NBER WORKING PAPER SERIES

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Working Paper 23499
http://www.nber.org/papers/w23499

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2017

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NBER Working Paper No. 23499
June 2017
JEL No. D0,O0

ABSTRACT

Cultural psychologists and anthropologists argue that societies have developed heterogeneous systems of social organization to cope with social dilemmas, and that an entire bundle of cultural characteristics has coevolved to enforce cooperation within these different systems. This paper develops a measure of the historical tightness of kinship structures to provide empirical evidence for this large body of theories. In the data, societies with loose ancestral kinship ties cooperate and trust broadly, which is apparently sustained through a belief in moralizing gods, universally applicable moral principles, feelings of guilt, and large-scale institutions. Societies with a historically tightly knit kinship structure, on the other hand, exhibit strong in-group favoritism: they cheat on and are distrusting of out-group members, but readily support in-group members in need. This cooperation scheme is enforced by moral values of in-group loyalty, conformity to tight social norms, emotions of shame, and strong local institutions. These relationships hold across historical ethnicities, contemporary countries, ethnicities within countries, and migrants. The results suggest that religious beliefs, language, emotions, morality, and social norms all coevolved to support specific social cooperation systems.

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1 Introduction

Social and economic life are pervaded by social dilemma problems – situations that are characterized by a conflict between collective and individual interests. Be it in the contexts of the tragedy of the commons, bilateral trade, stealing, team production, or mutual aggression, people could in principle effectively cooperate with each other, yet basic game theory tells us that defecting on others is often an individually rational self-interested strategy. Given the ubiquitous presence of social dilemmas, psychologists and anthropologists argue that this "fundamental problem of human existence" (Greene, 2014) is of such importance that it has induced societies to build its entire social organization around solving this problem.

In these theories, researchers point to the existence of variation in societal structures, often as they are induced by differences in kinship systems. Some societies are said to consist of multiple disjoint tightly structured and cohesive in-groups that form dense social networks of kith and kin. Here, a social group is the basic unit of society, people are believed to effectively cooperate with in-group members, yet everybody outside the in-group is considered an enemy. In other societies, in contrast, the basic unit of society is the individual. Here, people are said to have weaker personal relationships, but pesumably also engage in mutually beneficial interactions with members of society at large because they have less pronounced in-group vs. out-group notions (see, e.g., Hofstede, 1984; Shweder, 1991; Markus and Kitayama, 1991; Triandis, 1995; Nisbett, 2003). Loosely in line with these accounts, experimental games have revealed that cooperation behavior indeed varies widely across societies (Henrich et al., 2001, 2010; Herrmann et al., 2008).

However, if societies exhibit different scopes of cooperation, then they should also have developed different tools to incentivize people to behave cooperatively. While economists typically emphasize institutions and social norms, moral psychologists and cultural anthropologists argue that some aspects of human psychology have specifically evolved to support effective cooperation, so that cross-cultural psychological variation can be rationalized as reflecting differential needs for "internal police officers", i.e., psychological punishment devices (e.g., Haidt, 2012; Greene, 2014; Norenzayan et al., 2016; Henrich, 2015, n.d.). The key argument is that maintaining cooperation within in-groups that typically depend on repeated interaction requires a different set of psychological adaptations and formal or informal institutions, than regulating behavior in societies that largely rely on impersonal exchange. According to the anthropological and psychological literature, key mechanisms for sustaining cooperation in the latter type of society are (i) "moralizing" gods that are actively concerned with and supportive of human morality (Roes and Raymond, 2003; Norenzayan and Shariff, 2008; Botero

et al., 2014), (ii) universally applicable moral values versus relationship-specific values such as in-group loyalty (Fei et al., 1992; Haidt, 2012; Greene, 2014), and (iii) emotions of internal guilt versus external shame (Bowles and Gintis, 2003; Wong and Tsai, 2007; Henrich, n.d.). On the other hand, enforcing behavior in a kith-and-kin based society is hypothesized to require strong local institutions, tight social norms and values related to norm adherence, as well as external shaming of wrongdoings.

This paper presents a unified empirical analysis of this large body of psychological and anthropological theories. The contribution is twofold. First, the paper develops a novel measure of the historical tightness of kinship systems as proxy for social organization, which builds directly on observable societal characteristics and can be used to study variation across a large number of historical and contemporary societies. Second, by linking kinship tightness to various cross-cultural datasets from economics, psychology, and linguistics, the empirical analysis documents the presence of a continuum of social cooperation systems that are associated with fundamentally different enforcement devices, including aspects of human psychology. At one end of the spectrum, societies with weak kinship ties cooperate and trust broadly, but do not place special emphasis on helping in-group members in need. Such cooperation patterns appear to be enforced through a belief in moralizing gods, universally applicable moral principles, feelings of guilt, and large-scale institutions. At the other extreme, societies with tight kinship structures are readily willing to support in-group members, but cheat on and are deeply distrusting of the out-group. This cooperation system of in-group favoritism tends to be regulated within the group through strong local institutions, conformity to tight social norms, relationship-specific "tribalistic" moral values such as in-group loyalty, and emotions of shame.

According to cultural anthropologists, the structure of kinship systems is one of the – if not *the* – most important determinant of social organization. Kinship describes the system of procreative relationships in society, i.e., patterns of relatedness as they arise through mating and birth. This concept is much broader than "Western" notions of the nuclear family. Kinship is relevant in the present context because cohesive and tight kinship systems are believed to give rise to "clannish" social structures (Henrich, n.d.), and are hence directly related to the scope of people's cooperation patterns. This paper develops a measure of the historical tightness of kinship systems that is based on information in the Ethnographic Atlas, an ethnographic dataset on the historical structure of 1,311 pre-industrial ethnicities around the globe (Murdock, 1967; Giuliano and Nunn, 2017a). Textbook knowledge in cultural anthropology prescribes that kinship systems can be classifiued along three dimensions, i.e., family structure, marriage patterns, and descent systems (Parkin, 1997; Haviland, 2002; Schultz and Lavenda, 2005; Henrich,

n.d.). Closely following prior anthropological work, for each of these dimensions, I select two variables in the Ethnographic Atlas that measure the respective dimensions of kinship, and aggregate them through a factor analysis. The resulting score of kinship tightness loads positively on the presence of extended versus nuclear family systems, negatively on neolocal post-marital residence (family structure), positively on the presence of both cousin marriage and polygamy (marriage patterns), and positively on the presence of lineages and localized clans (descent systems). Thus, the score intuitively corresponds to what anthropologists consider tight kinship systems. This composite index can be used to study variation (i) within the Ethnographic Atlas, i.e., across historical ethnicities, (ii) across contemporary countries by matching historical ethnicities to contemporary populations (Giuliano and Nunn, 2017a), (iii) across contemporary ethnicities within countries in the World Values Survey by linking historical ethnicities to contemporary ethnicities, (iv) across contemporary second-generation migrants in the European Social Survey by linking migrants to the characteristics of their ancestors from their country of origin, and (v) across contemporary first-generation migrants in the Moral Foundations Questionnaire (Haidt and Joseph, 2004; Graham et al., 2012).

The empirical analysis begins at the country level, by investigating relationship between kinship tightness and the scope of cooperation and trust. In the data, ancestral kinship tightness is strongly negatively correlated with out-group cooperation, measurd by contributions in an experimental public goods game that was conducted among students across countries (Herrmann et al., 2008). In addition, ancestral kinship tightness is positively correlated with cheating on an out-group member in the cross-cultural experiments of Gächter and Schulz (2016). But while tight kinship is associated with lower cooperation and more cheating on out-group members, it is strongly positively associated with cross-country variation in in-group favoritism in the business domain, i.e., the fraction of management jobs that is assigned based on kin relations. Similar results obtain within countries: across contemporary ethnicities in the World Values Survey and across second-generation migrants in the European Social Survey, tight kinship is positively correlated with the importance people attach to helping and caring for in-group members.

The strong distinction between behaviors towards in-group and out-group members in tight kinship societies is mirrored in people's trust radius. Across countries, kinship tightness is positively correlated with trust in in-group members (i.e., neighbors), but negatively associated with both generalized trust and trust in specific categories of out-group members such as strangers or foreigners. In addition, by again exploiting variation across contemporary ethnicities and across second-generation migrants in the World Values and European Social Surveys, the analysis documents that the relation-

ship between ancestral kinship tightness and people's trust extends to individual-level within-country analyses. Here, again, people from tight kinship societies exhibit higher in-group trust, but lower trust in people in general. In a final step of the analysis of trust patterns, I exploit ethnographic information on the extent to which historical ethnicities inculcated trust into their children. The results reveal that the negative relationship between kinship tightness and trust was already present in pre-industrial times.

Next, the paper analyzes the relationship between kinship tightness and the structure of enforcement devices, i.e., religious beliefs, moral values, shame versus guilt, formal institutions, and social norms. First, the analysis uncovers that historical ethnicities with strong kinship ties were less likely to honor a moralizing god, consistent with the idea that moralizing gods are more beneficial in regulating behavior when interactions are not of a repeated nature.

Second, the analysis documents that kinship tightness is negatively related to the importance of universally applicable moral principles relative to "groupish" or "tribalistic" values that emphasize relationship-specific obligations such as in-group loyalty. These relationships hold (i) across historical ethnicities by exploiting variation in ethnographic records of societies' moral values, (ii) across contemporary countries, and (iii) in within-country analyses across migrants in the Moral Foundations Questionnaire.

Third, to study the relationship between kinship tightness and the relative importance of emotions of guilt versus shame, the analysis follows work in comparative linguistics. Linguists have long argued that the structure and usage of language reflects the cultural importance of corresponding concepts. Based on this insight, the analysis exploits two different sources of variation for whether the respective context emphasizes (external) shaming or (internal) guilt: (i) the number of synonyms for shame and guilt in a given language, and (ii) within-language variation in how often people across countries searched for "shame" or "guilt" on Google in their respective language. Across both measures, i.e., both across and within languages, is kinship tightness positively related to the relative importance of shame.

Fourth, turning to an analysis of institutional structures, the analysis provides evidence that – across historical ethnicities – kinship tightness is negatively related to the development of large-scale institutions that supersede local groups, but *positively* correlated with the sophistication and power of institutions at the level of local communities.

Fifth, the analysis illuminates the role of social norms. In contemporary cross-country data, ancestral kinship tightness is strongly related to the tightness of social norms (Uz, 2015) as well as experimentally measured norm compliance or conformity (Bond and Smith, 1996). In addition, kinship tightness is positively correlated with the importance of values that mandate norm adherence, such as valuing proper behavior or

rule-following. This relationship holds across contemporary countries, within countries across ethnicities in the World Values Survey, within countries across second-generation migrants in the European Social Survey, and across historical ethnicities.

In sum, the structure of enforcement devices close corresponds to the observed cooperation and trust patterns, hence pointing to a coevolution of kinship structures, cooperation patterns, institutions, and cultural traits. On the one hand, the broad cooperation and trust patterns of loose kinship societies are supported by large-scale institutions and "internal police officers" that broadly sanction wrongdoing even outside of the in-group, including moralizing gods, universal moral values, and guilt. On the other hand, the in-group oriented cooperation system of tight kinship societies appears to be sustained by strong social norms and corresponding values of norm adherence, combined with strong *local* institutions, and an increased importance of being shamed in front of others. Thus, punishment in tight kinship societies is largely personal and direct, while it is often anonymous and "psychological" in loose kinship societies.

The final part of the paper sheds light on the origins of tight kinship and its relation to economic development. Anthropologists have long argued that kinship tightness is hump-shaped in societal complexity (Blumberg and Winch, 1972). The gist of the argument is twofold. First, tight kinship is believed to have evolved to serve a functional role in enabling effective cooperation within suitably defined in-groups for the purposes of agricultural (as opposed to hunter-gatherer) subsistence (Johnson and Earle, 2000; Gowdy and Krall, 2016). Second, however, tight kinship is believed to have turned into a sticky disadvantage once technological change required increased specialization, geographic mobility, and trade with strangers (Henrich, n.d.). Consistent with the anthropological narrative, historical ethnicities that subsisted on agriculture exhibit tighter kinship systems than hunter-gatherers. In addition, more advanced historical agricultural production techniques are associated with a decrease in kinship tightness relative to basic extensive agriculture. In line with this correlation, ancestral kinship tightness is strongly negatively correlated with contemporary per capita income, and this relation largely emerged during the Industrial Revolution.

The remainder of the paper is organized as follows. Section 2 discusses related literature. Section 3 lays out the hypothesized relationship between kinship tightness, cooperation patterns and enforcement devices, mostly by discussing and integrating arguments from anthropology and psychology. Section 4 presents the data. The empirical analysis starts in Section 5 with the relationships between kinship tightness and coperation, cheating, and trust patterns. Section 6 presents evidence on how kinship tightness is associated with different enforcement devices. Section 7 discusses the emergence of tight kinship and its relationship to development, and Section 8 concludes.

2 Related Literature

Since the classic treatment of Greif (1994), economists have become interested in cultural heterogeneity in social organization. While theoretical work and case studies of China vs. Europe have provided novel insights into cooperation patterns (Greif, 2006; Tabellini, 2008b; Greif and Tabellini, 2012), empirical work on cooperation and corresponding enforcement devices is more limited. Instead, research on specific conceptualizations of social structures has focused on the cross-country relationships between contemporary cousin marriages and corruption levels or democracy (Akbari et al., 2016; Schulz, 2016), analyses of how segmentary lineage organization shapes civil conflict and trust in Africa (Moscona et al., 2017a,b), the relationship between matrilineal kinship systems and intra-household bargaining (Lowes, 2017), or studies of the relationship between survey measures of individualism and per capita income (Gorodnichenko and Roland, 2011, 2016). Recent work on (nuclear) family ties (Bertrand and Schoar, 2006; Alesina and Giuliano, 2013) is likewise concerned with social structures, but differs greatly in terms of substantive focus and measurement. Research on the relationship between agriculture and social structures includes Olsson and Paik's (2012; 2016) analysis of the role of collectivism in an "agricultural reversal" as well as the contemporary work by Buggle (2017). The distinguishing feature here is a novel mesurement of kinship tightness, an extensive analysis of how kinship structures are related to cooperation with and trust in in- and out-group members, how they link to the structure of enforcement devices, and the identification of a non-linear relationship between societal complexity and kinship ties.

Broadly, this paper is part of the literature on cultural variation in economic preferences and attitudes (Guiso et al., 2009; Voigtländer and Voth, 2012; Chen, 2013; Falk et al., 2016; Dohmen et al., 2016; Desmet et al., Forthcoming), in particular papers that highlight the endogeneity or evolution of cultural traits (Bisin and Verdier, 2001; Fernández, 2007; Doepke and Zilibotti, 2014; Alesina and Giuliano, 2015; Becker et al., 2016; Galor and Özak, 2016; Galor et al., 2016; Litina, 2016; Buggle and Durante, 2017; Giuliano and Nunn, 2017b). The paper also links to the literatures on experimental cooperation behavior (Fehr and Gächter, 2000), parochial altruism (Bernhard et al., 2006), trust (Knack and Keefer, 1997; Algan and Cahuc, 2010) and religious beliefs (Barro and McCleary, 2003; Campante and Yanagizawa-Drott, 2015).

Finally, the paper is also related to various literatures in moral and cultural psychology and anthropology. While the various often disjoint narratives that were developed in these fields serve as basis for my analysis, the results in this paper contribute to this literature by proposing an explicit measurement of kinship tightness as well as a rigorous and quantitative investigation of the topic in a unified empirical framework.

3 Research Hypothesis and Background

The various literatures in psychology and anthropology that deal with human cooperation share one aspect in common: they emphasize that enforcing cooperation is not achieved by any single mechanism, but rather by an entire package of tools. The goal of this paper is to understand the relationship between kinship systems, cooperation and corresponding enforcement devices as broadly as possible. Thus, the paper does not focus on a single variable or mechanisms, but rather on presenting a comprehensive pattern of correlations that integrate variables and hypotheses from across the social sciences.

As will become clear below, the hypotheses to be investigated are not easily amenable to formal modeling. At the same time, the analysis is neither ad hoc nor based on introspection, but based on large literatures in cultural psychology and anthropology.

3.1 Tight Kinship, Cooperation and Trust

For cultural psychologists, the idea that societies exhibit heterogeneity in basic social organization regarding how deeply people are embedded in cohesive in-groups, is as basic as the idea that markets equilibrate supply and demand to an economist (Triandis, 1995). In some societies, economic and social life is organized around dense, tightly structured in-groups that form the basic unit of society. Here, people are said to think of themselves as "we": they rely on the in-group for food, sex, and other necessities of life in exhange for unquestioning loyalty. Outsiders to their group (be it the family, extended family, ethnicity, or village) are considered strangers at best, and enemies at worst.

At the other extreme of the spectrum, psychologists say, lie societies in which people think of themselves as "I". Such individuals are said to have weaker personal relationships with in-group members and cannot rely on unconditional loyalty, but at the same time enter productive relationships with people outside their own group. Thus, one expects a negative correlation between kinship tightness and cooperation with (or trust in) out-group members, but a postive relation between kinship tightness and treating in-group members well or trusting them.

3.2 Tight Kinship and Enforcement Devices

If it is true that societies exhibit heterogeneous cooperation schemes, it is also conceivable that they have developed different devices to sustain and enforce such cooperation. Across the social sciences, researchers have proposed various mechanisms to enforce

cooperative behavior, including religious beliefs, moral values, basic emotions, formal institutions, and social norms, some of which predominantly apply to enforcing cooperation *within* an in-group, or *across* groups of people. Excellent overviews of (various subsets) of the hypotheses outlined below can be found in Boyd and Richerson (1988); Fei et al. (1992); Boyd and Richerson (2009); Greene (2014); Henrich (n.d.). To clarify any potential ambiguity, the below hypotheses are not intended to suggest that kinship systems or social organization more generally *cause* the emergence of certain institutional or cultural structures – the argument is merely about the *coevolution* of social organization, cooperation schemes, and enforcement devices.

Moralizing gods. Cultural psychologists, anthropologists, historians, and scholars of religious studies routinely emphasize the importance of religious practices and beliefs in sustaining cooperation. In this context, moralizing gods are believed to play a key role (Roes and Raymond, 2003; Norenzayan and Shariff, 2008; Botero et al., 2014). A god is said to be moralizing if they are concerned with and supportive of human morality by, e.g., punishing wrongdoing or rewarding prosocial behavior.[1] The notion that a god is moralizing is often implicit in contemporary discussions because – mostly due to the spread of the Abrahamic religions Islam and Christianity – today the vast majority of humans live in a society that honors a moralizing god. However, historically, this was not the case. Animistic religions, for example, usually featured gods that were not particularly interested in the actions of mortal humans.

Crucially, moralizing gods are hypothesized to have evolved to solve human social dilemma problems. In large-scale anonymous societies in which direct enforcement and punishment is difficult, belief in a moralizing god is helpful because it functions as an internal "policeman" who punishes human wrongdoing even in the absence of wordly punishment. But this logic makes it clear that societies with tight kinship ties are in less need of a moralizing god: because people predominantly interact within their own group in which personal monitoring is feasible, a moralizing god has a smaller upside, but presumably the same downside in terms of paying the costs of religious beliefs such as attending mass and extending sacrifices.

Shame versus guilt. Basic emotions and their physiological consequences are conceptually very similar to moralizing gods in that they are internal to an individual. In a by now classic cultural psychology paper, Markus and Kitayama (1991) argue that cultural contexts that are characterized by cohesive in-groups emphasize emotions that occur *between* individuals, rather than within a certain person. In particular, cultural psychol-

[1] Small-scale behavioral experiments have shown that belief in a punitive god is positively correlated with cooperative behavior (Purzycki et al., 2016; Norenzayan et al., 2016).

ogists have long coined the terms "shame" and "guilt" cultures (Dodds, 1957; Benedict, 1967; Scherer and Wallbott, 1994; Bowles and Gintis, 2003; Gintis, 2003; Wong and Tsai, 2007; Henrich, n.d.) to draw attention to the notion that societies inculcate different emotional responses to wrongdoing into their children. In this terminology, guilt refers to something that is internal to an individual, while shame describes an emotion that is invoked in front of others, presumably in particular those one cares about (in economics terminology, this distinction is reminiscent of the difference between social and self image). In impersonal exchange societies, the argument goes, people often engage in anonymous one-shot interactions, so that instilling feelings of shame is less effective than inculcating internalized guilt. Thus, loose kinship systems should be associated with a more pronounced importance of guilt relative to shame.

Moral values. Moral and evolutionary psychologists argue that human morality partly evolved to solve social dilemma problems by imbuing principles that prevent people from defecting on others (e.g., Haidt, 2012; Greene, 2014). However, if true, then this implies that moral principles *should* vary across societies: societies with tight kinship should have evolved "groupish" or "tribalistic" moral values that sustain in-group cooperation, such as in-group loyalty, whereas those with low kinship tightness should develop moral principles that apply universally, i.e., equally to everyone. In line with this reasoning, moral psychologists have indeed documented cross-cultural variation in the moral principles people employ, in particular with respect to whether moral reasoning emphasizes universally applicable moral principle or relationship-specific obligations (Fei et al., 1992; Haidt, 2012).

Institutions and social norms. Differences in social organization should go hand in hand with the development of institutions and social norms, where I will speak of norms simply as a less formal way to regulate behavior than through laws and courts. If people mainly interact with in-group members and everybody outside of that group is considered an enemy, then there is less of a need to bear the cost of setting up large-scale formal enforcement institutions that supersede each separate group. Instead, such societies have incentives to develop strong institutions at the *local* level. That is, this perspective suggests that kinship tightness is negatively correlated with the development of formal institutions *above* the level of an in-group, but positively correlated with the development of institutions at the *local* level, including the strength of and conformity to informal social norms.

To sum up the discussion, Table 1 presents an overview of the hypotheses underlying the empirical analysis.

Table 1: Overview of hypotheses

	High kinship tightness	*Low kinship tightness*
Behavior	Cheat on out-group; In-group favoritism Strong care for in-group members	Cooperate with out-group; Equal treatment of in- and out-group
Trust	High in in-group; Low in out-group	Uniformly high
Enforcement devices	Moral values pertaining to relationship-specific obligations; Shame; Local institutions; Strong social norms and values of norm adherence	Universally applicable moral principles; Moralizing god; Guilt; Global institutions

4 Data

4.1 Measure of Kinship Tightness

Cultural psychologists and anthropologists agree that the single most important aspect of people's in-group ties are their kin relations. Kinship describes the system of procreative relationships in society. It clarifies what rights and obligations people have, and oftentimes even constitutes the foundation of people's social lifes Schultz and Lavenda (2005). Accordingly, this paper measures social organization by developing an index of historical kinship tightness. In contrast to the more qualitative survey-based approach of psychologists, this measure is based on observable characteristics and is hence arguably amenable to direct interpretation.

The measure of kinship tightness is based on variables in the Ethnographic Atlas (EA), an ethnicity-level dataset that contains detailed information on the living conditions and social structures of 1,265 ethnic groups prior to industrialization (Murdock, 1967). Murdock constructed these data by coding ethnicities for the earliest period for which ethnographic data is available or can be reconstructed from written records.[2] Accordingly, the year of observation varies widely. The average year of observation is 1898, but even for those ethnicities for which information was sampled during the 20th century, the data are meant to describe living conditions prior to intense European contact or industrialization.[3] Following work in ethnography, Giuliano and Nunn

[2]Murdock assembled the EA by relying on the records of different ethnographers. It is hence implausible that Murdock's own predispositions are a major source of bias in the dataset.

[3]The year of observation is only weakly and insignificantly correlated with the index of kinship tightness that I develop below ($\rho = 0.04$).

(2017a) extend this dataset by additionally including 46 ethnicities to broaden coverage in Europe. The EA contains information on mode of subsistence (agriculture, animal husbandry, hunting, gathering, and fishing), family structure and community organization, religious beliefs, language, and institutions, among others. In fact, for a subset of 186 ethnicities – the so-called Standard Cross-Cultural Sample (SCCS) – extremely detailed ethnographic information on local customs, beliefs etc. is available.

The dimensions that cultural anthropologists use to classify the nature of kinship systems are anthropological textbook knowledge. This paper closely follows the – largely overlapping – discussions in Parkin (1997), Haviland (2002), Schultz and Lavenda (2005), and Henrich (n.d.). At a broad level, kin relations describe patterns of relatedness as they arise through mating and birth. Dimensions of kinship can be partitioned into (i) family structure, (ii) marriage patterns, and (iii) descent systems (Parkin, 1997; Schultz and Lavenda, 2005). For each of these categories, this paper uses those two variables in the EA that are closest to the presentations in Haviland (2002) and Henrich (n.d.); this is straightforward given that these discussions are based on the terminology or even data in the EA:

1. Family structure

    (a) *Domestic organization.* A key distinction in anthropological research is the presence of independent nuclear versus that of extended families. I generate a binary variable that equals zero if the domestic organization is around independent nuclear families and one otherwise (Q8 in the EA).

    (b) *Post-wedding residence.* Post-marital residence varies widely across cultures. Anthropologists argue that close kinship ties are indicated by social norms that prescribe residence with the husband's (or the wife's) group. Weak kinship ties, on the other hand, are indicated by couples either living by themselves or flexibly with either the wife's or the husband's group. Accordingly, I generate a variable that equals 1 if the wife is expected to move in with the husband's group or vice versa, and 0 otherwise (Q11).

2. Marriage patterns

    (a) *Cousin marriage.* Endogamous marriage, i.e., marriage within in-groups is believed to be a key characteristic of tight kinship, and the most important case of this is cousin marriage (also see Schulz, 2016). While many cultures allow marriage among (certain) first- or second-degree cousins, others do not. I construct a three-step index that equals one if marrying first-degree cousins is allowed, 0.5 if marriage among second-degree cousins is allowed,

and zero otherwise (Q24). Since this variable is missing for 253 ethnicities in the EA (which leads to a loss of more than a dozen countries), I supplement this variable with information on local kin terminology (Q27). Anthropologists have long noted that those cultures that allow cousin marriage tend to make a linguistic distinction between those cousins that can be married and those that cannot. Thus, information on kin terms can be used to impute levels of cousin marriage for those ethnicities for which the cousin marriage variable is missing.[4]

(b) *Polygamy.* Polygamy is argued to support strong kinship ties because it allows the building of large interconnected families. For example, if a man has several wives and children from all of them, then in a patrilineal society the children would all be considered part of the same lineage, even though they have different mothers. To capture this aspect of kinship systems, I code a variable that equals 0 if polygamy is absent and 1 otherwise (Q9).

3. Descent systems

(a) *Lineages.* Descent groups in general are defined by people's ancestry. Key defining characteristic of a descent system is whether it features unilineal or bilateral descent groups. Unilineal descent systems that track descent primarily through one line as opposed to through both lines are said to induce particularly strong and cohesive in-groups because they make people feel close to a particular part of the family. A lineage is hence a group of people who trace descent to a known common ancestor, i.e., people who can specify the links that unite them. Such groups are typically much larger than Western notions of "the family" and can be composed of more than 1,000 people. In contrast to the more ego-oriented bilateral descent systems, lineages do not end with the death of some individual, but endure as long as people can remember how they trace back to a common ancestor. I construct a variable that equals 0 if descent is bilateral, and 1 otherwise (Q43).

(b) *Segmented communities and localized clans.* When lineage systems become too large to be tractable and memorized, they split into new, smaller lineages. In such cases, people continue to recognize their "broad relatedness" even though they could not describe the specific path that connects them.

[4]Specifically, for each of eight different kin terminology systems, I compute the average cousin marriage index described in the main text for all societies in the EA that have information on both Q24 and Q27. Then, I assign this index of "expected cousin marriage" to those ethnicities for which cousin marriage information is missing, based on their respective kin terminology. All main results in the paper are robust to excluding cousin marriage from the construction of the kinship tightness index altogether.

Such systems are called clans. Clans are more or less closely interconnected, partly depending on whether clans determine geographical residency as opposed to being geographically dispersed. Accordingly, I code a variable that equals one if a clan takes the form of localized clans that live as segmented communities in, e.g., clan barrios, and zero otherwise (Q15).

In sum, this paper characterizes kinship systems through a set of six variables. To aggregate these dimensions of kinship tightness, I compute the first principal component.[5] This score endogenously has the appealing property that it loads to a substantial extent on all six of the above variables in a direction that is consistent with anthropological notions of tight kinship.[6] The index loads negatively on independent nuclear families (weight 0.35), negatively on neolocal residence (0.42), positively on cousin marriage (0.19), positively on polygamy (0.34), negatively on bilateral descent (0.54), and positively on the presence of segmented communities or clans (0.50).[7] The resulting Kinship Tightness Index (KTI) is normalized to be in $[0, 1]$. Figure 7 in Appendix A depicts the distribution of the kinship tightness index at the level of 989 historical ethnicities for which data on all six dimensions are available.[8]

4.2 Additional Data Sources and Nature of Variation

The measure of kinship tightness can be utilized to exploit variation across historical ethnicities. In addition, the data can be matched to contemporary populations, hence allowing for contemporary cross-country, cross-ethnicity, and cross-migrant analyses. To facilitate a comprehensive analysis of cooperation patterns and enforcement devices, this paper links the kinship tightness index to various cross-cultural datasets such as experiments, surveys, ethnographic records, and information on language use. Thus, most of the dependent variables are independent from the sampling and coding scheme in the EA. Appendix D provides a detailed description of all variables used in this study.

[5]Principal component analysis constructs a set of uncorrelated principal components from the observations such that the first principal component accounts for as much of the variance in the data as possible. Each succeeding component is then constructed to also explain as much of the variance as possible, conditional on being orthogonal to all previous principal components.

[6]This first component has an eigenvalue of 2.10, whereas that of the second component is 1.07. This second component is difficult to interpret given its weights. For example, it loads positively on cousin marriage, but also positively on bilateral descent and nuclear families, a combination that is hard to reconcile with anthropological notions of tight kinship.

[7]To interpret these weights, recall that all six variables are in [0,1].

[8]Table 13 in Appendix B documents that the country-level index of kinship tightness is positively correlated with measures of collectivism (vs. individualism) that people have previously employed, including the collectivism vs. individualism index of Hofstede (1984), a measure of family ties by Alesina and Giuliano (2013), and the fraction of the population speaking a language that does allow dropping the pronoun (Tabellini, 2008a).

Cross-Country. Giuliano and Nunn (2017a) propose a method to match the historical ethnicities in the EA to contemporary populations using the language people speak. Following their methodology, Figure 1 depicts the country-level distribution of historical kinship tightness, as it applies to contemporary populations.[9] The color coding roughly corresponds to the seven-quantiles of the distribution of kinship tightness. Evidently, kinship tightness exhibits geographic clustering: with a few exceptions, Western Europe and their offshoots have loose ancestral kinship ties, whereas parts of Eastern Europe, Asia, and Africa exhibit substantial variation. South America lies in between Western Europe and Asia or Africa. The analysis will link this variation to data on behavioral experiments, surveys, and language use across countries. In light of the geographical clustering of kinship tightness, the analysis will include within-country regressions to alleviate potential concerns about cross-country results. In addition, the cross-country analyses will control for the fraction of the population of European descent as well as continent fixed effects.

World Values Survey: Ethnicities Within Countries. The World Values Survey (WVS) contains information on respondents' ethnicity. While these data are often very coarse, 89 ethnicities in 41 countries were described in sufficiently great detail for me to be able to match a total of 39,117 respondents to their ancestors in the EA. Thus, I can investigate the relationship between ancestral kinship tightness, and respondents' trust or values by exploiting variation across contemporary ethnicities within countries.

European Social Survey: Second-Generation Migrants. The European Social Survey (ESS) provides detailed information on the migration background of respondents' parents. Thus, following Giuliano (2007) and Fernández (2007), I can study the relationship between people's values and the kinship tightness of their ancestors by computing the average kinship tightness index across the country of origin of father and mother (where the country-level data are computed as described above). That is, in these analyses, the sample is restricted to respondents who were born in the country of current residence, yet their ancestral kinship tightness varies because of the parents' migratory background. Thus, similarly to the cross-ethnicity analysis in the WVS, this analysis identifies pure within-country correlates of kinship tightness. In total, I can make use of 319,121 respondents in 32 countries of residence. Of these, 42,946 people

[9] In cases in which the kinship tightness index is missing for the dominant ethnicity in a country, the country-level score is based on ethnicities that account for only a relatively small share of the population. I have verified that excluding all countries in which this is the case has only very minor, if any, effects on coefficient estimates and significance levels in the cross-country regressions. Figure 9 in Appendix C provides a map of the kinship tightness index that accounts for these populations.

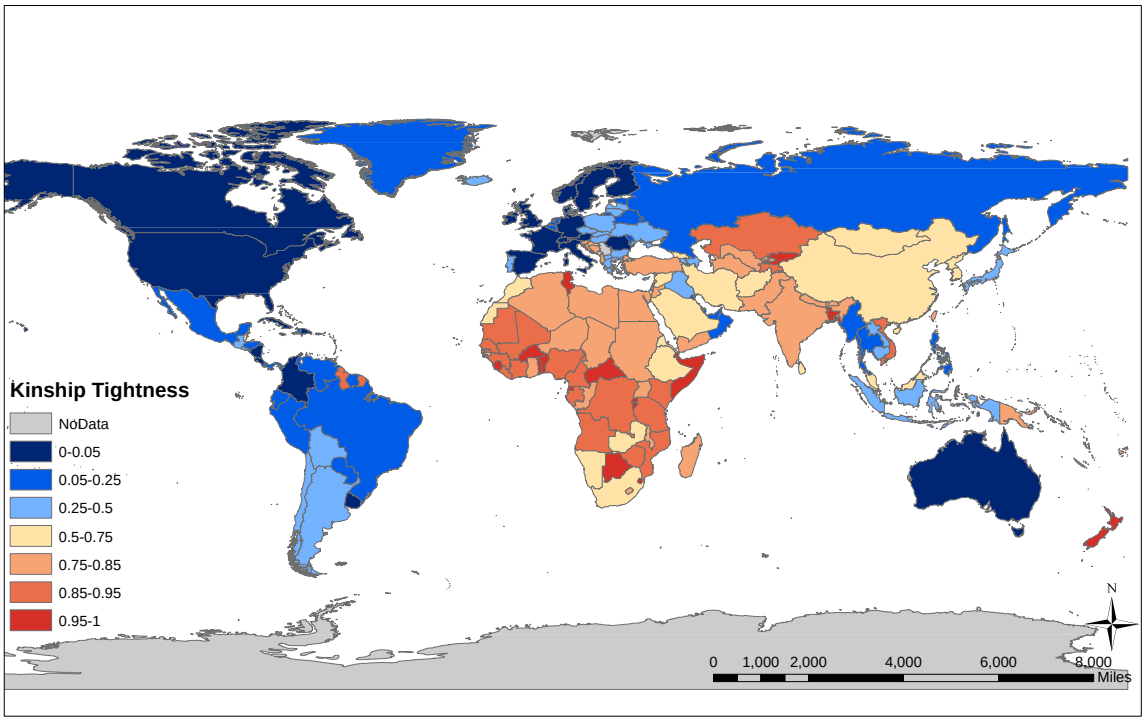

Figure 1: Distribution of kinship tightness across countries

are second-generation migrants (with respect to at least one parent); their fathers and mothers migrated from 180 and 182 countries of birth, respectively.

Moral Foundations Questionnaire: Migrants. The Moral Foundations Questionnaire (MFQ) is a psychological questionnaire on moral values (Graham et al., 2012). The authors uploaded this questionnaire to `www.yourmorals.org` in 2008, where thousands of people have completed the questionnaire and provided basic background information including their country of birth. The sample of respondents is purely based on self-selection and hence not representative of a country's population. At the same time, I am not aware of reasons why the nature of differential self-selection into the survey across countries or groups of migrants should bias the results in favor of my research hypothesis, as opposed to just inducing measurement error. Similarly to the ESS, the MFQ allows to leverage within-country variation in kinship tightness by relating people's moral values to the ancestral kinship tightness in their country of birth. In total, I have access to 314,962 respondents from 206 countries of residence, of which 40,402 are immigrants from 201 different countries of birth.

5 Tight Kinship, Cooperation and Trust

5.1 Cooperation, Cheating and In-Group Favoritism

The empirical analysis starts by investigating the relationship between historical kinship tightness and contemporary behaviors pertaining to cooperation, cheating, and in-group favoritism. First, Herrmann et al. (2008) conducted public goods games across 15 countries in which participants were students and hence presumably strangers to each other, or at least not in-group members.[10] My dependent variables are (i) initial contribution levels in an experimental treatment without availability of punishment, (ii) initial contribution levels in a treatment with punishment, and (iii) average contribution levels across conditions and periods. Second, Gächter and Schulz (2016) conducted an experimental cheating game across 23 countries in which participants could lie to the experimenter – an out-group member – to increase their monetary reward. I use average lying levels as proxy for cheating behavior. Third, while the aforementioned experimental games capture the treatment of out-group members, a survey conducted among managers in large firms gives insights into people's preferential treatment of in-group members (Van de Vliert, 2011). Here, managers in large companies were asked which fraction of management jobs in their company is assigned based on kin relationships as opposed to personal qualifications.

Table 2 presents the results from OLS estimations. Throughout the paper, I present multiple specifications for each dependent variable if feasible given the respective number of observations. Depending on the specification, I make use of three sets of covariates: (i) control variables for ancestral characteristics of contemporary populations from the EA, i.e., historical dependence on agriculture and animal husbandry, respectively, number of jurisdictional hierachies above the local level, and year of observation; (ii) additional country-level covariates, including distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500; (iii) continent fixed effects and colonizer fixed effects. Unless noted otherwise, all dependent variables are transformed into z-scores, so that OLS coefficients can be easily interpreted: a coefficient of x means that increasing kinship tightness from its minimum of zero to its maximum of one is associated with an increase of x% of a standard deviation in the dependent variable. To keep the exposition concise, the tables in the main text do not report the coefficients of any covariates. The table notes contain detailed information on which covariates are included.

[10] The cross-cultural public goods games run by Henrich and collaborators are less useful for my purposes because they were administered on small-scale societies that may have had little cultural overlap with the majority of the population of the country they reside in (Henrich et al., 2001, 2010).

Table 2: Cooperation, cheating and in-group favoritism: Cross-country evidence

	Dependent variable:							
	Public goods game contributions			Cheating		In-group favoritism		
	Initial NOP	Initial P	Average	Lying game		Mgmt. jobs based on kin		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Kinship tightness	-1.92***	-2.08***	-1.76**	2.04***	2.15***	0.80***	0.89***	0.93***
	(0.61)	(0.60)	(0.72)	(0.53)	(0.54)	(0.26)	(0.26)	(0.31)
EA controls	No	No	No	No	Yes	No	Yes	Yes
Other controls	No	No	No	No	No	No	No	Yes
Continent FE	No	No	No	No	No	No	No	Yes
Colonizer FE	No	No	No	No	No	No	No	Yes
Observations	15	15	15	23	23	114	113	111
R^2	0.34	0.40	0.29	0.43	0.48	0.08	0.21	0.57

Notes. Country-level OLS estimates, robust standard errors in parentheses. The dependent variables in columns (1) and (2) are initial contribution levels in the PGG of Herrmann et al. (2008) in the treatments without (NOP) and with availability of punishment (P), respectively. In column (3), contribution levels are averaged across both conditions and all ten periods of the PGG. In columns (4)–(5), the dependent variable is the average monetary payout subjects reported in the lying game of Gächter and Schulz (2016). In columns (6)–(8), the dependent variable is the fraction of jobs that is assigned based on kinship (Van de Vliert, 2011). All dependent variables are expressed as z-scores. EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Columns (1)–(3) document that country-level ancestral kinship tightness is negatively correlated with contributions in a public goods game, hence providing evidence that societies with strong kinship ties are less cooperative when interacting with out-group members. Columns (4) and (5) establish that kinship tightness is positively associated with cheating on an out-group member in a lying game. The left panel of Figure 2 visualizes the relationship between kinship tightness and cheating behavior. While these behavioral tendencies suggest that social structures that are characterized by tight kinship have detrimental consequences for interactions among out-group members, the opposite holds true for in-group interactions. As columns (6)–(8) show, kinship tightness is significantly positively related to nepotism in the business domain. Here, the larger number of observations allows to condition on the full set of covariates described above, including the fraction of the population that is of European descent, continent fixed effects and colonizer fixed effects.

Table 2 has provided evidence for a cross-country difference in how members of tight kinship societies treat in- and out-group members. Table 3 shows that – analogously to the cross-country findings – tight ancestral kinship is also postively associated with people's willingness to help in-group members *within* countries. For this purpose, the

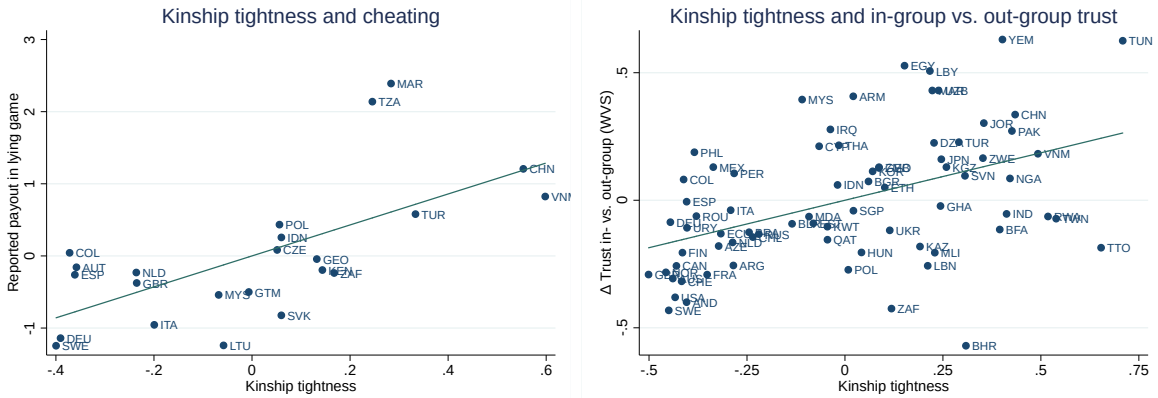

Figure 2: Relationship between kinship tightness cheating in a lying game (Gächter and Schulz, 2016, left panel) and the difference between in-group and out-group trust in the WVS (right panel). Both plots are partial correlation plots conditional on the vector of "EA controls", compare column (5) of Table 2.

analysis exploits individual-level variation in ancestral kinship tightness in the WVS and ESS. In these analyses, the unit of observation is always an individual, yet the kinship tightness index is assigned (i) based on the ethnicity of the respondent (WVS) or (ii) based on the respondents' parents' countries of birth (ESS).

Both the WVS and the ESS ask respondents how important it is for them to help people around them and to care for their well-being. I interpret these survey questions as asking about respondents' attitudes towards their in-group.[11] Columns (1)–(2) establish that ancestral kinship tightness is positively correlated with the importance people attach to helping in-group members in the WVS. This relationship holds conditioning on individual-level covariates (age, age squared, gender, and education) as well as historical ethnicity-level controls from the EA, including dependence on agriculture and animal husbandry, respectively, number of jurisdictional hierarchies above the local level, and year of observation. Columns (3) and (4) show that similar results obtain in the ESS. Here, the importance individuals attach to "helping people around him or her" and to "care for their well-being" is significantly positively correlated with the average ancestral kinship tightness of the countries of birth of father and mother. Again, this relationship holds conditional on individual-level covariates as well as country of origin controls that control for the (average) characteristics of the country of birth of father and mother, including distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500.

[11]The WVS also contains a question that asks people how important it is for them to "do something for the good of society". This question is arguably difficult to interpret given that "society" could pertain either to the local community or to, e.g., the country as a whole. In any case, in analogous regressions to columns (1) and (2) of Table 3, kinship tightness is significantly positively correlated with this variable.

Table 3: Attitudes about helping in-group members (WVS and ESS)

Variation in KTI is across:	World Values Survey Ethnicities		European Social Survey Parents' countries of birth	
	Dependent variable:			
	Important help people nearby		Important help people around self	
	(1)	(2)	(3)	(4)
Kinship tightness	0.45***	0.40**	0.20***	0.11**
	(0.12)	(0.18)	(0.03)	(0.04)
Country FE	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes
Ethnicity-level controls	No	Yes	No	No
Country of origin controls	No	No	No	Yes
Observations	11819	11598	278775	267547
R^2	0.07	0.07	0.07	0.07

Notes. Individual-level OLS estimates in the WVS / ESS, standard errors in parentheses. In columns (1)–(2), the sample consists of individuals in the WVS. The dependent variable is the importance people attach to helping others nearby. The standard errors are clustered at the ethnicity level. Individual level controls include gender, age, age squared, and educational attainment. Ethnicity level controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation in the EA. In columns (3)–(4), the sample includes individuals in the ESS and the standard errors are clustered at the level of the country of birth of the father times the country of birth of the mother. Individual level controls include gender, age, age squared, years of education, and a second-generation migrant dummy. Country of origin controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all from the EA, but computed as pertaining to contemporary populations) as well as distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. All dependent variables are expressed as z-scores. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 The Radius of Trust

To complement the analysis of people's behavior with evidence on their beliefs, I study individual's trust levels. Researchers in economics have long used beliefs about whether "people in general" can be trusted (Knack and Keefer, 1997; Glaeser et al., 2000). More recently, the World Values Survey (WVS) introduced six additional trust questions that ask respondents for their level of trust in their family, their neighbors, people they know, people they meet for the first time, people of another religion, and foreigners (Delhey et al., 2011). These data will allow to evaluate people's trust radius.

The analysis starts with OLS cross-country regressions which relate the different trust variables to kinship tightness, with and without covariates. Columns (1)–(3) of Table 4 reveal that kinship tightness is negatively associated with trust in people in general. To disaggregate this result and develop deeper insights into people's trust radius, I consider levels of trust in specific groups. I omit "trust in family" due to a ceiling effect:

on a four-point scale, the average trust in family across countries is 3.80. But while all societies seem to trust their own family, systematic patterns hold regarding the other groups. Columns (4) through (8) show that kinship tightness is *positively* correlated with trust in neighbors, but negatively with trust in all other groups. Also, as the analysis successively moves to more "distant" forms of out-group members (from left to right in Table 4), the point estimate monotonically decreases in size and eventually becomes highly statistically significant. The right panel of Figure 2 visualizes the relationship between kinship tightness and the difference between in-group and out-group trust.

To draw out the distinction between trust in in-group and out-group even more clearly, I construct a variable of difference in trust between in- and out-group. For this purpose, I add up trust in family, neighbors and people one knows and then subtract trust in all other groups. As columns (9)–(11) show, kinship tightness is strongly and significant correlated with this measure of the radius of trust.

To investigate whether these results might be spuriously driven by omitted cross-country variables, the analysis proceeds with within country-regressions. For this purpose, the paper again makes use of variation (i) across ethnicities in the WVS and (ii) across second-generation migrants in the ESS. Table 5 presents the results, which closely mirror those established in the cross-country analysis. In the WVS, columns (1)–(4), people exhibit lower trust in people in general and a larger difference between in- and out-group trust. Table 14 in Appendix B shows that the latter result again hides the fact that kinship tightness is positively correlated with trust in neighbors, yet negatively with trust in strangers. Columns (5) and (6) show that similar results obtain in the ESS using the general trust question. Here, an individual's trust is strongly and significantly negatively correlated with the average ancestral kinship tightness of the countries of birth of father and mother, conditional on a large set of individual-level controls as well as country of origin controls of the country of birth of father and mother. In sum, even though the nature of variation differs in various ways – across countries, across ethnicities, and across second-generation migrants – do the results consistently point to a relationship between kinship tightness and *contemporary* trust levels.

In a final step, the analysis provides evidence that tight kinship ties were already negatively correlated with trust levels in historical ethnicities. For a subset of societies in the Ethnographic Atlas, the so-called Standard Cross-Cultural Sample (SCCS), very detailed information on the practices and values of historical ethnicities are available, based on the records of ethnographers. Ross (1983) coded an eleven-step variable that describes the extent to which parents in the respective ethnicity inculcated trust into their children. For the lack of more detailed information, I interpret this abstract trust variable as being similar to the "general trust" question in the WVS, i.e., that it describes

Table 4: Trust across countries

	Dependent variable:										
	Trust in:										
	People in general			Neighbors	People know	First time	Other religion	Foreigner	Δ [In-group – out-group]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Kinship tightness	-0.60*	-0.65*	-0.77**	0.74**	-0.59	-0.68*	-0.81**	-1.19***	0.31***	0.37***	0.31**
	(0.33)	(0.37)	(0.38)	(0.34)	(0.37)	(0.35)	(0.36)	(0.33)	(0.09)	(0.09)	(0.14)
EA controls	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes
Other controls	No	No	Yes	No	No	No	No	No	No	No	Yes
Continent FE	No	No	Yes	No	No	No	No	No	No	No	Yes
Colonizer FE	No	No	Yes	No	No	No	No	No	No	No	Yes
Observations	94	94	92	75	75	74	75	74	74	74	72
R^2	0.04	0.13	0.64	0.06	0.04	0.05	0.08	0.17	0.16	0.28	0.59

Notes. Country-level OLS estimates, robust standard errors in parentheses. All dependent variables are expressed as z-scores. The dependent variable in columns (1)–(3) is generalized trust. In columns (4)–(8), the dependent variables are people's trust in their neighbors, people they know, people they meet for the first time, people of another religion, and people of another nationality, respectively. In columns (9)–(11), the dependent variable is the the difference between trust in in-group (family, neighbors, and people one knows) and out-group (groups in columns (6)–(8)). EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Trust patterns: Within-country evidence

Variation in KTI is across:	World Values Survey Ethnicities				European Social Survey Parents' countries of birth	
	Dependent variable:					
	General trust		Δ Trust [In- vs. out-group]		General trust	
	(1)	(2)	(3)	(4)	(5)	(6)
Kinship tightness	-0.15**	-0.13	0.52***	0.45***	-0.21***	-0.16***
	(0.06)	(0.14)	(0.08)	(0.15)	(0.05)	(0.05)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity-level controls	No	Yes	No	Yes	No	No
Country of origin controls	No	No	No	No	No	Yes
Observations	34618	32429	17963	17755	288519	277186
R^2	0.08	0.08	0.08	0.08	0.17	0.15

Notes. Individual-level OLS estimates in the WVS / ESS, standard errors in parentheses. In columns (1)–(4), the sample consists of individuals in the WVS. The dependent variables are people's generalized trust and the difference in trust between family and neighbors on the one hand, and all other four groups on the other hand, compare Table 4. The standard errors are clustered at the ethnicity level. Individual level controls include gender, age, age squared, and educational attainment. Ethnicity level controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level and year of observation in the EA. In columns (5)–(6), the sample includes individuals in the ESS and the standard errors are clustered at the level of the country of birth of the father times the country of birth of the mother. Individual level controls include gender, age, age squared, years of education, and a second-generation migrant dummy. Country of origin controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all from the EA, but computed as pertaining to contemporary populations) as well as distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. All dependent variables are expressed as z-scores. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

trust levels in other people in general, as opposed to in the family or neighbors only. To reiterate, these variables reflect the impressions of ethnographers of the nature of people's values and child-rearing practices in the respective communities; while such variables are probably noisy, I am not aware of reasons to expect that they are somehow biased in favor of the research hypothesis. Columns (1) and (2) of Table 6 provide evidence that this trust variable is negatively correlated with kinship tightness, which is reminiscent of the correlations found in contemporary data.

In sum, the cross-country and within-country results on people's experimental behaviors, willingness to help others, and trust beliefs draw a consistent picture. Tight kinship is associated with low cooperativeness and trust towards the out-group, but in-group favoritism and strong trust in the in-group, while loose kinship societies cooperate relatively well with out-group members and do not disproportionately favor or trust in-group over out-group members. The analysis now turns to studying the enforcement devices that are associated with these two different systems.

6 Enforcement Devices

6.1 Moralizing Gods

The relationship between the presence of a moralizing god and kinship tightness cannot be meaningfully studied in contemporary data because – due to the spread of Christianity and Islam – the vast majority of human societies today honor a moralizing god. However, in the EA, only 26% of historical ethnicities are coded as believing in a moralizing god.

Columns (3) and (4) of Table 6 study the relationship between religious beliefs and kinship tightness in the EA. The dependent variable is a (standardized) binary indicator that equals one if a society has a moralizing god and zero otherwise, i.e., if the society has no high god or a god that is not moralizing (Q34 in the EA). The results show that societies with high kinship tightness were significantly less likely to develop beliefs in a moralizing god. This result holds up against a large and comprehensive vector of control variables that account for pre-industrial heterogeneity in subsistence style, settlement patterns, year of observation in the EA, geography, as well as continent fixed effects.[12]

6.2 Moral Values: Universally Applicable Principles vs. Relationship-Specific Obligations

6.2.1 Moral Values: Evidence from Historical Ethnicities

To study of the link between the structure of moral values and kinship tightness, the analysis again makes use of the detailed information contained in the SCCS. Specifically, a variable (Q778) measures the extent to which people are loyal to their local community on a scale of 1–4. According to Ross (1983), who assembled these data, this variable is meant to measure the degree of in-group loyalty and "we" feelings. Columns (5)–(6) of Table 6 present the results. Loyalty to the local community is significantly increasing in kinship tightness, both with and without geographic and climatic control variables.

6.2.2 Moral Values: Contemporary Evidence

In a second step, the analysis investigates the relationship between ancestral kinship tightness and contemporary values, both across and within countries. For this purpose, I exploit variation in universally applicable vs. relationship-specific moral principles in the

[12]Table 15 in Appendix B shows that very similar results obtain when I restrict the sample of ethnicities to (i) societies that have a high god or (ii) continents that were largely not influenced by the Abrahamic religions at the time of recording (Christianity, Islam, Judaism), i.e., the Americas and Oceania.

Table 6: Beliefs and moral values of historical ethnicities

	Dependent variable:					
	Trust		Religion		Moral values	
	Inculcate trust children		Moralizing god		Loyalty to community	
	(1)	(2)	(3)	(4)	(5)	(6)
Kinship complexity	-0.65*	-0.69*	-0.74***	-0.53***	0.99**	0.99**
	(0.38)	(0.40)	(0.17)	(0.14)	(0.41)	(0.48)
Continent FE	Yes	Yes	Yes	Yes	Yes	Yes
Historical controls	No	Yes	No	Yes	No	Yes
Observations	129	126	656	635	82	81
R^2	0.05	0.11	0.20	0.48	0.10	0.15

Notes. Ethnicity-level OLS estimates, robust standard errors in parentheses. In columns (1)–(2), the dependent variable is a categorical 11-step variable that describes the extent to which ethnicities inculcated trust in their children. The dependent variable in columns (3)–(4) is an indicator for whether the ethnicity had a moralizing god. In columns (5)–(6), the dependent variable is the extent to which people are loyal towards their local community. All dependent variables are expressed as z-scores. In column (4), the historical controls include dependence on agriculture, dependence on animal husbandry, year of observation, settlement complexity, number of jurisdictional hierarchies above the local level, distance from the equator, longitude, and average elevation. Due to the smaller number of observations, the historical controls in columns (2) and (6) only include distance from the equator, longitude, average elevation, and number of jurisdictional hierarchies above the local level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

MFQ, which was specifically designed to measure variation in moral principles that go beyond traditional notions of distributional fairness, reciprocity, and not harming others. In particular, building on research in cultural anthropology Shweder et al. (1997), the moral psychologist Haidt (2012) and his collaborators noticed that while the previously mentioned dimensions are moral principles that are meant to apply universally to everyone, other moral principles such as in-group loyality or submitting to authorities refer to relationship-specific obligations, i.e., to moral rules that differ depending on the person concerned. The latter types of values have also been referred to as "groupish" or "tribalistic" in the literature.[13] The MFQ contains survey-based measures of five "moral foundations": fairness / reciprocity, harm / care, in-group loyalty, respect / authority, and purity. For example, the in-group loyalty dimension includes an item that asks respondents to indicate their agreement with the statement "People should be loyal to their family members, even when they have done something wrong", see Appendix D for details.

In line with the research hypothesis discussed in Section 3, the analysis employs two dependent variables, i.e., (i) the measure of in-group loyalty, and (ii) an index of the importance of universally applicable values *relative* to the more "groupish" ones.

[13]Haidt and his collaborators also refer to the different types of moral values as "individualizing" and "binding".

Table 7: Moral values across countries

	Dependent variable:					
	In-group loyalty			Rel. imp. universal values		
	(1)	(2)	(3)	(4)	(5)	(6)
Kinship tightness	0.84***	0.73***	0.98**	-0.35***	-0.33***	-0.28**
	(0.27)	(0.27)	(0.44)	(0.09)	(0.09)	(0.14)
EA controls	No	Yes	Yes	No	Yes	Yes
Other controls	No	No	Yes	No	No	Yes
Continent FE	No	No	Yes	No	No	Yes
Colonizer FE	No	No	Yes	No	No	Yes
Observations	104	103	94	104	103	94
R^2	0.08	0.10	0.37	0.16	0.22	0.53

Notes. Country-level OLS estimates, robust standard errors in parentheses. The dependent variable in columns (1)–(3) is the in-group loyalty dimension in the MFQ. In columns (4)–(6), I compute the relative importance of universally applicable values by adding the MFQ dimensions of fairness / reciprocity and harm / care and subtracting in-group loyalty and submission to authority. The sample is restricted to countries with at least 18 respondents in the MFQ, which corresponds to the 25th percentile of the distribution. EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

That is, the hypothesis is explicitly not about some societies being more or less moral than others, but merely about heterogeneity in the relative importance that people attach to structurally different types of values. To construct the index, I compute the first principal component of fairness / reciprocity, harm / care, in-group / loyalty, and respect / authority. The resulting score endogenously has the appealing property that it loads positively on the first two values and negatively on the latter two, in line with the research hypothesis. See Appendix D for details. Since purity relates to the religious domain, it is not directly related to the research question pursued here.[14] For both of these variables, I compute a country-level score by averaging responses by country of residence of respondents.

Table 7 presents the cross-country results. Kinship tightness is strongly and significantly correlated with in-group loyalty as well as the relative importance of relationship-specific vs. universally applicable moral values. The left panel of Figure 3 depicts the relationship between ancestral kinship tightness and the relative importance of universally applicable principles.

[14]However, including the purity dimension in the index of universally applicable moral principles leaves the results unaffected.

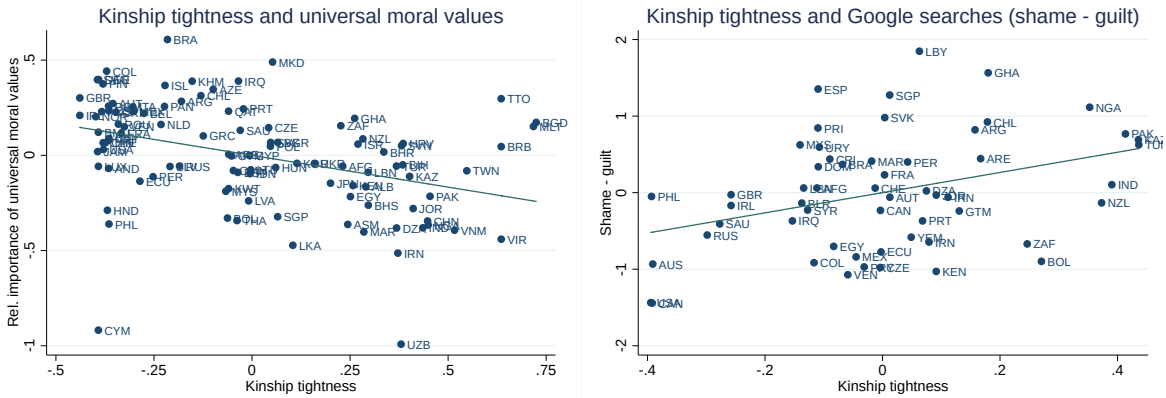

Figure 3: The left panel depicts the relationship between kinship tightness and the relative importance of universally applicable moral principles (Haidt, 2012). The right panel illustrates the correlation between kinship tightness and the relative importance of shame over guilt on Google. Both plots are partial correlation plots. The left panel is conditional on the vector of "EA controls", compare, e.g., column (5) of Table 2, and the right panel conditional on both the "EA controls" and language fixed effects.

Table 8 presents analogous within-country analyses in the MFQ. These regressions leverage variation in the country of birth of respondents in the MFQ, conditional on the same country of residence. The regressions control for both individual-level covariates (age, age squared, gender, education, subjective socioeconomic status) and country of origin controls, including distance from the equator, longitude, average temperature, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. Across specifications and dependent variables, kinship tightness is significantly correlated with moral values.

6.3 Emotions: Shame versus Guilt

Measuring the relative importance of different emotions across cultures requires non-standard data. Comparative linguists have long argued that the structure and usage of language reflects the structure of thought (e.g., Wierzbicka, 1997; Levinson et al., 2002; Gordon, 2004; Pinker, 2007).[15] Based on this idea, I develop two linguistic measures of the relative importance of shame and guilt. While one measure exploits variation in the number of synonyms for a given concept *across* languages, the second one exploits variation in word use *within* languages (across countries).

First, I take the number of synonyms in a given language as a proxy for the importance of that concept in the respective culture. For this purpose, I extracted data from a comparative linguistics paper that counted the number of synonyms for shame and

[15]The idea that language *reflects* culture and thinking modes is widely accepted among linguists. It is a much weaker notion than the controversial Sapir-Whorf hypothesis which posits that language *shapes* and *constrains* the way people think.

Table 8: Universal vs. relationship-specific moral values: Within-country evidence (MFQ)

	Dependent variable:					
	In-group loyalty			Rel. imp. universal values		
	(1)	(2)	(3)	(4)	(5)	(6)
Kinship tightness	0.53***	0.52***	0.40***	-0.42***	-0.44***	-0.37***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	Yes
Country of origin controls	No	No	Yes	No	No	Yes
Observations	285715	279208	278020	269878	263881	262755
R^2	0.01	0.07	0.07	0.01	0.03	0.03

Notes. Individual-level OLS estimates in the MFQ, standard errors (clustered at country of birth) in parentheses. The dependent variable in columns (1)–(3) is the in-group loyalty dimension in the MFQ. In columns (4)–(6), I compute the relative importance of universally applicable values by computing the first principal component of fairness / reciprocity and harm / care (both of which have positive weights) and in-group loyalty and authority / respect (both of which have negative weights). See Appendix D for details. All dependent variables are expressed as z-scores. Individual level controls include gender, age, age squared, an immigrant dummy, and education fixed effects (seven categories). Country of origin controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all from the EA, but computed as pertaining to contemporary populations) as well as distance from the equator, longitude, average temperature, average elevation, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

guilt, respectively, in 64 different languages (Jaffe et al., 2014). I then matched these languages to countries using population share data from the Ethnologue database. The analysis then makes use of all countries for which I could classify the languages (i.e., count the number of synonyms) of at least 75% of the population.[16] The variable of interest is then the difference between the number of synonyms for shame and guilt in a given country.

Second, I follow the idea that – even fixing people's language – people's usage of the concepts guilt and shame might vary across cultures. One way to assess how often people think about a given concept is arguably by analyzing how often they entered the term into Google (Stephens-Davidowitz, 2014). Google Trends allows to assess this frequency *relative* to overall search volume, separately for each country. Thus, I derive a measure of how often people – who speak the same language, yet reside in different countries – google shame and guilt. For this purpose, I restrict attention to languages that are an official language in at least two countries (since otherwise no within-language variation can be exploited) and that are covered in Jaffe et al. (2014)

[16]The results are robust to using other cutoffs such as 70%, 80%, 90%, or 95%.

Table 9: Importance of shame versus guilt

	Dependent variable: Shame – guilt					
	# of synonyms			# of Google searches		
	(1)	(2)	(3)	(4)	(5)	(6)
Kinship tightness	0.69**	0.68**	-0.42	1.13**	1.32***	1.43**
	(0.32)	(0.29)	(0.41)	(0.42)	(0.44)	(0.58)
EA controls	No	Yes	Yes	No	Yes	Yes
Other controls	No	No	Yes	No	No	Yes
Continent FE	No	No	Yes	No	No	No
Language FE	No	No	No	Yes	Yes	Yes
Observations	97	95	86	56	56	56
R^2	0.06	0.33	0.66	0.49	0.51	0.59

Notes. Country-level OLS estimates, robust standard errors in parentheses. In columns (1)–(3), the dependent variable is the average difference in the number of synonyms between shame and guilt in a given country, weighted across languages by the fraction of people who speak a given language. In columns (4)–(6), the dependent variable is the difference between the relative frequency of Google searches for shame and guilt in a given country-language pair, see Appendix D. All dependent variables are expressed as z-scores. In columns (4)–(6), the standard errors are clustered at the country level. EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

so I have access to translations for shame and guilt. To take English as an example, I entered "guilt" and "shame" separately into Google trends and recorded how often (relative to total search volume) people across countries searched for either concept. I repeated the same procedure for each language in the consideration set. In total, I gathered data on search frequency in 55 country-language pairs (consisting of 9 languages and 53 countries) and computed the difference in word use between shame and guilt.[17] Importantly, this procedure implies that – in contrast to the cross-language analysis using synonym counts – any noise or bias in the construction of the language variable that operates at the level of languages is netted out because in the empirical analysis I only compare populations that speak the same language.

Table 9 presents the results. Columns (1)–(3) show that kinship tightness is positively correlated with the (average) number of synonyms for shame relative to guilt in the languages that people in the respective country speak. The correlation is robust to

[17] See Appendix D for details.

controlling for other ancestral features of contemporary populations, but vanishes once continent fixed effects and additional control variables are accounted for. Second, complementary to this cross-language variation, columns (4)–(6) exploit variation within languages (by including language fixed effects) in search behavior on Google. I find that kinship tightness is significantly correlated with the relative importance of shame, even conditional on ancestral controls from the EA, contemporary geographic and climatic controls, and the fraction of Europeans. The right panel of Figure 3 visualizes this correlation.

6.4 Institutions

To understand the relationship between the development of institutional structures and kinship tightness, I consider variation across ethnicities in the EA. As outlined above, this analysis requires me to distinguish between institutions at the local (community) level and those that supersede separate groups, which I refer to as "global". First, the data contain a five-step variable that measures the number of levels of jurisdictional hierarchies beyond the local community (e.g., no levels, petty chiefdom, large chiefdom, state, large state, Q33 in the EA). This is the standard variable in the literature that people have used to proxy for the institutional sophistication of ethnicities in the EA (e.g., Giuliano and Nunn, 2013). However, the data also contain a variable that measures the levels of jurisdictional hierarchy at the *local* level (Q32), which is used less frequently in the literature. Local levels of hierarchy include nuclear family, extended family, clan, and village. These institutional structures are arguably not just more "local", but also more informal than the jurisdictional hierarchies above the local level.

Columns (1)–(4) of Table 10 relate these two variables to the kinship tightness index. As hypothesized, kinship tightness is negatively correlated with the development of institutions above the local level, but positively associated with levels of hierarchy at the local level, conditional on the society's dependence on agriculture and animal husbandry, respectively, settlement complexity, year of observation, distance from the equator, longitude, average elevation, and continent fixed effects. These findings are consistent with the idea that tight kinship coevolved with strong institutions at the local level to regulate behavior within the group, while loose kinship requires the development of broader institutional frames to sustain cooperation across groups.

To shed further light on the nature of local institutions, I consider the power these local institutions had in terms of spelling out sanctions and enforcement for community decisions[18] Columns (5) and (6) show that high kinship tightness is associated with

[18]For this purpose, I extract the first principal component of Q776 and Q777 in the SCCS. These items code the power of local institutions in enforcing community decisions and the presence of enforcement

Table 10: Historical institutions and norm adherence

	Dependent variable:							
	Global institutions		Local institutions				Norm adherence	
	# Levels jurisdictional hierarchy				Strength of local		Inculcate obedience	
	Above local level		Local level		enforcement		in children	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Kinship complexity	-0.35**	-0.32**	1.57***	1.53***	1.17**	0.83*	0.62*	0.75**
	(0.18)	(0.16)	(0.13)	(0.13)	(0.48)	(0.45)	(0.35)	(0.29)
Continent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Historical controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	919	908	928	917	88	87	157	154
R^2	0.26	0.39	0.27	0.32	0.30	0.43	0.11	0.26

Notes. Ethnicity-level OLS estimates in the EA, robust standard errors in parentheses. The dependent variables in columns (1)–(2) and (3)–(4) are the number of levels of jurisdictional hierarchy above the local and at the local level, respectively. In columns (5)–(6), the dependent variable is the extent to which there is local enforcement and sanctioning for community decisions. The dependent variable in columns (7)–(8) is the average of the z-scores of four variables that measure the extent to which societies instill obedience into young boys, old boys, young girls, and old girls, respectively. All dependent variables are expressed as z-scores. In columns (1)–(4), the historical controls include dependence on agriculture, dependence on animal husbandry, year of observation, settlement complexity, distance from the equator, longitude, and average elevation. Due to the smaller number of observations, the historical controls in columns (6) and (8) only include distance from the equator, longitude, average elevation, and number of jurisdictional hierarchies above the local level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

local institutions that were not just more developed, but also more powerful in enforcing behavior. Here, the smaller number of observations only allows me to condition on a subset of covariates, including continent fixed effects and geographic covariates.

In sum, tight kinship is associated with less developed institutions above the local level, but powerful institutions at the local level to regulate in-group behavior. A potential concern with these regressions is that they compare ethnicicities with different subsistence modes. Chiefly, while some ethnic groups followed sophisticated farming or herding practices, others subsisted largely on hunting, gathering, and fishing. The analysis addresses this issue by controlling for (i) the extent (0-100%) to which an ethnicity subsisted on agriculture and animal husbandry, respectively, (ii) the complexity of local settlements as proxy for local development, and (iii) the year of observation in the EA. In a further robustness check, Table 16 in Appendix B shows that virtually identical results hold if I exclude all hunter-gatherers from the sample.

6.5 Social Norms

Social norms can be thought of as informal institutions, i.e., a set of rules that regulates behavior without elaborate formal enforcement structures. The study of norms can

specialists, respectively, see Appendix D for details.

arguably be partitioned into (i) people's perception of the strength of social norms, (ii) people's conformity to these norms, and (iii) intrinsic values related to norm adherence.

Following work by Gelfand et al. (2011), the psychologist Uz (2015) developed an index of the strength, or tightness, of social norms by measuring the within-population *heterogeneity* in people's attitudes regarding morally questionable behaviors in the WVS. The key argument is that if strong social norms exist, people should state relatively homogenous responses, regardless of what that response may be. This is my dependent variable to assess the *strength* of social norms. The standard method to experimentally measure norm *compliance* in social psychology consists of Asch's (1956) famous conformity game. Here, subjects are asked to point out the longest line out of a set of three, and are implicitly induced to give blatantly obvious wrong answers because seven other "subjects" (who are actually confederates) provided the same mistaken response beforehand. That is, these confederates uniformly point to the same wrong line to make the subject feel like they "have to" conform. Since the implementation of this seminal study, researchers have replicated this design across 15 countries, as summarized in the meta-study of Bond and Smith (1996). The measure of conformity is the fraction of wrong responses in this experimental game, i.e., the fraction of subjects who follow the confederates.

Finally, to assess the extent to which people's conformity with group norms is driven by values related to norm adherence, the analysis makes use of a range of questions in the WVS and ESS that ask people to assess to which extent it is important to "behave properly", "follow the rules", and "not draw attention".

The analysis begins at the country level. Columns (1)–(2) of Table 11 show that kinship tightness is positively correlated with the tightness of social norms, with a raw correlation of $\rho = 0.50$. As column (3) shows, kinship tightness is also very strongly ($\rho = 0.69$) and significantly correlated with conformity in Asch's game. Finally, columns (4)–(6) provide evidence that valuing proper behavior is also significantly positively related to kinship tightness. Taken together, these results suggest that conformity to social norms plays an important role in regulating behavior in societies with strong kinship ties. Figure 4 depicts the relationships between kinship tightness, conformity, and valuing proper behavior.

In a next step, the analysis provides within-country evidence for the relationship between social norm adherence and kinship tightness. For this purpose, I exploit variation in values related to norm adherence in the WVS and ESS, see Table 12. Columns (1)–(2) exploit variation across native ethnicities within countries in the WVS to show that valuing proper behavior is positively related to kinship tightness. Similarly, columns (3)–(8) exploit variation across second-generation migrants in the ESS to show that an-

Table 11: Social norms across countries

	Dependent variable:						
	Tightness of social norms			Conformity	Important behave properly		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kinship tightness	1.50***	1.80***	0.94*	1.93***	1.20***	1.15***	0.81*
	(0.33)	(0.36)	(0.51)	(0.55)	(0.30)	(0.31)	(0.47)
EA controls	No	Yes	Yes	No	No	Yes	Yes
Other controls	No	No	Yes	No	No	No	Yes
Continent FE	No	No	Yes	No	No	No	Yes
Colonizer FE	No	No	Yes	No	No	No	Yes
Observations	62	61	60	15	75	75	73
R^2	0.25	0.33	0.64	0.48	0.17	0.31	0.60

Notes. Country-level OLS estimates, robust standard errors in parentheses. The dependent variable in columns (1)–(3) is the tightness index of Uz (2015). In column (4) it is the fraction of errors in Asch's conformity game, i.e., the fraction of subjects who follow the responses of the confederates. All dependent variables are expressed as z-scores. EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

cestral kinship tightness (of mother's and father's country of birth) are correlated with valuing proper behavior, rule-following, and not drawing attention.[19]

In a final step, the analysis investigates the importance of social norm adherence in historical ethnicities. For this purpose, I again make use of detailed information in the SCCS on the values that parents inculcated in their children, according to ethnographic records. In particular, four separate variables describe the extent to which obedience is instilled into young boys, old boys, young girls, and old girls, respectively, on a scale of 0–9 each (Q322-325). I compute the z-scores of these four obedience variables and then average them to arrive at a summary measure of obedience. Columns (7) and (8) of Table 10 show that obedience is positively correlated with kinship tightness in historical ethnicities. In sum, across contemporary countries, ethnicities, and migrants as well as historical ethnicities, kinship tightness is positively related to the importance of norm adherence.

Taken together, the analysis in this section has brought to light that the two extreme poles of cooperation systems are associated with fundamentally different enforcement schemes. On the one hand, the broad cooperation and trust patterns of loose kinship societies are supported by large-scale institutions and "internal police officers" that

[19]Similar results hold when I use the importance of inculcating obedience into children from the WVS in the within-country analyses.

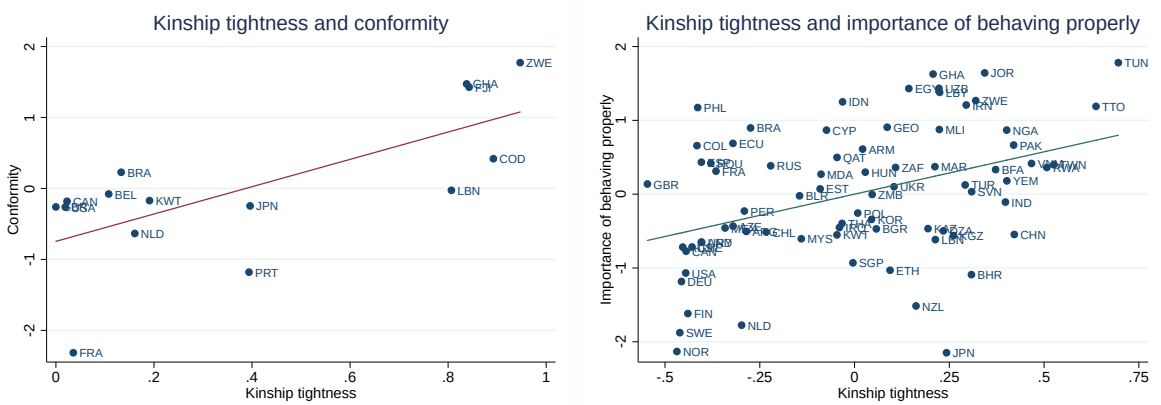

Figure 4: Relationship between kinship tightness and conformity in Asch's game (Bond and Smith, 1996, left panel) and the subjective importance of behaving properly in the WVS (right panel). The right hand panel is a partial correlation plot conditional on the vector of "EA controls", compare, e.g., column (5) of Table 2.

broadly sanction wrongdoing even outside of the in-group, and in the absence of wordly punishment, including moralizing gods, universal moral values, and guilt. On the other hand, the in-group oriented cooperation system of tight kinship societies appears to be sustained by strong social norms and corresponding values of norm adherence, combined with strong *local* institutions, and an increased importance of being shamed in front of others. Thus, punishment in tight kinship societies is largely personal and direct, while it is often anonymous and "psychological" in loose kinship societies.

7 Tight Kinship Systems, Agriculture and Development

Anthropologists have long argued that – correlationally – kinship tightness is hump-shaped in economic development (see Blumberg and Winch, 1972, for an early account). In essence, their argument has two ingredients. First, they assert that tight kinship ties optimally evolved when societies transitioned from hunter-gatherer subsistence to agricultural production. According to these accounts, agricultural subsistence lead to the emergence of tight kinship systems because (i) agriculture implies an enhanced need for small-scale cooperation for the sake of planting or harvesting crop under time pressure, or controlling and defending territory to protect fields in the timeframe between harvesting and planting, that can be achieved in extended families (Johnson and Earle, 2000; Talhelm et al., 2014; Gowdy and Krall, 2016), (ii) sedentary agriculture often implies de facto moving restrictions because farmers' wealth is "tied to the soil", implying that people are less likely to mingle with geographically distant groups and thereby weaken local kinship structures (Fei et al., 1992), and (iii) agricul-

Table 12: Attitudes related to norm adherence: Within-country evidence (WVS and ESS)

Variation in KTI is across:	World Values Survey Ethnicities		European Social Survey Parents' countries of birth					
	Dependent variable: Important to:							
	Behave properly		Behave properly		Follow rules		Not draw attention	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Kinship tightness	0.18**	0.21	0.34***	0.22***	0.20***	0.18***	0.24***	0.094
	(0.09)	(0.13)	(0.04)	(0.06)	(0.05)	(0.05)	(0.05)	(0.07)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity-level controls	No	Yes	No	No	No	No	No	No
Country of origin controls	No	No	No	Yes	No	Yes	No	Yes
Observations	20037	19819	278021	266816	277190	266018	278493	267296
R^2	0.07	0.08	0.08	0.08	0.10	0.10	0.11	0.10

Notes. Individual-level OLS estimates in the WVS / ESS, standard errors in parentheses. In columns (1)–(2), the sample consists of individuals in the WVS. The dependent variable is the importance people attach to behaving properly. The standard errors are clustered at the ethnicity level. Individual level controls include gender, age, age squared, and educational attainment. Ethnicity level controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation in the EA. In columns (3)–(8), the sample includes individuals in the ESS and the standard errors are clustered at the level of the country of birth of the father times the country of birth of the mother. The dependent variables are the extent to which respondents deem following rules, behaving properly, and not drawing attention important. Individual level controls include gender, age, age squared, years of education, and a second-generation migrant dummy. Country of origin controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all from the EA, but computed as pertaining to contemporary populations) as well as distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. All dependent variables are expressed as z-scores. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

tural subsistence often comes with increased pathogen prevalence, against which one mode of protection is to reduce out-group interaction (Fincher et al., 2008; Fincher and Thornhill, 2012). In line with these hypotheses, recent small-scale anthropological evidence suggests that farming societies are indeed especially prone to marry within clan (Walker, 2014). In contrast, hunter-gatherers predominantly have large social networks and reside with genetically unrelated individuals (Hill et al., 2011).

Second, anthropologists hold that tight kinship was detrimental in the transition from simple agricultural to more advanced production techniques because it prevents people from cooperating and interacting broadly, trusting strangers, participating in specialization and trade, and being geographically mobile (e.g., Henrich, n.d.).

This paper investigates these theories on a correlational basis. The left panel of Figure 5 presents a histogram of average kinship tightness across six categories of agricultural intensity of societies in the EA. According to this classification, agricultural practices vary from no agriculture, to casual, to extensive, and eventually to intensive

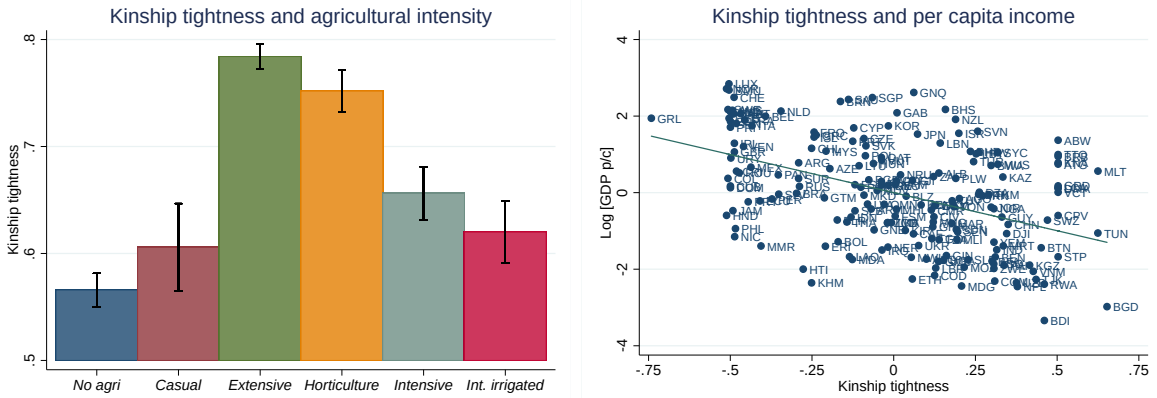

Figure 5: The left panel depicts average kinship tightness and corresponding standard errors for each of six levels of agricultural intensity. The right panel visualizes the partial correlation between kinship tightness and per capita income conditional on the vector of "EA controls", compare, e.g., column (5) of Table 2.

and intensive irrigated agriculture. Here, intensive agriculture should be thought of as technologically more advanced production techniques including fertilization, crop rotation, or other techniques to shorten or eliminate fallow periods.

The histogram reveals that kinship tightness indeed significantly increases by almost 30% as the subsistence mode changes from a hunter-gatherer lifestyle (first two categories) to extensive agriculture. However, as the agricultural production technology becomes more advanced, kinship tightness decreases again, which is reminiscent of the "curvilinear hypothesis" in anthropology (Blumberg and Winch, 1972). Table 19 in Appendix B analyzes this pattern more rigorously through OLS regressions and confirms that the relationship between kinship tightness and agricultural intensity is indeed hump-shaped. At the same time, the variance explained in these regressions is fairly small (10%). In other words, while there appears to be systematic covariation of kinship tightness and agricultural production modes, the data exhibit large heterogeneity on top of this mechanism. For example, the large difference in kinship structures between Western Europe and large parts of Asia cannot be "explained" by agricultural intensity: after all, many East and Southeast Asian ethnicities employed advanced intensive irrigated production modes that – according to the classification in the EA – are at least as advanced as the subsistence style of Western Europeans.

In any case, the data presented in this section evidently do not lend themselves to a straightforward (causal) interpretation: even if it was true that agricultural subsistence caused the emergence of tight kinship structures, it is not at all obvious whether the decreasing part of the relationship between kinship tightness and agricultural intensity reflects the causal negative effect of kinship tightness on technological progress, or, e.g.,

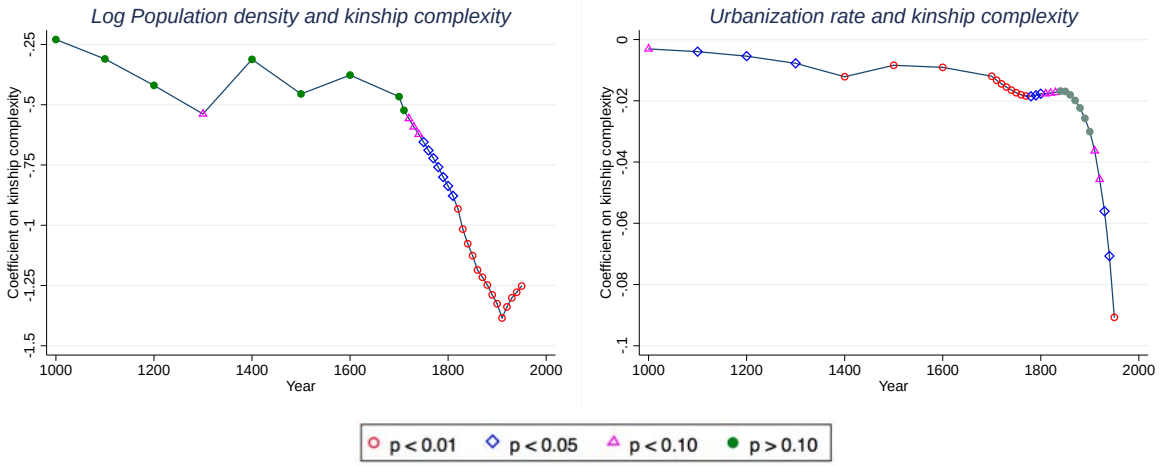

Figure 6: Kinship tightness and development over time. The left panel shows the results of OLS regressions in which I regress log population density in a given year on kinship tightness. Each dot then represents the OLS point estimate for the regression in the respective year, and the color coding denotes levels of significance. In all regressions, the sample is restricted to countries in which at least 50% of the population are native, resulting in a sample of 98 countries. The right panel follows an analogous logic, except that the dependent variables are urbanization rates.

a by-product of more general social change (e.g., Greenfield, 2009, 2013).

Given that contemporary societies consist of few hunter-gatherer groups, the anthropological theory of a hump-shaped relationship between development and kinship tightness predicts that contemporary income and kinship tightness are negatively correlated. The right panel of Figure 5 shows that this is indeed the case, $\rho = -0.53$.[20] However, this strong negative correlation appears to have emerged relatively recently. To make this point, I regress country-level log population density (as adequate proxy for development in pre-industrial times) in any given available year since 1000 CE on kinship tightness and then analyze the evolution of OLS coefficients over time. To keep the analysis meaningful in light of the changes in the structure of populations in the course of the post-Columbian migration flows, I restrict the sample to countries in which at least 50% of the current population are native, according to the migration matrix of Putterman and Weil (2010). The left panel of Figure 6 presents the results. In this figure, each dot represents the regression coefficient of kinship tightness from a given year and the color coding is used to denote statistical significance.[21]

[20]Table 18 in Appendix B investigates this correlation more thoroughly through multiple regression analysis and shows that the correlation is robust to the standard control variables that are commonly used in the literature. While the hump-shaped relationship between kinship tightness and agricultural intensity is statistically significant and in line with prior anthropological work, it should be emphasized that this relationship per se does not account for the contemporary cross-country correlation between per capita income and ancestral kinship tightness. For example, in an OLS regression of per capita income on kinship tightness and ancestral agricultural intensity, the former is statistically highly significant, compare Table 18 in Appendix B.

[21]Table 17 in Appendix B shows the regressions results underlying the construction of Figure 6.

As the figure shows, the relationship between country-level population density and kinship tightness starts out to be small and statistically insignificant. However, around the onset of the Industrial Revolution, the coefficient rapidly increases in absolute size and becomes statistically significant. Moreover, a set of Seemingly Unrelated Regressions brings to light that the regression coefficient in 1900 is statistically significantly larger than those in, e.g., 1000, 1500, 1600, 1700, and 1800 ($p < 0.01$).

The right panel of Figure 6 replicates the preceeding analysis, but uses urbanization rates instead of population density as dependent variable. The resulting picture is very similar in that the relationship between kinship tightness and development becomes much stronger in the course of the Industrial Revolution.

8 Conclusion

Based on prominent narratives in cultural psychology and anthropology, this paper has presented an analysis of cultural variation in cooperation patterns and corresponding enforcement devices. The results suggest that social organization matters: it is intimately linked to the way people cooperate with and trust each other, and the formal and informal mechanisms they put in place to enforce cooperation.

One of the key insights of the analysis is that – in line with prominant accounts in psychology and anthropology (Greene, 2014; Henrich, 2015, n.d.) – basic aspects of human psychology including the structure of religious beliefs, language, moral values, and basic emotions, seem to have adapted to serve the functional role of enforcing cooperation within specific social structures. Accordingly, understanding cultural variation in social organization illuminates the co-occurrence of various cultural traits. Across the social sciences, researchers with an interest in cultural variation have noted that cultural traits are frequently highly correlated, yet insights into why that is the case are rare (Alesina and Giuliano, 2015). The present paper sheds light on this issue by showing that a large number of cultural traits are correlated because they all support heterogeneous social systems that are structured along two extreme poles to sustain cooperation within society. Indeed, the results suggest that maintaining cooperation in society necessitates the coevolution of an entire bundle of tools including institutions, language, religion, values, and emotions.

A key open question concerns the origins of the large heterogeneity in ancestral kinship systems. The analysis has taken a first step in this direction by discussing the relationship between agricultural subsistence and kinship ties, yet – as discussed in Section 7 – this does not explain, e.g., the stark difference between Western Europe and many other parts of the world. Historians and anthropologists have put forward a

number of potential *proximate* mechanisms through which European local kinship structures got dismantled (most prominenently the Roman Catholic Church, Goody, 1983; Henrich, n.d.; Schulz, 2016), yet what ultimately set these social changes in motion is beyond our current understanding, not just in economics, but also in anthropology.

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ONLINE APPENDIX

A Kinship Tightness Index

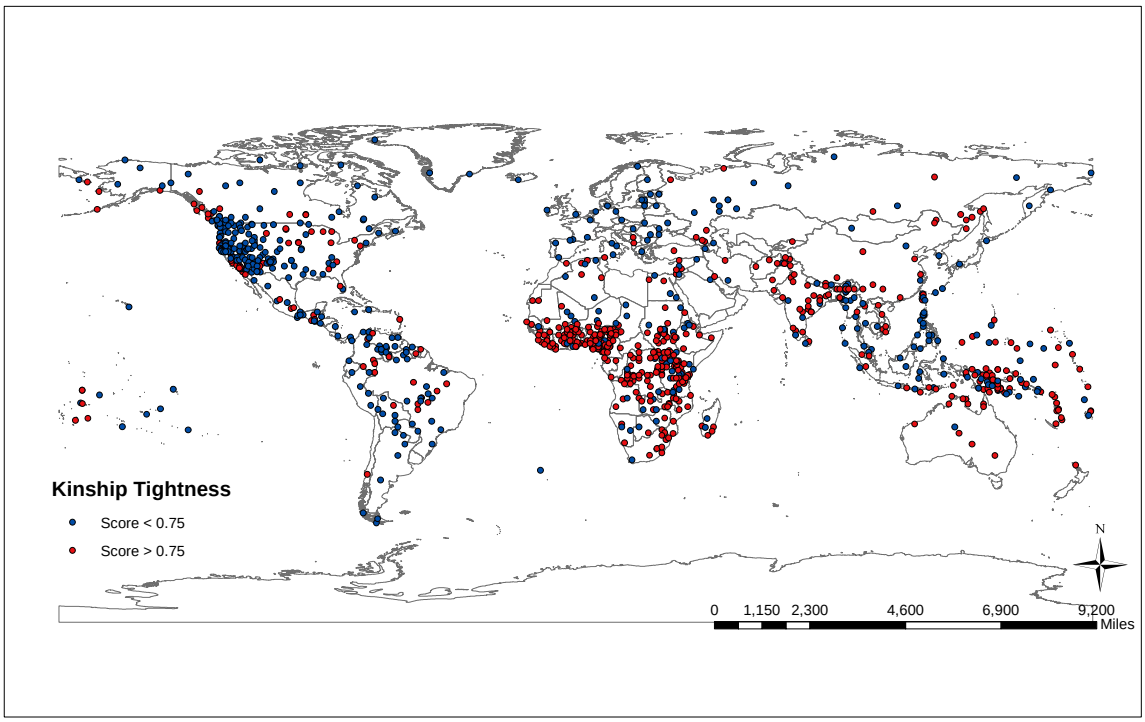

Figure 7: Distribution of kinship tightness index in the EA

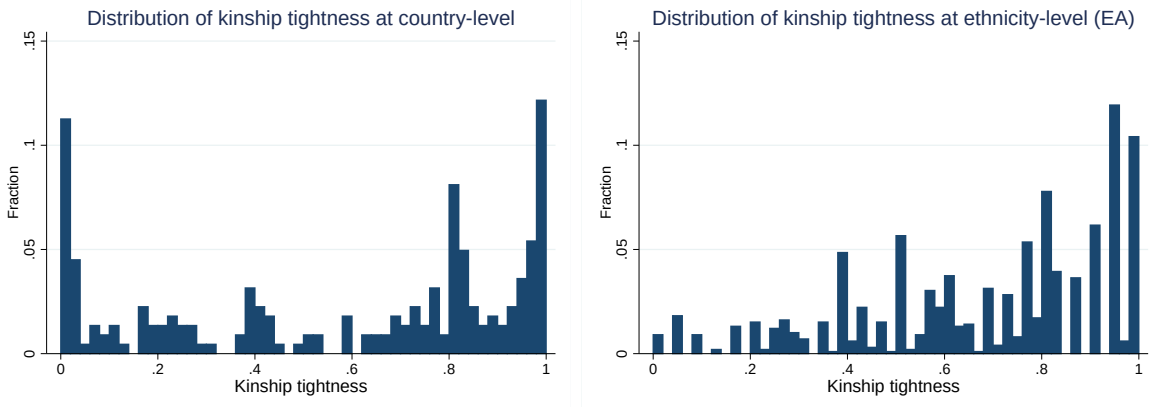

Figure 8: Distribution of kinship tightness at country level (left panel) and ethnicity level (right panel).

B Additional Tables

Table 13: Kinship tightness and proxies for individualism

	Dependent variable:								
	Individualism			Family ties			Pronoun drop allowed		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Kinship tightness	-1.14***	-1.04***	-1.39***	0.37***	0.35***	0.54***	1.06***	1.14***	1.67***
	(0.27)	(0.27)	(0.30)	(0.12)	(0.13)	(0.18)	(0.26)	(0.30)	(0.36)
EA controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other controls	No	No	Yes	No	No	Yes	No	No	Yes
Continent FE	No	No	Yes	No	No	Yes	No	No	Yes
Colonizer FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	100	99	96	66	66	65	109	107	95
R^2	0.16	0.30	0.78	0.12	0.27	0.76	0.14	0.29	0.67

Notes. Country-level OLS estimates, robust standard errors in parentheses. The dependent variable in columns (1)–(3) is the individualism variable of Hofstede (1984). In columns (4)–(6), it is family ties as discussed in Alesina and Giuliano (2013), and in columns (7)–(9) it is the fraction of the population that speaks a language which allows dropping the pronoun, see Appendix D. EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14: Trust patterns: Within-country evidence

	Dependent variable:									
	Trust in:									
	Neighbors		People know		Meet first time		Other religion		Foreign nationality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Kinship tightness	0.28***	-0.0074	0.074*	0.13	-0.13***	-0.029	-0.37***	-0.69***	-0.37***	-0.36
	(0.05)	(0.20)	(0.04)	(0.15)	(0.05)	(0.17)	(0.08)	(0.21)	(0.09)	(0.22)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity-level controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	19077	18851	19094	18868	18919	18695	18352	18136	18361	18148
R^2	0.05	0.05	0.04	0.04	0.05	0.05	0.09	0.10	0.09	0.09

Notes. Individual-level OLS estimates in WVS, standard errors (clustered at ethnicity level) in parentheses. The dependent variables are respondents' trust in specific groups of people, as explained in the notes of Table 4. All dependent variables are expressed as z-scores. Individual level controls include gender, age, age squared, and educational attainment. Ethnicity level controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation in the EA. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 15: Religious beliefs of historical ethnicities: Robustness

	Dependent variable:			
	Moralizing god			
	Sample restricted to:			
	Have a high god		Americas & Oceania	
	(1)	(2)	(3)	(4)
Kinship complexity	-1.27***	-0.80***	-0.57**	-0.33**
	(0.24)	(0.20)	(0.24)	(0.17)
Continent FE	Yes	Yes	Yes	Yes
Historical controls	No	Yes	No	Yes
Observations	401	381	265	259
R^2	0.19	0.52	0.05	0.42

Notes. Ethnicity-level OLS estimates in EA, robust standard errors in parentheses. The dependent variable is an indicator for whether a society had a moralizing god, expressed as z-score. The sample is restricted to ethnicities that have a high god (moralizing or not), columns (1)–(2), or to Oceania and the Americas, columns (3)–(4). The historical controls include dependence on agriculture, dependence on animal husbandry, settlement complexity, number of jurisdictional hierarchies above the local level, distance from the equator, longitude, and average elevation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 16: EA analyses excluding hunter-gatherers

	Dependent variable:					
	Global institutions		Local institutions		Religion	
	# Levels jurisdictional hierarchy					
	Above local level		Local level		Moralizing god	
	(1)	(2)	(3)	(4)	(5)	(6)
Kinship complexity	-0.54**	-0.52**	1.66***	1.64***	-0.61**	-0.48**
	(0.25)	(0.25)	(0.18)	(0.17)	(0.24)	(0.22)
Continent FE	Yes	Yes	Yes	Yes	Yes	Yes
Historical controls	No	Yes	No	Yes	No	Yes
Observations	595	587	603	595	430	410
R^2	0.21	0.30	0.23	0.28	0.23	0.48

Notes. Ethnicity-level OLS estimates in EA, robust standard errors in parentheses. The dependent variables in columns (1)–(2) and (3)–(4) are the number of levels of jurisdictional hierarchy above the local and at the local level, respectively. In columns (5)–(6), the dependent variable is the presence of a moralizing god. All dependent variables are expressed as z-scores. The sample excludes ethnicities that subsisted to at least 50% on (the sum of) hunting, gathering, and fishing. TIn columns (1)–(4), the historical controls include dependence on agriculture, dependence on animal husbandry, year of observation, settlement complexity, distance from the equator, longitude, and average elevation. Column (6) additionally includes the number of levels of jurisdictional hierarchies above the local level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 17: Kinship tightness and historical population density over time

	Dependent variable:								
	Log [Population density] in:								
	1000	1500	1600	1700	1750	1800	1850	1900	1950
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Kinship tightness	-0.23	-0.46	-0.38	-0.47	-0.47	-0.84**	-1.13***	-1.33***	-1.25***
	(0.25)	(0.29)	(0.32)	(0.32)	(0.32)	(0.34)	(0.34)	(0.34)	(0.35)
Observations	127	127	127	127	127	127	127	127	127
R^2	0.01	0.02	0.01	0.02	0.02	0.05	0.09	0.12	0.10

Notes. Country-level OLS estimates in the EA, robust standard errors in parentheses. The sample is restricted to countries in which at least 50% of the population in 2010 are native to their current location. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 18: Contemporary development and kinship tightness

	Dependent variable:				
	Log [GDP p/c]				
	(1)	(2)	(3)	(4)	(5)
Kinship tightness	-2.32***	-1.99***	-0.81**	-2.36***	-1.36***
	(0.27)	(0.29)	(0.37)	(0.28)	(0.42)
Intensity of agriculture				-0.025	-0.022
				(0.07)	(0.07)
EA controls	No	Yes	Yes	No	No
Continent FE	No	No	Yes	No	Yes
Other controls	No	No	Yes	No	No
Colonizer FE	No	No	Yes	No	Yes
Observations	189	187	157	189	189
R^2	0.30	0.33	0.71	0.30	0.56

Notes. Country-level OLS estimates, robust standard errors in parentheses. The dependent variable is per capita income. EA controls include dependence on agriculture, dependence on animal husbandry, number of levels of jurisdictional hierarchies above the local level, and year of observation (all computed as pertaining to contemporary populations). Other controls include distance from the equator, longitude, average temperature, average elevation, fraction of population of European descent, log land suitability for agriculture, and ancestry-adjusted log population density in 1500. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 19: Kinship tightness and agricultural intensity: Evidence from the EA

	Dependent variable: Kinship tightness						
	Full sample			No vs. ext. agric.		Ext. vs. int. agric.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intensity of agriculture	0.22***	0.063**	0.076**	0.048***	0.064***	-0.030***	-0.033***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)
Intensity of agriculture sqr.	-0.031***	-0.011***	-0.012***				
	(0.00)	(0.00)	(0.00)				
Continent FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Historical controls	No	No	Yes	No	Yes	No	Yes
Observations	937	937	926	582	580	694	683
R^2	0.10	0.36	0.36	0.40	0.42	0.39	0.38

Notes. Ethnicity-level OLS and IV estimates in the EA, robust standard errors in parentheses. The dependent variable is kinship tightness in the EA. In columns (4)–(5), the sample is restricted to levels of agricultural intensity of 1–3. In columns (6)–(7), the sample is restricted to levels of agricultural intensity of 3–6. Historical controls include year of observation, distance from the equator, longitude, and average elevation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C Additional Figures

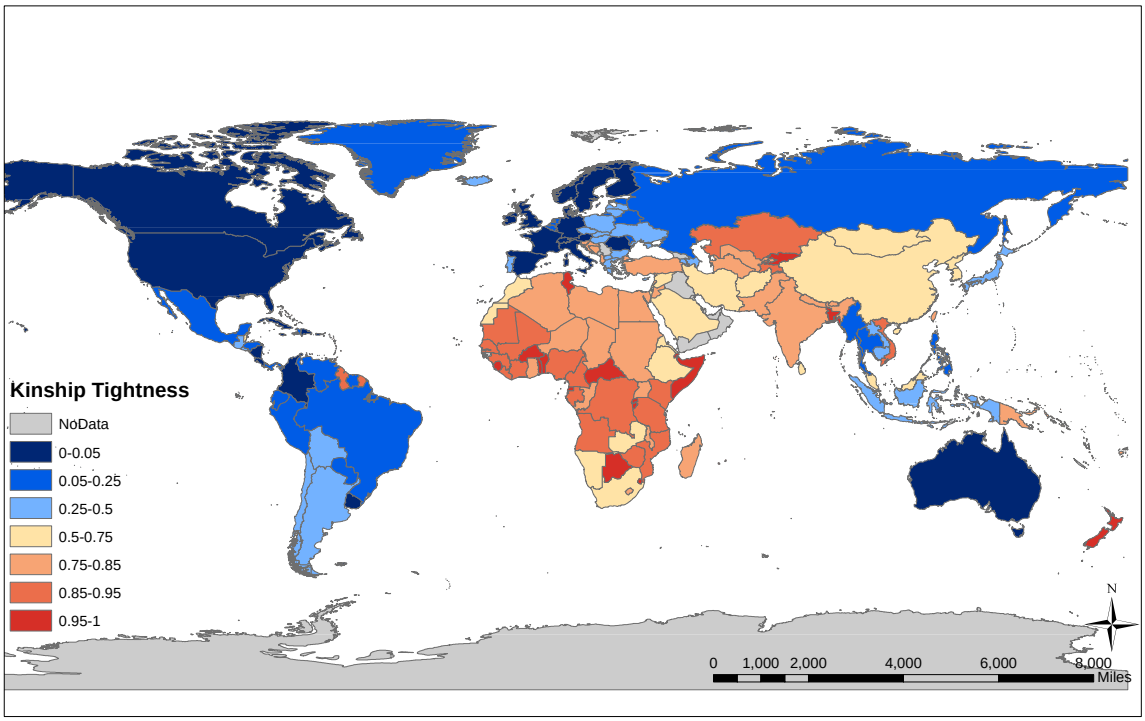

Figure 9: Distribution of kinship tightness across countries. In this map, a country is set to missing if some of the variables underlying the kinship tightness index are based on a relatively small fraction of the population.

D Data Description

D.1 Ethnographic Atlas

D.1.1 Construction of Kinship Tightness Index

Extended vs. nuclear family. Q8. Binary variable that takes on value of zero if domestic organization is around nuclear families (1 and 2), and one otherwise.

Post-wedding residence. Q11. Binary variable coded as 1 if couples can live with either the husband's or the wife's family or have neolocal residence (3) or no common residence (8), and zero otherwise.

Kin terminology. Q27. Binary variable coded as zero if the kin terminology (q27) is "Eskimo' (3) or "Hawaiian' (4), and one otherwise.

Cousin marriage. Q24. Three-step variable that takes on value of zero if no first or second cousins can be married (8), 0.5 if second cousins can be married (5-7), and one otherwise. Whenever Q24 is missing, the cousin marriage variable is imputed from the kin terminology variable. For this purpose, I first compute the average cousin marriage variable for each of the eight possible values of Q27, and then assign this average value to an ethnicity based on its kin terminology if Q24 is missing.

Polgamy. Q9. Binary variable that takes on value of zero if monogamous (1) and zero otherwise.

Lineages. Q43. Binary variable that takes on the value zero if descent is bilateral and one otherwise.

Segmented communities and localized clans. Q15. Binary variable that takes value of one in the presence of segmented communities or localized clans (2, 5 and 6) and zero otherwise.

Kinship tightness. First principal component of extended vs. nuclear family, post-wedding residence, cousin marriage, polygamy, lineages, and segmented communities and clans.

D.1.2 Dependent Variables

Moralizing god. Q34. Binary variable coded as one if a High Gods is present and supportive of human morality, and zero otherwise.

Number of levels of jurisdictional hierarchy above local level. Q33. Five-step categorical variable that describes the number of levels of jurisdictional hierarchies above the local level (0-4 levels).

Number of levels of jurisdictional hierarchy at local level. Q32. Three-step categorical variable that describes the number of levels of jurisdictional hierarchies at the local level (2-4 levels).

D.1.3 Covariates

Dependence on agriculture. Q5. Ranges from 2.5% to 92.5% by taking midpoint of respective interval.

Dependence on animal husbandry. Q4. Ranges from 2.5% to 92.5% by taking midpoint of respective interval.

Agricultural intensity. Q28. Categorical variable that characterizes the intensity of agriculture production modes, ranging from 1 to 6. The categories are: 1 for no agriculture, 2 for casual agriculture, incidental to other subsistence modes, 3 for extensive or shifting agriculture, long fallow, and new fields cleared annually, 4 for horticulture, vegetal gardens or groves of fruit trees, 5 for intensive agriculture, using fertilization, crop rotation, or other techniques to shorten or eliminate fallow period, and 6 for intensive irrigated agriculture.

Year of observation. Q101 and Q102. Year of observation in EA.

Settlement complexity. Q30. Eight-step categorical variable that describes settlement patterns as: 1 for nomadic or fully migratory, 2 for seminomadic, 3 for semisedentary, 4 for compact but impermanent settlements, 5 for neighborhoods of dispersed geamily homesteads, 6 for separated hamlets that form a single community, 7 for compact and relatively permanent settlements, and 8 for complex settlements.

Distance from equator, longitude. Q103, Q104.

Average elevation. Calculated based on Global 30 Arc-Second Elevation provided by USGS. For ethnicities, elevations aggregated across grid cells within a 200km radius centered at the coordinates specified in the EA.

D.2 Standard Cross-Cultural Sample

Trust in children. Q335. Describes the extent to which societies inculcate trust in their children. Categorical variable ranging from 0 to 9, with 0 representing "no inculcation or opposite trait" and 9 "extremely strong inculcation".

Obedience in children. Q322-Q325. Describes the extent to which societies inculcate obedience into young boys, old boys, young girls, and old girls, respectively. Categorical variables ranging from 0 to 9, with 0 representing "no inculcation or opposite trait" and 9 "extremely strong inculcation". The final score of obedience is computed as unweighted average of the z-scores of the four separate obedience variables.

Loyalty to community. Describes the extent to which members of society feel loyal to their local community. Categorical variable ranging from 0 to 3 ("especially high", "high", "moderate", and "low").

Strength of local enforcement. Q776 and Q777. Q776 describes the extent to which societies made use of formal sanctions and enforcement for community decisions (2: "great sanctioning power available", 1: "some", 0: "little or none"). Q777 encodes the presence of enforcement specialists (1: "present" or "not specialized but done by leaders who do other things as well", 0: "absent, or carried out by social pressure of wider community"). The final score of strength of local enforcement is computed as first principal component of these two variables.

D.3 Cross-Country Data

D.3.1 Dependent Variables

Public goods game contribution: Initial NOP. Average initial contribution levels in treatment without availability of punishment in the cross-cultural public goods experiments of Herrmann et al. (2008).

Public goods game contribution: Initial P. Average initial contribution levels in treatment with availability of punishment in the cross-cultural public goods experiments of Herrmann et al. (2008).

Public goods game contribution: Average. Average contribution levels across treatments and rounds in the cross-cultural public goods experiments of Herrmann et al. (2008).

Cheating: Lying game Average monetary payout reported in the lying game of Gächter and Schulz (2016).

In-group favoritism: Management jobs based on kin. Index reported in Van de Vliert (2011), summarizing the results of a cross-cultural survey by the World Economic Forum that asks top executives to what extent senior management positions in their country are held by relatives.

General trust. Answers to WVS question: do you agree that most people can be trusted (A165). Country level results calculated as means of all individual level responses across waves.

Out-group trust. Based on answers to three WVS questions on how much one trusts people that one meets for the first time (G007_34), people of another nationality (G007_01) and people of another religion (G007_35). Country level variable constructed as average across individuals and waves, averaged across the three different trust variables.

In-group trust Based on answers to three WVS questions on how much one trusts one's family (D001), neighbors (G007_18) and people known personally (G007_33). Country level variable constructed as average across individuals and waves, averaged across the three different trust variables.

Trust [In-group – Out-group]. Difference between in-group and out-group trust.

Number of synonyms for shame and guilt. For each language, I extract the number of synonyms for shame and guilt, respectively, from Jaffe et al. (2014). The country level measure is then generated by weighting the number of synonyms by the fraction of the population in the country speaking a given language, taken from Ethnologue. The analysis is restricted to countries in which the language (i.e., the synonym count) of at least 75% of the population could be classified.

Google searches for shame and guilt. First, I restricted the set of languages to those that are an official language in at least two countries (since otherwise no within-language variation can be exploited) and that are included in Jaffe et al. (2014) so I have access to the most apt translations for shame and guilt. This is the case for English, Arabic, French, German, Portuguese, Russian, Spanish, Persian, and Slovakian. Second, for each remaining language, access the relative search frequency of "shame" and "guilt", respectively, on Google Trends, restricting attention to countries in which the respective language is an official language. Note that this procedure implies that those countries with multiple official languages appear multiple times in the resulting dataset. Finally, for each country-language-pair, compute the difference between the search frequency index for shame and guilt.

Tightness of social norms. Index measuring the strength of social norms developed by Uz (2015). The inddex computes the standard deviation in responses for various morally disputable behaviors in the WVS. The underlying reasoning is that the presence of strong social norms should induce people to give *similar* responses, irrespective of what that response may be.

Conformity. Measure of conformity based on a meta-analysis of Asch's conformity game by Bond and Smith (1996). The variable is the fraction of errors people make in the conformity game, i.e., the fraction of times respondents give the same (wrong) response as the experimental confederates.

Importance of behaving properly. Based on answers to WVS question: It is important to this person to always behave properly (A196). Aggregate to country level based on country where the interview was conducted.

In-group loyalty. Based on data in the online version of the Moral Foundations Questionnaire, `www.yourmorals.org`. The in-group loyalty index is based on answers to six questions. First, people are asked to assess to which extent the following behaviors are morally relevant: Whether or not someone cared for someone weak or vulnerable (q3), Whether or not someone did something to betray his or her group (q9), Whether or not someone did something disgusting (q14). Second, respondents are asked to indicate their agreement or disagreement with the following statements: It is more important to be a team player than to express oneself (q19), I am proud of my countryś history (q25) and People should be loyal to their family members, even when they have done something wrong (q30). All of these questions have response options between zero and five. The in-group loyalty score is then computed as sum of responses

across the six questions. The country score is obtained as average in-group loyalty of all respondents in the MFQ in a given country of residence.

Relative importance of universal moral values. Based on data in the online version of the Moral Foundations Questionnaire, www.yourmorals.org. This composite index measures the relative importance of the moral dimensions of "fairness / reciprocity" and "harm / care" (which constitute universally applicable moral principles) over "in-group / loyalty" and "authority / respect", which are relationship-specific obligations, i.e., "groupish" or "tribalistic" values. The full Moral Foundations Questionnaire can be accessed here: http://www.moralfoundations.org/questionnaires. The score of the relative importance of universal moral values is computed through the following procedure: First, at the individual level, normalize each moral foundation by dividing it through the sum of all four dimensions to express the importance of values relative to each other rather than in absolute terms. Second, conduct a principal component analysis. Here, the resulting weights in the index of the relative importance of universal moral values are 0.60 for harm / care, 0.33 for fairness / reciprocity, -0.53 for ingroup / loyalty and -0.50 for authority / respect. Finally, compute the average of this index by country of residence.

Individualism. Variable generated by Hofstede (1984) and taken from https://geert-hofstede.com/countries.html. The data are available at the country level and are based on qualitative questionnaires conducted with IBM employees. According to Hofstede, this measure is meant to capture the following: "The high side of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we"."

Family ties. Following Alesina and Giuliano (2013), defined as first principal component of answers to three World Value Survey questions: how important is family in life (A001), one should respect and love parents (A025) and parents have responsibilities towards their children (A026). Larger values correspond to stronger agreement to the statement. Country level results calculated as means of all individual level responses across waves.

Pronoun drop. Following Tabellini (2008a), this variable measures whether a given language allows to drop the pronoun. The argument is that languages that forbid dropping the first-person pronoun give more emphasis to the individual as opposed to the group. The score is computed by applying the classification in the World Atlas of Languages, supplemented by Kashima and Kashima (1998). To arrive at a country-level score, I compute a weighted average across languages, weighted by the fraction of speakers according to Ethnologue. The analysis is restricted to countries in which I could classify at least 75% of the population.

D.3.2 Development Indicators

Log population density from 1000-1900. Computed based on grid cell level population density from the History Database of Global Environment (HYDE) data. Country average calculated as average population within contemporary boundaries of the country.

Ancestry-adjusted log population density from 1000-1900. Computed as above, but ancestry-adjusted using Migration matrix of Putterman and Weil (2010).

Urbanization rate from 1000 to 1900. Computed based on grid cell level urban and total population from the History Database of Global Environment (HYDE) data. Country average calculated as average population within contemporary boundaries of the country.

Log GDP per capita. GDP per capita in current US dollar in 2010, reported by the World Bank's World Development Indicators.

D.3.3 Covariates

Log population density in 1500 AD, ancestry adjusted. Population density (in persons per square km) for a 1500 AD is calculated as population in that year, as reported by McEvedy and Jones (1978), divided by total land area, as reported by the World Bank's World Development Indicators. Ancestry adjusted with World Migration Matrix by Putterman and Weil (2010).

Average Temperature. For countries, average of annual mean temperature from 1961 to 1990 based on FAO's GAEZ dataset. Mean temperature first calculated at grid cell level and then aggregated with current country boundaries.

Average elevation. Calculated based on Global 30 Arc-Second Elevation provided by USGS. For countries, elevations aggregated across grid cells within countries' current boundaries.

Fraction of population of European descent. Percentage of population of European descent, taken from Ashraf and Galor (2013).

Log land suitability for agriculture. Composite agriculture suitability index computed using FAO GAEZ dataset. Suitability measured for post-Columbian Exchange (1500) where all crops are assumed to be available. For each grid cell, we compute the average overall potential production of all crops in the GAEZ data (unit measured in T/ha). For country level measure, aggregate across all cells within country's boundary.

D.4 World Values Survey

Important help people nearby, Based on agreement with statement "It is important to this person to help the people nearby; to care for their well-being."
Other variables coded as in cross-country analyses.

D.5 European Social Survey

Important help people around self. Based on agreement with statement "It's very important to her/him to help the people around her/him. She/he wants to care for their well-being".

Important to behave properly. Based on agreement with statement "It is important to her/him always to behave properly. She/he wants to avoid doing anything people would say is wrong".

Important to follow rules. Based on agreement with statement "She/he believes that people should do what they're told. She/he thinks people should follow rules at all times, even when no-one is watching".

Important to not draw attention. Based on agreement with statement "It is important to her/him to be humble and modest. She/he tries not to draw attention to herself/himself".

D.6 Moral Foundations Questionnaire

Coded as in cross-country case.