item designed to capture "long-term orientation" in terms of childrearing. Specifically, the survey asks: "Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important?" This variable is coded as 1 if the individual lists "thrift, saving money and things," regardless of what other qualities the respondent lists. For risk preference, there is a seemingly plausible proxy in the WVS, which asks the respondent to judge their similarity with a hypothetical person described as follows: "Adventure and taking risks are important to this person; to have an exciting life." This WVS question was derived from the Schwartz Values Survey (Schwartz 2012) and designed to capture a universal "value of stimulation." A WVS survey item that seems to come closest to capturing altruism, albeit from a particular, societal perspective, asks respondents how similar they are to a hypothetical person for whom "it is important [...] to do something for the good of society." The WVS also includes a well-known measure of trust, which we compare to the GPS trust measure. The WVS measure asks whether the respondent thinks "most people can be trusted" or whether they would rather say that "you can't be too careful."

The Hofstede data set contains various cultural dimensions (Hofstede 2001) composed of collections of qualitative survey items. Two cultural dimensions have labels that are evocative of time and risk preference, respectively: The "long-term orientation" (LTO) cultural dimension, which is occasionally used in economics, and the "uncertainty avoidance" dimension. Both measures include individual items that seem distant from either time or risk preference, but the data do not include responses to individual items, so it is not possible to use a subset of items for preference proxies.[7]

7. The four items for long-term orientation are (i) value a person places on "doing a service to a friend"; (ii) value of "thrift (not spending more than needed)"; (iii) agreement with "persistent efforts are the surest way to results"; (iv) an item asking "How proud are you to be a citizen of your country?" The uncertainty avoidance dimension consists of (i) "How often do you feel nervous or tense?"; (ii) "All in all, how would you describe your health these days?"; (iii) agreement with "One can be a good manager without having a precise answer to every question that a subordinate may raise about his or her work;" (iv) agreement with "a company's or organization's rules should not be broken—not even when the employee thinks breaking the rule would be in the organization's best interest."

TABLE II

RELATIONSHIPS BETWEEN PREFERENCE PROXIES IN THE WVS AND HOFSTEDE (2001) AND GPS MEASURES

	Spearman's rho	p-value	Obs.
Correlations with GPS patience			
WVS long-term orientation	0.09	.52	60
Hofstede long-term orientation	0.44	<.01	56
Correlations with GPS risk taking			
WVS value of stimulation	0.32	.03	47
Hofstede uncertainty avoidance	−0.38	<.01	62
Correlation with GPS altruism			
WVS altruism	0.20	.24	35
Correlation with GPS trust			
WVS trust	0.49	<.01	60

Table II reports the country-level correlations. Starting with the WVS, the table shows that the questions for patience and altruism are only weakly correlated with the corresponding GPS preference measures. This might reflect the fact that the LTO item in the WVS is about childrearing rather than individual patience, and the altruism question is about a particular, societal perspective. On the other hand, the WVS value of stimulation measure, and the WVS trust question, are significantly positively correlated with the GPS risk preference and trust measures, respectively.[8] The Hofstede long-term orientation and uncertainty avoidance dimensions also turn out to be significantly correlated with the corresponding GPS preference measures, perhaps surprisingly given that some of the individual items underlying the cultural dimensions appear far removed from preferences.[9]

8. If the WVS candidate proxies capture preferences, one might also expect them to be related to determinants, and economic outcomes, in a similar way to the measures in the GPS. Tables 22 and 23 in Online Appendix J explore these relationships. For the WVS value of stimulation measure, and the trust measure, we find that the relationships to determinants and outcomes are broadly similar to those obtained with the GPS risk and trust measures. For the candidate altruism and time preference proxies in the WVS, by contrast, the variation with determinants and outcomes is different from the corresponding GPS measures. For example, the WVS time preference proxy has the opposite gender difference to the GPS patience measure and is negatively related to educational attainment at the individual level, and GDP at the country level, the opposite of what one would expect if it were to capture patience.

9. To shed more light on the relationship between the GPS preference measures and some of the other survey measures, Online Appendix I provides scatter

In sum, the exercise helps distinguish weaker and stronger preference proxies in existing data sets. It provides evidence for the meaningfulness of the widely used WVS trust measure and points to a potentially valuable proxy for risk preference for the WVS set of countries. The results also lend some support for using two of the Hofstede dimensions as preference proxies.

At the same time, the GPS data arguably have some important advantages along several dimensions. First, the data rely on experimentally validated survey items as opposed to ad hoc constructions. Second, in contrast to, for example, the Hofstede variables, the data rely on nationally representative samples and are hence available not only at the country level, but also at the individual or regional level. Perhaps as a consequence, Online Appendix I documents that the GPS patience measure is substantially more predictive of comparative development than the Hofstede or WVS measures. Finally, the GPS contains data on the whole set of preferences. In contrast to existing data sets, this allows the exploration of the correlation structure among multiple preference dimensions, and investigations of how relationships between preferences and outcomes might be subject to omitted variable concerns because preferences are intracorrelated.

III. Distribution of Preferences around the World

Figures I and II show how the country averages for each preference compare to the world average.[10] Each preference is normalized to have mean 0 and standard deviation 1 in the individual-level data. Country averages are computed using sampling weights provided by Gallup. In each figure, darker shades (darker blue online) indicate higher values of a given trait, while

plots between the preference data and the Hofstede variables as well as the WVS trust and risk-taking measures. These figures reveal that the measures often differ in substantive ways. For example, according to the Hofstede long-term orientation measure, Eastern European and Asian countries are considerably more patient than according to the GPS patience measure. Conversely, Western Europe is considerably more patient in the GPS measure. African and South American countries are more willing to take risks in the GPS measure than according to the Hofstede uncertainty avoidance variable, while large parts of Europe and Asia appear more risk averse according to the GPS measure.

10. Country-level averages are calculated using the sampling weights provided by Gallup. See Online Appendix AD.3 for details.

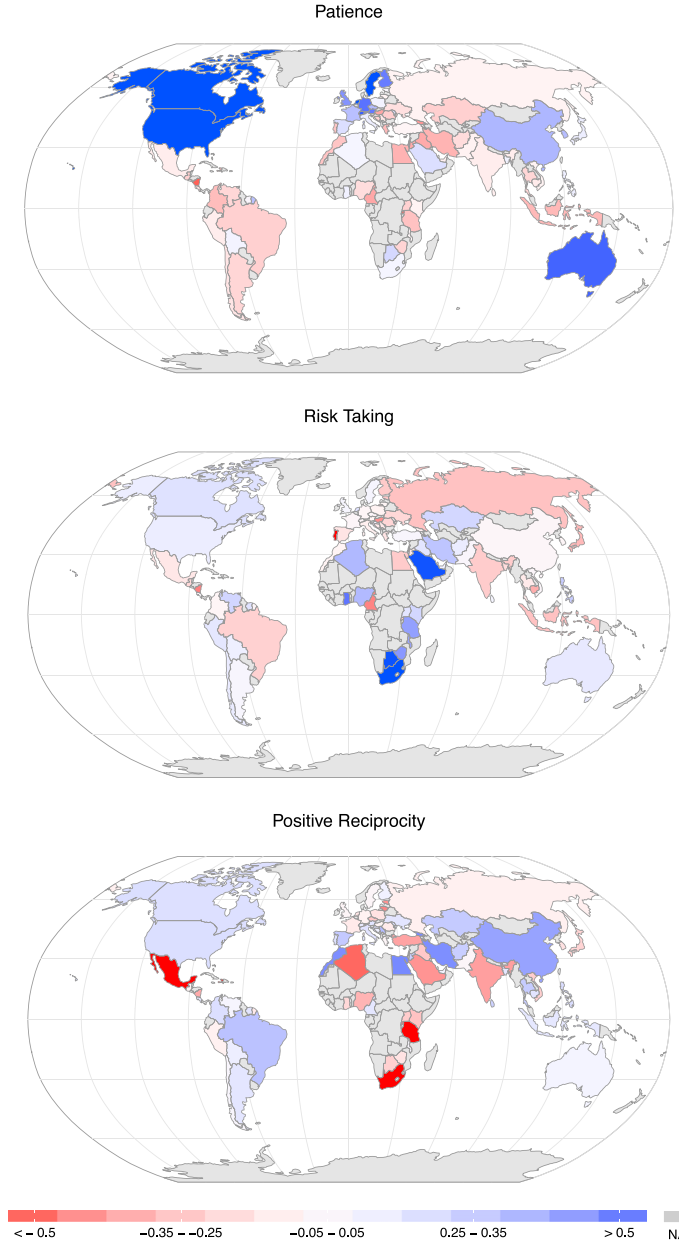

FIGURE I

World Maps of Patience, Risk Taking, and Positive Reciprocity

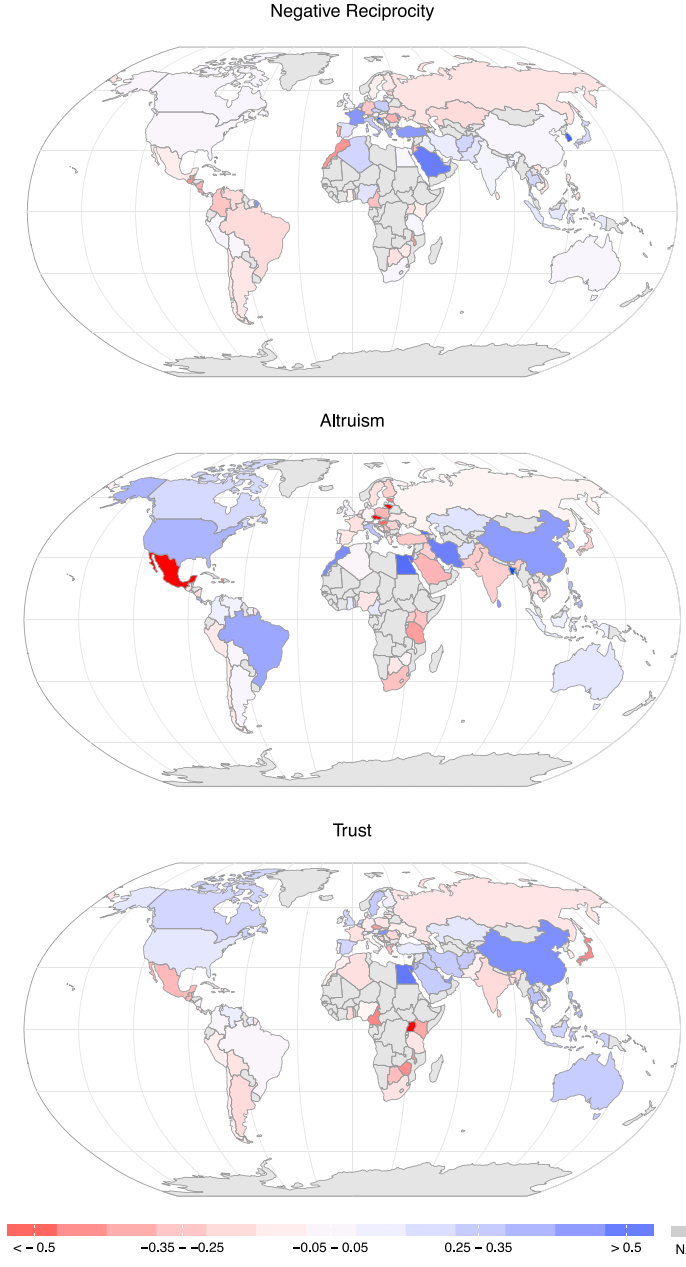

FIGURE II

World Maps of Negative Reciprocity, Altruism, and Trust

TABLE III
REGIONAL AVERAGES AND VARIANCE DECOMPOSITION

	Patience	Risk taking	Pos. recip.	Neg. recip.	Altruism	Trust	# Obs.
Western Europe	0.49	−0.11	0.06	0.04	−0.04	0.10	11
Eastern Europe	−0.12	−0.12	−0.02	0.10	−0.22	−0.07	16
Neo-Europe	0.73	0.15	0.16	0.02	0.26	0.23	3
South and East Asia	−0.00	−0.10	0.07	0.11	0.13	0.04	13
North Africa and ME	−0.14	0.16	0.07	0.08	0.13	0.23	9
Sub-Saharan Africa	−0.16	0.34	−0.34	−0.11	−0.15	−0.33	11
South America	−0.21	−0.03	−0.08	−0.16	−0.05	−0.10	13
% between-country variation	13.5	9.0	12.0	7.0	12.3	8.2	

Notes. Neo-Europe includes the United States, Canada, and Australia. Regional averages of each preference are expressed in terms of standard deviations from the world individual mean. The variance decomposition in the bottom row decomposes the individual-level variation into the variance of the average preference across countries and the average of the within-country variance. Formally, the between-country variation corresponds to the R^2 of an OLS regression of all individual-level observations on a set of country dummies in which all observations are weighted by the sampling weights provided by Gallup to achieve (ex post) representativeness. ME = Middle East.

lighter shades (darker red online) indicate lower values. White (gray online) countries are not included in the GPS. To provide a complementary perspective, Table III provides information on the average preferences for various groupings of countries.

The figures reveal that preferences vary substantially across countries, by at least one standard deviation for each preference.[11] Most differences are statistically significant: calculating t-tests of all possible (2,850) pairwise comparisons for each preference, the fraction of significant (1% level) country differences are 78% for risk, 83% for patience, 80% for altruism, 81% for positive reciprocity, 79% for negative reciprocity, and 78% for trust.

In terms of patterns of preference variation, a first observation is that populations of European ancestry tend to be more patient than the world mean. Indeed, all of the 10 most patient countries in the world are either located in the neo-European, English-speaking world, or else in Western Europe, with the Scandinavian countries exhibiting particularly high levels of patience. Trust levels are also particularly high in neo-Europe, while

11. Online Appendix BA provides an alternative way to visualize the heterogeneity, with histograms of preferences at the country and individual levels.

TABLE IV
PAIRWISE CORRELATIONS BETWEEN PREFERENCES AT THE COUNTRY LEVEL

	Patience	Risk taking	Pos. reciprocity	Neg. reciprocity	Altruism	Trust
Patience	1					
Risk taking	0.230**	1				
Pos. reciprocity	0.016	−0.256**	1			
Neg. reciprocity	0.258**	0.193*	−0.154	1		
Altruism	−0.010	−0.015	0.711***	−0.132	1	
Trust	0.190	−0.062	0.363***	0.160	0.273**	1

Notes. Pairwise Pearson correlations between average preferences at country level. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Western European countries are notable for being relatively risk averse.

To the east, the formerly communist Eastern European countries are on average rather risk averse, not very patient, and low on altruism, but the patterns are less clear compared to their Western European counterparts. Countries in East and South Asia are also relatively impatient, except for "Confucian countries" (China, Japan, South Korea). This group of countries is consistently risk averse and relatively negatively reciprocal. On average, altruism is high, but patterns are diverse at the country level.

Middle Eastern and North African populations have in common relatively high levels of risk tolerance and low levels of patience. Social preferences and trust in this group of countries are fairly diverse. Notably, all of the ten most risk-tolerant countries in our sample are located in the Middle East or Africa, with most of these in sub-Saharan Africa; in addition, all sub-Saharan populations are on average lower than the world mean on positive reciprocity, altruism, and trust, and are rather impatient. Finally, in South America, most populations appear impatient and low in terms of negative reciprocity. They have more intermediate values in risk taking and the prosocial traits, that is, altruism, positive reciprocity, and trust.

In sum, different types of preferences are spatially and culturally concentrated. While individual preferences exhibit geographic variation, preferences might also be correlated among each other, giving rise to distinct country-level preference profiles. Table IV shows Pearson correlations of preferences together with levels of significance.

The significant correlations indicate that preferences are not distributed independently of one another. One set of traits that goes together is risk tolerance and patience, as shown by the positive and statistically significant correlation at the country level. This is in spite of the special case of sub-Saharan African countries, which tend to be risk seeking and impatient, as discussed above.

Another grouping of positively correlated traits involves prosociality, that is, the traits of positive reciprocity, altruism, and trust. While trust constitutes a belief rather than a preference, all of these traits share in common that they describe positive behavioral dispositions toward others. The correlation between altruism and positive reciprocity is particularly high, and trust also tends to be higher where people are positively reciprocal. This is intuitive as it is hard to imagine high levels of trust absent positive reciprocity, that is, trust-rewarding behaviors.

Despite being related to the social domain, negative reciprocity is not at all correlated with prosociality. Instead, it is positively correlated with patience. We report the correlation structure among preferences at the individual level in Online Appendix C.

Evidence that preference dispositions vary substantially across countries does not imply that cross-country or cultural differences are the primary source of preference variation in the world. The last row of Table III shows results from a total variance decomposition, which reveals that the within-country variation in preferences is actually larger than the between-country variation, an observation that varies only minimally by preference. Across preferences, about 10% of the total variation is due to between-country variation. Part of the within-country variation might reflect measurement error, so that the variation in true preferences is overstated. However, the available evidence on the size of test-retest correlations and measurement error suggests that it is highly unlikely that measurement error alone produces the fact that within-country variation dominates between-country variation, see Online Appendix D for details.[12]

12. The between-country variation should be scaled up by the inverse of the fraction of variance that is due to measurement error. A very conservative estimate of the test-retest correlation of a given preference measure that is as low as 0.33 implies that the between-country variation is about three times as high as reported in Table III. Because test-retest correlations between 0.5 and 0.6 are typically

IV. Determinants and Cultural Correlates of Preferences

IV.A. Preferences and Individual-Level Characteristics

The pronounced within-country heterogeneity in preferences calls for a better understanding of individual-level preference variation. The following analysis investigates whether preference heterogeneity is related to three traits: age, gender, and cognitive ability. Indeed, a large literature in behavioral economics has investigated the relationships between these traits and preference variation, mostly for two reasons. First, they are associated with differences in economic outcomes; if preferences vary with these traits, this could be part of the explanation for outcome differences.[13] Second, these traits are plausibly exogenous to preferences. Although the evidence is correlational, the previous literature has proposed various mechanisms, ranging from biological to purely social, through which gender, age, and cognitive ability might determine preferences.[14] Because most previous evidence on preferences has come from individual countries or nonrepresentative samples, the GPS provides new insights into which relationships might reflect mechanisms that are more universal and which might be specific to certain societies. For instance, the origins and universality of gender differences across cultures remain an open question (e.g., Gneezy, Leonard, and List 2009; Niederle 2014).

For the purposes of our analysis, we make use of the sociodemographic covariates contained in the GPS. As a proxy for cognitive skills, our data set contains a measure of self-reported math skills that we use to proxy for cognitive skills. Although this is an imperfect proxy for cognitive ability, there is evidence that math skills are correlated with cognitive ability in general (Borghans et al. 2016), that subjective assessments of ability are correlated with measured cognitive ability, and that these have predictive power for academic achievement (Marsh 1990; Marsh et al. 2005; Spinath et al. 2006; Ackerman and Wolman 2007; Chamorro-Premuzic et al. 2010). Since such relative self-assessments might

found for single items that constitute our measures, we are confident that the between-country variation does not exceed 50%.

13. See, for example, Barsky et al. (1997), Donkers, Melenberg, and Van Soest (2001), Frederick (2005), Sutter and Kocher (2007), Croson and Gneezy (2009), Dohmen et al. (2010, 2011), and Benjamin, Brown, and Shapiro (2013).

14. See Croson and Gneezy (2009), Dohmen et al. (2011), and Benjamin, Brown, and Shapiro (2013).

be interpreted in different ways across countries, we only use self-reported cognitive skills for within-country analyses.

Table V presents OLS regression estimates for how preferences are related to gender, cognitive ability, and age across the GPS sample. We report results with country fixed effects and subnational region fixed effects. The preference variables are standardized, so coefficients are in units of standard deviations. In Online Appendix E we show that the results are robust to adding a set of additional control variables.

Starting with time preference, Table V documents that women are less patient than men on average across the world, but the difference is quite small. Patience is more pronounced among individuals with higher cognitive ability, and it varies with age, in a hump-shaped pattern: middle-aged individuals are the most patient, compared with the young and the elderly. There is limited previous cross-country evidence on time preference, but the small gender difference we find is in line with a cross-country study on college students.[15] Earlier studies have found that higher cognitive ability goes with greater patience, but this has been documented in only a small set of countries, for example, the United States, Germany, and Chile. There is little previous evidence, from cross-country or representative data, on how patience varies with age.

Turning to risk preference, Table V indicates that women are substantially more risk averse than men, by about a fifth of a standard deviation. Risk aversion is more pronounced for individuals with lower cognitive ability. The elderly are also significantly more risk averse than the young, on average around the world. The gender difference we find for risk aversion is qualitatively in line with the results of many previous studies, for particular countries or nonrepresentative subpopulations.[16] Previous studies have also found a similar relationship between risk

15. See Wang, Rieger, and Hens (2016) for results from a survey with college students across 45 countries.

16. Vieider et al. (2015b) conduct experiments measuring risk preference in 30 countries with student subjects and find that female students are more risk averse than males, on average; the study does not compare gender differences across countries. In meta-analyses, women tend to be more risk averse in the majority of studies (Byrnes, Miller, and Schafer 1999; Croson and Gneezy 2009), but effect sizes are heterogeneous, and roughly 40% of studies do not find a gender difference (Niederle 2014). The mixed results across studies could potentially reflect small samples (Niederle 2014).

TABLE V

CORRELATES OF PREFERENCES AT INDIVIDUAL LEVEL

	Dependent variable:											
	Patience		Risk taking		Pos. reciprocity		Neg. reciprocity		Altruism		Trust	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1 if female	−0.056***	−0.060***	−0.17***	−0.18***	0.049***	0.053***	−0.13***	−0.14***	0.10***	0.097***	0.066***	0.059***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Subj. math skills	0.028***	0.026***	0.046***	0.043***	0.038***	0.039***	0.040***	0.035***	0.044***	0.041***	0.056***	0.054***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.72***	0.76***	−0.083	−0.080	1.02***	1.10***	−0.36*	−0.39**	−0.0061	−0.0090	0.37*	0.28
	(0.17)	(0.17)	(0.20)	(0.20)	(0.17)	(0.16)	(0.19)	(0.18)	(0.14)	(0.14)	(0.21)	(0.20)
Age squared	−1.45***	−1.50***	−1.20***	−1.19***	−1.17***	−1.27***	−0.45**	−0.40**	0.015	0.010	0.032	0.11
	(0.20)	(0.20)	(0.21)	(0.21)	(0.18)	(0.16)	(0.18)	(0.18)	(0.15)	(0.16)	(0.20)	(0.19)
Country FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Region FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	78,501	77,585	78,445	77,543	78,869	77,949	77,521	76,718	78,632	77,721	77,814	76,922
R^2	0.17	0.21	0.17	0.22	0.13	0.22	0.11	0.18	0.13	0.19	0.11	0.17

Notes. OLS estimates, standard errors (clustered at country level) in parentheses. Coefficients are in terms of units of standard deviations of the respective preference (relative to the individual world mean). Age is divided by 100. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

aversion and cognitive ability for a few countries. A similarly shaped age profile in risk preference has been documented previously for individual countries.[17]

Social preferences and trust also vary significantly with individual characteristics. Table V shows that positive reciprocity and altruism are more pronounced among women, while negative reciprocity is weaker among women. Positive reciprocity, altruism, and negative reciprocity are all positively related to cognitive ability. The estimates reveal that positive reciprocity has a hump-shaped relationship to age, negative reciprocity is declining with age, and altruism is not significantly related to age. The few previous cross-country studies relating social preferences to gender and age have mainly focused on students or other nonrepresentative samples and found varying results.[18] Some previous studies have also found a positive relationship between cognitive ability and altruism, using student subjects (e.g. Chen et al. 2013). Finally, the results on trust in Table V are broadly in line with evidence from the trust literature.

We turn next to a country-level analysis to see whether the aggregate results in Table V reflect an underlying uniformity or conceal heterogeneity across societies. For each country separately, we regress a given preference on age, age squared, gender, and cognitive ability. We then summarize the results in three figures. Figure III shows the gender coefficients for the different countries, with a separate panel for each preference. Figure IV presents cognitive ability coefficients in a similar format.[19] Because the relationships between some preferences and age is nonlinear and cannot be summarized with a single coefficient, Figure V plots age profiles. Showing profiles for 76 countries in one graph is unwieldy, so the figure compares two groupings of countries, Organisation for Economic Co-operation and Development (OECD) members

17. For example, Dohmen et al. (2011) show that willingness to take risks declines with age in a representative sample of German adults. See also Dohmen et al. (2017b). Mata, Josef, and Hertwig (2016) show that the WVS measure of "value of stimulation" declines with age.

18. Engel (2011) provides a meta-analysis of studies measuring altruism using dictator games, mainly for student subjects, across 35 countries. The analysis finds no gender difference in altruism, and a positive relationship between age and altruism, in contrast to our findings.

19. Online Appendix EB provides an overview table that contains all of the corresponding regression coefficients and their level of statistical significance.

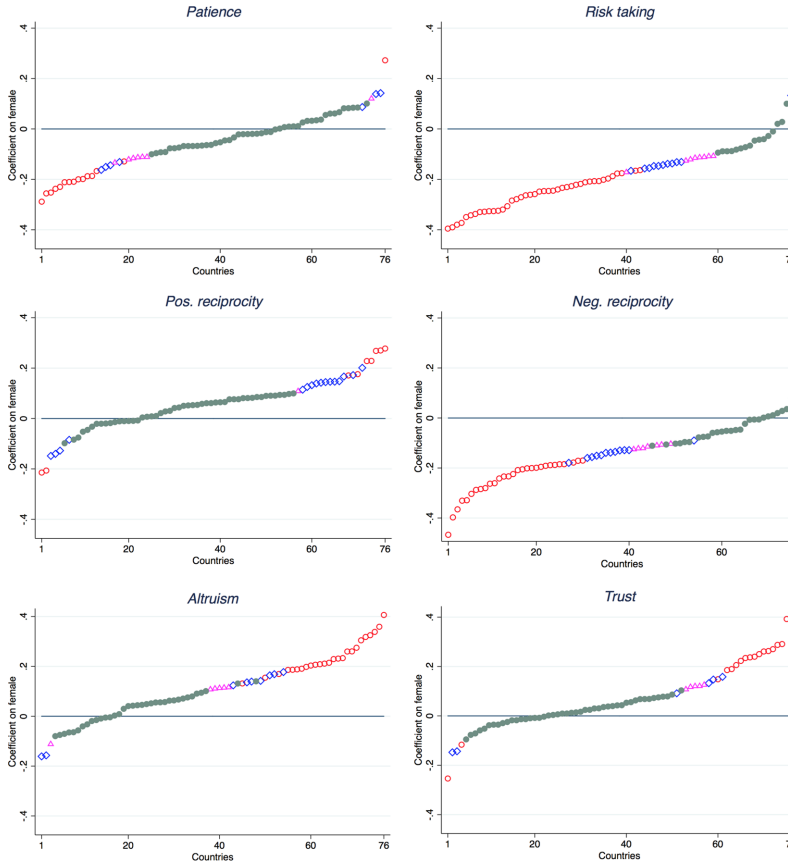

FIGURE III

Gender Coefficients by Country

For each country, we regress the respective preference on gender, age and its square, and subjective math skills, and plot the resulting gender coefficients as well as their significance level. To make countries comparable, each preference was standardized (z-scores) within each country before computing the coefficients. Solid (green online) circles indicate countries in which the gender coefficient is not statistically different from 0 at the 10% level, and empty (red online) circles/(blue online) diamonds/(pink online) triangles denote countries in which the effect is significant at the 1%/5%/10% level, respectively. Positive coefficients imply that women have higher values in the respective preference.

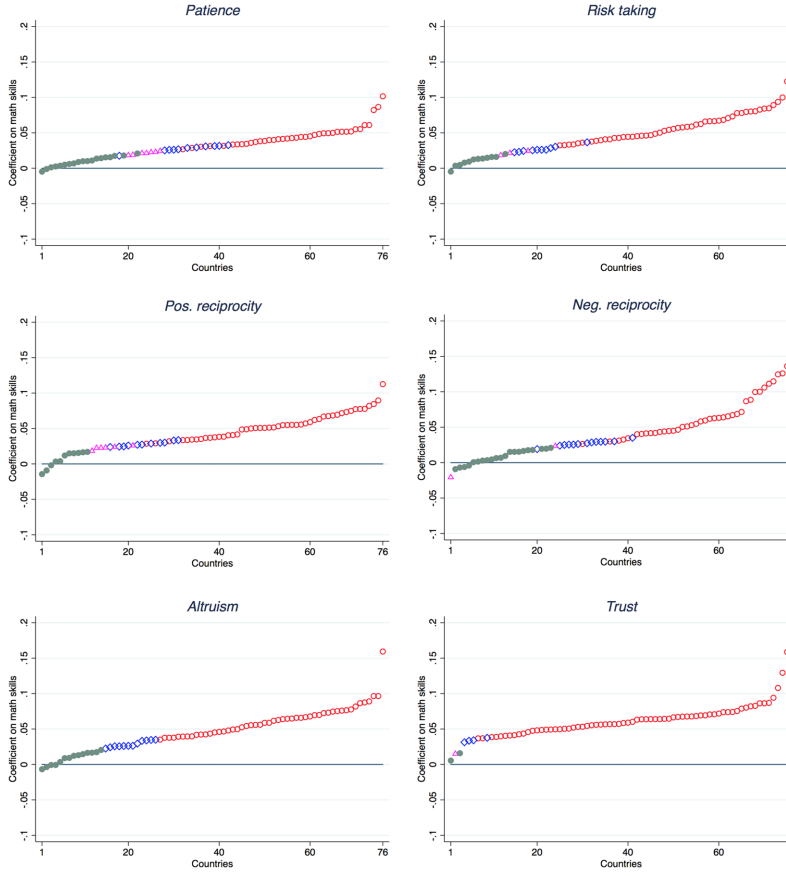

FIGURE IV

Cognitive Ability Coefficients by Country

For each country, we regress the respective preference on gender, age and its square, and subjective math skills, and plot the resulting coefficients on subjective math skills as well as their significance level. To make countries comparable, each preference was standardized (z-scores) within each country before computing the coefficients. Solid (green online) circles indicate countries in which the cognitive ability coefficient is not statistically different from 0 at the 10% level, and empty (red online) circles/(blue online) diamonds/(pink online) triangles denote countries in which the effect is significant at the 1%/5%/10% level, respectively. Positive coefficients imply that higher cognitive ability is associated with higher values in the respective preference.

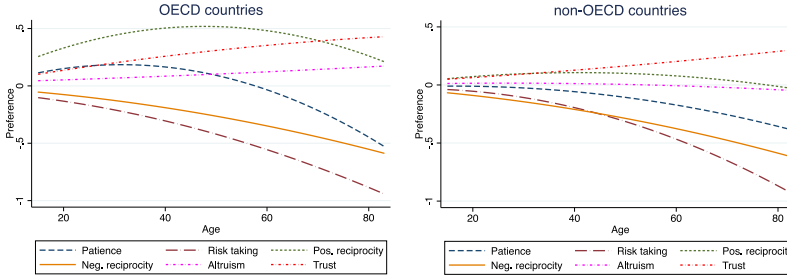

FIGURE V

Age Profiles by OECD Membership

The figures depict the relationship between preferences and age conditional on country fixed effects, gender, and subjective math skills. These are augmented component plus residuals plots, in which the vertical axis represents the component of the preference that is predicted by age and its square plus the residuals from the regression in the first column of Table V. The horizontal axis represents age, winsorized at 83 (99th percentile).

versus non-OECD; this division of countries captures some of the most salient cross-country differences or commonalities.

Beginning with time preference, Figure III shows that the slightly larger degree of impatience among women, at the aggregate level, conceals substantial heterogeneity. Only 68% of countries have a coefficient indicating greater impatience for women, and only 32% have a statistically significant difference (p-value < 0.1) in that direction. Figure IV indicates, by contrast, that the relationship of patience with cognitive ability goes in the same direction and is statistically significant in almost all countries. This suggests that the relationship is relatively universal and arguably not the product of institutions or specific educational and value systems. In Figure V we see that the hump-shaped age pattern for patience, observed in the aggregate, is actually only present for OECD member countries; the profile is different (strictly declining) in non-OECD countries.

Turning to risk preference, Figure III reveals that in 95% of countries, the gender coefficient is nonzero and in the direction of greater risk aversion among women. Of these, 82% are statistically significant at least at the 10% level. This reveals the widespread prevalence of the gender difference in risk preference, in qualitative terms, across a wide range of cultures and on a representative basis. Figure IV shows that in almost all countries, lower cognitive ability is associated with significantly greater risk

aversion. The age profiles in Figure V imply that risk tolerance is decreasing with age for both OECD and non-OECD countries. This similarity in age profiles is interesting given the diversity of historical experiences across countries, for different age groups.

For positive reciprocity, some relationships to individual characteristics are more universal than others. While women are more positively reciprocal on average across the world, Figure III shows that this is statistically significant for only 26% of countries, so the difference is driven by a subset of societies. By contrast, Figure IV shows that positive reciprocity is associated with higher cognitive ability irrespective of culture. In terms of age profiles, Figure V reveals another difference across societies: the profile for positive reciprocity is hump-shaped for OECD countries, but less so for non-OECD countries.

Figure III shows that altruism and negative reciprocity are related to gender in opposite ways across countries, in line with the aggregate results. In most countries, altruism is more pronounced among women, whereas negative reciprocity is less pronounced. Altruism and negative reciprocity are both associated with higher cognitive ability in almost every country, as seen in Figure IV. Figure V indicates that altruism is weakly increasing with age for OECD countries, and largely flat for non-OECD countries, whereas negative reciprocity declines with age for both groups of countries.

Finally, Figures III, IV, and V show that the aggregate results on trust are largely borne out in the data on individual countries. One exception is the positive relationship of trust to gender at the aggregate level; at the country level, women are more trusting than men in about 68% of countries, but this is statistically significant for only about 33%. Previous studies conducted in different countries have sometimes found that women are less trusting than men, perhaps reflecting this cultural specificity. In almost all countries, trust is increasing with cognitive ability, and trust increases with age for both OECD and non-OECD countries.

In summary, some relationships between preferences and individual characteristics appear to reflect mechanisms that are relatively universal across a wide range of countries. There are other relationships, however, such as between time preference and gender, or positive reciprocity and age, for which the qualitative relationships differ substantially across countries. These latter findings point to cases where results from one country might

TABLE VI

PAIRWISE CORRELATIONS BETWEEN PREFERENCES AND GEOGRAPHIC AND CULTURAL VARIABLES

	Patience	Risk taking	Pos. recip.	Neg. recip.	Altruism	Trust	# Obs.
(Bio-) geography							
Geographic conditions (O-H)	0.45***	−0.31**	0.20	0.39***	−0.10	0.39***	51
Absolute latitude	0.48***	−0.19	0.13	0.25**	−0.13	0.26**	76
Agricultural suitability (aa)	−0.02	−0.14	−0.18	0.03	−0.22*	−0.47***	73
Crop suitability (aa)	0.11	−0.18	−0.10	0.08	−0.22*	−0.37***	73
Biological conditions (O-H)	0.37***	−0.37***	0.33**	0.30**	−0.00	0.44***	51
Culture							
Weak future time reference	0.32***	−0.13	0.13	−0.04	0.07	0.21*	68
Pronoun drop not allowed	0.57***	0.08	0.04	0.06	0.01	0.18	67
Share Protestants	0.45***	0.10	−0.20*	−0.18	−0.14	−0.01	76
Individualism	0.65***	−0.01	−0.05	0.14	−0.14	0.16	62
Family ties	−0.57***	0.34**	0.11	−0.02	0.27*	0.09	49

Notes. Pairwise Pearson correlations between average preferences and other geographic and climatic variables at the country level. See Online Appendix K for additional information about the variables. In analyses with language variables, the sample only includes countries for which we could classify the interview language of at least 50% of our respondents. Geographic and biological conditions are the first principal components of the geography and biological variables in Olsson and Hibbs (2005), also see Spolaore and Wacziarg (2013). aa = ancestry-adjusted. O-H = Olsson and Hibbs (2005). $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

not generalize to others, and where the underlying mechanisms might be sensitive to cultural differences.

IV.B. Geographic and Cultural Correlates

To unpack the nature of country-level variation, this section relates preferences to a set of geographic and cultural variables that have been proposed as potential determinants of preferences in the literature. Although the results presented here are to be understood as simple raw correlations, they nonetheless speak to previously articulated narratives, hypotheses, or empirical results. For example, various authors have proposed that the evolution of time preference and trust is related to geographic conditions (Galor and Özak 2016; Litina 2016), and that negative reciprocity is intimately linked to biological endowments as in the "culture of honor" hypothesis of Nisbett and Cohen (1996). The GPS allows for a comprehensive evaluation of these hypotheses using experimentally validated survey measures of preferences.

The analysis is divided into (bio)geographical characteristics, which are more likely to be exogenous to preferences, and cultural variables that are potentially endogenous to preferences, at least in the long run. The first five rows of Table VI present the Pearson

correlations between all preferences and the following geographic conditions: (i) a summary statistic of geographic conditions proposed by Spolaore and Wacziarg (2013), which consists of the first principal component of absolute latitude, agricultural suitability, rate of east-west orientation, and size of landmass, coded such that the first component is positively correlated with per capita income (Olsson and Hibbs 2005); (ii) a summary statistic of biological conditions, which is the principal component of number of annual or perennial wild grasses and number of domesticable big animals, again coded such that the first component is positively correlated with per capita income (Olsson and Hibbs 2005); (iii) distance from the Equator; (iv) agricultural suitability, adjusted for post-Columbian migration flows using the migration matrix of Putterman and Weil (2010); and (v) a recently developed index of crop suitability, also ancestry-adjusted (Galor and Özak 2016).

Focusing first on the geography summary statistic of the variables in Olsson and Hibbs (2005), we see that most preferences are significantly related to geographic conditions. For example, patience, negative reciprocity, and trust are all positively correlated with those geographic variables that have previously been argued to be conducive for economic development (Diamond 2005; Spolaore and Wacziarg 2013).

While the Olsson-Hibbs summary statistic has the advantage of capturing various dimensions of geography, its interpretation as a principal component is not fully transparent, so we also report separate correlations between preferences and distance to the Equator as well as agricultural suitability indexes. The results show that patience, negative reciprocity, and trust all increase in distance from the Equator. On the other hand, the results show that agricultural suitability and crop suitability are only very weakly correlated with the GPS patience variable.[20] However, both agricultural and crop suitability are significantly negatively correlated with trust. All other preferences are largely uncorrelated with agricultural suitability.

Turning to the Olsson-Hibbs summary statistic of biological endowments, we see that patience, negative reciprocity, and trust all positively covary with biological conditions. Further unpacking these relationships, negative reciprocity is positively correlated with the number of large domesticable animals, broadly in line

20. Galor and Özak (2016) find a correlation between Hofstede's long-term orientation variable and crop suitability for agriculture.

with the culture of honor hypothesis (Nisbett and Cohen 1996; Grosjean 2014). On the other hand, those biogeographic conditions that are conducive to development are negatively correlated with risk taking.

Taken together, the correlations between biogeographic factors and patience exhibit an interesting structure. In particular, all of the traits that previous literatures have hypothesized to be relevant for development—patience, trust, and negative reciprocity—are strongly positively correlated with those geographic and biological conditions that Spolaore and Wacziarg (2013) find to be predictive of comparative development. It is hence conceivable that preferences are a potential mediating factor in the relationship between geography and outcomes. We study the relationship between preferences and outcomes in more detail in Section V.B.

Next we study correlations between preferences and cultural variables that have been proposed as potential drivers of preference variation. We consider linguistic structures, religion, individualism, and family ties. First, various recent publications have argued that language might shape people's preferences and behaviors (Tabellini 2008; Chen 2013; Galor, Özak, and Sarid 2016; Sutter et al. 2018). In particular, a linguistic feature called weak future time reference (FTR) has attracted attention because it correlates with future-oriented decisions. This linguistic variable assumes a value of 1 if a given language allows one to speak about the future in the present tense, and 0 otherwise. Table VI shows that in our data patience is also highly and significantly correlated with weak FTR.[21] Moreover, weak FTR is postively correlated with trust. Second, we study the linguistic feature of pronoun drop, which was originally used by Licht, Goldschmidt, and Schwartz (2007) and Tabellini (2008). This variable assumes a value of 1 if a language does not allow one to drop pronouns, which is hypothesized to invoke a stronger emphasis on individual needs as opposed to those of other people. However, perhaps in contrast with this notion, we find that pronoun drop is

21. For this analysis, we made use of the classification by Chen (2013), with minor additions and changes. First, we set Persian to missing after corresponding with him (he originally classified Persian as strong FTR, which is open to discussion). Second, we managed to classify Moroccan Arabic (strong), Fula (strong), and Khmer (weak).

uncorrelated with all of the social preferences. Instead, it is strongly correlated with patience.[22]

A prominent hypothesis in the social sciences is Weber's (1930) argument of a "Protestant ethic," which, among other aspects, is believed to have made people more patient. We investigate this argument on a correlational basis by relating our patience measure to the share of Protestants in a given country (Barro 2003). Consistent with Weber's hypothesis, we find that Protestantism is strongly correlated with patience. This correlation is robust to restricting attention to Europe or predominantly Christian countries.

Finally, we turn our attention to variables that measure aspects of social and family structure. Hofstede (2001) proposes a measure of individualism that has subsequently been used in economics (Gorodnichenko and Roland 2011). Likewise, Alesina and Giuliano (2013) extract a measure of family ties from the WVS that measures the importance of the family relative to other aspects in life. Intuitively, it seems possible that family ties and individualism are related to social preferences. However, we find only weak evidence for such relationships. While family ties are correlated with altruism, all other correlations are not significant. Instead, individualism and family ties are also both correlated with patience.

Taken together, all of the cultural variables are strongly correlated with patience, but not with any of the other preferences. Notably, the strong associations with individualism, family ties, and Protestantism are in line with theories that link patience to the spirit of capitalism (Doepke and Zilibotti 2008).[23] Thus, as in the case of biogeographic factors, patience appears to be strongly linked to variables that have been documented to be related to development.

In sum, this section has brought to light that the distribution of preferences across countries is not random but follows geographic and cultural patterns. In particular, patience is strongly

22. Online Appendix F investigates the relationship between preferences and FTR and pronoun drop at the individual level within countries by exploiting within-country variation in interview language. In these analyses, weak FTR is again significantly associated with patience and trust and with altruism and positive reciprocity. The linguistic feature of no pronoun drop is also again correlated with patience and with risk taking and altruism.

23. We thank a particularly helpful reviewer for contributing this interpretation.

related to many cultural and geographic conditions, and future research might tap further into the potential of the GPS to illuminate potential causal channels.

V. Preferences and Outcomes

This section investigates the relationship of economic outcomes to preferences. The focus is on outcomes that previous literatures have hypothesized might depend on a particular preference or set of preferences.

V.A. Preferences and Individual Outcomes

1. Accumulation Decisions. Economic theory suggests that patience is instrumental for savings and investments in human capital. We evaluate the relationship of our patience measure to these outcome variables in the GPS. Columns (1) and (2) of Table VII display the results of a linear probability model, in which we employ as dependent variable a binary indicator for whether the respondent saved in the previous year. Patience is correlated with savings behavior both in specifications with country and subnational region fixed effects, and conditional on socioeconomic covariates such as age, gender, income, cognitive ability, and religion. The point estimate implies that a one standard deviation increase in patience is associated with a roughly 15% increase of the probability of saving relative to the baseline probability of 26.7%. Columns (3) and (4) establish that patience is also significantly related to educational attainment; these estimates are based on a three-step categorical variable (roughly: primary, secondary, and tertiary education).[24] In Online Appendix GB we show that the significant relationship between our patience variable and accumulation processes is not driven by only a few countries. Rather, the coefficient of patience is positive in more than 90% of countries for both savings and education, and in most cases statistically significant.

2. Risky Choices. We next investigate the relationship of risk preferences to behaviors that have been hypothesized to depend on a taste for risk. Specifically, the career choice of being self-employed as well as the risky health behavior of smoking

24. All results are robust to using (ordered) probit estimations.

TABLE VII

PATIENCE AND ACCUMULATION DECISIONS, RISK PREFERENCES, AND RISKY CHOICES

	Dependent variable:									
	Accumulation decisions				Risky choices					
	Saved last year		Education		Own business		Plan start business		Smoking int.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Patience	0.038***	0.027***	0.069***	0.033***						
	(0.01)	(0.01)	(0.01)	(0.00)						
Risk taking					0.027***	0.024***	0.023***	0.019***	0.057***	0.032**
					(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.01)
Country FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Region FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15,260	14,459	79,357	68,409	72,839	62,125	57,072	50,687	15,309	14,490
R^2	0.07	0.18	0.21	0.36	0.06	0.14	0.11	0.17	0.03	0.23

Notes. OLS estimates, standard errors (clustered at country level) in parentheses. Saved last year is a binary indicator, while education level is measured in three categories (roughly elementary, secondary, and tertiary education). Self-employment and planned self-employment are binary, while smoking intensity is measured in three categories (never, occasionally, frequently). Additional controls include age, age squared, gender, subjective math skills, log household income, and indicators for religious affiliation. See Online Appendix K for additional information about the variables. $^{**}p < .05$, $^{***}p < .01$.

have been modeled as depending on sufficient willingness to take risks (e.g., Kihlstrom and Laffont 1979; Viscusi and Hersch 2001). As columns (5) and (6) of Table VII document, our preference measure is related to actual self-employment. The same pattern holds when considering individuals' intention to start their own business, conditional on not being self-employed (columns (7) and (8)). Columns (9) and (10) relate risk preferences to the respondent's smoking intensity, measured on a 3-point scale (never, occasionally, and frequently). We find that more risk-tolerant people are more likely to smoke, both with country and subnational region fixed effects, and conditional on a set of additional covariates. Online Appendix GB again shows that the correlations between risk preferences and labor market or health decisions are qualitatively similar across countries.

3. Social Interactions. Next we analyze the relationships of the social preference measures to behaviors and outcomes in the social domain. We focus on behaviors that correspond to unconditional giving and behaviors that are linked to maintaining social relationships, as these types of outcomes have been hypothesized to depend on altruism and reciprocity, respectively.[25]

Table VIII summarizes the results. Columns (1)–(8) show that altruism is significantly related to a broad range of giving behaviors including donating, volunteering time, helping strangers, or sending money or goods to other people in need. Across the different behavioral categories, the point estimate is very consistent and implies that an increase in altruism by one standard deviation is correlated with an increase in the probability of engaging in prosocial activities of 3.5–6.5 percentage points, which corresponds to an increase of roughly 15–20% compared to the respective baseline probabilities.[26] Positive reciprocity is a significant correlate of helping people in need (columns (5) through (8)), perhaps a manifestation of generalized reciprocity in the sense that reciprocal people who have been helped before are also willing to help others. In contrast, the negative reciprocity variable is virtually uncorrelated with all of the prosocial activities in the first

25. See, for example, Andreoni (1989) for theoretical work on altruism, and Fehr and Gächter (2002) and Rand et al. (2009) for discussions of how reciprocity may help sustain cooperative relationships.

26. These baseline probabilities are 31.8%, 21.6%, 48.3%, and 23.7%, respectively (see Table VIII, columns (1)–(8), for the order of variables).

TABLE VIII

SOCIAL PREFERENCES AND SOCIAL INTERACTIONS

	Dependent variable:													
	Donated money		Volunteered time		Helped stranger		Sent money / goods to other individual		Voiced opinion to official		Have friends / relatives I can count on		In a relationship	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Altruism	0.066***	0.059***	0.038***	0.036***	0.056***	0.052***	0.036***	0.032***	0.025***	0.022***	0.020***	0.017***	−0.0025	0.0031
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Positive reciprocity	0.0010	0.0046	0.0060*	0.0022	0.038***	0.034***	0.019***	0.020***	0.00095	−0.0015	0.018***	0.016***	0.012***	0.0083***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Trust	0.0088**	0.0054	0.0077**	0.010***	−0.0077**	−0.0066*	0.0017	0.0020	0.0033	0.0023	0.0011	0.0020	0.010***	0.0024
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Negative reciprocity	−0.0059*	−0.0027	−0.00031	−0.0014	0.0062	−0.0022	0.0088**	0.0030	0.021***	0.017***	0.0096**	0.00064	−0.012***	0.00038
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Country FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Region FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	57,456	52,124	57,439	52,116	55,233	51,919	55,519	52,276	55,191	51,873	65,117	57,835	76,888	66,693
R^2	0.18	0.24	0.08	0.14	0.08	0.15	0.11	0.18	0.05	0.10	0.09	0.17	0.05	0.24

Notes. OLS estimates, standard errors (clustered at country level) in parentheses. For the purposes of this table, age is divided by 100. Additional controls include age, age squared, gender, subjective math skills, log household income, and indicators for religious affiliation. See Online Appendix K for additional information about the variables. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

eight columns. As columns (9) and (10) show, however, negative reciprocity is a significant predictor of whether people are willing to voice their opinion to a public official. Columns (11) through (14) examine the relationship between social preferences and respondents' family and friendship relationships. We find that more altruistic and more positively reciprocal people are more likely to have friends they can count on when in need, and that positive reciprocity correlates with being in a relationship.

The overall pattern in Table VIII is that the social preference measures are related to a wide range of behaviors in the social domain. As Online Appendix GB shows, these relationships are not restricted to a small set of countries, but hold for most countries separately. For instance, the correlation between altruism and donating is statistically significant at the 5% level in 80% of all countries.

Tables 18 and 19 in the Online Appendix provide a robustness check by showing that the relationships between outcomes and the corresponding preferences, discussed above, remain similar when controlling for all other preferences simultaneously. For example, regressing savings on all preferences, patience is still significantly related to savings (and has a larger point estimate than other preferences).

In sum, all of the GPS preference measures are significantly related to a broad range of economic and social behaviors, in the expected directions based on conceptual frameworks or models. Although the results are correlational, they are consistent with preference heterogeneity being important for understanding variation in economic outcomes. In addition, the fact that the correlations are qualitatively similar across cultural backgrounds and development levels provides reassuring evidence that the GPS survey items do indeed capture the relevant underlying preferences even in a heterogeneous sample. In this sense, the correlations provide an important out-of-context validation check for the survey module.

V.B. Preferences and Country-Level Outcomes

This section explores the correlation between preferences and outcomes at the country level, again focusing on outcomes that previous literatures have hypothesized might be endogenous to particular preferences.

TABLE IX

ECONOMIC DEVELOPMENT AND PREFERENCES

	Dependent variable: log [GDP p/c]									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Patience	2.63***	1.73***							2.67***	1.92***
	(0.26)	(0.27)							(0.29)	(0.31)
Trust			1.58**	0.56					0.73	0.31
			(0.68)	(0.48)					(0.56)	(0.45)
Risk taking					−0.53	0.59*			−1.34***	−0.53
					(0.56)	(0.33)			(0.50)	(0.39)
Neg. reciprocity							1.30**	0.51	0.54	0.092
							(0.51)	(0.50)	(0.52)	(0.45)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	76	73	76	73	76	73	76	73	76	73
R^2	0.39	0.70	0.08	0.59	0.01	0.59	0.05	0.59	0.48	0.71

Notes. OLS estimates, robust standard errors in parentheses. Controls include the distance to the Equator, average temperature, average precipitation, the share of the population living in (sub) tropical zones, terrain ruggedness, average distance to the nearest waterway, and an island dummy. See Online Appendix K for additional information about the variables. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

1. Patience, Trust, and Economic Development. We begin by investigating whether variation in per capita income across countries is related to variation in those preferences that previous literatures or models have highlighted as potential drivers of development. This includes time preference, as many models of economic development such as standard Ramsey-Cass-Koopmans models involve a key role for time preference. Another literature, on social capital, has emphasized that trust may play an important role in development (Knack and Keefer 1997; La Porta et al. 1997; Algan and Cahuc 2013). Research in anthropology and behavioral economics has led to the hypothesis that sanctioning of inefficient behaviors, driven by negative reciprocity, may help sustain large-scale cooperation and hence generate efficient outcomes (Fehr and Gächter 2002; Boyd et al. 2003; Henrich et al. 2006). Finally, willingness to take risks has previously been found to be correlated with income at the individual level (Barsky et al. 1997; Dohmen et al. 2011).

Columns (1) and (2) of Table IX provide evidence that patience is strongly correlated with per capita income, in specifications with and without geographic controls. In a statistical sense, patience "explains" 40% of the variation in income. Columns (3) and (4) establish that the GPS trust measure is also significantly correlated with per capita income, yet this correlation is no longer statistically significant once controls are accounted for. Columns

(5) and (6) show that willingness to take risks is uncorrelated with per capita income, but weakly positively correlated once controls are accounted for (this correlation is not very robust across specifications). Columns (7) and (8) document that between negative reciprocity and per capita income are significantly correlated, but this correlation loses significance once controls are accounted for.

Finally, columns (9) and (10) show a "horse race" between the set of preferences that have been linked conceptually to development. The results show that patience is the only variable robustly correlated with per capita income. The insight that patience "outperforms" trust in the GDP regressions is robust to using the standard WVS trust question as opposed to the GPS trust variable. These results appear noteworthy given the strong emphasis in the previous literature on the importance of trust, and provide a first piece of evidence for the potential of the GPS in furthering understanding of the relationship between development and preference or belief variables.[27] In a follow-up paper (Dohmen et al. 2017a), we study the relationship between patience, income, and potential mechanisms in greater detail. For instance, we document that average patience is also significantly correlated with average years of schooling ($\rho = 0.65$, $p < .01$) and gross national savings ($\rho = 0.25$, $p < .05$).

Although the main focus of the analysis is investigating correlations, rather than maximizing predictive power, it is noteworthy that patience contributes substantially to explained variation, above and beyond standard geographic variables. This can be seen comparing the R^2 with preferences included to the R^2 from a regression on controls alone (0.58). Adding all preferences increases explained variation by 13 percentage points, and adding patience alone increases the R^2 by 12 percentage points.

Finally, the strong correlation between the GPS patience variable and economic development provides an additional potential rationale for using the GPS data. In particular, as we document in Table 21 in Online Appendix I, the GPS patience variable is a much stronger correlate of per capita income than previously used measures, that is, the Hofstede long-term orientation and World Values Survey trust variables.

27. The relationship of patience to GDP remains strong and significant with positive reciprocity and altruism in the regression as additional controls.

2. Risk Taking and Risky Entrepreneurial Activities. Turning to risk preference, previous literatures have hypothesized that willingness to take risks may drive entrepreneurship and have also shown evidence of a link between risk preference and self-employment at the individual level. Columns (1)–(6) of Table X investigate the relationship between the GPS risk-taking variable and different proxies for risky entrepreneurial activities at the country level.[28] Specifically, as dependent variables, the analysis uses the number of patent applications per capita, the number of scientific articles published in a given country per capita, and total factor productivity (TFP) as a measure of the stock of ideas and knowledge.

The results reveal that risk taking is uncorrelated with patent applications, but risk taking is significantly correlated with the number of scientific articles per capita and TFP, once the confounding effects of the geographic and climatic covariates are taken into account. The increase in R^2 from adding risk taking to the set of covariates is small but notable.[29]

3. Social Preferences, Charitable Activities, and Conflict. Finally, the analysis explores the country-level correlations between the social preferences and outcomes that are conceptually linked to the respective preferences. A first dependent variable is the dollar value of charitable donations and volunteering activities, as a fraction of GDP (Salamon, Sokolowski, and Associates 2004). Given the many studies showing that social preferences and charitable giving are correlated at the individual level, it is natural to explore whether cross-country variation in charitable activity might be related to variation in average prosociality at the population level. Because altruism, positive reciprocity, and trust are highly correlated at the country level, we collapse these variables into a single "prosociality" variable by computing the first principal component at the individual level and aggregating this score at the country level. Columns (7) and (8) show that this score is

28. Cross-country data on self-employment are not very meaningful for our purposes because self-employment may refer to very different business concepts in developed and developing economies.

29. Online Appendix H shows that results are similar with social preferences included in the regression as controls. Adding patience, however, causes risk taking to no longer be statistically significant, whereas patience is significantly positively related to entrepreneurial activities.

TABLE X

COUNTRY-LEVEL OUTCOMES AND PREFERENCES

	Dependent variable:									
	Entrepreneurship						Social outcomes			
	Patent applic. p/c		Scientific articles p/c		TFP		Volunt. & donat.		Armed conflicts	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Risk taking	−0.031	0.28	−0.013	0.094**	0.11	0.22**				
	(0.98)	(0.43)	(0.05)	(0.05)	(0.10)	(0.09)				
Prosociality							0.85	1.23**		
							(0.57)	(0.48)		
Negative reciprocity									1.59***	1.20***
									(0.41)	(0.41)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	64	61	69	67	60	59	32	32	76	73
R^2	0.00	0.66	0.00	0.44	0.02	0.49	0.06	0.42	0.13	0.32

Notes. OLS estimates, robust standard errors in parentheses. The dependent variables in columns (1)–(2) and (3)–(4) are the logs of the number of patent applications p/c and the number of scientific articles p/c, respectively. In columns (7)–(8), the dependent variable is volunteering and donation as a fraction of GDP. Frequency of conflicts is measured by the log of conflicts according to PRIO, in the Quality of Government data set. Prosociality is the first principal component of altruism, positive reciprocity, and trust. Controls include the distance to the Equator, average temperature, average precipitation, the share of the population living in (sub) tropical zones, terrain ruggedness, average distance to the nearest waterway, and an island dummy. See Online Appendix K for additional information about the variables. $^{**}p < .05$, $^{***}p < .01$.

significantly correlated with donations and volunteering once the baseline set of controls is taken into account.

Second, motivated by research at the individual level on how punishment can trigger conflict in the form of vengeful counterpunishment (Herrmann, Thöni, and Gächter 2008; Nikiforakis 2008), the analysis correlates average negative reciprocity of a country's population with the log of the frequency of armed conflicts. The conflict variable is based on the Peace Research Institute Oslo (PRIO) data set. Columns (9) and (10) show that countries with a higher degree of negative reciprocity have experienced significantly more armed conflicts, conditional on controls. Here, the raw correlation is particularly pronounced ($\rho = 0.37$), and the inclusion of negative reciprocity leads to an increase in R^2 of 7 percentage points relative to the set of controls.[30]

VI. Conclusion

The evidence in this article shows that (i) preferences exhibit large heterogeneity across and within countries, (ii) this variation is at least partly systematic and linked to both individual-level characteristics and aggregate cultural or biogeographic endowments, and (iii) the survey measures of preferences appear to capture heterogeneity that is relevant for explaining outcomes. These findings are only a first step toward tapping the potential of the GPS. The data are well suited for many potential research agendas on the determinants and implications of preference variation. One example is deepening understanding of the observed correlation structure for preferences across countries, investigating which mechanisms could potentially be involved in the coevolution of different preference combinations. Another direction is exploring in more detail the nature of individual differences in preferences, for example, whether gender differences in preferences are related to measures of the degree of female empowerment across societies. Differences in how preferences relate to individual economic outcomes across countries could potentially be understood from the perspective of how preferences interact with institutional differences. Finally, the relationship between country-level preference profiles and aggregate economic outcomes is essentially

30. Online Appendix H shows that prosociality and negative reciprocity are still significantly related to charitable activities and frequency of conflicts, when time and risk preference are included as controls.

uncharted territory. In this respect, the article has provided evidence of some novel raw correlations, for example, between per capita income and time preference, or negative reciprocity and conflicts, which call for a more detailed analysis of the underlying causal pathways.

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SUPPLEMENTARY MATERIAL

An Online Appendix for this article can be found at *The Quarterly Journal of Economics* online. Data and code replicating the tables and figures in this article can be found in Falk et al. (2018), in the Harvard Dataverse, doi:10.7910/DVN/HH8DV4.

REFERENCES

Ackerman, Phillip L., and Stacey D. Wolman, "Determinants and Validity of Self-Estimates of Abilities and Self-Concept Measures," *Journal of Experimental Psychology: Applied*, 13 (2007), 57–78.

Åkerlund, David, Bart H. H. Golsteyn, Hans Grönqvist, and Lena Lindahl, "Time Discounting and Criminal Behavior," *Proceedings of the National Academy of Sciences*, 113 (2016), 6160–6165.

Alesina, Alberto, Yann Algan, Pierre Cahuc, and Paola Giuliano, "Family Values and the Regulation of Labor," *Journal of the European Economic Association*, 13 (2015), 599–630.

Alesina, Alberto, and Paola Giuliano, "Family Ties," *Handbook of Economic Growth*, 2 (2013), 177–215.

Algan, Yann, and Pierre Cahuc, "Inherited Trust and Growth," *American Economic Review*, 100 (2010), 2060–2092.

———, "Trust and Growth," *Annu. Rev. Econ.*, 5 (2013), 521–549.

Andreoni, James, "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence," *Journal of Political Economy*, (1989), 1447–1458.

Apicella, Coren L., Eduardo M. Azevedo, Nicholas A. Christakis, and James H. Fowler, "Evolutionary Origins of the Endowment Effect: Evidence from Hunter-Gatherers," *American Economic Review*, 104 (2014), 1793–1805.

Arrow, Kenneth J., "Gifts and Exchanges," *Philosophy & Public Affairs*, 1 (1972), 343–362.

Ashraf, Quamrul, and Oded Galor, "The Out of Africa Hypothesis, Human Genetic Diversity, and Comparative Economic Development," *American Economic Review*, 103 (2013), 1–46.

Barro, Robert, "Religion Adherence Data," http://scholar.harvard.edu/barro/publications/religion-adherence-data (2003).
Barsky, Robert B., F. Thomas Juster, Miles S. Kimball, and Matthew D. Shapiro, "Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study," *Quarterly Journal of Economics*, 112 (1997), 537–579.
Benjamin, Daniel J., Sebastian A. Brown, and Jesse M. Shapiro, "Who Is 'Behavioral'? Cognitive Ability and Anomalous Preferences," *Journal of the European Economic Association*, 11 (2013), 1231–1255.
Bonin, Holger, Thomas Dohmen, Armin Falk, David Huffman, and Uwe Sunde, "Cross-Sectional Earnings Risk and Occupational Sorting: The Role of Risk Attitudes," *Labour Economics*, 14 (2007), 926–937.
Borghans, Lex, Bart H. H. Golsteyn, James J. Heckman, and John Eric Humphries, "What Grades and Achievement Tests Measure," *Proceedings of the National Academy of Sciences*, 113 (2016), 13354–13359.
Boyd, Robert, Herbert Gintis, Samuel Bowles, and Peter J. Richerson, "The Evolution of Altruistic Punishment," *Proceedings of the National Academy of Sciences*, 100 (2003), 3531–3535.
Byrnes, James P., David C. Miller, and William D. Schafer, "Gender Differences in Risk Taking: A Meta-Analysis," *Psychological Bulletin*, 125 (1999), 367.
Chabris, Christopher F., David Laibson, Carrie L. Morris, Jonathan P. Schuldt, and Dmitry Taubinsky, "Individual Laboratory-Measured Discount Rates Predict Field Behavior," *Journal of Risk and Uncertainty*, 37 (2008), 237–269.
Chamorro-Premuzic, Tomas, Nicole Harlaar, Corina U. Greven, and Robert Plomin, "More than Just IQ: A Longitudinal Examination of Self-Perceived Abilities as Predictors of Academic Performance in a Large Sample of UK Twins," *Intelligence*, 38 (2010), 385–392.
Chen, Chia-Ching, I-Ming Chiu, John Smith, and Tetsuji Yamada, "Too Smart to Be Selfish? Measures of Cognitive Ability, Social Preferences, and Consistency," *Journal of Economic Behavior and Organization*, 90 (2013), 112–122.
Chen, M. Keith, "The Effect of Language on Economic Behavior: Evidence from Savings Rates, Health Behaviors, and Retirement Assets," *American Economic Review*, 103 (2013), 690–731.
Cornsweet, Tom N., "The Staircase-Method in Psychophysics," *American Journal of Psychology*, 75 (1962), 485–491.
Croson, Rachel, and Uri Gneezy, "Gender Differences in Preferences," *Journal of Economic Literature*, 47 (2009), 448–474.
Diamond, Jared M., *Guns, Germs, and Steel* (Washington, DC: National Geographic, 2005).
Doepke, Matthias, and Fabrizio Zilibotti, "Occupational Choice and the Spirit of Capitalism," *Quarterly Journal of Economics*, 123 (2008), 747–793.
Dohmen, Thomas, Benjamin Enke, Armin Falk, David Huffman, and Uwe Sunde, "Patience, Accumulation and Comparative Development," working paper, 2017a.
Dohmen, Thomas, Armin Falk, Bart Golsteyn, David Huffman, and Uwe Sunde, "Risk Attitudes across the Life Course," *Economic Journal*, 127 (2017b), F95–F116.
Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde, "Representative Trust and Reciprocity: Prevalence and Determinants," *Economic Inquiry*, 46 (2008), 84–90.
———, "Homo Reciprocans: Survey Evidence on Behavioural Outcomes," *Economic Journal*, 119 (2009), 592–612.
———, "Are Risk Aversion and Impatience Related to Cognitive Ability?" *American Economic Review*, 100 (2010), 1238–1260.
Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp, and Gert G. Wagner, "Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences," *Journal of the European Economic Association*, 9 (2011), 522–550.

Donkers, Bas, Bertrand Melenberg, and Arthur Van Soest, "Estimating Risk Attitudes Using Lotteries: A Large Sample Approach," *Journal of Risk and Uncertainty*, 22 (2001), 165–195.
Eckel, Catherine, Cathleen Johnson, and Claude Montmarquette, "Savings Decisions of the Working Poor: Short- and Long-Term Horizons," In *Research in Experimental Economics*. Vol. 10: *Field Experiments in Economics*, Jeff Carpenter, Glenn Harrison, and John List, eds. (Amsterdam: Elsevier, 2005), 219–260.
Engel, Christoph, "Dictator Games: A Meta Study," *Experimental Economics*, 14 (2011), 583–610.
Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde, "Replication Data for 'Global Evidence on Economic Preferences'," (2018), Harvard Dataverse, doi: 10.7910/DVN/HH8DV4.
Falk, Armin, Anke Becker, Thomas Dohmen, David Huffman, and Uwe Sunde, "The Preference Survey Module: A Validated Instrument for Measuring Risk, Time, and Social Preferences," IZA Discussion Paper 9674, 2016.
Fehr, Ernst, and Simon Gächter, "Altruistic Punishment in Humans," *Nature*, 415 (2002), 137–140.
Fernández, Raquel, and Alessandra Fogli, "Culture: An Empirical Investigation of Beliefs, Work, and Fertility," *American Economic Journal: Macroeconomics*, 1 (2009), 146–177.
Frederick, Shane, "Cognitive Reflection and Decision Making," *Journal of Economic Perspectives*, 19 (2005), 25–42.
Galor, Oded, and Ömer Özak, "The Agricultural Origins of Time Preference," *American Economic Review*, 106 (2016), 3064–3103.
Galor, Oded, Ömer Özak, and Assaf Sarid, "Geographical Origins and Economic Consequences of Language Structures," CESifo Working Paper Series No. 6149, 2016.
Giuliano, Paola, "Living Arrangements in Western Europe: Does Cultural Origin Matter?" *Journal of the European Economic Association*, 5 (2007), 927–952.
Gneezy, Uri, Kenneth L. Leonard, and John A. List, "Gender Differences in Competition: Evidence from a Matrilineal and a Patriarchal Society," *Econometrica*, 77 (2009), 1637–1664.
Golsteyn, Bart H. H., Hans Grönqvist, and Lena Lindahl, "Adolescent Time Preferences Predict Lifetime Outcomes," *Economic Journal*, 120 (2014), F739–F761.
Gorodnichenko, Yuriy, and Gerard Roland, "Individualism, Innovation, and Long-Run Growth," *Proceedings of the National Academy of Sciences*, 108 (2011), 21316–21319.
Grosjean, Pauline, "A History of Violence: The Culture of Honor and Homicide in the US South," *Journal of the European Economic Association*, 12 (2014), 1285–1316.
Guiso, Luigi, and Monica Paiella, "Risk Aversion, Wealth, and Background Risk," *Journal of the European Economic Association*, 6 (2008), 1109–1150.
Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, and Richard McElreath, "In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies," *American Economic Review: Papers & Proceedings*, 91 (2001), 73–78.
Henrich, Joseph, Jean Ensminger, Richard McElreath, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, and Natalie Henrich et al., "Markets, Religion, Community Size, and the Evolution of Fairness and Punishment," *Science*, 327 (2010), 1480–1484.
Henrich, Joseph, Richard McElreath, Abigail Barr, Jean Ensminger, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, and Natalie Henrich et al., "Costly Punishment across Human Societies," *Science*, 312 (2006), 1767–1770.
Herrmann, Benedikt, Christian Thöni, and Simon Gächter, "Antisocial Punishment across Societies," *Science*, 319 (2008), 1362–1367.

Hofstede, Geert, *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations, 2nd ed.*, (London: Sage, 2001).
Kihlstrom, Richard E., and Jean-Jacques Laffont, "A General Equilibrium Entrepreneurial Theory of Firm Formation Based on Risk Aversion," *Journal of Political Economy*, (1979), 719–748.
Kirby, Kris N., and Nancy M. Petry, "Heroin and Cocaine Abusers Have Higher Discount Rates for Delayed Rewards than Alcoholics or Non-Drug-Using Controls," *Addiction*, 99 (2004), 461–471.
Knack, Stephen, and Philip Keefer, "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *Quarterly Journal of Economics*, 112 (1997), 1251–1288.
Kosfeld, Michael, and Devesh Rustagi, "Leader Punishment and Cooperation in Groups: Experimental Field Evidence from Commons Management in Ethiopia," *American Economic Review*, 105 (2015), 747–783.
La Porta, Rafael, Florencio Lopez-De-Silane, Andrei Shleifer, and Robert W. Vishny, "Trust in Large Organizations," *American Economic Review*, 87 (1997), 333–38.
Licht, Amir N., Chanan Goldschmidt, and Shalom H. Schwartz, "Culture Rules: The Foundations of the Rule of Law and Other Norms of Governance," *Journal of Comparative Economics*, 35 (2007), 659–688.
Litina, Anastasia, "Natural Land Productivity, Cooperation and Comparative Development," *Journal of Economic Growth*, 21 (2016), 351–408.
Marsh, Herbert W., "Causal Ordering of Academic Self-Concept," *Journal of Educational Psychology*, 82 (1990), 646–656.
Marsh, Herbert W., Ulrich Trautwein, Oliver Lüdtke, Olaf Köller, and Jürgen Baumert, "Academic Self-Concept, Interest, Grades, and Standardized Test Scores: Reciprocal Effects Models of Causal Ordering," *Child Development*, 76 (2005), 397–416.
Mata, Rui, Anika K. Josef, and Ralph Hertwig, "Propensity for Risk Taking Across the Life Span and Around the Globe," *Psychological Science*, 27 (2016), 231–243.
Meier, Stephan, and Charles Sprenger, "Present-Biased Preferences and Credit Card Borrowing," *American Economic Journal: Applied Economics*, 2 (2010), 193–210.
Niederle, Muriel, "Gender," Mimeo, Stanford University Economics Department, 2014.
Nikiforakis, Nikos, "Punishment and Counter-Punishment in Public Good Games: Can We Really Govern Ourselves?" *Journal of Public Economics*, 92 (2008), 91–112.
Nisbett, Richard E., and Dov Cohen, *Culture of Honor: The Psychology of Violence in the South* (Boulder, CO: Westview Press, 1996).
Olsson, Ola, and Douglas A. Hibbs, "Biogeography and Long-Run Economic Development," *European Economic Review*, 49 (2005), 909–938.
Putterman, Louis, and David N. Weil, "Post-1500 Population Flows and the Long-Run Determinants of Economic Growth and Inequality," *Quarterly Journal of Economics*, 125 (2010), 1627–1682.
Rand, David G., Anna Dreber, Tore Ellingsen, Drew Fudenberg, and Martin A. Nowak, "Positive Interactions Promote Public Cooperation," *Science*, 325 (2009), 1272–1275.
Rieger, Marc-Oliver, Mei Wang, and Thorsten Hens, "Risk Preferences around the World," *Management Science*, 61 (2014), 637–648.
Rustagi, Devesh, Stefanie Engel, and Michael Kosfeld, "Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management," *Science*, 330 (2010), 961–965.
Salamon, Lester M., and Wojciech W. Sokolowski, and Associates, eds. *Global Civil Society: Dimensions of the Nonprofit Sector,* vol. 2. (Bloomfield, CT: Kumarian Press, 2004).
Schwartz, Shalom H., "An Overview of the Schwartz Theory of Basic Values," *Online Readings in Psychology and Culture*, 2 (2012), 11.

Spinath, Birgit, Frank M. Spinath, Nicole Harlaar, and Robert Plomin, "Predicting School Achievement from General Cognitive Ability, Self-Perceived Ability, and Intrinsic Value," *Intelligence*, 34 (2006), 363–374.
Spolaore, Enrico, and Romain Wacziarg, "How Deep Are the Roots of Economic Development?" *Journal of Economic Literature*, 51 (2013), 325–369.
Sutter, Matthias, Silvia Angerer, Daniela Glätzle-Rützler, and Philipp Lergetporer, "The Effects of Language on Children's Intertemporal Choices," *European Economic Review*, 106 (2018), 21–34.
Sutter, Matthias, and Martin G. Kocher, "Trust and Trustworthiness across Different Age Groups," *Games and Economic Behavior*, 59 (2007), 364–382.
Sutter, Matthias, Martin G. Kocher, Daniela Glätzle-Rützler, and Stefan T. Trautmann, "Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior," *American Economic Review*, 103 (2013), 510–531.
Tabellini, Guido, "Institutions and Culture," *Journal of the European Economic Association*, 6 (2008), 255–294.
Talhelm, Thomas, X. Zhang, Shige Oishi, Chen Shimin, D. Duan, X. Lan, and S. Kitayama, "Large-Scale Psychological Differences within China Explained by Rice versus Wheat Agriculture," *Science*, 344 (2014), 603–608.
Tanaka, Tomomi, Colin F. Camerer, and Quang Nguyen, "Risk and Time Preferences: Linking Experimental and Household Survey Data from Vietnam," *American Economic Review*, 100 (2010), 557–571.
Ventura, Luigi, "Direct Measures of Time Preference," *Economic and Social Review*, 34 (2003), 293–310.
Vieider, Ferdinand M., Thorsten Chmura, Tyler Fisher, Takao Kusakawa, Peter Martinsson, Frauke Mattison-Thompson, and Adewara Sunday, "Within- versus Between-Country Differences in Risk Attitudes: Implications for Cultural Comparisons," *Theory and Decision*, 78 (2015a), 209–218.
Vieider, Ferdinand M., Mathieu Lefebvre, Ranoua Bouchouicha, Thorsten Chmura, Rustamdjan Hakimov, Michal Krawczyk, and Peter Martinsson, "Common Components of Risk and Uncertainty Attitudes across Contexts and Domains: Evidence from 30 Countries," *Journal of the European Economic Association*, 13 (2015b), 421–452.
Viscusi, W. Kip, and Joni Hersch, "Cigarette Smokers as Job Risk Takers," *Review of Economics and Statistics*, 83 (2001), 269–280.
Wang, Mei, Marc Oliver Rieger, and Thorsten Hens, "How Time Preferences Differ: Evidence from 53 Countries," *Journal of Economic Psychology*, 52 (2016), 115–135.
Weber, Max, *The Protestant Ethic and the "Spirit" of Capitalism* (New York: Scribner's, 1930).