The University Of Sheffield.

Department Of Economics

Historical pathogen prevalence and the radius of trust

Pantelis Kammas, Vassilis Sarantides

Sheffield Economic Research Paper Series

SERPS no. 2022016

ISSN 1749-8368

19 October 2022

Historical pathogen prevalence and the radius of trust

Pantelis Kammas[a] and Vassilis Sarantides[b]

[a] *Athens University of Economics and Business, Patission 76, Athens 10434, Greece*.
kammas@aueb.gr

[b] *Athens University of Economics and Business, Patission 76, Athens 10434, Greece*.
v.sarantides@aueb.gr

October 19, 2022

What explains the emergence of cooperation among individuals and what determines the range of situations in which humans cooperate? In this study, we build on the *pathogen stress hypothesis* to explore the role of infectious diseases on the radius of trust (i.e., on whether trust was restricted towards a narrow circle of familiar others or, in contrast, involved a much wider circle of strangers) in different societies through the years. Our analysis develops and employs both contemporary and historical measures of radius of trust and takes place along four layers, namely at: (i) cross-country level, (ii) cross-country individual level, (iii) pre-industrial ethic group level, and (iv) using data on second-generation migrants. Empirical findings across all layers of analysis clearly indicate that historical pathogen prevalence is robustly and negatively associated with the radius of trust that the reference point of in-groups is restricted to the closest circle of familiar others. In other words, lethal disease environments seem to increase the distance between out-group and in-group trust, decreasing consequently the radius of people who are deemed trustworthy.

JEL classification: N00, Z10
Keywords: pathogens; radius of trust; persistence

Acknowledgments: We have benefited from comments and suggestions by Sarah Brown, Sotiris Kampanelis, Frago Kourandi, Charoula Pariarou, Jennifer Roberts, Argyris Sakalis, Koen Schoors and Enrico Vanino. This work has also benefited from comments received by seminar/conference participants at the University of Sheffield, the National and Kapodistrian University of Athens and the 5th International Conference on The Political Economy of Democracy and Dictatorship. Sarantides thanks the Department of Economics at the University of Sheffield for funding this research under the ReGS scheme. Any remaining errors are ours.

1. Introduction

What explains the emergence of cooperation among individuals and what determines the range of situations in which humans cooperate? Both questions are of central importance in the social sciences (see e.g., Dawkins, 1976; Dixit, 2004; Tabellini, 2008).[1] This is because, although effective cooperation produces socially desirable outcomes in several cases (such as public good provision, bilateral trade), non-cooperative behavior is often an individually optimal strategy. So, research on how different societies promote cooperative behavior leading to economic prosperity, always remains at the heart of economics and neighboring social sciences (see e.g., Greif, 2006; Greif and Tabellini, 2010; 2017; Algan and Cahuc, 2014; Henrich, 2020).

The traditional approach in economics highlights the importance of reputation in repeated interactions as a major force of cooperation (see e.g., Dixit, 2004).[2] A number of more recent studies place the spotlight on moral values and internalized norms, and investigate how the latter served as alternative mechanisms through which different societies safeguarded cooperative behavior through the years (see e.g., Greif, 2006; Tabellini, 2008; Greif and Tabellini, 2010; 2017; Enke, 2019, Schulz et al., 2019). Since trust is the principal social norm that promotes cooperation, a strand of the relevant literature explores -both analytically and historically- what determined the emergence of trust (see e.g., Fukuyama, 1995; Tabellini, 2010; Guiso et al., 2016; Buggle and Durante, 2021).[3] Moreover, another strand inquires

---

[1] Starting from Darwin, who suggested that natural selection could encourage altruistic behavior among kin so as to improve the reproductive potential of the "family", a large number of researchers also from positive sciences (i.e., evolutionary biologists, animal behavior researchers, neuroscientists) are searching out the genetic basis and molecular drivers of sociality and cooperative behavior among different species (see Dawkins, 1976; Penissi, 2005 for more details on this). So, the question of "how did cooperative behavior evolve?" is not examined solely by social sciences.

[2] Dixit (2004) provides an excellent overview of this literature according to which the scope of cooperation is explained by the strength of the incentives someone has to preserve his reputation in repeated interactions, relative to the incentive to cheat.

[3] Arrow (1972) was among the first to identify the value of trust, and he wrote that 'virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can

whether trust was perceived as a desirable norm only between a narrow circle of familiar others (i.e., particular trust) or in contrast involved a wider circle of unfamiliar ones (i.e., general trust) (see e.g., Banfield,1958; Delhey et al., 2011; Enke, 2019, Schulz et al., 2019).[4] In other words, did trust emerge as a product of reciprocal moral obligations and personal interactions within the context of specific kin-based institutions or does it rely on generalized moral values and impersonal enforcement procedures? (see e.g., Greif and Tabellini, 2017).

Starting from the pioneer works of McNeill (1974, 1980) and Diamond (1997), a large body of literature in social anthropology investigates how infectious diseases affect the structure of human communities and the cultural norms within societies across different times and places.[5] More recently, a number of studies explore the so-called "pathogen stress hypothesis" by investigating how infectious diseases affected the structure of social networks (see e.g., Fogli and Veldkamp, 2021), the tightness of pre-industrial kinship (see e.g. Enke, 2019), the cultural dimension of individualism-collectivism (see e.g., Fincher et al., 2008;

---

be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence.' Related to that, other studies document the importance of trust for: financial development, and trade (see Guiso, et al., 2004, 2009); for innovation (Fukuyama, 1995); for firm productivity (Bloom et al., 2012); and well-functioning institutions (Knack, 2002).

[4] As a composite measure, trust has two basic attributes: (i) the level of trust and (ii) the radius of trust (see, Delhey et al., 2011 for more details on this). The former is the strength (or intensity) of cooperative norms, whereas the latter concerns the scope of cooperation. Fukuyama (2001) describes the radius of trust as the width of the 'circle of people among whom cooperative norms are operative'. A higher radius enables productive relationships with socially 'remote' individuals, while those with a narrow radius lack of trust outside family and intimate social circles. The level of trust is captured by the Noelle-Neumann's standard question of generalized trust on the 'anonymous other': "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?". The radius of trust can be measured by six items devised by Christian Welzel, which has been designed to disentangle in-group (e.g., family) and out-group trust (e.g., people met for the first time) (see, Welzel 2010). The radius of trust is defined as the difference between out-group and in-group trust (see e.g., Enke, 2019; Schulz et al., 2019).

[5] For instance, McNeill (1974) suggested that castes in India initially formed, at least in part, as a cultural response to local parasite-stress. In other words, castes were formed as a system of social values and behavior towards out-group and in-group members to avoid exposure with people perceived as unhealthy, contaminated or unclean.

Murray and Schaller, 2010; Nikolaev et al., 2017), the family ties and the religiosity (see e.g., Fincher and Thornhill, 2012), the ethnolinguistic diversity (see e.g., Cashdan, 2001; Cervellati et al., 2019) in different societies through the years.[6] The general idea behind most of these works, is that infectious diseases constituted a major source of morbidity and mortality along human history and so human communities developed behavioural adaptations to defend against parasites (see Fincher and Thronhill, 2012; 2014). Behavioural adaptations basically consist of attitudes, social values and norms towards in-group members, as well as rules of interaction with potentially unhealthy or contaminated out-groups. In other words, human communities developed a set of cultural norms aiming at avoiding infectious diseases and managing their contagion (see e.g., Fincher and Thornhill, 2014 for more details on this).[7] Since contemporary cultural values are affected -at least in part- by the cultural values developed by human communities in the past, we expect historical pathogen prevalence to be reflected, to some extent, also in nowadays cultural values.

Building on these ideas, the paper at hand seeks to investigate empirically the role of infectious diseases on the *radius of trust* in different societies through the years (i.e., on whether trust was restricted towards a narrow circle of familiar others or in contrast involved a much wider circle of strangers). To this end, our analysis develops and employs both contemporary and historical measures of the *radius of trust*. Following the rationale of the relevant literature (see e.g., Delhey et al., 2011; Enke, 2019) our contemporary measures of *radius of trust* are based on survey questions that are asking how much respondents trust different groups, along the following scale: their family/ their neighbors/ people they know/ people they meet for the

[6] See Enke (2019) and Fincher and Thornhill (2014) for a detailed review of this literature

[7] Fogli and Veldkamp (2021) explore how disease prevalence affects the structure of social networks by allowing (or not) the development of high-diffusion networks that are beneficial for the diffusion of ideas and technology, and therefore positively correlated with income. At the same time though these high-diffusion networks are detrimental in terms of diseases' contagion.

first time/ people of another religion/ foreigners. Based on this information, we develop the variables: (i) *lower radius of trust* that equals the difference between the average trust in all groups other than family, and trust in family members (so in this case only family members are considered as in-groups) and (ii) *higher radius of trust* that treats also neighbors and people known personally as in-groups (so in this case family members, neighbors and people known personally are considered as in-groups).[8] In turn, for a subset of pre-industrial societies, we also construct two proxies of *historical radius of trust* based on the Standard Cross-Cultural Sample (SCCS) (Murdock and White, 1969). In particular, by relying on Ross (1983) data we construct the variables: (i) *historical lower radius of trust* proxy that equals the difference between the acceptability of violence towards people in other societies and people of the local community (so in this case only members of the local community are considered as in-groups) and (ii) *historical higher radius of trust* proxy that equals the difference between the acceptability of violence towards people in other societies and people of the same society (so in this case members of the same society are considered as in-groups). [9]

Our empirical analysis takes place along the following four layers. First, using cross-country analysis that associates historical pathogen prevalence and the contemporary radii of trust. Along the same lines, our second layer uses cross-country individual-level analysis. Third, to assess whether pathogens influence the radius of trust from a historical perspective, we focus on SCCS data of pre-industrial societies.[10] Fourth, to study the transmission of

---

[8] By focusing on Sub-Saharan Africa and by employing data from the Afrobarometer, Moscona et al., (2017) develop a very similar index that equals the difference between trust in relatives and trust in nonrelatives which is defined as *scope of trust* in their study.

[9] Ross (1983) coded the acceptability of violence along the following scale: members of the local community/ members of the same society/ people of other societies. It is worth noting that since, in this case- primary data measure acceptability of violence and not trust, the measure under consideration could be viewed as a reverse trust measure. In sub section 3.2.1 we provide more details.

[10] In most of the specifications we employ country level data of historical pathogen prevalence put together by Murray and Schaller (2010) that captures the stress of nine infectious diseases (leishmanias, trypanosomes,

cultural values from parents to children, we make use of the so-called epidemiological approach which exploits variation in the cultural background of adult children of migrants who grew up in the same country (see Fernández, 2007; Giuliano, 2007). More precisely, we use data on second-generation migrants that associate historical pathogen prevalence at the country of origin with the contemporary radius of trust.

Our results across all layers clearly indicate that historical pathogen prevalence is robustly and negatively associated with the *lowest radius of trust* (i.e., this is the case that only family members and local community members are considered as in-groups). In other words, high pathogen prevalence seems to increase the distance between out-group and in-group trust, decreasing consequently the radius of people who are deemed trustworthy. Obviously, none of these layers of analyses are decisive when considered in isolation and it is likely to think alternative explanations for each one of them. However, taken together, all four layers (contemporary countries, pre-industrial ethnicities, individuals, second-generation migrants) one could argue that they coherently support the "pathogen stress hypothesis" on the radius of trust.

The article contributes to several branches of the existing literature. Our results complement recent studies that investigate the emergence and long-term persistence of trust, as well as a parallel strand of the literature that inquires whether trust was a norm only between a narrow circle of familiar others or in contrast involved a wider circle of unfamiliar ones. Regarding the former, Buggle and Durante (2021) advance the hypothesis that unfavourable weather conditions have encouraged cooperation, and therefore created differences in trust over

malaria, schistosomes, filariae, dengue, typhus, leprosy and tuberculosis). In addition, for the SCCS sample of pre-industrial societies we employ the coded data of seven pathogens developed by Low (1994). Six of these pathogens (leishmanias, trypanosomes, malaria, shistosomes, filariae, and leprosy) overlap with the index of Murray and Schaller (2010), except spirochetes. Both variables attempt to measure the pathogen stress populations were facing in the past, and before the significant public health changes started to occur and the introduction of modern medicine.

time. Other studies document how historical episodes, such as the slave trade and colonial medicine in Africa, the introduction of the Napoleonic civil code, and the East German system of mass surveillance, had long-lasting effect on contemporary trust attitudes (Jacob and Tyrell, 2010; Nunn and Wantchekon, 2011; Buggle, 2016; Lowes and Montero, 2021). Regarding the radius of trust, the big question in the relevant literature is what explains the fact that in some regions trust is restricted exclusively to a narrow circle of familiar others (for example within clans in China, India and Middle East) (see e.g., Greif, 2006; Greif and Tabellini, 2010; 2017; Fukuyama, 2011), whereas in Western countries trust relies on impersonal moral values which allowed the organization of society through a network of corporations (see e.g., Greif and Tabellini, 2017; De la Croix et al., 2018; Enke, 2019).[11,12] According to Delhey et al. (2011) Confucianism is negatively correlated with the radius of trust, whereas the opposite holds for other religions (e.g., Protestantism). Moreover, Enke (2019) provides evidence that the contemporary radius of trust is negatively associated with pre-industrial kinship tightness, whereas Schulz et al. (2019) and Henrich (2020) explore how specific policies of the medieval Roman Catholic Church (such as the prohibition on cousin marriage that weakened the kinship ties) are associated with an increased radius of trust. To the best of our knowledge, our paper is the first systematic study that explores the role of historical pathogen prevalence on the radius of trust.

Therefore, our paper also intersects with cross-cultural research that assessed the importance of the "pathogen stress hypothesis". Fogli and Veldkamp (2021) building on the

[11] The corporation is a voluntary association between unrelated individuals, established to pursue common interests. The most well-known historical example is the independent city, others are guilds, communes, and business associations (see Greif and Tabellini, 2017; Schulz, 2022 for more details on this).

[12] Trust is based on personal relations, and it is restricted strictly to family members (this is the so-called *amoral familism*) also in the region of South Italy. This stylized fact was first highlighted by Banfield (1958) and then analysed in detail by Putnam (1993), in their pioneer works. Both studies treat in-group favouritism as a crucial determinant of political and economic underdevelopment of South Italy relative to the North.

theory of networks, explore how infectious diseases blocked the development of high-diffusion networks (that are beneficial for the diffusion of ideas and technology, but at the same time detrimental in terms of disease contagion) and in turn social organization that condemned several geographical regions to economic underdevelopment. Previous empirical studies have documented the effect of infectious diseases on different aspects of social organization and cultural norms. More precisely, they suggest that high prevalence of parasitic stress is positively associated with collectivism (see e.g., Fincher et al., 2008; Murray and Schaller, 2010; Nikolaev et al., 2017); the tightness of pre-industrial kinship (see e.g., Enke, 2019), family loyalty and religiosity (Thornhill et al., 2010); cultural conformity (Murray et al., 2011); authoritarianism (Murray et al., 2013), and ethnolinguistic diversity (Cashdan, 2001; Cervellati et al., 2019). Our analysis seeks to extent this strand of the literature to investigate empirically the potential existence of long-run *inertia,* and to establish a diachronic relationship between infectious diseases and the radius of trust.

Finally, our empirical results are indirectly associated to the literature that investigates the relationship between pathogen environment and long-run comparative development. The hypothesis that disease environment affects the productivity and consequently economic development, goes back at least to McNeill (1974) and today a rich empirical literature has assessed empirically this relationship (see e.g., Gallup and Sachs, 2001; Sachs and Malanay, 2002). More recently, Depetris-Chauvin and Weil (2016) and Cervellati et al. (2017) highlight the negative impact of malaria on the economic development in Africa; Bleakley (2010) establish a similar relationship for the Americas; Cutler et al. (2010) for India; and Lucas (2010) for Paraguay and Sri Lanca. Along the same lines, Bleakley (2007) and Bleakley and Lange (2010) evaluate the consequences of eradication of hookworm disease (circa 1910) on education, health and long-run economic development in South America. Moreover, Alsan (2015) explores how the suitability of the climate for the tsetse fly within Africa, prevented the adoption of domesticated animals and resulted in lower population density. Finally, Cervellati and Sunde (2011, 2013) investigate the reduced form effect of health on economic growth in the last half century. Our findings contribute to this literature by documenting that historical disease burden can also influence the radius of trust, and this can be viewed as an additional channel through which pathogens affect long-term economic development.

The remainder of the paper is organized as follows. Section 2 describes the conceptual link between pathogen prevalence and the radius of trust. Section 3 illustrates the empirical strategy and describes the data. Section 4 presents the results. Section 5 concludes.

2. Conceptual framework

2.1. Infectious Disease Environment and Aspects of Social Networks

Parasitic (infectious = pathogenic) stress constituted a major source of morbidity and mortality along human history (see McNeill, 1980; Diamond, 1997) and so human communities developed social networks (i.e., kin networks, attitudes, social values and norms) that allowed them to defend against parasites (see Fogli and Veldkamp, 2021; Fincher and Thornhill, 2014 for more details on this). More precisely, in geographical regions characterized by lethal disease environment, humans developed *low-diffusion networks* based on personal relationships - that were able to manage diseases' contagion, but at the same time they were detrimental for the diffusion of ideas and technology. In contrast, in low pathogen environments, there was no need for such a protection and therefore *high-diffusion networks* based on impersonal relationships were viable (see Fogli and Veldkamp, 2021).

According to the relevant literature, a social network has many different aspects and dimensions (see Fogli and Veldkamp, 2021). *Kinship structure*, that determines the way that individuals are interconnected in family networks (i.e., extended clan-based kin networks, nuclear family) is a central aspect of social network with many interesting social and economic implications.[13] Similarly, the *social values and cultural norms* towards in-group members and the rules of interaction with out-group people is also a fundamental dimension of the social network structure (see e.g., Fogli and Veldkamp, 2021).

2.2. Social Values and Cultural Norms: How did they emerge?

Focusing on social values, and according to the so-called "parasite-stress theory of sociality" (PST), human communities developed behavioural adaptations to defend against parasites (see Fincher and Thronhill, 2012; 2014). Behavioural adaptations (also described as *behavioural immune system*) basically consist of a number of ancestrally adaptive attitudes, norms towards in-group members, codes of interaction with out-group people and prejudice against people perceived as contaminated.[14] An important implication of the PST is that humans evolve resistance to local pathogenic strains (see, e.g., Tibayrenc, 2007; Fincher and Thornhill, 2008b). As a result, host defense works more effectively against the local parasites, and not against those evolving in nearby host groups. Because of that, in an ecological setting of high parasite stress, to avoid a novel parasite, people were more likely to naturally select personality

---

[13] The importance of kinship in social and economic outcomes has been widely recognized in the relevant literature. Indicatively, Schulz (2022) and Woodley and Bell (2012) provide evidence that clan-based kin networks are detrimental for democratic participatory institutions; Akbari et al. (2019) present evidence that cousin marriage fosters corruption; Buonanno and Vanin (2017) suggest that social disclosure is associated with reduced tax compliance. Along the same lines, Enke (2019), Schulz et al. (2019) and Henrich (2020) provide evidence of clear-cut associations between kinship structure and several social and moral values. Finally, by focusing on Sub-Saharan Africa, Moscona et al. (2017) provide evidence that segmentary lineage organization is associated with a larger gap between the trust in one's relatives compared to nonrelatives; and Moscona et al. (2020) suggest that ethnic groups organized around segmentary lineages are more prone to conflict.

[14] To be more precise, human communities developed chiefly two types of adaptation against parasites stress. The first one is the *classical immune system* that consists of biochemical, cellular and tissue-based adaptation, whereas the second one is the *behavioral immune system,* which is comprised by a set of cultural norms and social values aiming to protect the community from infectious diseases (see e.g., Fincher and Thornhill, 2012, 2014).

traits that include xenophobia and mistrust towards out-groups (see, Fincher et al., 2008a).[15] The benefits and costs of contacting out-groups will shift along the parasite-stress gradient. In particular, as parasite-stress declines, and consequently the contagion risk from out-groups, individuals are expected to develop value systems that include trust of out-groups.

Regarding attitudes towards in-groups, according to Fincher and Thornhill (2012) high pathogen prevalence may lead people to be more ethnocentric, to focus in prosociality among in-group members and foster supportive social values for coping with present infections in members of the in-group. Consistent to this, Van Leeuwen et al. (2012) showed that in regions with high pathogen prevalence individuals tended to endorse group-binding moral values. This finding is also supported by Imada and Mifune (2021), who argued that pathogen threat facilitates cooperation within in-group members as a reactive behavioural immune response. In particular, individuals might utilize cooperative behaviour to ensure that they can receive social support when they have contracted an infectious disease.[16] Obviously, trust and cooperation between in-groups are expected to be weaker in environments of low pathogen prevalence.

Thus, according to the PST, as pathogenic stress increases societies were more likely to develop mistrust towards out-groups as defence mechanism against novel parasites, and at the same time enhance cooperation within in-groups through supportive social values to cope with present infections. As a result, we would expect a higher distance between out-group and in-group trust as pathogen prevalence increases, and consequently a lower radius of people who are deemed trustworthy.

[15] In support of this theory, Faulkner et al. (2004) provide experimental evidence that people who feel more vulnerable to disease (either as a baseline trait or through experimental manipulation) tend to respond more negatively to questions regarding potential outsiders such as migrants.

[16] A similar argument for attitudes towards in-group members is made also by Navarrete and Fessler (2006) under experimental conditions.

2.3 Social Values and Cultural Norms: Why do they persist?

PST suggests that historical pathogens affected the emergence of trust either as a product of reciprocal moral obligations (within the context of clan-based institutions) or as a generalized cultural norm (within the context of impersonal relationships and corporations). However, the question of "why these social values and cultural norms persist overtime" and seem to survive even in modern industrialized economies where a negligible fraction of the population is affected by the diseases of the past (see e.g., Acemoglu and Johnson, 2007) must be addressed. Following the rationale of a large literature in evolutionary anthropology (see e.g., Boyd and Richerson, 1985; 2005), we view cultural norms as behavioral heuristics or rules-of-thumb that simplify decision-making in uncertain and complex environments. More precisely, Boyd and Richerson (1985) show that if information acquisition is either costly or imperfect, it can be optimal for individuals to develop heuristics or rules-of-thumb in decision making. By relying on general beliefs about how to behave, individuals may not act in a manner that is precisely optimal in every instance, but they save on the costs of obtaining the information necessary to always behave optimally. In practice, these heuristics often take the form of deeply held social values and cultural norms (see Alesina et al., 2013; Buggle and Durante, 2021 for more details on this). So, at the individual level this persistence is generally attributed to intergenerational transmission of attitudes and traits through parents. Because of the persistent nature of cultural beliefs, norms about the radius of trust may persist even after substantial improvements on health standards that ensure that only a small fraction of the population is affected by the diseases of the past.[17]

3. Empirical specification and data

[17] For a more detailed analysis about the determinants of cultural persistence and the alternative theoretical models that explain both cultural persistence and change, see Nunn and Guiliano (2021).

3.1 Regression model

In order to explore the long-run impact of historical pathogen prevalence on the radius of trust, we estimate OLS regressions of the following form:

$$radius_i = \alpha + \beta pathogen\ stress_i + \gamma X_i + \varepsilon_t \qquad (1)$$

where *radius* is an index that captures the radius of trust, *pathogen stress* is an index of historical pathogen prevalence, *X* includes a large set of control variables, and ε is an unobserved error term. The above empirical specification will be estimated using: (i) cross-country data; (ii) cross-country individual-level data; (iii) pre-industrial ethnic group-level data and (iv) and using data of second-generation migrants. All our estimates include also fixed effects that are specified in each subsection that results are discussed. For instance, layer (i) of the analysis includes continental fixed effects in order to capture unobserved time invariant heterogeneity at the continental level. We follow the classification of the World Bank that includes East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North America, North America, South Asia, and Sub-Saharan Africa.

3.2 Data

3.2.1 Radius of trust

To construct our dependent variable for layers of empirical analysis (i), (ii) and (iv) we use data from the joint European Values Survey (EVS) and World Values Survey (WVS) wave 7 (2017-2022) that combines two distinct characteristics for the purposes of our study. First, this joint wave allows us to identify a second-generation migrants' ancestry by the father's or mother's country of birth for the main layer of empirical analysis (iv).[18] Second, it provides a set of six survey questions that disentangle in-group and out-group trust (see, e.g., Delhey et

[18] It should be noted that in layers (i) and (ii) of the analysis we keep only native individuals in the sample.

al., 2011; Delhey and Wenzel, 2012). Although these survey questions are also available in wave 5 (2004-2009) and wave 6 (2010-2014) of the WVS, full information for second generation migrants is not. To this end, we have decided to use the joint wave for the consistency of the analysis between layers (i), (ii) and (iv) - and add waves 5 and 6 in the analysis as a robustness check in layers (i) and (ii).

The survey questions ask participants about their level of trust for each of the following six distinct groups: (i) their family; (ii) their neighbours; (iii); people they know; (iv) people they meet for the first time; (v) people of another religion and (vi) foreigners.[19] We partition these groups in two ways. First, by taking the difference between average out-group and in-group trust (*higher radius of trust*). The former includes people met for the first time, people of another religion and foreigners, whereas the latter all the remaining groups (see Delhey et al., 2011; Enke, 2019). Second, by taking the difference between the average trust in all groups (other than family) and family trust (*lower radius of trust*) (see Enke, 2019). Using both variables allow us to assess not only if the *higher radius of trust* is affected negatively by pathogen prevalence, but also if the coalition of in-groups becomes narrower as the latter increases. Figures A1 and A2 in the Appendix display the country level variation for the two versions of the radius of trust. As can be seen, in all cases we have negative values which indicate that in all countries of our sample in-groups (or family members) are trusted more than out-groups. At the same time, though, it has to be noted that we observe significant variation within the limits of negative values. For instance, Scandinavian countries are among the countries that display the lowest negative values, while some European (e.g., Greece) and South American countries (e.g., Peru) the highest. Also, although African countries are

[19] Original coding from 1 (Trust completely) to 4 (Do not trust at all) was reversed so that a higher value means more trust.

underrepresented in the sample, available data indicate that they belong at the higher end of the distribution.

For layer (iii) of the analysis, we use Murdock and White's (1969) Standard Cross-Cultural Sample (SCCS) to construct two analogous proxies. The SCCS consists of 186 nonindustrial, mostly small-scale ethnic groups. These societies are chosen to be culturally and historically independent, as well as representative of the 1265 societies recorded in the Ethnographic Atlas. Ross (1983) coded the acceptability of violence towards members of the local community (v781), towards members of the same society (v782), and towards people in other societies (v783) (see, e.g., Cashdan and Steele, 2013).[20] From these variables, we compute the difference between the acceptability of violence towards people in other societies and people of the same society as a (reversed) proxy for the *higher radius of trust* (*historical higher radius of trust*) (see, Enke, 2019). Moreover, to proxy for the *lower radius of trust* we take the difference between the acceptability of violence towards people in other societies and people of the local community (*historical lower radius of trust).*

3.2.2 Historical pathogen prevalence

According to epidemiologists, diseases are classified into zoonotic, multi-host, and human-specific (see, e.g., Smith, et al., 2007; Thornhill and Fincher, 2014). Zoonotic parasites (e.g., rabies) develop and reproduce entirely in non-human hosts and can infect humans as well but are not transmitted directly from human to human. Multi-host parasites can use both non-human and human hosts to complete their life cycle and may be transmitted directly from human to human. Human-specific parasites are transmitted only from human to human. This classification is of paramount importance as the PST correlates with the presence of non-zoonotic parasites - i.e., that have the capacity for (direct or indirect) human-to-human

[20] Original coding from 1 (Valued) to 4 (Disapproved) was reversed so that a higher value means violence is more valued.

transmission. Following this rationale, Murray and Shaller (2010) created an index that assesses the historical prevalence of nine non-zoonotic pathogens detrimental to human reproductive fitness (leishmanias, trypanosomes, malaria, schistosomes, filariae, leprosy, dengue, typhus and tuberculosis) for 155 countries.

It should be noted that this index has two characteristics that accommodate our identification strategy. First, for eight of these diseases (all but tuberculosis) old epidemiological atlases were used (e.g., Simmons et al., 1944), before the introduction of modern medicine (see Murray and Schaller, 2010 for more details on this). This allows us to assess if historical prevalence of pathogens is associated with contemporary cross-cultural differences. Second, seven of these pathogens (leishmanias, trypanosomes, malaria, schistosomes, filariae, dengue, typhus) are transmitted indirectly from human to human through a vector (like the mosquito Anopheles for malaria).[21] As a consequence, the endemicity of these pathogens is exogenous, as it requires specific bio-climatological conditions that are suitable for the respective transmission vectors (see, e.g., Cervellati et al., 2017).

A 4-point coding scheme was employed by Murray and Schaller (2010): 0 = completely absent or never reported, 1 = rarely reported, 2 = sporadically or moderately reported, 3 = present at severe levels or epidemic levels at least once. To ensure the comparability across different diseases, Murray and Schaller (2010) convert disease data for each pathogen into a z-score. In turn, the overall pathogen prevalence index is estimated as the average of the nine individual disease z-scores (*pathogen stress*). Thus, the mean of the overall index is close to zero, with positive (negative) values suggesting that the average pathogen score is higher (lower) than the mean. This is our main independent variable for layers of empirical analysis (i), (ii) and (iv). Figure A3 displays the country level variation of *pathogen stress*. Also,

[21] The remaining two diseases (leprosy, and tuberculosis) have the capacity to be transmitted directly from human to human.

consistent to expectations Figure 1 reveals a negative association between *pathogen stress* and the two contemporary radii of trust. In particular, the correlation between *pathogen stress* and the *higher radius of trust* and the *lower radius of trust* is -0.46 $(p < 0.01)$ and -0.60 $(p < 0.01)$ respectively.

For layer (iii) of the analysis, we use Low's (1994) published pathogen codes for the SCCS (v1253-v1259). Available data include information for seven pathogens: (i) six that overlap with the index described above, namely leishmanias, trypanosomes, malaria, schistosomes, filariae, and leprosy; (ii) and spirochetes (Borrelia duttoni, B. recurrentis, Treponema) that is also classified as a non-zoonotic disease. Low (1994) employs a 3-point coding scheme: 1 = absent or not recorded; 2 = present, no indication of severity; 3 = present and serious, widespread, or endemic. Given that for value two the severity is unclear, we decided to assign the value of one if a disease is present (or recorded), and zero otherwise. In turn, the overall pathogen index is estimated as the average of the seven dummy variables (*SCCS pathogens*). As a result, it takes values from zero to one, with higher values indicating that more of the coded pathogens were present within the territory of the ethnic group. Although this definition allows us to explore pathogen exposure at the extensive margin, thus not informative about the severity of pathogen exposure, it is subject to much lower measurement error. Tables A1-A4 in the Appendix provides descriptions, data sources, and descriptive statistics for the main variables included in the four layers of our empirical analysis.

4. Results

4.1 Cross-country analysis

Table 1 reports the estimates for the relationship between the radius of trust and *pathogen stress*. In particular, columns (1)-(3) report estimates for the effect *pathogen stress* on the *higher radius of trust*, whereas in columns (4)-(6) the latter variable is replaced with the *lower radius of trust*. We adopt an 'incremental' strategy and estimate alternative specifications where progressively we add new controls. In particular, columns (1) and (4) include continental fixed effects and our basic controls (absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing) following previous studies (see, e.g., Galor and Özak, 2016; Ang and Fredriksson, 2017; Ang, 2019; Buggle, 2020). Columns (2) and (5) introduce controls for legal origins and colonial dummies to account for institutional effects (see e.g., Acemoglu et al., 2002). Finally, the relationship between pathogen stress and the radius of trust can also be associated with the level of development and some religious traits and constraints. To this end, in columns (3) and (6) we add the remaining controls that include contemporary GDP per capita, years of schooling and percentages of a major religion (Muslims, Protestants, and Catholics). It should be noted that for direct comparability, coefficient estimates of *pathogen stress* throughout the analysis are standardised on the respective estimation sample. According to the results, the coefficient of *pathogen stress* is negative and statistically significant between 1 and 5 per cent levels of significance, only in columns (4)-(6) that the *lower radius of trust* is the dependent variable. The full specification in column (6) implies that a one standard deviation increase in the pathogen stress (0.63), is associated with a 0.544 standard deviation decrease in the radius of trust. With an unconditional mean of -1.21, this corresponds to a decrease in the *lower radius of trust* of about 53 per cent. In contrast, in columns (1)-(3) that neighbors and friends are also considered as in in-groups, the effect is weaker and statistically insignificant. This is a first indication that *pathogen stress* matters, but only for the narrower radius of trust where family is the only reference point of in-group members.

We perform three robustness checks for the cross-country analysis. First, in Table A5 we control for additional channels through which *pathogen stress* can be associated with the radius of trust. In particular, we control progressively for state antiquity and pre-industrial kinship, and for contemporary institutions, ethnic fractionalization and individualism. The *state* *antiquity index* of cumulative presence of state institutions from 1 AD to 1500 AD (see, Putterman, 2010) controls for the possibility that early institutions can be correlated both with the *pathogen stress* and the radius of trust. Also, according to Enke (2019) pre-industrial *kinship* tightness is a strong predictor of contemporary radius of trust. Moreover, we control for contemporary institutions, ethnic fractionalization and individualism, using data obtained from Marshall and Jaggers (2010), Desmet et al. (2012), and Hofstede et al. (2010), respectively. The latter allows us to exclude the possibility that we capture the relationship identified by previous studies between historical pathogen stress and individualistic values (see, e.g., Fincher et al., 2008; Gorodnichenko and Roland, 2017; Kammas et al., 2017; Nikolaev et al., 2017). In addition, epidemiological conditions have been shown to affect the origins of ethnic diversity and its persistence (see, Cashdan, 2001; Cervellati et al., 2019). Finally, we control for contemporary institutions to exclude the possibility that we capture the effect of institutional quality on the radius of trust. Second, in Table A6 we control for *contemporary pathogen stress*, as developed by Fincher and Thornhill (2008a), on its own and in combination with the historical *pathogen stress*. Third, we explore the possibility that our results are driven by outliers. In order to mitigate this concern, the analysis in Table A7 censors the sample by excluding a number of countries that have very low (<5 per cent of the sample) or very high (>95 per cent) *pathogen stress*. In all cases, findings are consistent with those obtained in Table 1, according to which *pathogen stress* is significantly statistically associated only with the *lower radius of trust*.

4.2 Individual-level analysis

The second part of the empirical analysis assesses the effect of pathogen stress on the radius of trust using individual level data from the last joint wave of the EVS and the WVS, 2017-2022. In relation to the cross-country analysis, disaggregated individual data allows to account for individual controls, such as age and gender. The set of basic controls (e.g., absolute latitude) used in the cross-country analysis are also included in the second layer of the empirical analysis. The same holds for legal origins and colonial dummies. The set of individual controls include age, aged squared, marital status and gender. Also, country-level GDP per capita, average years of schooling, and percentages of a major religion (Muslims, Protestants, and Catholics) are not included as their effects are captured at the individual level (see, e.g., Ang and Fredriksson, 2017). In particular, GDP per capita is replaced with dummy variables for income level (low, middle, high). Also, the variable average years of schooling is replaced with educational attainment dummy variables (lower, middle, upper), whereas religiosity with dummy variables of religious denomination (Muslim, Protestant, or Catholic). We control also for continental and study fixed effects, whereas the standard errors are corrected for clustering at the country where the interview was taken. As can be seen in Table 2, the coefficient of *pathogen stress* is negative and statistically significant between 1 and 10 per cent levels of significance in columns (1)-(3), whereas in columns (4)-(6) the coefficient remains negative and statistically significant at the 1 per cent level. So, in contrast to the cross-country analysis, both radii of trust seem to be associated with the *pathogen stress*. In Tables A8-A10 in the Appendix we perform the three robustness checks introduced in Section 4.1. Finally, in Table A11 we add in the sample information from waves 5 and 6 (2004-2014) of the WVS that the six components of trust are available. In all cases results remain intact.

4.3 SCCS analysis

Our next step is to assess whether pathogen prevalence influences the radius of trust from a historical perspective, by using Murdock and White's (1969) ethnic-group level SCCS data. To this end, we replace *pathogen stress* with *SCCS pathogen* as defined in Section 3.2. In addition, as already mentioned, we intent to proxy for trust using data that contain information on the acceptability of violence (see, e.g., Enke, 2019). In particular, the *historical higher (lower) radius of trust* is used to proxy for the *higher (lower) radius of trust*. If the radius of trust decreases as pathogen prevalence increases, we would expect a positive effect of the later on the radius of acceptability of violence. Following the analysis so far, we adopt an 'incremental' strategy where we progressively add new controls. In particular, columns (1) and (3) include continental fixed effects and our basic controls (absolute latitude, precipitation, elevation, distance to coast, ruggedness, and land quality) following previous studies (see, e.g., Fenske, 2013; Galor and Özak, 2016). Moreover, in columns (2) and (4) we proxy for development at the ethnic group level using an ordered variable of population density. Also, following Enke (2019) we control for kinship tightness that seems to have a strong positive (negative) association with the radius of violence (trust).

The estimates using the SCCS data are reported in Table 3. Although the sample of observations is limited, findings are quite intriguing. In particular, in columns (1) and (2), where the radius takes into account members of other societies versus members of the same society, the effect of *SCCS pathogens* is statistically insignificant. In contrast, in columns (3) and (4), the presence of more pathogens is positively and statistically significantly associated at the 10 per cent level with acceptability of violence that distinct members of other societies versus members of the local community. This is consistent to the findings obtained in the previous layers of analysis, according to which pathogen prevalence matters, but only when the reference point of in-group members is narrower. In other words, evidence seems to suggest that pathogen stress seems to enhance in-group favouritism around a close cycle of individuals. In Tables A12-A14 we conduct three robustness checks. In Table A12 we drop observations that according to Ross (1983) are of weak quality. Moreover, in Table A13 we exclude observations with a Cook's distance above a common rule-of-thumb threshold (four divided by the number of observations). Finally, in Table A14 we replace heteroskedasticity robust standard errors, with standard errors clustered at the language subfamily level. Overall, the pre-industrial ethnic-group analysis suggests that the narrower historical proxy of the radius of trust, namely *historical lower radius of trust*, is also associated with pathogen prevalence.

4.4 Second-generation migrant analysis

In the final and main layer of our empirical analysis, we apply an epidemiological approach to study the parental transmission of culture to children. In particular, our goal is to examine to what extent cultural parameters embedded in *pathogen stress* at the country of origin, are affecting the current levels of radius of trust of second-generation migrants using data from the joint EVS and WVS. This approach accounts for time invariant unobserved heterogeneity in the host country (e.g., geographical and institutional characteristics). Moreover, since *pathogen stress* in the parental country of origin is distinct from the *pathogen stress* in the country of residence, the estimated effect in the country of origin captures the culturally embodied, intergenerationally transmitted effect of *pathogen stress*. The sample of second-generation migrants is composed by participants in the survey who were born in the country where the interview was taken, and whose parents were not born in that country. More specifically, we use two different samples. First, the most relaxed approach that one of the two parents is migrant and use that parent's *pathogen stress* in the country of origin. This allows us to have 4706 second generation migrants coming from 104 countries of origin, and who currently reside in 67 countries that the interview of the survey was taken.[22] Second, a specification that at least the mother is migrant and use that mother's *pathogen stress* in the country of origin. This allows us to have 1506 second generation migrants coming from 69 countries of origin, and who currently reside in 58 countries that the interview of the survey was taken.

The OLS estimates from this analysis are presented in Table 4. Columns (1)-(3) and (7)-(9) use the ancestry of the mother or the father, to estimate the effect of *pathogen stress* on

[22] When both parents are migrants we take the average value of *pathogen stress* in the country/countries of origin.

the *higher radius of trust* and the *lower radius of trust*, respectively. Following the same structure, columns (4)-(6) and (10)-(12) use the ancestry of the mother. Moreover, in columns (1), (4), (7) and (10) we include fixed effects for the country that the interview was taken, study fixed effects and our basic controls (e.g., absolute latitude) adjusted for the country of the individual's country of ancestry. Columns (2), (5), (8) and (11) introduce controls for legal and colonial origins adjusted for the ancestry of the individual. Finally, in columns (3), (6), (9) and (12) we introduce our individual controls (e.g., age). Heteroskedasticity robust standard errors are clustered at the parent's country of origin. As can be seen, the effect of *pathogen stress* is negative and statistically significant between 5 and 10 per cent levels of significance only in columns (7)-(12) that the *lower radius of trust* is used as dependent variable. This is consistent with our findings in the other three layers of the empirical analysis. This pattern clearly indicates that pathogen prevalence increases in-group favouritism towards the closest cycle of individuals (i.e., family or local community).

Our first robustness check in this section is to explore the effect of *pathogen stress* on the components of the radius of trust, namely *family trust*, *out-group trust* and *out-group 2 trust*. *Family trust* takes values from one to four, with higher values indicating more trust towards family members. *Out-group trust* is the average trust towards people that one meets for the first time, people of another nationality, and people of another religion – i.e., the three groups considered as out-groups in the *higher radius of trust* variable. *Out-group 2 trust* is the average trust towards the 5 groups outside the family. Results are reported in Table 5. As can be seen, *pathogen stress* is positively related with *family trust*, but interestingly its effect is statistically significant at the 10 per cent level only in column (4) that the ancestry of the mother is used. Regarding out-group trust, although all coefficients of *pathogen stress* are negative none of those are close to conventional levels of statistically significance. These results indicate a significant distance between family trust and trust to other groups, as pathogen prevalence increases, which in turn affects the 'narrow' radius of trust that the reference point of in-groups is limited to the closest circle of familiar others

We perform four additional robustness checks of our findings in Table 4. In particular, in Table A15 we introduce the additional controls (e.g., individualism); in Table A16 we add the *contemporary pathogen stress* on its own and in combination with historical *pathogen stress*; and in Table A17 we censor our sample for the possibility that our results are driven by outliers. Finally, in Table A18 we examine if our results are driven from countries with significant prevalence in our sample. To this end, we drop from the full specifications estimated in Table 4, the three most prevalent groups of second-generation migrants of our sample, namely from China, Germany and Russia, on their own and in combination. In all cases, results verify our findings in Table 4, according to which second-generation migrants, who originate from countries with higher *pathogen stress*, tend to have a narrower radius of trust around their family members.

5. Conclusions

Did trust emerge as a product of reciprocal moral obligations and personal interactions within the context of specific kin-based institutions, or did it rely on generalized moral values and impersonal enforcement procedures? And what was the role of disease environment on the historical pattern followed by different societies through the years? This paper proposes and tests the hypothesis that historical exposure to pathogens is an influential factor in explaining the scope of cooperation across societies and countries. In particular, building on the *pathogen stress hypothesis*, our analysis suggests that lethal disease environment is associated with a lower radius of trust. This is because, as pathogenic stress increases, societies were more likely to develop mistrust towards out-groups as a defence mechanism against novel parasites, and at the same time enhance cooperation within in-groups through supportive social networks to cope with present infections (see, Fincher et al., 2008a; Fincher and Thornhill (2012).

Our analysis develops and employs both contemporary and historical measures of radius of trust and takes place along four layers, namely: (i) cross-country level, (ii) cross-country individual level, (iii) pre-industrial ethic group level, and (iv) and using data of second-generation migrants. The results findings provide robust evidence that higher pathogen prevalence is negatively associated with the lower radius of trust. In particular, this effect is established when relating historical pathogen prevalence and contemporary radius of trust in cross-country analysis and cross-country individual-level analysis. Moreover, analogous evidence is provided for a sample of pre-industrial societies that associates historical pathogen prevalence and a historical proxy of trust radius (i.e., acceptability of violence). Finally, we document that the effect of past exposure on pathogens persists in second-generation migrants. Together, the evidence presented in this paper highlights a persistent association over time.

References

Acemoglu, D., Johnson, S., and Robinson, J. A. (2002). Reversal of fortune: Geography and institutions in the making of the modern world income distribution, *The Quarterly Journal of Economics, 117*(4), 1231–1294.

Acemoglu, D., and Johnson, S. (2007), Disease and Development: The Effect of Life Expectancy on Economic Growth, *Journal of Political Economy*, 115, 925–985.

Acemoglu, D., Johnson, S., and Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. In P. Aghion and S. N. Guif (Eds.), *Handbook of economic growth* (Vol. IA, pp. 385–472). Amsterdam: Elsevier.

Akbari, M., Bahrami-Rad, D. and Kimbrough, E.O. (2019). Kinship, fractionalization and corruption, *Journal of Economic Behavior and Organization*, 166, 493–528.

Alesina, A., Giuliano, P., and Nunn, N. (2013). On the origins of gender roles: Women and the plough. *The Quarterly Journal of Economics*, 128(2), 469–530.

Algan, Y., and Cahuc, P. (2014). Trust, well-being and growth: New evidence and policy implications. In Aghion, P., and Durlauf S. N. (eds.), Handbook of Economic Growth, Vol. 2B, Elsevier Science, pp. 49–120.

Alsan, M. (2015). The effect of the tsetse fly on African development, *American Economic Review*, 105(1), 382-410.

Ang, J. (2019). Agricultural legacy and individualistic culture. *Journal of Economic Growth*, 24 (4), 397–425.

Ang, J. and Fredriksson, P. (2017). Wheat agriculture and family ties, *European Economic Review*, 100, 236-256.

Arrow, K. (1972). Gifts and exchanges, *Philosophy and Public Affairs*, 1, 343-362.

Banfield, E.C. (1958). *The Moral Basis of a Backward Society*, New York: Free Press.

Barro, R. and Lee, J. (2013). A new data set of educational attainment in the world, 1950 2010. *Journal of development economics*, 104, 184–198.

Bleakley, H. (2007). Disease and Development: Evidence from Hookworm Eradication in the American South. *Quarterly Journal of Economics*,122, 73–117.

Bleakley, H. (2010). Malaria eradication in the Americas: A retrospective analysis of childhood exposure. *American Economic Journal: Applied Economics*, 2, 1-45.

Bleakley, H., and Lange, F. (2010). Chronic Disease Burden and the Interaction of Education, Fertility and Growth. *Review of Economics and Statistics*, 91, 52-65.

Bloom, N., Sadun, R., and van Reenen, J. (2012). The organization of firms across countries, *The Quarterly Journal of Economics*, 127(4), 1663-1705.

Boyd, R., and Richerson. P. (1985). *Culture and the Evolutionary Process*. Chicago: University of Chicago Press.

Boyd, R., and Richerson. P. (2005). *The Origins and the Evolution of Cultures.* Oxford: Oxford University Press.

Buggle, J. C. (2016). Law and social capital: Evidence from the code Napoleon in Germany. *The European Economic Review*, 87, 148–175.

Buggle, J. (2020). Growing collectivism: Irrigation, group conformity and technological divergence, *Journal of Economic Growth*, 25,147-193.

Buggle, J., and Durante, R. (2021). Climate risk, cooperation and the co-evolution of culture and institutions. *The Economic Journal*, 131(637), 1947–1987.

Buonanno, P., and Vanin, P. (2017). Social closure, surnames and crime, *Journal of Economic Behavior and Organization*, 137,160–75.

Cashdan, E. (2001). Ethnic diversity and its environmental determinants: Effects on climate, pathogens, and habitat diversity. *American Anthropology* 103, 968–991.

Cashdan, E., and Steele, M. (2013). Pathogen prevalence, group bias, and collectivism in the standard cross-cultural sample, *Human Nature*, 24(1), 59–75.

Cervellati, M., Chiovelli, G., and Esposito, E. (2019). Bite and Divide: Malaria and Ethnolinguistic Diversity, CEPR Discussion Papers 13437, C.E.P.R. Discussion Papers.

Cervellati, M. and Sunde, U. (2011). Life expectancy and economic growth: the role of the demographic transition, *Journal of Economic Growth*, 16(2), 99–133.

Cervellati, M. and Sunde, U. (2013). Life expectancy, schooling, and lifetime labor supply: theory and evidence revisited, *Econometrica*, 81(5), 2055–86.

Cervellati, M., Sunde, U., and Valmori, S. (2017). Pathogens, weather shocks, and civil conflicts, *Economic Journal*, 127, 2581-2616.

Cutler, D., Fung, W., Kremer, M., Singhal, M., and Vogl, T., (2010). Early-life malaria exposure and adult outcomes: Evidence from malaria eradication in India. *American Economic Journal: Applied Economics*, 2, 72-94.

Dawkins, R. (1976). *The Selfish Gene*. Oxford University Press

Dixit, A.K. (2004). Lawlessness and Economics. Alternative Models of Governance. Princeton, NJ: Princeton University Press.

De la Croix, D., Doepke, M. and Mokyr, J. (2018). 'Clans, guilds, and markets: Apprenticeship institutions and growth in the preindustrial economy', *Quarterly Journal of Economics*, 133, 1–70.

Depetris-Chauvin, E., and Weil, D. (2018). Malaria and Early African Development: Evidence from the Sickle Cell Trait. *Economic Journal*, 128, 1207–1234.

Delhey J, Newton, K. and Welzel, C. (2011). How general is trust in “most people”? Solving the radius of trust problem. *American Sociological Review*, 76(5), 786–807.

Delhey, J., and Welzel, C. (2012). Generalizing trust: How outgroup-trust grows beyond in group-trust. *World Values Research*, 5(3), 46-69.

Desmet, K., Ortuño-Ortín, I., and Wacziarg, R. (2012). The political economy of linguistic cleavages, *Journal of development Economics*, 97(2), 322-338.

Diamond., J., (1997). *Guns, Germs, and Steel: The Fates of Human Societies*. W. W. Norton & Company.

Enke, B. (2019). Kinship, cooperation, and the evolution of moral systems. *The Quarterly Journal of Economics,* 134(2), 953–1019.

Faulkner, J., Schaller, M., Park, J. H. and Duncan, L. A. (2004) Evolved disease avoidance mechanisms and contemporary xenophobic attitudes. *Group Processes and Intergroup Relations*, 7, 333–53.

Fenske, J. (2013). Does land abundance explain African institutions? *Economic Journal*, 123, 1363-90.

Fernández, R. (2007). Women, work, and culture, *Journal of the European Economic Association*, 5, 61–79.

Fincher, C. L. and Thornhill, R. (2008a). Assortative sociality, limited dispersal: Infectious disease and the genesis of the global patterns of religious diversity, *Proceedings of the Royal Society of London, B: Biological Sciences*, 275, 2587–94.

Fincher, C. L. and Thornhill, R. (2008b). A parasite-driven wedge: Infectious diseases may explain language and other biodiversity. *Oikos*, 117, 1289–97.

Fincher, C.L., Thornhill, R., Murray, D.R., and Schaller, M. (2008). Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism? *Proceedings of the Royal Society B: Biological Sciences*, 275 (1640), 1279–1285.

Fincher, C. L. and Thornhill, R. (2012) Parasite-stress promotes in-group assortative sociality: The cases of strong family ties and heightened religiosity. *Behavioral and Brain Sciences*, 352, 61–79.

Fincher, C. L., and Thornhill, R. (2014). *The Parasite-Stress Theory of Values and Sociality: Infectious Disease, History and Human Values Worldwide*. New York, Springer.

Fogli, A., and Veldkamp, L. (2021). Germs, social networks, and growth. *Review of Economic Studies*, 88, 1074-1100.

Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity*. Free Press, New York.

Fukuyama, F. (2001). Social capital, civil society and development. *Third World Quarterly,* 22 (1), 7-20.

Fukuyama, F. (2011). *The Origins of Political Order: From Prehuman Times to the French Revolution*, New York: Farrar, Straus and Giroux.

Gallup J.L., and Sachs, J. (2001). The economic burden of malaria. *The American Journal of Tropical Medicine and Hygiene*, 64, 85-96.

Galor, O. and Özak, Ö. (2016). The agricultural origins of time preference, *American Economic Review*, 106(10), 3064–3103.

Giuliano, P. (2007). Living arrangements in Western Europe: Does cultural origin matter?, *Journal of the European Economic Association*, 5, 927–52.

Gorodnichenko, Y., and Roland, G. (2017). Culture, institutions and the wealth of nations. *Review of Economics and Statistics*, 99 (3), 402–416.

Greif, A. (2006). Family structure, institutions, and growth: The origin and implications of Western corporatism. *American Economic Review*, 96, 308–12.

Greif, A. and Tabellini, G. (2010). Cultural and institutional bifurcation: China and Europe compared. *American Economic Review*, 100, 135–40.

Greif, A. and Tabellini, G. (2017). The clan and the cooperation: Sustaining cooperation in China and Europe. *Journal of Comparative Economics*, 45, 1–35.

Guiso, L., Sapienza P. and Zingales, L. (2004). The role of social capital in financial development, *American Economic Review*, 94, 526-556.

Guiso, L., Sapienza P. and Zingales, L. (2009). Cultural bias and economic exchange. *Quarterly Journal of Economics*, 124(3), 1095-1131.

Guiso, L., Sapienza P. and Zingales, L. (2016). Long-term persistence. *Journal of the European Economic Association*, 14 (6), 1401–1436.

Henrich, J. (2020). *W.E.I.R.D People: How Westerners became Individualistic, Self-Obsessed, Guild-Ridden, Analytic, Patient, Principled and Prosperous*. Princeton, NJ: Princeton University Press.

Hofstede, G., Hofstede, G. J., and Minkov, M. (2010). Cultures and organizations: Software of the mind (Revised and Expanded 3rd ed.). New York: McGraw-Hill.

Jacob, M. and Tyrell, M. (2010). The legacy of surveillance: An explanation for social capital erosion and the persistent economic disparity between East and West Germany. Available at SSRN: 1554604.

Imada, H., and Mifune, N. (2021). Pathogen Threat and In-Group Cooperation, *Frontiers in Phycology*, 12:678188.

Kammas, P., Kazakis, P., and Sarantides, V. (2017). The effect of culture on fiscal redistribution: Evidence based on genetic, epidemiological and linguistic data. *Economics Letters*, 160, 95-99

Knack, S. (2002). Social capital and the quality of government: Evidence from the States. *American Journal of Political Science*, 46 (4), 772–785.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. W. (1999). The quality of government. *Journal of Law, Economics, and Organization*, *15*(1), 222–279.

Lucas, A. (2010). Malaria eradication and educational attainment: Evidence from Paraguay and Sri Lanka. *American Economic Journal: Applied Economics*, 2, 46-71.

Low, B. (1994). Pathogen intensity cross-culturally, *World Cultures*, 8(1), 24-34.

Lowes, S. R., and Montero E. (2021). The Legacy of Colonial Medicine in Central Africa, *American Economic Review*, 111(4), 1284-1314.

Marshall, M., and Jaggers, K. (2010). Polity IV Project, Center for Systemic Peace. Available from: www.systemicpeace.org

McNeill, W. H. (1974). *Plagues and Peoples*. Anchor, Harpswell, ME.

McNeill, W. H. (1980). *The Human Condition. An Ecological and Historical View*. Princeton University Press. Princeton, New Jersey.

Moscona, J., Nathan, N. and Robinson, J. (2017). Keeping it in the family: Lineage organization and the scope of trust in Sub-Saharan Africa, *American Economic Review: Papers and Proceedings*, 107, 565-571.

Moscona, J., Nathan, N. and Robinson, J. (2020). Segmentary lineage organization and conflict in Sub-Saharan Africa, *Econometrica*, 88, 1999–2036.

Murdock, G., and White, D. (1969). Standard cross-cultural sample, *Ethnology*, 8(4), 329–369.

Murray, D., and Schaller, M. (2010). Historical prevalence of infectious diseases within 230 geopolitical regions: A tool for investigating origins of culture, *Journal of Cross-Cultural Psychology*, 41(1), 99-108.

Murray, D. R., Trudeau, R. and Schaller, M. (2011). On the origins of cultural differences in conformity: Four tests of the pathogen prevalence hypothesis. *Personality and Social Psychology Bulletin*, 37, 318–29.

Murray, D. R., Schaller, M., and Suedfeld, P. (2013). Pathogens and politics: Further evidence that parasite prevalence predicts authoritarianism. *PloS One*, 8(5): e62275.

Navarrete, C. D. and Fessler, D. M. T. (2006) Disease avoidance and ethnocentrism: The effects of disease vulnerability and disgust sensitivity on intergroup attitudes, *Evolution and Human Behavior*, 27, 270–82.

Nikolaev, B., Boudreaux, C., and Salahodjaev, R. (2017). Are individualistic societies less equal? Evidence from the parasite stress theory of values. *Journal of Economic Behavior & Organization*, 138, 30–49.

Nunn, N., and Giuliano, P. (2021). Understanding cultural persistence and change. *Review of Economic Studies*, 88, 1541-1581.

Nunn, N. and Puga, D. (2012). Ruggedness: The blessing of bad geography in Africa, *Review of Economics and Statistics*, 94, 20-36.

Nunn, N. and Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa, *American Economic Review*, 101 (7), 3221–52.

Pennisi, E. (2005). How Did Cooperative Behavior Evolve? *Science*, 309, 93.

Putnam, R. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press

Putterman, L. (2008). Agriculture, diffusion and development: ripple effects of the Neolithic Revolution, *Economica*, 75(300), 729–748.

Putterman, L., and Weil, D. (2010). Post-1500 population flows and the long-run determinants of economic growth and inequality, *Quarterly Journal of Economics*, *125*(4), 1627–1682.

Ramankutty, N., Foley, J. A., Norman, J. and McSweeney, K. (2002). The global distribution of cultivable lands: current patterns and sensitivity to possible climate change, *Global Ecology and Biogeography*, 11(5), 377-392.

Ross, M. (1983). Political decision making and conflict: additional cross-cultural codes and scales, *Ethnology*, 22, 169–192.

Sachs, J., and Malanay, P., (2002). The economic and social burden of malaria. *Nature*, 415, 680-685.

Schulz, J.F., Bahrami-Rad, D., Beauchamp, J.P. and Henrich, J. (2019). The Church, intensive kinship, and global psychological variation. *Science*, 366(6466), eaau5141.

Schulz, J.F., (2022). Kin networks and institutional development. *Economic Journal*, forthcoming.

Simmons, J.S., Whayne, T.F., Anderson, G.W., and Horack, H.M. (1944). Global Epidemiology: pt. 1. India and the Far East.-pt. 2. The Pacific area.-v. 3. The Nearand Middle East, vol. 1. JB Lippincott.

Smith, K.F., Sax, D. F., Gaines, S. D., Guernier, V., and Guégan, J.-F. (2007). Globalization of human infectious disease, *Ecology*, 88, 1903-1910.

Tabellini, G. (2008). The Scope of Cooperation: Values and Incentives. *Quarterly Journal of Economics*, 123, 905–950.

Tabellini, G. (2010). Culture and institutions: Economic development in the regions of Europe. *Journal of the European Economic Association*, 8 (4), 677–716.

Thornhill, R., and Fincher, C.L. (2014). The parasite-stress theory of values and sociality: Infectious disease, history and human values worldwide. Springer.

Thornhill, R., Fincher, C. L., Murray, D. R. and Schaller, M. (2010). Zoonotic and non-zoonotic diseases in relation to human personality and societal values: Support for the parasite-stress model. *Evolutionary Psychology*, 8,151–69.

Tibayrenc, M. (2007) Human genetic diversity and the spread of infectious diseases. In: Encyclopedia of infectious diseases – modern methodologies, ed. M. Tibayrenc, 321–35.

van Leeuwen, F., Park, J.H., Koenig, B.L., and Graham, J. (2012). Regional variation in pathogen prevalence predicts endorsement of group-focused moral concerns? *Evolutionary. Human Behaviour,* 33 (5), 429–437

Welzel, C. (2010). How selfish are self-expression values? A civicness test. *Journal of Cross-Cultural Psychology*, 41, 1–23.

Woodley, M.A. and Bell, E. (2012). Consanguinity as a major predictor of levels of democracy: A study of 70 nations', *Journal of Cross-Cultural Psychology*, 44, 263–80.

Table 1. Pathogen stress and the radius of trust: a cross-country analysis

Radius of trust:	*higher radius of trust*			*lower radius of trust*		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.281	-0.501**	-0.300	-0.370**	-0.537***	-0.544**
	(-1.350)	(-2.136)	(-1.032)	(-2.084)	(-3.062)	(-2.242)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony		✓	✓		✓	✓
Additional controls			✓			✓
R2	0.597	0.734	0.809	0.703	0.815	0.880
Observations	67	67	57	67	67	57

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Additional controls include GDP per capita, years of schooling, and percentages of major religions (Muslims, Protestants, and Catholics). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table 2. Pathogen stress and the radius of trust: individual-level analysis

Radius of trust:	*higher radius of trust*			*lower radius of trust*		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.122*	-0.179***	-0.182***	-0.184***	-0.237***	-0.230***
	(-1.975)	(-3.229)	(-3.650)	(-2.705)	(-4.852)	(-5.075)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony		✓	✓		✓	✓
Individual controls			✓			✓
R2	0.073	0.087	0.100	0.113	0.131	0.143
Observations	96613	96613	87817	96613	96613	87817

Notes: All estimates include a full set of continental and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country level are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table 3. Pathogen stress and the radius of trust: SCCS analysis

Radius of trust:	*historical higher radius of trust* (reverse)		*historical lower radius of trust* (reverse)	
	(1)	(2)	(3)	(4)
SCCS pathogens	0.280	0.109	0.594*	0.513*
	(1.019)	(0.390)	(1.926)	(1.737)
Basic controls	✓	✓	✓	✓
Additional controls		✓		✓
R2	0.232	0.381	0.209	0.286
Observations	59	59	61	61

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, elevation, distance to coast, ruggedness, land quality, and area. Additional controls include population density, and kinship tightness. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table 4. Pathogen stress and the radius of trust: Second-generation migrants' analysis

Country of origin:	Mother or father			Mother			Mother or father			Mother		
Radius of trust:	*higher radius of trust*						*lower radius of trust*					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
pathogen stress	-0.082**	-0.029	-0.017	-0.037	-0.002	-0.070	-0.101**	-0.088**	-0.075*	-0.172*	-0.209**	-0.240**
	(-2.014)	(-0.522)	(-0.304)	(-0.425)	(-0.022)	(-0.577)	(-2.503)	(-2.156)	(-1.810)	(-1.987)	(-2.335)	(-2.485)
Basic controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Legal - Colony		✓	✓		✓	✓		✓	✓		✓	✓
Individual controls			✓			✓			✓			✓
R2	0.130	0.132	0.149	0.193	0.198	0.225	0.140	0.142	0.158	0.144	0.150	0.174
Observations	4706	4706	4250	1560	1560	1428	4706	4706	4250	1560	1560	1428

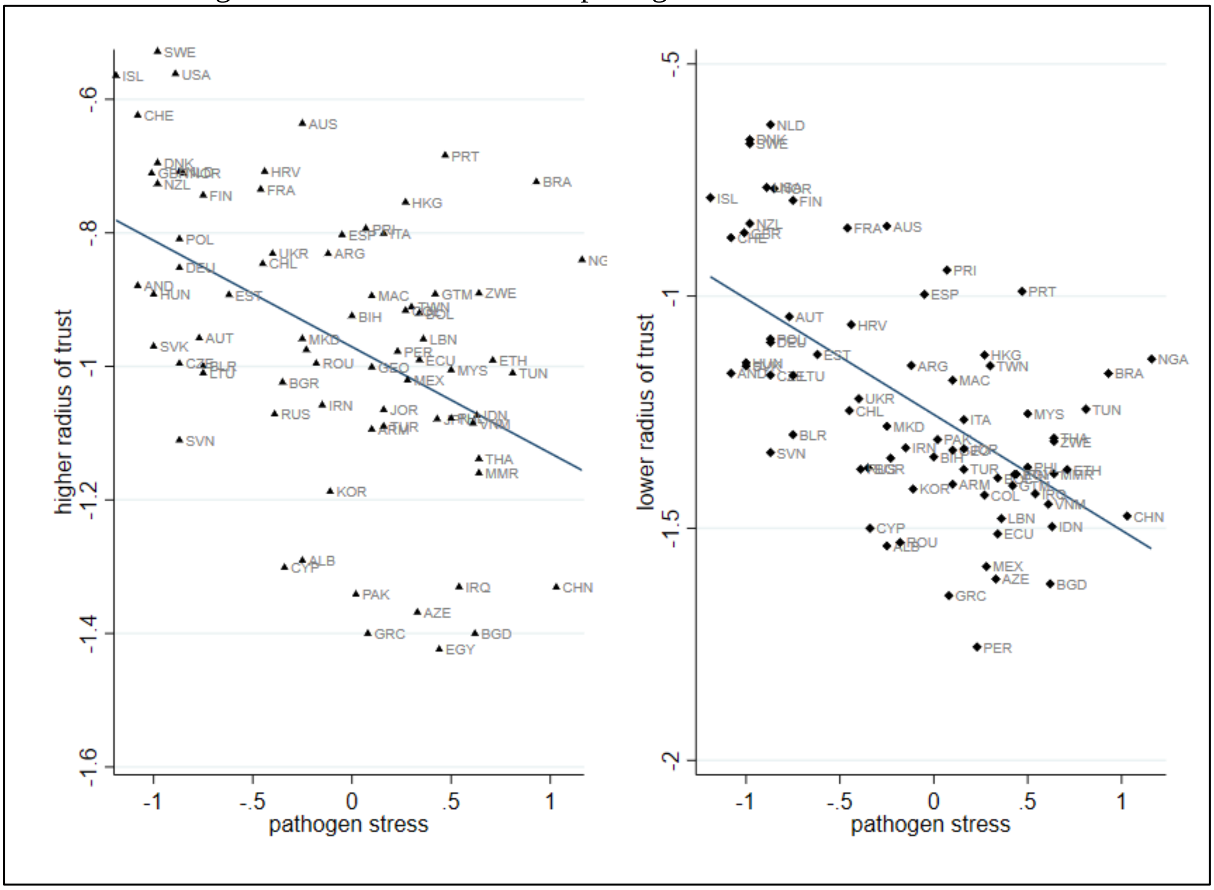
Notes: All estimates include fixed effects for the country where the interview was conducted, and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country of origin of the parent are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table 5. Pathogen stress and the radius of trust: Second-generation migrants' analysis, decomposing trust

Country of origin:	Mother or father			Mother		
Trust:	family	out-group	out-group 2	family	out-group	out-group 2
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	0.059	-0.027	-0.030	0.197*	-0.097	-0.114
	(1.214)	(-0.552)	(-0.596)	(1.804)	(-0.985)	(-1.272)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓
R2	0.084	0.236	0.236	0.127	0.229	0.200
Observations	4652	4290	4257	1526	1439	1430

Notes: see Table 4

Figure 1. Correlation between pathogen stress and radius of trust



Notes: Scatter plot relationship between the radii of trust (EVS and WVS, 2017-2022) and pathogen stress (Murray and Schaller, 2010).

Appendix. Additional Tables and Figures

Table A1. Main variables used in cross-country estimations

	Description	Source	mean	st. dev	min	max
higher radius of trust	Difference between average out-group (people that one meets for the first time, people of another nationality, and people of another religion) and in-group (family, neighbours, people know personally) trust. Country level average across native individuals of joint EVS/WVS wave 7 (2017-2020).	European Values Survey (EVS) and World Values Survey (WVS) 2017-2022	-0.965	0.220	-1.609	-0.528
lower radius of trust	Difference between average trust towards neighbours, people know personally, people that one meets for the first time, people of another nationality, people of another religion and family trust. Country level average across native individuals of wave 7 (2017-2020).	EVS and WVS 2017-2022	-1.243	0.259	-1.821	-0.631
pathogen stress	Index measuring the historical prevalence of infectious diseases (leishmanias, trypanosomes, malaria, schistosomes, filariae, dengue, and typhus) in a particular country.	Murray and Schaller (2010)	-0.109	0.614	-1.190	1.160
absolute latitude	The absolute value of the latitude of a country's approximate geodesic centroid.	Galor and Özak (2016)	35.479	16.123	2.000	65.000
precipitation	Mean precipitation per annum.	Galor and Özak (2016)	86.788	55.485	2.911	233.933
temperature volatility	Volatility of temperature.	Galor and Özak (2016)	13.418	5.346	3.698	27.385
elevation	The mean elevation of a country in km above sea level.	Galor and Özak (2016)	0.571	0.505	0.024	2.674
island	An indicator for whether or not a country shares a land border with any other country.	Galor and Özak (2016)	0.156	0.365	0.000	1.000
landlocked	An indicator for whether or not a country is landlocked.	Galor and Özak (2016)	0.182	0.388	0.000	1.000
distance to waterway	The distance, in thousands of km, from a GIS grid cell to the nearest ice-free coastline or sea-navigable river, averaged across the grid cells of a country.	Galor and Özak (2016)	277.422	463.271	11.040	2385.580
ruggedness	An index that quantifies small-scale terrain irregularities in each country.	Nunn and Puga (2012)	1.650	1.258	0.037	5.717
land quality	Average probability within a region that a particular grid cell will be cultivated	Ramankutty et al. (2002)	0.428	0.235	0.003	0.900
Neolithic transition timing	The number of thousand years elapsed (as of the year 2000) since the majority of the population residing within a country's modern national borders began practicing sedentary agriculture as the primary mode of subsistence.	Putterman (2008)	5866.792	2350.908	400.000	10500.000
European colony	An indicator for whether or not a country was colonized by a European nation (UK, Spain, France, Portugal, Other). Summary statistics are provided for the UK.	Acemoglu et al. (2005)	0.143	0.352	0.000	1.000
Legal origins	Legal origin of the Company Law or Commercial Code of a country. The five legal origin possibilities are: (i) UK, (ii) France, (iii) German, (iv) Scandinavian, and (v) Socialist. Summary statistics for the UK.	La Porta (1999)	0.158	0.367	0.000	1.000
GDP per capita	The logged value of GDP per capita, PPP, in constant 2005 U.S. dollars for the year 2005	World Development Indicators	9.397	0.966	6.514	10.935
years of schooling	Average number of years of schooling in 2005	Barro and Lee (2013)	8.773	2.216	3.690	12.690
% religion	Percentage of major religion (Muslims, Protestants, or Catholics) in each country. Summary statistics for Protestants.	La Porta (1999)	12.637	24.671	0.000	97.800

Table A2. Main variables used in individual-level estimations

	Description	Source	mean	st. dev	min	max
higher radius of trust	Difference between average out-group (people that one meets for the first time, people of another nationality, and people of another religion) and in-group (family, neighbours, people know personally) trust.	EVS and WVS 2017-2022	-0.953	0.652	-3.000	2.333
lower radius of trust	Difference between average trust towards neighbours, people know personally, people that one meets for the first time, people of another nationality, people of another religion and family trust.	EVS and WVS 2017-2022	-1.230	0.698	-3.000	2.600
married	Dummy variable that takes the value one if the respondent is married (or living together as married), and zero otherwise.	EVS and WVS 2017-2022	0.607	0.489	0.000	1.000
age	The respondent's age.	EVS and WVS 2017-2022	45.497	17.211	17.000	82.000
gender	The gender of the respondent. It is assigned a value of one if it is female, and zero otherwise.	EVS and WVS 2017-2022	0.534	0.499	0.000	1.000
religious denomination	The respondent is considered as a Muslim, Protestant, or Catholic. Summary statistics for Protestants.	EVS and WVS 2017-2022	0.112	0.315	0.000	1.000
educational attainment	Highest educational level attained, separated by lower, middle and upper. Summary statistics for middle educational attainment.	EVS and WVS 2017-2022	0.392	0.488	0.000	1.000
income level	The respondent's income level. The original scale of income is recoded into three categories: high, middle and low. Summary statistics for middle income level.	EVS and WVS 2017-2022	0.319	0.466	0.000	1.000

Notes: Description and summary statistics of variables used at the country level are provided in Table A1.

Table A3. Main variables used in SCCS analysis

	Description	Source	mean	st. dev	min	max
historical higher radius of trust (reverse)	The difference between the acceptability of violence towards people in other societies and people of the same society	Ross (1983)	0.984	1.133	0.000	3.000
historical lower radius of trust (reverse)	The difference between the acceptability of violence towards people in other societies and people of the local community	Ross (1983)	1.952	1.007	0.000	3.000
SCCS pathogens	An index that takes values from zero to one, with higher values indicating that more of the coded pathogens (leishmanias, trypanosomes, malaria, shistosomes, filariae, and leprosy and spirochetes) were present within the territory of the ethnic group.	Low (1994)	0.510	0.319	0.000	1.000
absolute latitude	The absolute value of the latitude of an ethnic group's approximate geodesic centroid.	Galor and Özak (2016)	20.957	16.303	0.418	60.932
precipitation	Mean precipitation per annum	Galor and Özak (2016)	108.436	76.562	0.000	305.154
elevation	The mean elevation of an ethnic group's territory in km above sea level.	Galor and Özak (2016)	0.722	0.660	0.011	3.581
distance to coast	Average distance from each point in the ethnic group's territory to the nearest point on the coast, in decimal degrees.	Fenske (2013)	4.419	4.311	0.000	14.599
ruggedness	An index that quantifies small-scale terrain irregularities in each ethnic group.	Galor and Özak (2016)	1.267	1.828	0.078	10.760
land quality	constraints on rain-fed agriculture that were measured as part of the Food and Agriculture Organization's Global Agro-Ecological Zones (FAO-GAEZ) project	Fenske (2013)	0.382	0.290	0.000	0.952
area	Area of ethnic homeland	Galor and Özak (2016)	88856.486	2.43e+05	0.113	1.83e+06
population density	An ordered variable that takes the following values from 1 (1 person per 5 sq. mile) to 7 (over 500 persons per sq. mile)	Murdock and White (1969)	3.508	1.822	1.000	7.000
kinship	Kinship tightness index	Enke (2019)	0.675	0.275	0.000	1.000

Table A4. Main variables used in second generation analysis

	Description	Source	mean	st. dev	min	max
higher radius of trust	Difference between average out-group (people that one meets for the first time, people of another nationality, and people of another religion) and in-group (family, neighbours, people know personally) trust.	EVS and WVS 2017-2022	-0.814	0.599	-3.000	1.333
lower radius of trust	Difference between average trust towards neighbours, people know personally, people that one meets for the first time, people of another nationality, people of another religion and family trust.	EVS and WVS 2017-2022	-1.090	0.647	-3.000	2.400
family trust	Trust towards family members that takes values 1 (Do not trust at all) to 4 Trust completely).	EVS and WVS 2017-2022	3.780	0.488	1.000	4.000
out group trust	Average out-group trust towards people that one meets for the first time, people of another nationality, and people of another religion	EVS and WVS 2017-2022	2.465	0.663	1.000	4.000
out group 2 trust	Average out-group trust towards neighbours, people know personally, people that one meets for the first time, people of another nationality, and people of another religion	EVS and WVS 2017-2022	2.690	0.562	1.000	4.000
pathogen stress	Index measuring the historical prevalence of infectious diseases (leishmanias, trypanosomes, malaria, schistosomes, filariae, dengue, and typhus) in the country of origin.	Murray and Schaller (2010)	-0.122	0.650	-1.310	1.160
absolute latitude	The absolute value of the latitude of a country's of origin approximate geodesic centroid.	Galor and Özak (2016)	42.986	12.055	1.000	65.000
precipitation	Mean precipitation per annum in the country of origin.	Galor and Özak (2016)	64.447	30.350	2.911	241.718
temperature volatility	Volatility of temperature.	Galor and Özak (2016)	16.005	5.361	3.698	27.385
elevation	The mean elevation of a country in km above sea level in the country of origin.	Galor and Özak (2016)	0.620	0.503	0.024	2.674
island	An indicator for whether or not a country of origin shares a land border with any other country.	Galor and Özak (2016)	0.059	0.235	0.000	1.000
landlocked	An indicator for whether or not a country of origin is landlocked.	Galor and Özak (2016)	0.113	0.316	0.000	1.000
distance to waterway	The distance, in thousands of km, from a GIS grid cell to the nearest ice-free coastline or sea-navigable river, averaged across the grid cells of a country of origin.	Galor and Özak (2016)	454.866	698.927	7.952	2385.580
ruggedness	An index that quantifies small-scale terrain irregularities in each country of origin.	Nunn and Puga (2012)	1.444	0.897	0.016	5.328
land suitability	Average probability within a country of origin that a particular grid cell will be cultivated	Ramankutty et al. (2002)	0.451	0.218	0.003	0.960
Neolithic transition timing	The number of thousand years elapsed (as of the year 2000) since the majority of the population residing within a country's of origin modern national borders began practicing sedentary agriculture as the primary mode of subsistence.	Putterman (2008)	6727.987	1935.758	400.000	10500.000
European colony	An indicator for whether or not a country of origin was colonized by a European nation (UK, Spain, France, Portugal, Other). Summary statistics are provided for the UK.	Acemoglu et al. (2005)	0.072	0.258	0.000	1.000
Legal origins	Legal origin of the Company Law or Commercial Code of a country of origin. The five legal origin possibilities are: (i) UK, (ii) France, (iii) German, (iv) Scandinavian, and (v) Socialist. Summary statistics for the UK.	La Porta (1999)	0.105	0.307	0.000	1.000

Notes: For brevity summary statistics are provided only for the specification that the Mother's or Father's country of origin is used in the estimates (e.g., Table 4, columns (1)-(3)). Also, for the control variables of the analysis, summary statistics are provided only for those that are calculated for the country of origin. For individual controls (e.g., age) summary statistics provided in Table A2 are representative.

Table A5. Pathogen stress and the radius of trust: a cross-country analysis, additional controls

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.270	-0.143	-0.071	-0.524*	-0.843***	-0.682*
	(-0.742)	(-0.355)	(-0.157)	(-1.927)	(-3.094)	(-1.728)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Additional controls	✓	✓	✓	✓	✓	✓
State & Kinship	✓		✓	✓		✓
Ethnic frac, Democracy & Individualism		✓	✓		✓	✓
R2	0.810	0.824	0.826	0.880	0.923	0.929
Observations	57	51	51	57	51	51

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Additional controls include GDP per capita, years of schooling, and percentages of major religions (Muslims, Protestants, and Catholics). State history & Kinship, stand for the state antiquity index, and the kinship tightness index respectively. Ethnic frac. Democracy and Individualism stand for the contemporary ethnic fractionalization index, the measure of democracy polity 2, and individualism. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A6. Pathogen stress and the radius of trust: a cross-country analysis, contemporary pathogen stress

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.300		-0.324	-0.544**		-0.563**
	(-1.032)		(-1.277)	(-2.242)		(-2.444)
contemporary pathogen stress		-0.457*	-0.501		-0.294	-0.410
		(-2.043)	(-1.421)		(-1.355)	(-1.605)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Additional controls	✓	✓	✓	✓	✓	✓
R2	0.809	0.813	0.824	0.880	0.865	0.890
Observations	57	61	57	57	61	57

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Additional controls include GDP per capita, years of schooling, and percentages of major religions (Muslims, Protestants, and Catholics). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A7. Pathogen stress and the radius of trust: a cross-country analysis, testing for outliers

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.245	-0.097	-0.012	-0.546*	-0.554**	-0.592*
	(-0.600)	(-0.253)	(-0.029)	(-1.730)	(-2.238)	(-2.095)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Additional controls	✓	✓	✓	✓	✓	✓
R2	0.804	0.842	0.839	0.886	0.901	0.903
Observations	54	54	51	54	54	51

Notes: All estimates include a full set of continental and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Additional controls include GDP per capita, years of schooling, and percentages of major religions (Muslims, Protestants, and Catholics). Columns (1) and (4) drop observations of *pathogen stress* in the bottom 5% percentile of the distribution. Columns (2) and (5) drop observations of *pathogen stress* in the top 5% percentile of the distribution. Columns (3) and (6) drop observations of *pathogen stress* in the bottom and top 5% percentiles of the distribution. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A8. Pathogen stress and the radius of trust: individual-level analysis, additional controls

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.172***	-0.188***	-0.209***	-0.214***	-0.264***	-0.226***
	(-3.236)	(-3.471)	(-4.198)	(-4.389)	(-3.775)	(-3.552)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓
State & Kinship	✓		✓	✓		✓
Ethnic frac, Democracy & Individualism		✓	✓		✓	✓
R2	0.099	0.115	0.118	0.144	0.163	0.169
Observations	84052	72648	71476	84052	72648	71476

Notes: All estimates include a full set of continental and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). State history & Kinship, stand for the state antiquity index, and the kinship tightness index respectively. Ethnic frac. Democracy and Individualism stand for the contemporary ethnic fractionalization index, the measure of democracy polity 2, and individualism. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country level are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A9. Pathogen stress and the radius of trust: individual-level analysis, contemporary pathogen stress

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.182***		-0.166***	-0.230***		-0.252***
	(-3.650)		(-2.947)	(-5.075)		(-5.197)
contemporary pathogen stress		-0.097**	-0.046		-0.033	0.063
		(-2.221)	(-0.868)		(-0.729)	(1.313)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓
R2	0.100	0.101	0.100	0.143	0.138	0.143
Observations	87817	92212	87817	87817	92212	87817

Notes: All estimates include a full set of continental and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). State history & Kinship, stand for the state antiquity index, and the kinship tightness index respectively. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country level are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A10. Pathogen stress and the radius of trust: individual-level analysis, testing for outliers

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.178***	-0.143***	-0.119***	-0.239***	-0.192***	-0.198***
	(-3.835)	(-3.216)	(-2.877)	(-6.046)	(-4.857)	(-6.026)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓
R2	0.093	0.092	0.085	0.150	0.133	0.140
Observations	82471	83151	77805	82471	83151	77805

Notes: All estimates include a full set of continental and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). Columns (1) and (4) drop observations of *pathogen stress* in the bottom 5% percentile of the distribution. Columns (2) and (5) drop observations of *pathogen stress* in the top 5% percentile of the distribution. Columns (3) and (6) drop observations of *pathogen stress* in the bottom and top 5% percentiles of the distribution. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country level are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A11. Pathogen stress and the radius of trust: individual-level analysis, adding WVS waves 5 & 6

Radius of trust:	higher radius of trust			lower radius of trust		
	(1)	(2)	(3)	(4)	(5)	(6)
pathogen stress	-0.083	-0.182***	-0.139***	-0.105*	-0.187***	-0.156***
	(-1.477)	(-3.444)	(-2.797)	(-1.746)	(-3.546)	(-3.196)
Basic controls	✓	✓	✓	✓	✓	✓
Legal - Colony		✓	✓		✓	✓
Individual controls			✓			✓
R2	0.088	0.101	0.112	0.085	0.101	0.111
Observations	233165	233165	230472	233165	233165	230472

Notes: All estimates include a full set of continental, wave and study and wave fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country level are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A12. Pathogen stress and the radius of trust: SCCS analysis, quality of violence data

Radius of trust:	historical higher radius of trust (reverse)		historical lower radius of trust (reverse)	
	(1)	(2)	(3)	(4)
SCCS pathogens	0.244	0.109	0.592*	0.501*
	(0.873)	(0.405)	(1.929)	(1.779)
Basic controls	✓	✓	✓	✓
Additional controls		✓		✓
R2	0.255	0.383	0.221	0.307
Observations	57	57	59	59

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, elevation, distance to coast, ruggedness, land quality, and area. Additional controls include population density, and kinship tightness. Observation with weak quality according to Ross (1983) are dropped from the estimates. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A12. Pathogen stress and the radius of trust: SCCS analysis, Cook's distance

Radius of trust:	historical higher radius of trust (reverse)		historical lower radius of trust (reverse)	
	(1)	(2)	(3)	(4)
SCCS pathogens	0.499*	0.347	0.987***	0.970***
	(1.751)	(1.301)	(2.761)	(3.065)
Basic controls	✓	✓	✓	✓
Additional controls		✓		✓
R2	0.325	0.462	0.445	0.517
Observations	53	53	51	51

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, elevation, distance to coast, ruggedness, land quality, and area. Additional controls include population density, and kinship tightness. We exclude observations with a Cook's distance above a common rule-of-thumb threshold (four divided by the number of observations). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A14. Pathogen stress and the radius of trust: SCCS analysis, clustered errors

Radius of trust:	historical higher radius of trust (reverse)		historical lower radius of trust (reverse)	
	(1)	(2)	(3)	(4)
SCCS pathogens	0.280	0.102	0.594*	0.502*
	(1.105)	(0.394)	(1.909)	(1.725)
Basic controls	✓	✓	✓	✓
Additional controls		✓		✓
R2	0.232	0.379	0.209	0.274
Observations	59	59	61	61

Notes: All estimates include a full set of continental fixed effects. Basic controls include absolute latitude, precipitation, elevation, distance to coast, ruggedness, land quality, and area. Additional controls include population density, and kinship tightness. The coefficients are standardized beta coefficients. Heteroskedasticity robust errors are clustered at the language subfamily level and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A15. Pathogen stress and the radius of trust: Second-generation migrants' analysis, adding controls

Country of origin:		Mother or father			Mother			Mother or father			Mother	
Radius of trust:			higher radius of trust						lower radius of trust			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
pathogen stress	0.040	-0.015	0.006	-0.056	-0.050	-0.096	-0.127**	-0.128*	-0.116*	-0.251**	-0.422***	-0.408***
	(0.724)	(-0.200)	(0.085)	(-0.571)	(-0.422)	(-0.822)	(-2.469)	(-1.883)	(-1.878)	(-2.457)	(-3.442)	(-2.747)
Basic controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
State & Kinship	✓		✓	✓		✓	✓		✓	✓		✓
Ethnic frac, Democracy & Individualism		✓	✓		✓	✓		✓	✓		✓	✓
R2	0.184	0.198	0.200	0.234	0.251	0.251	0.170	0.191	0.192	0.175	0.197	0.196
Observations	2907	2489	2484	1413	1233	1232	2907	2489	2484	1413	1233	1232

Notes: All estimates include fixed effects for the country where the interview was conducted, and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). State history & Kinship, stand for the state antiquity index, and the kinship tightness index respectively. Ethnic frac. Democracy and Individualism stand for the contemporary ethnic fractionalization index, the measure of democracy polity 2, and individualism. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country of origin of the parent are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A16 Pathogen stress and the radius of trust: Second-generation migrants' analysis, contemporary pathogen stress

Country of origin:	Mother or father			Mother			Mother or father			Mother		
Radius of trust:	higher radius of trust						lower radius of trust					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
pathogen stress	-0.017		-0.017	-0.070		-0.068	-0.075*		-0.076*	-0.240**		-0.224**
	(-0.304)		(-0.297)	(-0.577)		(-0.565)	(-1.810)		(-1.839)	(-2.485)		(-2.251)
contemporary pathogen stress		0.018	0.018		0.019	-0.025		-0.031	-0.044		-0.134	-0.154
		(0.397)	(0.374)		(0.270)	(-0.318)		(-0.804)	(-1.050)		(-1.477)	(-1.508)
Basic controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Legal - Colony		✓	✓		✓	✓		✓	✓		✓	✓
Individual controls			✓			✓			✓			✓
R2	0.149	0.147	0.149	0.225	0.230	0.225	0.158	0.156	0.158	0.174	0.172	0.176
Observations	4250	4348	4250	1428	1456	1428	4250	4348	4250	1428	1456	1428

Notes: All estimates include fixed effects for the country where the interview was conducted, and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country of origin of the parent are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A17. Pathogen stress and the radius of trust: Second-generation migrants' analysis, testing for outliers

Country of origin:	Mother or father			Mother			Mother or father			Mother		
Radius of trust:	higher radius of trust						lower radius of trust					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
pathogen stress	0.016	-0.024	0.007	-0.173	-0.085	-0.199	-0.069*	-0.079*	-0.074*	-0.317***	-0.255**	-0.350***
	(0.279)	(-0.425)	(0.119)	(-1.474)	(-0.671)	(-1.651)	(-1.828)	(-1.895)	(-1.937)	(-3.821)	(-2.569)	(-4.174)
Basic controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.151	0.149	0.151	0.222	0.225	0.222	0.161	0.158	0.161	0.167	0.175	0.168
Observations	3939	4244	3933	1349	1424	1345	3939	4244	3933	1349	1424	1345

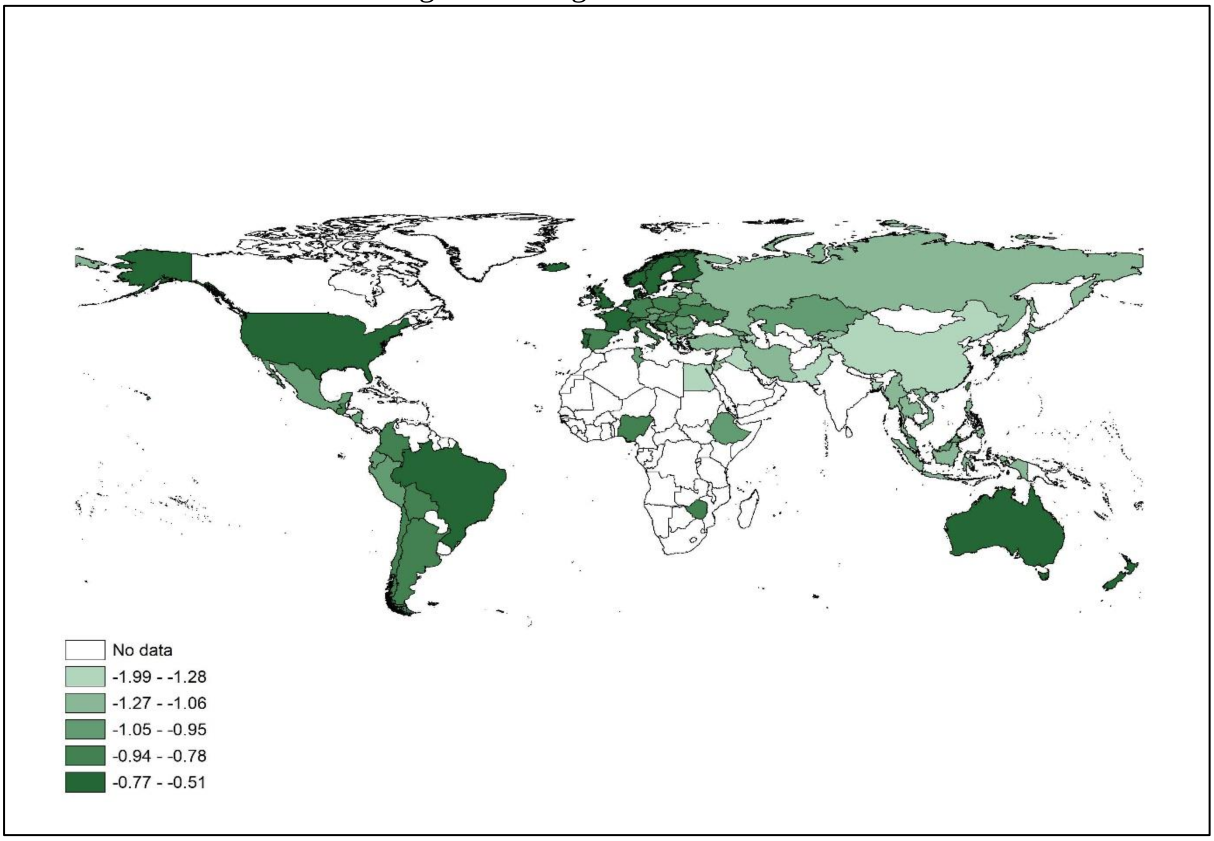
Notes: All estimates include fixed effects for the country where the interview was conducted, and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). Columns (1), (4), (7) and (10) drop observations of *pathogen stress* in the bottom 5% percentile of the distribution. Columns (2), (5), (8) and (11) drop observations of *pathogen stress* in the top 5% percentile of the distribution. Columns (3), (6), (9) and (12) drop observations of *pathogen stress* in the bottom and top 5% percentiles of the distribution. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country of origin of the parent are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table A18. Pathogen stress and the radius of trust: Second-generation migrants' analysis, dropping countries with a large sample of second-generation migrants

Country of origin:	Mother or father				Mother				Mother or father				Mother			
Radius of trust:	higher radius of trust								lower radius of trust							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
pathogen stress	-0.024	-0.006	-0.007	-0.016	-0.066	-0.055	-0.061	-0.054	-0.063*	-0.068*	-0.079*	-0.068*	-0.196***	-0.211**	-0.279***	-0.228***
	(-0.554)	(-0.111)	(-0.121)	(-0.393)	(-0.675)	(-0.462)	(-0.573)	(-0.650)	(-1.897)	(-1.688)	(-1.795)	(-1.921)	(-2.702)	(-2.260)	(-2.798)	(-3.017)
Basic controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Legal - Colony	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.162	0.144	0.155	0.168	0.282	0.223	0.231	0.291	0.161	0.145	0.164	0.158	0.203	0.170	0.181	0.212
Observations	3693	3965	3859	3017	999	1407	1345	895	3693	3965	3859	3017	999	1407	1345	895

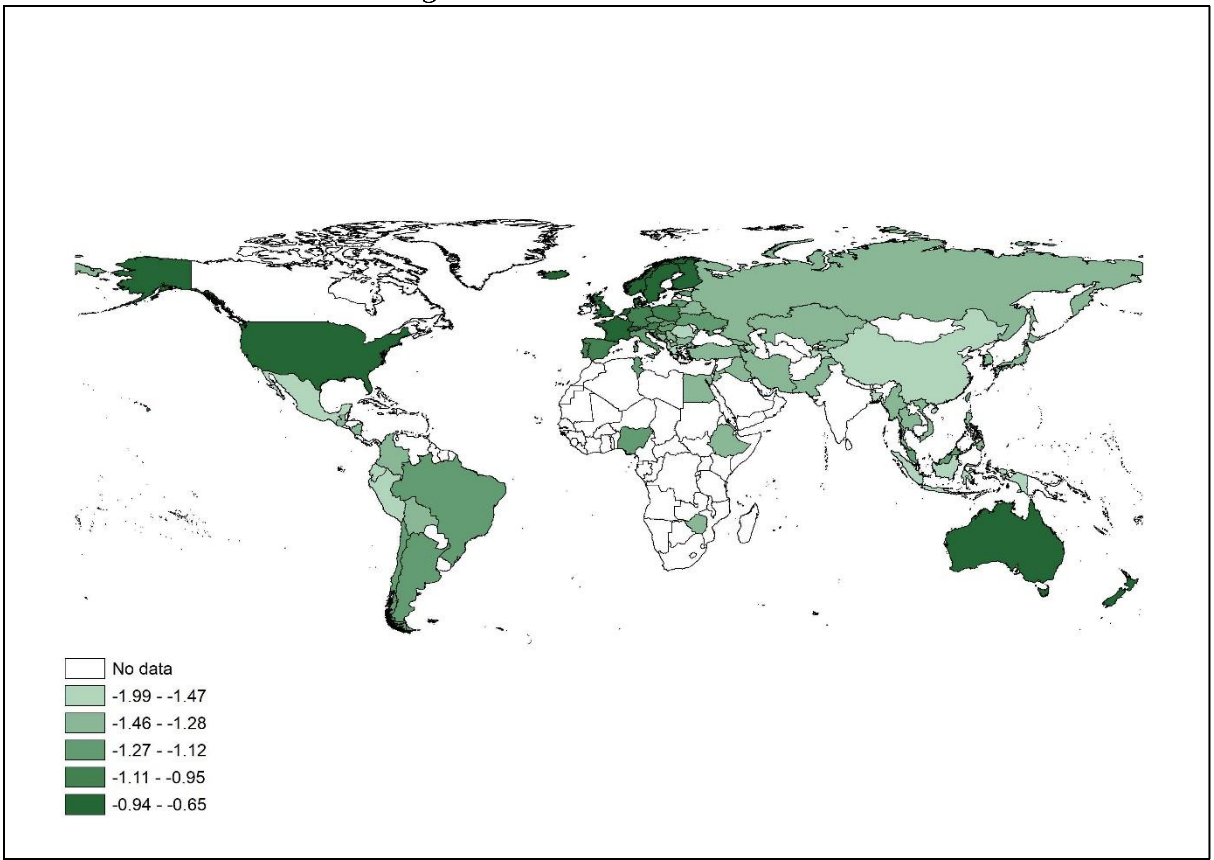
Notes: All estimates include fixed effects for the country where the interview was conducted, and study fixed effects. Basic controls include absolute latitude, precipitation, temperature volatility, elevation, island, landlocked, distance to waterway, ruggedness, land quality, and Neolithic transition timing. Legal - Colony stands for a set of legal origin dummies (British, French, German, Scandinavian and Socialist) and a set of European colony dummies (British, French, Spanish, and other European colony) respectively. Individual controls include age and age squared, gender, marital status, educational attainment (upper, middle, high), religious denomination (Muslim, Protestant, and Catholic) and income level (upper, middle, high). Columns (1), (5), (9) and (13) drop observations of second generation migrants with origin from China. Columns (2), (6), (10) and (14) drop observations of second generation migrants with origin from Germany. Columns (3), (7), (11) and (15) drop observations of second generation migrants with origin from Russia. Columns (4), (8), (12) and (16) drop observations of second generation migrants with origin from China, Germany and Russia. The coefficients are standardized beta coefficients. Heteroskedasticity robust standard errors clustered at the country of origin of the parent are used and t-statistics are reported in the parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Figure A1. Higher radius of trust



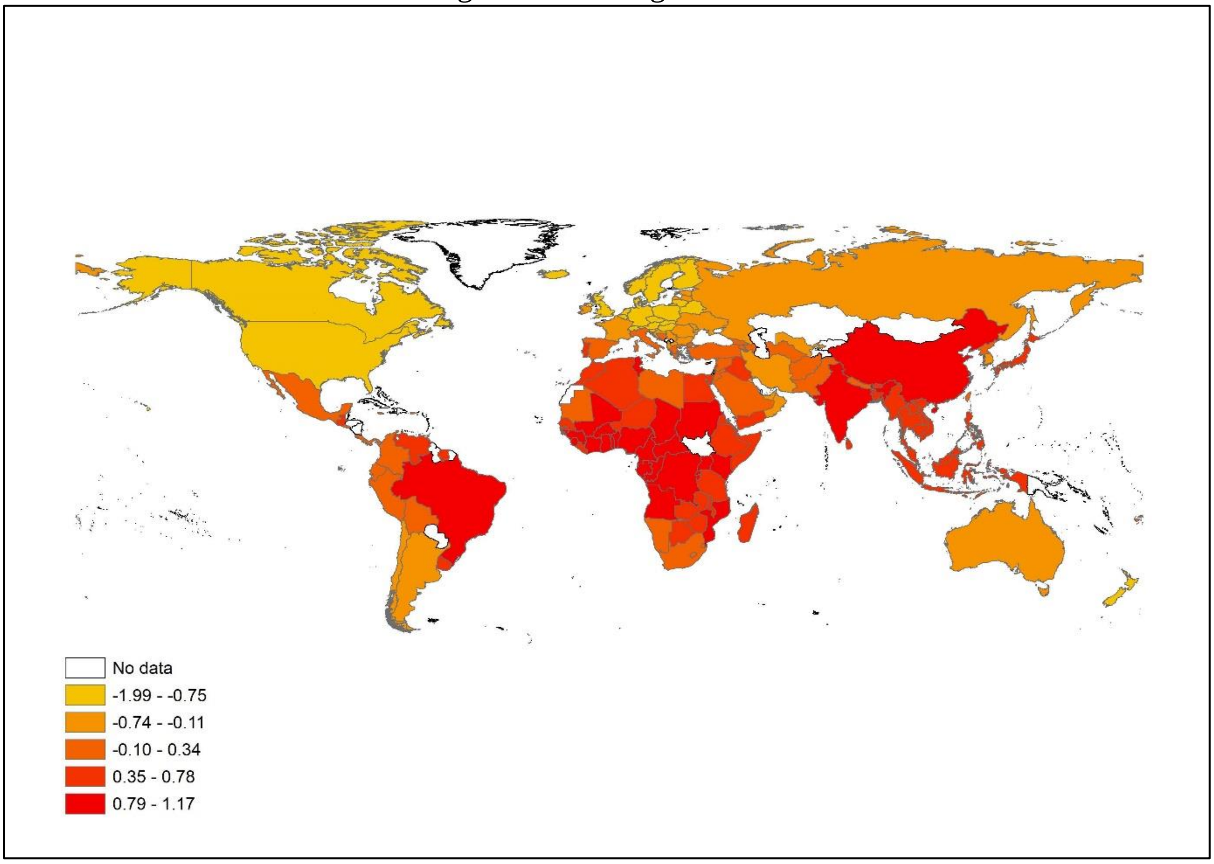
Notes: Darker colours indicates lower distance between the average trust to out-groups (i.e., people met for the first time, people of another religion, and foreigners) and average trust to in-groups (i.e., the family, neighbours and people known) (EVS and WVS, 2017-2022)

Figure A2. Lower radius of trust



Notes: Darker colours indicates lower distance between the average trust to out-groups (i.e., neighbours, people known, people met for the first time, people of another religion, and foreigners) and trust to family (EVS and WVS, 2017-2022)

Figure A3. Pathogen stress



Notes: Darker colours indicate higher historical disease prevalence (Murray and Schaller, 2010)