The Economic Origins of the Evil Eye Belief*

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Abstract

The evil eye belief is a widespread superstition according to which people can cause harm by a mere envious glance at coveted objects or their owners. This paper argues that such belief originated and persisted as a useful heuristic under conditions in which envy was likely to trigger destructive behavior and the avoidance of other people's envy, effectively prescribed by the evil eye belief, was a proper response to that threat. We hypothesize that in weakly institutionalized societies wealth differentiation and vulnerability of productive assets were the key factors enabling envy-induced destructive behavior and contributing to the emergence and spread of the evil eye belief as a cultural defense mechanism. Evidence from small-scale preindustrial societies shows that there is indeed a robust positive association between the incidence of the belief and measures of wealth inequality, controlling for potential confounding factors such as patterns of spatial and cross-cultural diffusion and various dimensions of early economic development. Furthermore, the evil eye belief is more prevalent in agro-pastoral societies that tend to sustain higher levels of inequality and where vulnerable material wealth plays a dominant role in the subsistence economy.

Keywords: Culture, Envy, Evil eye belief, Inequality, Institutions, Superstition

JEL Classification Numbers: D31, D74, N30, O10, Z10, Z13

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1 Introduction

Over the past few decades there has been a growing number of studies searching for the deep roots of long-standing traditional institutions and culture. A specific strand of this literature, the law and economics of superstition, seeks to rationally explain the emergence and durability of objectively false and often counterproductive beliefs.[1] Joining these efforts, this paper builds a theoretical framework and conducts an empirical analysis to investigate the origins of a peculiar cultural phenomenon known as the evil eye belief.

The evil eye belief is a widespread superstition according to which people can cause harm by a mere envious glance at coveted objects or their owners. In other words, it is a belief in the supernatural destructive force of envy projected through the eyes of the envier. Deeply ingrained in certain societies and transmitted through centuries, the evil eye belief is still actively present around the world. According to a 2009 survey conducted by the Pew Forum on Religion and Public Life, 16% of Americans believe in the "evil eye, or that certain people can cast curses or spells that cause harm."[2] So do over 42% of respondents in a 2008–2009 survey conducted in Sub-Saharan Africa, with a substantial variation across nineteen participating countries. The latest study, carried out in 2011–2012 among Muslim populations of 24 countries, reveals that the belief is especially widespread in the Middle East and North Africa, with prevalence rates as high as 90% in Tunisia.[3]

As documented in the next section, the fear of the evil eye can have real adverse effects on economic activity by hampering incentives to invest and accumulate wealth and leading to other types of unproductive behavior such as concealment of assets. Thus, an intriguing question is how such belief emerged and persisted despite its rather obvious social cost.

In search for the origins of the evil eye belief this paper develops a conceptual framework which combines a rational-choice model of production in the presence of envy with the well-known approach to culture as a set of useful heuristics that facilitate decision making in a

[1] This line of work goes back to the seminal contribution by Posner (1980) and has been recently advanced in a series of articles by Peter Leeson whose research is more thoroughly discussed further below. In anthropology, active exploration of the roles played by superstitions and magical practices in traditional societies dates back to the pioneering writings of Malinowski (1935) and Evans-Pritchard (1937). Harris (1977) is another classic reference.

[2] The broad interpretation of the evil eye belief used in the survey does not allow to clearly distinguish it from beliefs in witchcraft and sorcery. Hence, these motivating data should be treated with caution. Further details on all cited surveys are available at `http://pewforum.org`.

[3] In an independent survey by Gallup Pakistan in 2010, 57% of local respondents claimed to believe in the evil eye. Furthermore, 43% of them pointed out envy as the major motive behind doing magic on someone, see `http://www.gallup.com.pk` for a summary of results.

complex and uncertain environment.[4] Specifically, we first use a simple model to identify the conditions under which envy-avoidance in the form of underinvestment is the rational response to the threat of destructive envy. These are high wealth inequality, ease and effectiveness of envious retaliation, and the strength of social comparisons. We then argue that in the real world of boundedly rational people acting under uncertainty and costly information acquisition the evil eye belief represents a useful rule of thumb prescribing envy-avoidance behavior that limits exposure to other people's harmful envy-motivated actions. Hence, we hypothesize that, in the context of weakly institutionalized traditional societies where the evil eye belief emerged and spread through cross-cultural contact thousands of years ago, wealth differentiation, along with vulnerability and visibility of main productive assets, were the key features enabling destructive envy and thus favoring the adoption of this superstition as a cultural defense mechanism.

We explore these predictions using the Standard Cross-Cultural Sample (SCCS), a dataset on 186 well-described preindustrial societies from around the world. The data show that the incidence of the evil eye belief across these societies is indeed positively and significantly associated with measures of wealth inequality. This finding is robust to the inclusion of potential confounding factors such as spatial and cross-cultural diffusion, various dimensions of economic development, exposure to major world religions, and continental fixed effects.

To provide further evidence in favor of the main hypothesis, we explore the relationship between the prevalence of the evil eye belief and the subsistence mode of production. The belief turns out to be more widespread in agricultural and pastoral societies which rely more on visible and vulnerable material wealth and sustain higher levels of inequality compared to foragers and horticulturalists (Borgerhoff Mulder et al., 2009). Altogether, the empirical analysis is consistent with the view of the evil eye belief as a useful cultural response in an environment conducive to destructive manifestations of envy.

This paper is related to three strands of literature. First, it adds to the growing research agenda on the law and economics of superstition. Most notable is the recent work of Peter Leeson who employs rational choice theory to understand seemingly bizarre practices such as judicial ordeals (Leeson, 2012b), monastic maledictions (Leeson, 2012a), and vermin trials (Leeson, 2013b) in medieval Europe, Gypsy law (Leeson, 2013a), trial by poison ingestion in Liberia (Leeson and Coyne, 2012), the use of oracles (Leeson, 2014b), and even

[4]The latter approach has been advanced by anthropologists (Richerson and Boyd, 2005) and psychologists (Gigerenzer, 2008) and recently used by economists to explain the origins and persistence of culture, see Nunn (2012) for an overview.

human sacrifice (Leeson, 2014a). We apply a similar approach to explain the existence of the evil eye superstition as a useful envy-avoidance device. A recurring argument in this line of research is that in the absence of modern government and institutions, such as secure property rights, traditional practices can fill that gap, even if imperfectly, and thus are socially useful.[5] Such reasoning is also important in the present analysis of the evil eye belief and connects this paper to the literature on the economics of self-governance which examines how stateless societies manage to maintain peace and order by relying on alternative informal mechanisms.[6] Indeed, if property rights were perfectly protected and aggression were inevitably punished, destructive envy would not represent a serious threat rendering envy-avoidance behavior suboptimal and the evil eye belief purely unproductive. It is in the absence of formal institutions that the superstition plays an important role.

There are several direct parallels between our analysis of the evil eye belief and Leeson's examination of other superstitions. For instance, in Leeson (2014b) he argues that the use of oracles efficiently resolves "low-grade" interpersonal conflicts and prevents petty grievances, including those arising from envy, from escalating into more serious confrontation.[7] Similarly, the evil eye belief helps to avoid conflict, first, by encouraging envy-avoidance behavior and thus reducing the danger of envious aggression and, second, by shifting any potential blame to the supernatural force of destructive envy thereby preventing direct accusations and tensions within the community.

In another related paper, Leeson argues that the practice of human sacrifice in certain traditional societies is in fact a primitive technology of property rights protection (Leeson, 2014a). In his theory "conspicuous destruction" of wealth by way of exchanging valuable property for humans that are subsequently sacrificed makes the community poorer. This reduces the expected payoff from plundering and protects the community from external predation. Envy-avoidance behavior, such as underinvestment and concealment of wealth, prescribed by the evil eye belief, may be seen as a less cruel and spectacular way to achieve a similar goal within community, that is, reduce the likelihood of (envy-motivated)

[5]The interaction between institutions and culture is also explored in the work by Grosjean (2014) on the culture of violence in the U.S. She argues that such culture was brought by the Scottish and Irish immigrants but persisted only in the U.S. South, where low institutional quality made the "culture of honor" an adaptive trait.

[6]Examples of this literature not related to superstitious beliefs include the analyses of self-governance among Caribbean pirates (Leeson, 2007) and prison inmates (Skarbek, 2012).

[7]Specifically, oracles do so by providing a device for randomizing strategies about how to behave in a conflict situation and coordinating individuals' choices which secures a correlated equilibrium in the hawk-dove-type game.

destruction. As in Leeson's paper, one of the key ingredients to the story is the absence of effective government and formal protection of property rights which makes informal substitutes for such protection useful.

An important feature of most superstitions first explored in the seminal work of Evans-Pritchard (1937) in the context of witchcraft beliefs is that they are unfalsifiable. Leeson (2012b) argues that, in the context of monastic malediction, this feature is in fact a prerequisite for making this superstition effective in performing its main social function, protection of clerical property. While unfalsifiability is not necessary for the evil eye belief to work and be useful, it certainly helps to explain the persistence of the belief in the imperfect information world.

Finally, this paper contributes to the recent empirical literature on the origins of culture, broadly defined, which explores how economic and environmental constraints, often in the interaction with institutions and history, shaped certain cultural characteristics including trust, gender roles, and religious beliefs.[8]

The rest of the paper is organized as follows. Next section examines the relationship between the evil eye belief and the fear of envy in light of ethnographic case studies from around the world. Section 3 provides a conceptual framework for understanding the emergence and persistence of the belief. Section 4 conducts the empirical analysis. Section 5 concludes. Appendices contain the proofs, detailed description of the data, and additional robustness checks.

2 Evil eye belief as the fear of envy

A review of anthropological literature on the evil eye belief in various societies suggests that its common root is the fear of other people's envy. Envious gaze is believed to cause misfortunes manifested, among other things, in the damage to property (such as farm animals or shelter), production outcomes (such as crops), and health of the subject of envy. Numerous ethnographic studies reveal the following key regularities: 1) the evil eye belief reflects the fear of destructive envy which arises from inequality of economic outcomes; 2) the fear of the evil eye affects real economic decisions by discouraging effort, wealth accumulation, and upward mobility and encouraging unproductive practices such

[8] Alesina et al. (2013) link contemporary attitudes to female labor force participation and gender inequality to the historical use of plough in agriculture; Nunn and Wantchekon (2011) show that contemporary variation in trust levels across African ethnicities is associated with the historical intensity of slave trade; Michalopoulos et al. (2012) relate the adoption of Islam to inequality in agricultural endowments.

as concealment of wealth. The fear of envious glances is consistent with the notion that people perceive their own relative standing through observation of other people's material wealth which may trigger envious feelings.[9]

Anecdotal evidence on the presence and implications of the evil eye belief comes from across the globe. In Naçaawy, an Egyptian village, "the harmful effects of the envious glance are accepted as an article of faith" (Ghosh, 1983). Livestock, the main object of envy, and the main measure of wealth in the community, is kept in the recesses of the house to avoid the evil eye. Similarly, to avoid the envy of neighbors, villagers of a Teenek community in Mexico "weave the agave fibers in the darkness of their houses" (Vidas, 2007). The fear of envy also makes them reject lucrative jobs and leave some ripe oranges on the trees to rot. In Tzintzuntzan, also in Mexico, villagers refuse to install glass windows in their houses fearing to attract envious looks (Foster, 1972). In Caixa de Água, Brazil, "envy dries crops, slays cattle, fells trees, pollutes food and water, causes houses to collapse, and can even kill small children" (Ansell, 2009). The fear of *olho grande* (the Brazilian name for the evil eye) makes the relatively rich peasants conceal or degrade the worth of their wealth. Back in the Old World, an Indian villager refuses to use a new fertilizer for the fear of *nazar lagna* (the Urdu name for the evil eye) in case the innovation delivers an especially good harvest (Schoeck, 1969). Similar fears and behaviors were also documented among the Bedouin tribes of Negev desert (Abu-Rabia, 2005), Galician villagers in Spain (Lisón-Tolosana, 1973), and in Slovak-American communities of Western Pennsylvania (Stein, 1974). This body of ethnographic evidence highlights how the evil eye belief essentially enforces envy-avoidance behavior in different forms.

Most anthropological studies of the evil eye belief emphasize its deep connection to the underlying socioeconomic relations in the community. For instance, Schoeck (1981) classifies the evil eye belief as a "realistic fear" which "reveals man's deep knowledge that, no matter what our station in life, what our fortune or assets, there will always be someone who is less favored by life. And he is a potential enemy." Reminick (1974) in his study of the evil eye belief among the Amhara of Ethiopia suggests that there is a "social context" behind the belief and associated symbolic behaviors. Spooner (1970) considers it to be "an institutionalized psychological idiom for the personalization, or simply the personification of misfortune, in particular insofar as misfortune, or fear of it, may relate to the fear of outsiders and their envy." Wolf (1955) and Foster (1972) view the evil eye belief, along

[9]In many languages the expressions for "evil eye," "to see," and "envy" are closely related. In Arabic, for example, the "evil eye" is *ayn al-ḥasūd* literally meaning "the eye of envy." The Latin word *invidia* from which the English "envy" stems, derives from *vidēre*, "to see." Similarly, the Russian word for "envy," *zavist'*, derives from the root of the verb *videt'*, "to see."

with witchcraft, sorcery, and gossip, as part of "institutionalized envy" which is a set of cultural indicators of the existence of envy in a community. Roberts (1976) looks at the evil eye belief through the lens of "conflict enculturation" theory according to which conflicts that are pervasive in society become part of expressive culture.

This paper offers a complementary theory rooted in the literature on the law and economics of superstition and the economics of self-governance. It argues that, despite its social costs, the evil eye belief fulfills a useful role by inducing cautious envy-avoidance behavior that protects property from potential aggression. Our approach also addresses a commonly raised objection to the envy basis of the evil eye belief, which is that, while envy is a universal phenomenon, the evil eye belief is not. As the framework of the following section demonstrates, existence of envy per se does not imply the optimality of envy-avoidance behavior: destructive envy and the fear of it are only activated once wealth inequality surpasses a certain "tolerance threshold" that depends, in particular, on the visibility and vulnerability of productive assets, as well as institutional infrastructure.

3 Conceptual framework

Since the evil eye belief is rooted in the fear of envy, in order to trace its origins one has to understand the conditions under which envy-avoidance behavior, prescribed by the evil eye belief, is a proper response to the danger of envy-motivated aggression. The following model helps to identify such conditions.[10]

3.1 A model of the rational fear of envy

Consider two agents or, alternatively, two equal-sized homogeneous groups. They differ only in the amount of broadly defined endowments, K_i, $i = 1, 2$. The ratio $k \equiv K_2/K_1 \geqslant 1$ captures the degree of inequality: Agent 1 is "poor" and Agent 2 is "rich." They interact in the following two-stage game (see figure 1).

[10]The model's setup is similar to Mui (1995) who explores the incentives to adopt technological innovations under the threat of envious retaliation. There are, however, two important departures from his framework. First, we introduce inequality which is crucial for generating the main prediction of the theory. Second, rather than making a costless binary decision of adopting or rejecting an exogenously given new technology, individuals in our model are choosing their effort levels and care about foregone leisure.

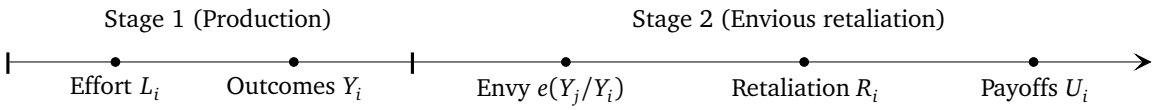

Figure 1: Timing of events in the envy game.

In the first stage, each agent has a unit of time that needs to be split between productive effort and leisure. A fraction of time $L_i \in [0,1]$ spent on production yields $Y_i = K_i L_i$ units of consumption good generating a utility level $\ln(Y_i)$ and a cost L_i of foregone leisure.[11]

Unequal outcomes of the production stage cause envy on part of the agent with a smaller outcome. In particular, Agent i's envy is generated according to the following function:

$$e(y_i) = (y_i - 1)^2, \quad \text{if} \quad y_i \equiv Y_j/Y_i > 1, \quad i,j = 1,2, \quad i \neq j. \tag{1}$$

If $y_i \leqslant 1$, Agent i experiences no envy, that is, $e(y_i) = 0$, while Agent j does. Envy can be assuaged through "retaliation" that is costly for the envious agent and harmful for the envied. Specifically, the amount of retaliation R_i reduces the envy of Agent i by a fraction $R_i/(1+R_i) \in [0,1)$ at a cost R_i/τ and causes disutility R_i to Agent j.[12] Parameter τ is the inverse marginal cost of retaliation that reflects the strength of formal institutions or, more broadly, the ease and effectiveness of retaliation. For instance, higher τ may be interpreted as insecure private property rights or low likelihood of getting caught and punished for envious retaliation. Since formal institutions and modern legal system are virtually nonexistent in the preindustrial small-scale societies, in the context of the empirical analysis of section 4 a different interpretation of τ is particularly relevant. Specifically, retaliation is more effective and less costly if the coveted wealth is more vulnerable, that is, easily harmed. Hence, higher vulnerability of assets corresponds to larger values of τ.[13]

[11] For simplicity, we use specific functional forms in the analysis, but the main results can be obtained in a more general framework.

[12] We follow Mui (1995) in assuming that retaliation brings a "psychological relief" to the envier. An alternative would be to model retaliation as either appropriation or destruction of the other agent's assets which directly improves the relative standing of the envier and reduces his envy. Such approach is implemented in Gershman (2014a) who constructs a comprehensive theory featuring both destructive and constructive sides of envy and their dynamic interaction with the process of development. The implications of that theory with regard to the emergence of the envy-avoidance behavior match the main findings of this section.

[13] As argued in section 4.3, agro-pastoral societies rely heavily on material wealth such as livestock and crops that are easily damaged or stolen. Hence, in such societies envious retaliation is less costly and the fear of it is likely to be greater.

The total payoff received at the end of the game is assumed to be additively separable across all benefits and costs:

$$U_i(Y_i, Y_j; R_i, R_j) = \ln(Y_i) - \frac{\theta e(Y_j/Y_i)}{1+R_i} - \frac{R_i}{\tau} - R_j - \frac{Y_i}{K_i}, \tag{2}$$

where $i, j = 1, 2$, $i \neq j$. Here, parameter θ captures the strength of social comparisons, or the importance of relative standing, which may be related to existing social norms as well as the visibility of consumption and productive assets.

We are looking for the subgame perfect equilibrium of this simple dynamic game using backward induction. At stage two, productive effort is sunk and the only decision to be made is whether to engage in envy-reducing retaliation or not. Thus, given y_i, Agent i is solving the following problem:

$$\max_{R_i} \left\{ -\frac{\theta e(y_i)}{1+R_i} - \frac{R_i}{\tau} \right\} \qquad s.t. \quad R_i \geqslant 0. \tag{3}$$

The above function is concave in R_i and the unique global optimum is given by

$$R_i^* = \begin{cases} 0, & \text{if} \quad y_i \leqslant \gamma; \\ \sqrt{\tau\theta} \cdot (y_i - 1) - 1, & \text{if} \quad y_i > \gamma, \end{cases} \tag{4}$$

where $\gamma \equiv 1 + 1/\sqrt{\tau\theta}$. The optimal retaliation function has two important features. First, the decision to engage in retaliation depends on the level of posterior inequality, y_i. If it is low enough, Agent i finds it optimal to tolerate envy peacefully. The endogenous "tolerance threshold" γ depends negatively on the the ease of retaliation, τ, and the strength of social comparisons, θ. Second, if Agent i finds it optimal to retaliate, the intensity of his response is increasing in y_i, τ, and θ.

At the production stage the forward-looking Agent i is solving the following problem:

$$\max_{Y_i} U_i(Y_i, Y_j; R_i^*, R_j^*) \qquad s.t. \quad 0 \leqslant Y_i \leqslant K_i, \tag{5}$$

where R_i^* and R_j^* are given by (4), $i, j = 1, 2$, $i \neq j$. The best responses then take a very simple form, as established in the following lemma.

Lemma 1 (Best responses). The best-response function of Agent i is given by

$$BR_i \equiv Y_i^*(Y_j) = \min\{K_i, \gamma Y_j\}, \quad i, j = 1, 2, \quad i \neq j. \tag{6}$$

Thus, in this setup it is never optimal to allow retaliation. As depicted in figure 2, the best-response function consists of two segments. If the output of Agent j is large enough,

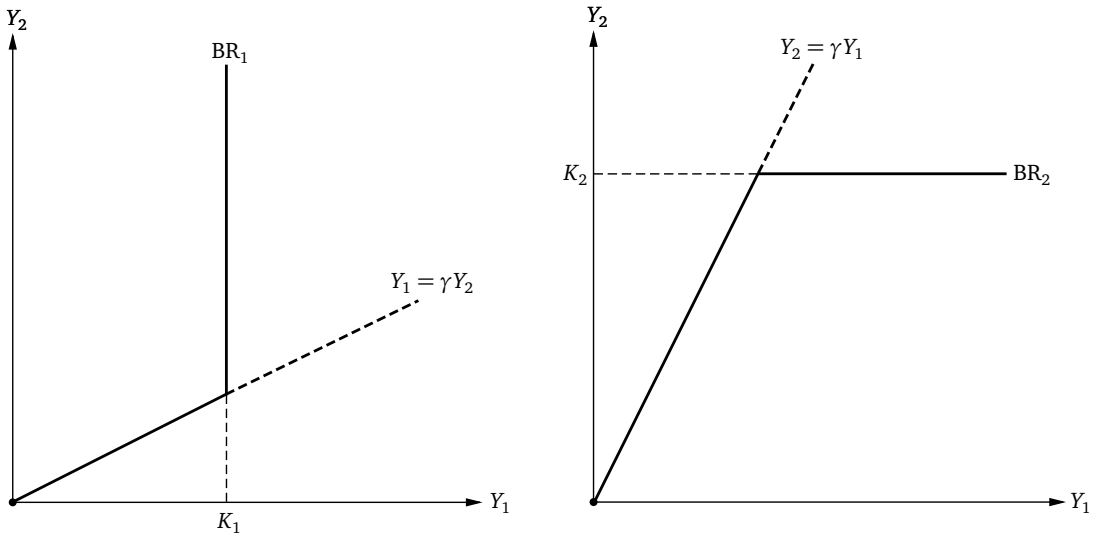

Figure 2: Best response functions of Agent 1 (left) and Agent 2 (right).

Agent i works full-time without fearing aggression. If, on the contrary, Y_j is low, Agent i finds it optimal to work only part-time since otherwise he would incite envious retaliation.

Depending on parameter values, one of the two equilibria emerges (see figure 3). In the "no-fear equilibrium" both agents work full-time and there is no retaliation. In the "fear equilibrium" the poor agent works full-time while the rich agent is at the corner solution and underinvests in order to avoid envious retaliation. Specifically, Lemma 1 leads to the following proposition.

Proposition 1 (Equilibrium). There exists a unique subgame perfect equilibrium (Y_1^*, Y_2^*) of the envy game:

$$(Y_1^*, Y_2^*) = \begin{cases} (K_1, K_2), & \text{if} \quad k \leqslant \gamma; \\ (K_1, \gamma K_1), & \text{if} \quad k > \gamma. \end{cases} \tag{7}$$

Hence, the fear of envy emerges when fundamental inequality is sufficiently high, institutions are weak (retaliation is easy), and social comparisons are strong.

Lemma 1 and Proposition 1 identify the conditions which make envy-avoidance behavior encouraged by the evil eye belief a perfectly rational response to the danger of destructive envy. Along with underinvestment, concealment of assets and sharing may be additional ways to avoid envious retaliation. In fact, it seems plausible that in such a setup there is scope for Pareto-improving redistribution. More precisely, the following proposition holds.

Proposition 2 (Optimal transfer of Agent 2). Assume that $k > \gamma$, that is, the economy is in the fear equilibrium, and let T be the size of endowment transfer from Agent 2 to

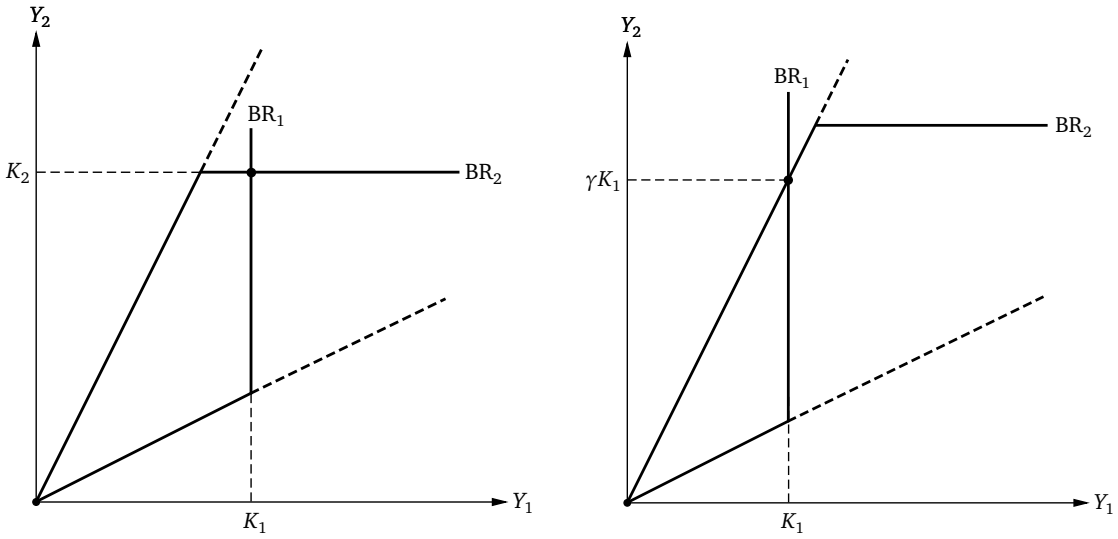

Figure 3: Equilibria of the envy game without (left) and with (right) the fear of envy.

Agent 1 before production takes place. Let $\bar{T} \equiv (K_2 - \gamma K_1)/(1+\gamma)$ denote the minimal transfer that would change the outcome of the game to the no-fear equilibrium. Then, the optimal transfer from the point of view of Agent 2 is

$$T^* = \begin{cases} K_2 - 0.5(K_1 + K_2)(\sqrt{\gamma(\gamma+4)} - \gamma), & \text{if} \quad k > 2/(\sqrt{1+4/\gamma}); \\ 0, & \text{if} \quad k \leqslant 2/(\sqrt{1+4/\gamma}). \end{cases} \tag{8}$$

Hence, the optimal redistributive transfer raises social welfare if inequality, k, is high and tolerance for inequality, γ, is low (that is, institutions are weak and social comparisons are strong). Moreover, when positive, T^* is increasing in k, τ, and θ, and $T^* < \bar{T}$.

Clearly, Agent 1 always benefits from a transfer since he experiences less envy in equilibrium. However, for Agent 2 it will only be optimal to share his endowment with Agent 1 if the fear constraint associated with envious retaliation is strong enough, that is, inequality is high and/or the tolerance for inequality is low. Otherwise, the benefit of alleviating the fear constraint does not cover the cost of giving away part of endowment and thus reducing the productivity of labor. Proposition 2 implies that, although redistribution never leads to a complete escape from the fear equilibrium, it can contribute to social welfare, if the fear of envious retaliation is particularly strong. Hence, if the evil eye belief tends to increase sharing due to the fear of envy, it can improve efficiency under conditions stated

in Proposition 2, which is an additional channel explaining the presence of the belief in weakly institutionalized unequal societies.[14]

3.2 From rational fear to superstition

The model presented above pins down the characteristics of a real-world environment in which the evil eye belief encourages the "right kind" of behavior, that is, envy-avoidance. As established by social scientists, individuals often recur to "fast and frugal" heuristics for "guessing the right thing to do in a complex and variable environment" (Richerson and Boyd, 2005, p. 119). Indeed, if information is imperfect and learning through experimentation is costly, simple norms approximating rational behavior may be adaptive and become encoded in culture (Nunn, 2012).[15] In the context of the above framework, there are several dimensions that may complicate fully rational behavior in the real imperfect-information world. For example, individuals may not know each other's cost functions and preferences making it difficult for them to calculate the exact optimal response. In this case, the evil eye belief provides a convenient rule of thumb prescribing envy-avoidance.

In his work on traditional societies Diamond (2012, ch. 8) points out that behavioral rules that minimize risks in a dangerous environment are often worth following even if they seem overcautious. Under conditions in which envy leads to conflict, erring on the side of caution, that is, underinvesting, may be preferable to running a risk of inciting envy-motivated aggression. Hence, a belief that a mere envious glance can cause damage becomes an adaptive strategy which, despite being too conservative in certain cases, allows to avoid severe conflict and major risk posed by the envy of others.

Scheibe and Sarbin (1965) argued that under conditions of uncertainty "extralogical propositions, such as superstitions, are necessary guides to action." Indeed, the evil eye belief is based on the fear of a supernatural destructive force of envy rather than rational fear of envious retaliation by neighbors. One possible explanation is that the latter is more likely to trigger accusations and costly open hostility. Hence, the idea that a neighbor is a potential enemy intentionally destroying other people's possessions is replaced by a belief in the supernatural destructive power of an envious glance that cannot be controlled. As

[14]Some authors have argued that redistributive mechanisms in traditional societies, such as the cargo system in Latin America, play an important role in mitigating the adverse effects of destructive envy (Cancian, 1965; Foster, 1979). In our analysis, the evil eye belief may fulfill a similar function.

[15]Foster and Kokko (2009) construct a simple evolutionary model in which natural selection may favor superstitious strategies that lump non-causal associations with causal ones. Beck and Forstmeier (2005) argue that, although superstitious behavior itself may not be adaptive, it is an inevitable by-product of an adaptive learning strategy.

a result, given the imperfect information about the real cause of a misfortune, the evil eye belief provides both an explanation and a rough guide to preemptive action (envy-avoidance) without escalating open conflict and direct accusations.[16]

Cultural norms and beliefs tend to persist over time if the socioeconomic environment makes them socially valuable.[17] An additional mechanism of persistence is suggested by Fudenberg and Levine (2006) whose approach to superstitions is based on the concept of self-confirming equilibrium. Specifically, they call the objectively false beliefs about off-equilibrium actions "superstitions" and show that such beliefs can persist for a long time if they prevent behavior that could provide new information to disconfirm prior beliefs (see also Fudenberg and Levine, 2009). In the context of the present analysis, if individuals believe that envious glances can cause real harm, they underinvest thereby avoiding destructive envy and generating no data to discredit that belief. Furthermore, if the source of destruction is not perfectly observable, the evil eye belief is more likely to persist in an environment enabling destructive envy since non-believers will face envy-motivated aggression with higher probability. In addition, in an imperfect information world the evil eye belief is essentially unfalsifiable which certainly contributes to its survival.

To summarize, the conceptual framework of this section identifies conditions that favor the emergence, adoption, and persistence of the evil eye belief as a useful heuristic prescribing envy-avoidance behavior and encouraging Pareto-improving sharing. These basic conditions include high inequality, ease of envious retaliation, whether due to weak institutions or vulnerability of wealth, and strong social comparisons. Hence, the theory makes the following predictions testable in the context of weakly institutionalized small-scale traditional societies:

1. Other things equal, the evil eye belief should be more prevalent in unequal societies rather than egalitarian. Among unequal societies, it should be less prevalent in societies with better formal institutions that mitigate the adverse effects of inequality.

2. Other things equal, the evil eye belief should be more prevalent in societies relying heavily on visible and vulnerable material wealth which triggers destructive envy.

These implications are explored in the empirical analysis of the following section.

[16] In contrast, witchcraft beliefs view misfortunes as consequences of intentional malevolent acts (driven by envy, among other things) and thus are more hostile by nature. Open accusations of witchcraft often lead to conflict entailing severe sanctions and eroding social capital (Gershman, 2014b).

[17] For excellent literature reviews on cultural persistence see Bisin and Verdier (2011) and Nunn (2012). For an anthropologist's perspective see Chibnik (1981).

4 Evidence

4.1 Data

To empirically investigate the economic origins of the evil eye belief we employ the Standard Cross-Cultural Sample, a "representative sample of the world's known and well described cultures, 186 in number, each "pinpointed" to the smallest identifiable subgroup of the society in question at a specific point in time" (Murdock and White, 1969). The SCCS is a subsample from a broader dataset, the Ethnographic Atlas (EA), which includes 1167 societies (Murdock, 1967). One of the motivations for creating the SCCS was to construct a sample spanning a wide range of diverse societies all around the world documented at a time of maximum cultural independence, in order to alleviate the problem of spatial correlation crucial for sound statistical analysis. The SCCS covers preindustrial societies, from foragers like the Hadza people of the central Rift Valley in Africa to technologically advanced agriculturalists like the Basques of the Iberian Peninsula.[18]

The original publication by Murdock and White was substantially expanded in the following years resulting in a wealth of coded data (around 2,000 variables) on subsistence economy and cultural characteristics of the SCCS societies. Heavily used by anthropologists, the SCCS and the EA data are increasingly employed by economists, recent examples being Baker (2008) on the transition to agriculture, Fenske (2013; 2014) and Michalopoulos and Papaioannou (2013) on pre-colonial African institutions, Alesina et al. (2013) on the origins of gender roles, and Giuliano and Nunn (2013) on the transmission of democracy.

The dependent variable of interest is the presence of the evil eye belief as coded for the SCCS by Roberts (1976) on the following ordinal scale: incontrovertibly absent (1), almost certainly absent (2), probably absent (3), possibly absent (4), possibly present (5), probably present (6), almost certainly present (7), incontrovertibly present (8).[19] Roberts also suggested a binary measure by separating the first four categories (absent) from the last four (present). According to this last measure, the evil eye belief was present in 36% of societies (67 in total) at the date of pinpointing. The geographical distribution of the belief is represented in figure 4. It is ubiquitous in the Circum-Mediterranean region broadly

[18]The mean pinpointing date is 1853, although it moves closer to 1900 when ancient empires like the Romans and the Babylonians are dropped. The main results are based on the full sample of 186 societies, but they are robust to omitting the twelve cultures pinpointed before 1800, see section 4.4. The breakdown of the SCCS by pinpointing date is given in table B.1 of appendix B.

[19]The coding was done on the basis of published sources on each society.

Figure 4: The evil eye belief across the SCCS societies.

Note. The circle size varies according to the evil eye scale: 1–2 (smallest), 3–4, 5–6, and 7–8 (largest).

defined, actively present in South Asia and Central America, and much less prominent among the aboriginal populations of the rest of the globe.

In the following analysis we use two measures as proxies for wealth inequality. The first measure is the stratification dummy adapted from Murdock (1967). The original scale comprises the following categories: absence of significant wealth distinctions among freemen (1); wealth distinctions based on the possession and distribution of property, not crystallized into distinct social classes (2); elite stratification, in which an elite class has control over scarce resources, particularly land (3); dual stratification into a hereditary aristocracy and a lower class of ordinary commoners or freemen (4); complex stratification into social classes correlated in large measure with extensive differentiation of occupational statuses (5). Since this scale is not really ordinal, it is converted into a stratification dummy, which equals 0, if the society is of the first type, and 1, otherwise.[20] Around 41% of the SCCS societies (76 in total) qualified as egalitarian at the date of pinpointing. Figure 5 shows the proportions of egalitarian and stratified societies where the evil eye belief is present according to the binary measure. Consistent with the main hypothesis, the belief is much more widespread in unequal societies.

We also construct a finer proxy for inequality by adjusting the stratification dummy for the complexity of technological specialization. In the absence of perfect mobility, which is a

[20]Similar strategy was used by Gennaioli and Rainer (2007) and Michalopoulos and Papaioannou (2013).

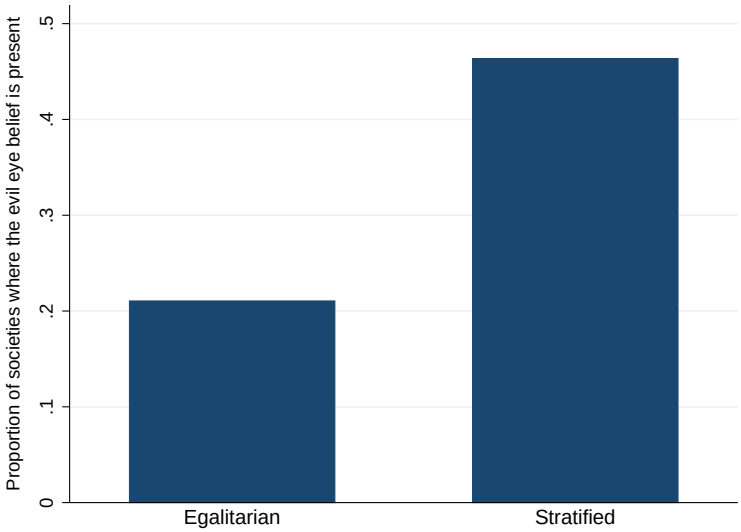

Figure 5: Stratification and the evil eye belief.

plausible assumption for the SCCS societies, a complex occupational specialization is likely to generate economic inequality.[21] The measure of technological specialization comes from Murdock and Provost (1973) and comprises the following categories: none; pottery only; loom weaving only; metalwork only; smiths, weavers, potters. We convert this variable into an ordinal measure of specialization: none (1), simple with only one type of artisans present (2), and complex (3). We then multiply the stratification indicator by this three-category scale to obtain the final measure of inequality based on technological specialization. By construction, the resulting variable is highly correlated with the stratification dummy, but gives more variation across stratified societies.

In what follows we examine the association between our measures of inequality and the prevalence of the evil eye belief more systematically in a regression framework. Given the non-experimental nature of the underlying data, one should be careful when interpreting the reported coefficient estimates as causal effects. What we are aiming to show is that the positive correlation between inequality and the prevalence of the evil eye belief is highly robust in a variety of specifications, consistent with the main prediction of the theoretical framework offered in section 3. Furthermore, we show that this relationship is unique for the evil eye belief and does not hold for other superstitions.

[21] Henrich and Boyd (2008) provide a simple model showing how occupational specialization between groups can lead to inequality when people occupying different economic roles are partially culturally isolated. They also apply their model to interpret the observed coexistence of specialized occupational groups with different mean payoffs across occupations among Swat Pathans in Pakistan.

The well-known possible threats to validity of our empirical results are omitted variable bias and reverse causality. In the following section we mitigate the first problem by controlling in the best feasible way for channels that plausibly contaminate the relationship of interest. Specifically we discuss and attempt to rule out the following confounding factors: spatial diffusion of the evil eye belief, various indicators of socioeconomic development, exposure to major world religions, and environmental volatility. In section 4.3 we address the reverse causality problem, first, by arguing that, if anything, the bias would work "in favor" of the stated hypothesis, and, second, by exploring the deep technological basis of inequality, the subsistence mode of production, that is unlikely to be affected by the evil eye belief.

4.2 Baseline results

Our baseline specification is a simple linear model:

$$\text{eye}_i = \alpha + \beta \text{ inequality}_i + \mathbf{X_i'}\Gamma + \mathbf{D_i'}\Delta + \varepsilon_i,$$

where i corresponds to an SCCS society, eye_i is the measure of the evil eye belief on the ordinal 1–8 scale, inequality_i is one of the two proxies for wealth inequality, $\mathbf{X_i'}$ is a vector of control variables, $\mathbf{D_i'}$ is a vector of continental dummies and ε_i is the society-level idiosyncratic component. The coefficient of interest, β, relates inequality and the incidence of the evil eye belief after partialling out the effects of $\mathbf{X}$ and $\mathbf{D}$. According to the fear of envy theory, β is expected to be positive. The model is estimated via ordinary least squares (OLS). An obvious alternative to this baseline specification is an ordered probit regression. For expositional purposes, we report the OLS estimates in the main text and relegate the ordered probit analysis to section 4.4 and appendix C.

4.2.1 Spatial diffusion

The first set of controls includes variables that capture possible spatial diffusion of the belief.[22] Some ethnographers hypothesize that the evil eye belief originated in the Circum-Mediterranean area, presumably in Mesopotamia, where the first references to it were documented in cuneiform texts (Thomsen, 1992), and then spread throughout the region and beyond. This is corroborated by figure 4 which indicates active presence of the belief in that region. Early scholars claimed that societies all over the world might have had an indigenous evil eye belief. In their classical works Seligmann (1910) and Elworthy (1895)

[22]Descriptive statistics and details on all variables may be found in appendix B.

call it, respectively, the "superstition of all times and people" and "ancient and widespread superstition." Yet the data clearly reject the universality hypothesis, and the framework of section 3 provides a possible explanation for this. The middle ground in the debate is that the observed prevalence of the superstition around the world reflects a combination of indigenous and acquired beliefs.[23]

The working hypothesis of the following analysis is that, even if the evil eye belief is not indigenous in a given society, it was more likely to have been adopted as a result of cross-cultural contact if the recipient society was unequal, that is, if the belief was beneficial given the underlying socioeconomic conditions.

To account for spatial diffusion from Mesopotamia we control for the great circle distance from each society in the Old World to ancient Babylon. For the New World, we control for the distance of each society to Tenochtitlan, capital of the Aztec empire that historically could have been the first SCCS society to acquire the evil eye belief from Spaniards. Furthermore, distance to coastline may proxy for the ease of contact with other cultures and is included as a control variable.[24] All distances are measured in thousands of kilometers. Apart from these distance controls, all specifications also include continental fixed effects for Africa, Eurasia, Oceania, North America and South America (see table B.1 for the breakdown of the SCCS by continent).[25]

Table 1 shows the estimation results controlling for this first group of "spatial" controls. The coefficient estimates on two inequality measures are highly economically and statistically significant. According to the estimates in table 1, controlling for distances and continental dummies, the evil eye score in a stratified society is, on average, 0.723 points higher compared to an egalitarian society. Similarly, a one-step-ahead move on the specialization scale increases the evil eye score by an average of 0.35, while a jump from egalitarianism to complex technological specialization corresponds to an increase by more than 1 point.

The distance measures themselves are significant and substantial in magnitude, especially the distance to Babylon, the alleged place of origin of the belief in the Old World.

[23]In his work on Aztec folk medicine Ortiz de Montellano (1989) points out that, albeit the evil eye belief could have been brought to Mesoamerica by the Europeans, the presence of a similar local belief, *ihiyotl*, facilitated its adoption.

[24]For Africa, it is also a good proxy for involvement in slave trade (Nunn and Wantchekon, 2011) through which the transmission of belief might have occurred.

[25]In section 4.4 we address the problem of cross-cultural diffusion in a more rigorous way by estimating spatial lag models. We also provide alternative estimates of standard errors that account for potential spatial autocorrelation. As it turns out, regular White's robust standard errors are the most conservative in the majority of cases and hence, are reported in all tables by default.

Table 1: Evil eye and inequality: controlling for spatial diffusion

	(1)	(2)	(3)	(4)	(5)	(6)
Stratification dummy	0.879***	0.753**	0.723**			
	(0.320)	(0.290)	(0.291)			
Specialization				0.526***	0.367***	0.350***
				(0.146)	(0.131)	(0.132)
Distance to Babylon		−0.586***	−0.612***		−0.561***	−0.588***
		(0.062)	(0.063)		(0.067)	(0.068)
Distance to Tenochtitlan		−0.268*	−0.276*		−0.248	−0.256*
		(0.151)	(0.148)		(0.151)	(0.149)
Distance to coastline			−0.540*			−0.517*
			(0.275)			(0.275)
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	186	186	186	186	186	186
Adjusted R^2	0.176	0.397	0.404	0.206	0.403	0.408

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively.

Note, however, that these distances are likely to capture effects far beyond the spatial diffusion of the belief via cross-cultural interactions. The historical homelands of Babylonians and Aztecs were the cradles of the Neolithic Revolution in the Old and the New World, respectively (Diamond and Bellwood, 2003). As discussed in more detail below, transition to agriculture and domestication of animals were important forces leading to economic complexity in general and wealth differentiation in particular. Hence, the included distances measure geographical proximity to ancient technological frontiers and may partially capture the effects that should be attributed to inequality rather than spatial diffusion.

4.2.2 Socioeconomic development

Social stratification is often viewed as one of the by-products of early economic development (see, e.g., Johnson and Earle, 1987). Ideally, one would want to isolate the role of wealth inequality and show that it is this particular dimension of development that is triggering the emergence or adoption of the evil eye belief. Thus, we control for a host of variables that were argued to be proximate correlates of early development. Murdock and Provost (1973) coded various scales of cultural complexity for the SCCS. One of them is social stratification, the primary variable of interest, while other ordinal measures include

Table 2: Evil eye and inequality: controlling for socioeconomic development

	(1)	(2)	(3)	(4)	(5)	(6)
Stratification dummy	0.704**	0.744**	0.708**			
	(0.304)	(0.301)	(0.291)			
Specialization				0.362**	0.407***	0.370***
				(0.145)	(0.145)	(0.141)
Population density	0.019	0.139	0.090	−0.022	0.120	0.086
	(0.107)	(0.144)	(0.146)	(0.112)	(0.143)	(0.145)
Urbanization		−0.064	−0.064		−0.107	−0.101
		(0.113)	(0.112)		(0.113)	(0.112)
Settlement pattern		−0.123	−0.131		−0.136	−0.140
		(0.122)	(0.123)		(0.120)	(0.123)
Money			0.186*			0.152
			(0.110)			(0.110)
Local hierarchy			−0.173			−0.149
			(0.221)			(0.224)
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	186	186	186	186	186	186
Adjusted R^2	0.400	0.399	0.403	0.405	0.406	0.407

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively.

urbanization level, population density, settlement pattern (from fully nomadic to permanent settlements), presence of money, and levels of hierarchy in the local community.[26] Most of these variables are positively correlated with inequality and among themselves (see table B.3 in appendix B). Table 2 shows the effects of adding development controls to the baseline specification. The coefficient estimates on inequality measures remain statistically and economically significant, and their magnitude is relatively stable. Curiously, when either inequality measure is included in the estimating equation, none of the other correlates of economic development are statistically significant (except for the presence of indigenous money in one specification).

[26] Ashraf and Galor (2011) have empirically demonstrated that population density is the relevant measure of economic development in the preindustrial Malthusian world.

4.2.3 Institutions

Institutions play an important role in our framework explaining the origins and persistence of the evil eye belief. As argued earlier, this cultural rule of thumb is especially useful in a weakly institutionalized environment in which destructive envy is not contained via formal laws and envy-avoidance behavior prescribed by the evil eye belief is sensible.

Since all of the SCCS societies are weakly institutionalized by modern standards, the sample is well-suited for our analysis. Still, one may argue that there are important institutional differences across the SCCS societies. To explore this variation we use two rudimentary measures of institutional development available in the dataset. The first one captures the presence of individual rights on movable property. The second measure is an ordinal index of jurisdictional hierarchy beyond the local community which is a proxy for the complexity of political organization or the presence of centralized government.[27] Although these measures do not capture finer institutional characteristics such as security of property rights, we expect inequality to be more strongly associated with the prevalence of the evil eye belief in societies completely lacking any formal institutions.

Table 3 shows the estimation results when we include these two variables in the empirical model in addition to measures of inequality, as well as interacted with them. First, note that in columns (2) and (5) of panel (a) the coefficient estimates on property rights indicator have a positive sign and are insignificant, while inequality measures remain statistically significant and of similar magnitude as before.[28] As shown in panel (b) of table 3, similar pattern of results applies to the political centralization index.[29] Interestingly, the coefficients on interaction terms are negative in all cases, although not precisely estimated. This is consistent with the idea that inequality is more likely to trigger destructive envy in a weakly institutionalized environment. Hence, the relationship between the prevalence of the evil eye belief and inequality appears stronger in societies in which property rights are absent and there is less political centralization.

[27] This measure has been argued to capture the quality of pre-colonial institutions and is associated with contemporary economic development in Africa (Michalopoulos and Papaioannou, 2013).

[28] When the sample is limited to those societies that do have property rights (86% of the total), the positive association between the incidence of the evil eye belief and inequality remains strong.

[29] While the "expected" sign of the coefficient estimates on formal institutions is negative, given the roughness of the available measures, one could rationalize the positive correlation as follows. On the one hand, the mere presence of individual property rights is contributing to the existence of substantial wealth inequality, as corroborated by the positive correlation between respective variables (see table B.3 in appendix B). On the other hand, the recognition of individual property rights per se may enable social comparisons (Davidson, 2009), as opposed to the situation, in which property is common and presumably there is less reason for envy.

Table 3: Evil eye, inequality, and institutions

	(1)	(2)	(3)	(4)	(5)	(6)
	(a) Property rights indicator ("rights")					
Stratification	0.879***	0.842***	1.748**			
	(0.311)	(0.317)	(0.682)			
Specialization				0.387**	0.373**	1.010**
				(0.150)	(0.152)	(0.463)
Rights		0.378	0.694		0.421	0.754*
		(0.397)	(0.473)		(0.405)	(0.451)
Stratification × rights			−1.006			
			(0.745)			
Specialization × rights						−0.672
						(0.474)
Observations	152	152	152	152	152	152
Adjusted R^2	0.400	0.398	0.398	0.397	0.396	0.398
	(b) Index of political organization ("government")					
Stratification	0.734**	0.690**	1.181**			
	(0.286)	(0.298)	(0.583)			
Specialization				0.382***	0.372**	0.683***
				(0.139)	(0.151)	(0.254)
Government		0.088	0.345		0.026	0.359
		(0.158)	(0.288)		(0.165)	(0.255)
Stratification × government			−0.300			
			(0.294)			
Specialization × government						−0.159
						(0.097)
Observations	186	186	186	186	186	186
Adjusted R^2	0.405	0.403	0.402	0.409	0.406	0.410
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	Yes	Yes	Yes	Yes	Yes	Yes
Development controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Development controls refer to a full set of five development variables included in specifications (3) and (6) of table 2.

4.2.4 Religion

The evil eye belief predates all major world religions (Christianity, Islam, Buddhism, and Hinduism). Moreover, it was firmly incorporated into the main texts of Christianity, Islam, and Hinduism, as well as associated broader cultures.[30] On the one hand, this implies mechanically that the diffusion of these religions throughout the world could have automatically contributed to the diffusion of the evil eye belief as their integral part. On the other hand, perhaps more importantly, there was a reason for incorporating this superstition in a collection of beliefs and behavioral rules dictated by religious teachings. This is perfectly consistent with the conceptual framework of the previous section: as long as destructive envy is a real threat and the evil eye belief represents a beneficial rule-of-thumb for envy-avoidance behavior, it becomes naturally integrated into a broad set of useful practices. This goes in line with the fact that envy features prominently as a major vice in both Judeo-Christian tradition (recall the Tenth Commandment and the seven deadly sins) and Islam (in which "hasad," destructive envy, is condemned as an evil and dangerous emotion). Not surprisingly, all societies in the SCCS, classified by Korotayev (2004) as "deeply" Islamic, Christian, or Hinduist, do possess the evil eye belief as part of their culture.

To the extent that both the evil eye belief and some religious norms are driven by conflict related to inequality, it is hard to separate the two in the empirical analysis.[31] It is still instructive to look at the earlier baseline specifications while controlling for the exposure to major world religions. First, based on earlier considerations, at least for some of them one should expect a positive correlation with the evil eye belief. Second, within a group of societies that were not heavily influenced by major world religions, more unequal ones should be more likely to have the evil eye belief.

These predictions are corroborated by estimates in table 4. Models in columns (1) and (2) include the detailed classification of the SCCS societies into seven categories: traditional religion (116 observations), deep islamization (19), superficial islamization (7), deep christianization (6), superficial christianization (24), Buddhism (10), and Hinduism (4). Compared to the baseline results, the coefficient estimates on inequality proxies are somewhat smaller but remain statistically significant at the 5 percent level. Furthermore,

[30] See Elliott (1994) for biblical references, Gächter (1998) on the place of the evil eye belief in Hinduism, and the Pew Forum report "The World's Muslims: Unity and Diversity" on its role in Islam (available at `http://www.pewforum.org`).

[31] For example, Michalopoulos et al. (2012) argue that Islam emerged in response to a conflict environment caused by unequal regional agricultural endowments and offered economic and moral rules addressing wealth inequality and fostering undisrupted trade.

Table 4: Evil eye, inequality, and religion

	(1)	(2)	(3)	(4)	(5)	(6)
Stratification dummy	0.596**		0.608**		0.726**	
	(0.300)		(0.296)		(0.332)	
Specialization		0.319**		0.336**		0.399**
		(0.149)		(0.146)		(0.173)
Deep Islam	1.403***	1.332***				
	(0.461)	(0.458)	1.148***	1.077**		
Light Islam	0.762	0.677	(0.428)	(0.424)	0.762	0.641
	(0.654)	(0.659)			(0.695)	(0.713)
Deep Christianity	1.545***	1.366**				
	(0.571)	(0.577)	0.635*	0.608*		
Light Christianity	0.438	0.454	(0.358)	(0.356)	0.455	0.467
	(0.406)	(0.402)			(0.399)	(0.393)
Buddhism	−0.821	−1.001*	−0.929*	−1.106*		
	(0.552)	(0.585)	(0.551)	(0.576)		
Hinduism	2.033**	1.915*	1.946**	1.835*		
	(0.996)	(1.045)	(0.964)	(1.019)		
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	Yes	Yes	Yes	Yes	Yes	Yes
Development controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	186	186	186	186	147	147
Adjusted R^2	0.449	0.452	0.448	0.452	0.255	0.260

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) In columns (3) and (4) deeply and superficially islamized societies are lumped into one group, as are deeply and superficially christianized societies. e) Omitted category in columns (1)–(6) is traditional religion. f) In columns (5) and (6) societies deeply influenced by either of the four classical religions are excluded from the sample. g) Development controls refer to a full set of five development variables included in specifications (3) and (6) of table 2.

as expected, being profoundly affected by one of the three religions (Islam, Christianity, and Hinduism) is strongly positively correlated with the prevalence of the evil eye belief. Buddhist influence seems to operate in the opposite way, although the coefficient estimate is only weakly significant. Superficial exposure to either Islam or Christianity does not yield statistically significant differences compared to traditional religion (although the associated point estimates are positive). In columns (3) and (4) we employ an aggregated classification by lumping deeply or superficially islamized societies in one group and deeply or superficially christianized societies in another. It seems that exposure to Islam is more

strongly associated with the evil eye belief, relative to Christianity. Finally, in columns (5) and (6) we drop the societies classified as heavily exposed to either of the four classical world religions. Within this group of societies, inequality measures are strongly positively associated with the incidence of the evil eye belief, and the corresponding point estimates are close to the baseline from table 2.

4.2.5 Environmental volatility

An important function of many supernatural beliefs is to explain misfortunes. To the extent that more volatile and risky environment generates more misfortunes to be explained, it might contribute to the emergence and diffusion of superstitions such as the evil eye belief, while at the same time producing higher inequality due to idiosyncratic wealth shocks. To address this potential issue we control for two proxies of environmental volatility available in the SCCS: pathogen stress, which captures the prevalence of various infectious diseases, and variation in mean annual rainfall. Neither variable turns out to be significant when included in the baseline specifications, and the coefficient estimates on inequality measures remain virtually intact.[32]

4.2.6 Falsification tests

One might wonder whether there is an intrinsic connection between inequality and superstitious beliefs in general, rather than just the evil eye belief. To explore this possibility we conduct a series of falsification tests exploring the prevalence of other supernatural beliefs. The candidates were selected from the data on traditional theories of illness available for a subsample of SCCS (115 societies). Each of the following phenomena is coded on an ordinal scale from 1 to 4 based on whether it is considered to be an important cause of illness: mystical retribution, sorcery, soul loss, spirit aggression, and witchcraft.[33]

Figure 6 demonstrates that there are no systematic differences between the prevalence of these superstitions in egalitarian and stratified societies, unlike in the case of the evil eye belief. To investigate this pattern more rigorously, for each of the five beliefs we estimate baseline specifications from columns (3) and (6) in table 2 and report the results in table 5. Reassuringly, the lack of relationship with inequality illustrated in figure 6 continues to hold in the presence of multiple control variables. Hence, it does not seem like there is anything about wealth differentiation that contributes to the formation of all sorts of

[32]The table of results is thus omitted. For definitions of environmental variables see appendix B.

[33]See Murdock et al. (1978) and appendix B for definitions and details on these beliefs.

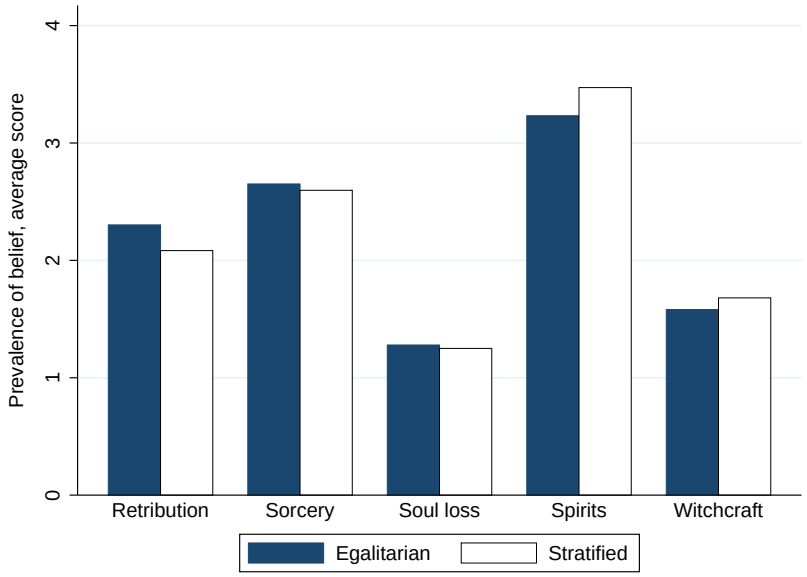

Figure 6: Stratification and various superstitions.

Table 5: Falsification tests: supernatural beliefs and inequality

	Evil Eye	Retribution	Sorcery	Soul loss	Spirits	Witchcraft
Stratification dummy	0.746**	−0.219	0.197	−0.009	0.178	−0.179
	(0.370)	(0.173)	(0.203)	(0.092)	(0.180)	(0.209)
Adjusted R^2	0.350	0.031	0.223	0.107	0.180	0.278
Specialization	0.319*	−0.128	0.150	0.011	0.065	−0.055
	(0.189)	(0.081)	(0.101)	(0.044)	(0.086)	(0.108)
Adjusted R^2	0.345	0.038	0.236	0.107	0.176	0.274
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	Yes	Yes	Yes	Yes	Yes	Yes
Development controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	115	115	115	115	115	115

Notes. a) Dependent variable is different for each column: (1) Evil eye belief on the 1–8 scale; columns (2)–(6) correspond to beliefs in the following phenomena as causes of illness, on the 1–4 scale: mystical retribution; sorcery; soul loss; spirit aggression; witchcraft. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Development controls refer to a full set of five development variables included in specifications (3) and (6) of table 2.

superstitions. The evil eye belief appears to be special in this regard reflecting the deep connection between inequality and envy.

4.3 Production mode, inequality, and the evil eye belief

As follows from the conceptual framework of section 3, the evil eye belief not just dictates the optimal "cautious" behavior, but also affects the level of inequality in society. This issue relates to the debate in anthropological literature about the leveling versus stratifying effects of "institutionalized envy." Eric Wolf (1955), who coined the term, started the debate stressing the leveling forces, based on his explorations of Latin American peasantry. Later studies, such as Cancian (1965) and Greenberg (1981), have demonstrated that, although redistributive mechanisms, triggered in part by the fear of envy, seem to reduce inequality, they only operate to a certain extent. In fact, redistribution can even enhance stratification through status and power acquired by the relatively rich individuals via sharing.[34]

To the extent that the evil eye belief acts as leveler, the estimates reported above provide a lower bound for the coefficient on inequality. This reverse causality concern is partly alleviated since the employed measures of inequality are rather coarse: despite the plausible leveling properties of the belief, it is unlikely to render a stratified society egalitarian. To further mitigate the issue this section explores the relationship between the evil eye belief and the subsistence production mode, the technological basis of wealth distribution in society whose choice is unlikely to be affected by the presence of the evil eye belief.

Social stratification is intimately linked to the type of subsistence economy, the two extremes being egalitarian foragers and highly stratified technologically advanced agricultural societies. An ambitious interdisciplinary project recently undertaken by a group of researchers employed individual-level data from small-scale societies to demonstrate that the production mode is systematically related to inequality and intergenerational transmission of wealth (Borgerhoff Mulder et al., 2009).[35] The latter were shown to be substantial in pastoral and agricultural societies but modest among foragers and horticulturalists.

The key mechanism behind this result relies on the importance of different wealth types across production modes. Material wealth (such as livestock and land) is relatively more important in agro-pastoral economies and is at the same time easily transmitted from parents to children, conditional on rules of inheritance. In contrast, human capital (such as somatic wealth and skills) and social capital (such as network ties) are relatively more important in foraging and horticultural societies and are harder to transmit vertically.

[34]For an excellent analysis of traditional redistributive norms in Sub-Saharan Africa see Platteau (2014).

[35]For a detailed description of methodology and results of this study see the February 2010 issue of *Current Anthropology* (volume 51, number 1).

Higher rate of intergenerational transmission implies that random shocks to family wealth are more persistent, counteract the tendency to mean reversion and raise the steady-state level of inequality. Note that technology (differential importance of wealth types) and institutions (rules of inheritance and redistributive norms) both contribute to differences in intergenerational mobility and inequality. We use production mode as a deep determinant of inequality.

First, we investigate the link between inequality and production mode across SCCS societies to confirm the general finding of Borgerhoff Mulder et al. (2009). Available data allow to do this not just for the SCCS, but also for a larger sample in the Ethnographic Atlas.[36] For the SCCS, we use the variable "Subsistence Economy: Dominant Mode" which comprises the following categories: advanced agriculture (56 societies), horticulture (18), simple or shifting cultivation (51), domestic animals (15), exchange (1), fishing (17), gathering (13), and hunting (15). Following the definitional guidelines in Borgerhoff Mulder et al. (2009), we combine the second and third groups in one, "horticulturalists," and also lump together the last 4 groups ("foragers") to obtain a similar four-way classification.[37]

For the EA the four-way classification is constructed based on variables measuring percentage dependence of the economy on gathering, hunting, fishing, animal husbandry, and agriculture, together with the data on the intensity of agriculture. The cases, for which the type of agriculture is unknown or several types of subsistence contribute equally, were omitted from the sample, to be consistent with the SCCS regressions.[38] Otherwise, the type of subsistence economy was defined based on the most important (50 percent and higher) contributing mode of production.

To control for rules of inheritance we include a categorical variable capturing the distribution of inheritance of land and movable property. The categories are as follows: no rights on land/movables, equal or relatively equal distribution, exclusive transfer (which comprises transfer to the "best qualified" individual, ultimogeniture, and primogeniture). Data on inheritance rules for movables and land are only available for subsamples of the SCCS and the EA.[39] The estimates are reported based on unified samples for which all the relevant data are available. Whenever stratification dummy is used as a dependent variable, we run probit regressions and report marginal effects based on maximum likelihood (ML) estimates.

[36]The only measure of inequality available in the EA is class stratification.

[37]One society in the "exchange" category are the Manus islanders, with fishing as secondary mode.

[38]Inclusion of these two categories as separate classes does not qualitatively alter the results. See figure B.1 in appendix B for the breakdown of both samples by subsistence production mode.

[39]See figure B.2 in appendix B for the breakdown of SCCS and EA societies based on this variable.

Table 6: Inequality and production mode

	Standard Cross-Cultural Sample (SCCS)						Ethnographic Atlas (EA)			
	Stratification dummy: ML			Specialization: OLS			Stratification dummy: ML			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Agriculture	0.471***	0.425***	0.456***	1.558***	1.378***	1.376***	0.356***	0.302***	0.312***	0.293***
	(0.107)	(0.117)	(0.128)	(0.309)	(0.325)	(0.366)	(0.066)	(0.074)	(0.076)	(0.079)
Horticulture	0.227**	0.134	0.213*	0.561**	0.340	0.433*	0.202***	0.135*	0.153*	0.123
	(0.116)	(0.144)	(0.126)	(0.247)	(0.292)	(0.259)	(0.074)	(0.081)	(0.080)	(0.084)
Pastoralism	0.326***	0.291**	0.332***	0.850**	0.681*	0.820**	0.385***	0.355***	0.381***	0.356***
	(0.093)	(0.113)	(0.087)	(0.358)	(0.376)	(0.352)	(0.053)	(0.066)	(0.055)	(0.065)
Equal distribution		0.333*			0.567*			0.235***		0.224***
(movables)		(0.173)			(0.337)			(0.072)		(0.076)
Exclusive transfer		0.358**			0.731*			0.253***		0.180*
(movables)		(0.145)			(0.378)			(0.077)		(0.095)
Equal distribution			−0.005			0.164			0.098	0.025
(land)			(0.143)			(0.283)			(0.069)	(0.077)
Exclusive transfer			0.163			0.485*			0.157**	0.118
(land)			(0.130)			(0.272)			(0.070)	(0.080)
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133	133	133	133	133	133	622	622	622	622
Adjusted R^2				0.304	0.318	0.312				

Notes. a) Dependent variables are stratification dummy in columns (1)–(3) and (7)–(10) and specialization in columns (4)–(6). b) Robust standard errors in parentheses. c) Marginal effects displayed for probit specifications in columns (1)–(3) and (7)–(10). d) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. e) Omitted categories are "foraging" for the production mode and "no rights or rules" for norms of inheritance.

As follows from estimates in columns (1)–(6) of table 6, evidence from the SCCS supports the main finding of Borgerhoff Mulder et al. (2009): agricultural and pastoral societies are on average more unequal compared to horticulturalists and foragers, where the latter category is taken as baseline. When stratification dummy is used as a measure of inequality, the formal test cannot reject the null that agriculture and pastoralism contribute equally to stratification. However, agricultural societies tend to be more technologically specialized compared to pastoral societies. Horticulturalists are closer to the omitted group of foragers, implying that the simplest cultivation technology does not yield a substantial increase in inequality. The rules of inheritance are also important correlates of inequality, consistent with the analysis of Borgerhoff Mulder et al. (2009). Rules that lead to more unequal distribution of inheritance are associated with higher stratification and specialization. Moreover, rules regulating the inheritance of movable property seem to be more important that those involving land. Estimates in columns (7)–(10) of table 6 support the above results in a broader sample of the Ethnographic Atlas.

To the extent that production mode differentially affects the degree of inequality in society, the evil eye belief should be more prevalent in agro-pastoral societies. Figure 7 and table 7 are consistent with this statement. That is, the incidence of the belief is substantially higher if the subsistence production mode is more prone to perpetuate inequality. Table 7 reveals several other patterns. First, the inclusion of distance controls makes a difference. This is not surprising, since, as mentioned above, they are good proxies for the diffusion of agriculture and domestication of animals, apart from the evil eye belief. Second, when inequality measures are included along with the production mode, they lose in magnitude, as expected. Nevertheless, stratification dummy remains marginally significant, while specialization remains significant at the 5 percent level. On the one hand, this means that the link between inequality and the incidence of the evil eye belief is present even conditional on the mode of production, which is reassuring. On the other hand, the fact that "unequal" production modes seem to matter even after controlling for more proximate measures of inequality may indicate that some of their other features are important. The conceptual framework of section 3 yields two possible explanations. First, material wealth which is more important in agro-pastoral societies is highly visible and thus, is more likely to trigger comparisons and destructive envy. Second, material wealth such as livestock and crops is highly vulnerable, making envious retaliation easier and the fear of destructive envy more pronounced. Hence, all three factors enabling destructive envy and the fear of it (inequality, strength of comparisons, and the ease of retaliation)

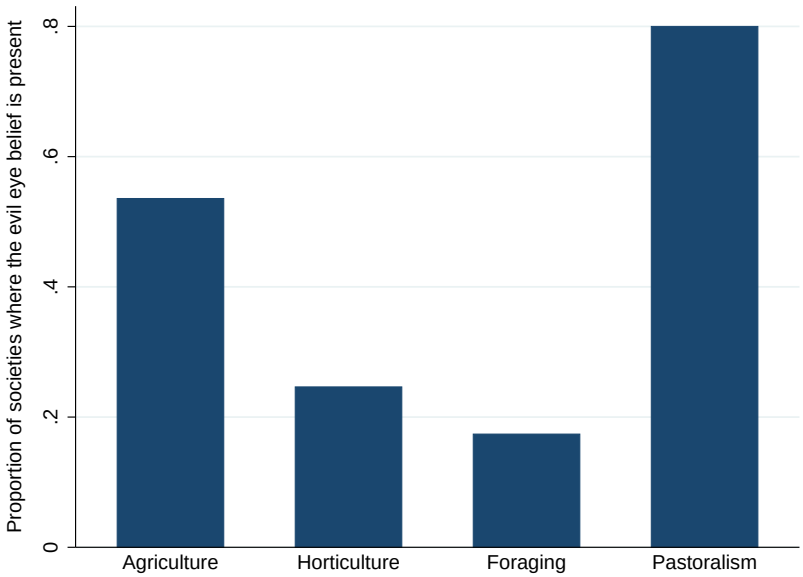

Figure 7: Production mode and the evil eye belief.

Table 7: Evil eye belief and production mode

	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture	1.692***	1.470***	1.146**	1.010**	0.736	0.554
	(0.423)	(0.449)	(0.479)	(0.427)	(0.453)	(0.479)
Horticulture	0.552	0.419	0.329	0.490	0.306	0.270
	(0.341)	(0.350)	(0.344)	(0.368)	(0.368)	(0.364)
Pastoralism	2.829***	2.607***	2.517***	1.941***	1.659***	1.666***
	(0.590)	(0.604)	(0.602)	(0.539)	(0.555)	(0.548)
Stratification dummy		0.515			0.527*	
		(0.318)			(0.298)	
Specialization			0.379**			0.298**
			(0.160)			(0.147)
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	No	No	No	Yes	Yes	Yes
Observations	186	186	186	186	186	186
Adjusted R^2	0.246	0.253	0.269	0.413	0.421	0.427

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Foraging is the omitted category for the production mode variable.

seem to be more prominent in agro-pastoral societies and may be jointly driving the main finding of this exercise.

4.4 Robustness checks

To check the robustness of our findings we carry out three additional exercises. First, we conduct ordered probit analysis to see if the results are qualitatively different from those based on OLS regressions. Second, the sample is trimmed in various ways to make sure the results are not sensitive to the inclusion of specific observations. Third, in order to deal in a more comprehensive way with the problem of spatial autocorrelation we provide alternative estimates of standard errors and estimate spatial lag specifications of the baseline model using two different weights matrices.

4.4.1 Ordered probit analysis

Since the prevalence of the evil eye belief is measured on the ordinal 1–8 scale, it is natural to estimate ordered probit equivalents of linear models from sections 4.2 and 4.3. The maximum-likelihood estimates and corresponding marginal effects are reported in tables C.1 and C.2 of appendix C. It is clear from table C.1 that ordered probit analysis reveals the same general patterns as the OLS regressions: the evil eye belief is more prevalent in unequal societies and those relying on agriculture or pastoralism as their major subsistence mode. More precisely, table C.2 shows that, other things equal, stratified societies are on average significantly more likely to have an evil eye score of 5 and higher and less likely to have the score of 2 and 3 relative to egalitarian societies. Similarly, agricultural and pastoral societies are significantly more likely to have a high (and less likely to have a low) evil eye score relative to foraging societies.[40]

4.4.2 Trimming the sample

To check for outliers we trim the baseline sample in three ways. Columns (1)–(4) of table D.1 in appendix D show the estimates when societies pinpointed before 1800 are dropped from the sample, which leaves out cultures described based on historical documents or diaries of travelers rather than ethnographic fieldwork. This restriction effectively reduces the sample by 12 observations and arguably increases comparability and reliability of the

[40] As an additional robustness check we also estimated a binary probit model for the absent/present measure of the evil eye belief mentioned in section 4.1. The results are qualitatively identical to those reported for the least-squares analysis and are therefore omitted.

data.[41] In columns (5)–(6) the model is estimated only for the Old World, leaving out the Americas thereby reducing the sample size by 65 observations. Finally, in columns (7)–(10) we drop observations with the evil eye belief score equal to 4 ("possibly absent") or 5 ("possibly present"), that is, the cases in which uncertainty about deciding on the presence or absence of the belief is the highest. Thus, in columns (7)–(10) the evil eye belief is absent for societies in the 1–3 score range and present in societies with the evil eye score of 6–8. Comparison with baseline regression tables shows that the results are robust to all trimming strategies and are not driven by outliers.

4.4.3 Spatial autocorrelation

Although the original sampling strategy of Murdock and White (1969) aimed to reduce the spatial dependence of observations, it still remains an issue in the SCCS (Eff, 2004). We follow several strategies to demonstrate the robustness of baseline results to this potential problem. First, continental dummies and distance controls are included in all specifications. Second, we calculate and report the standard errors adjusted for spatial correlation in table D.2. In columns (3)–(4) clustered standard errors are shown. To account for potential interdependence in the error terms across societies we cluster standard errors at one of two levels: language region and language family. Language region is a coarse measure of common language origin that comprises 10 categories, while language family is a finer subdivision into 47 categories (Burton, 1999).[42]

Columns (5)–(7) show standard errors corrected using the methodology of Conley (1999) that does not impose an a priori structure on the type of spatial dependence. Specifically, asymptotic covariance matrices are estimated as weighted averages of sample autocovariances, where the weight for each term is the product of weight functions in each dimension that decline linearly and are equal to zero beyond specified cutoff distances. To define these cutoffs we first use the Mercator projection to get the coordinates for each SCCS society on the Euclidean plane. We then compute an average distance band which "forces" each society to have a certain minimal number of neighbors within that band. This distance band is then used as cutoff for each dimension to calculate the spatially corrected standard errors. Specifically, in column (5) it is the average distance band that covers at least 5 neighbors

[41] Specifically, the following cultures are dropped (date of pinpointing in parentheses): Babylonians (1750 B.C.), Hebrews (621 B.C.), Romans (110), Khmer (1292), Aztec (1520), Inca (1530), Tupinamba (1550), Huron (1634), Callinago (1650), Micmac (1650), Natchez (1718), Abipon (1750). Another strategy is to include the date of pinpointing explicitly as an additional regressor. This does not change any of the reported results, and the new regressor itself turns out insignificant in all specifications.

[42] Clustering at the continental level yields qualitatively similar results.

for each society, while in columns (6) and (7) the number of neighbors is increased to 10 and 20, respectively. In general, table D.2 reveals that adjustment of standard errors for potential spatial autocorrelation does not change the qualitative results. In fact, White's robust standard errors reported throughout the paper turn out to be the most conservative in the majority of cases.

Finally, it is possible that distance controls do not fully account for the direct cross-cultural transmission of the belief. To explore the transmission mechanism more closely we estimate the following spatial lag specification of the model:[43]

$$\text{eye} = \alpha_S + \rho_S \mathbf{W}\text{eye} + \beta_S \text{ inequality} + \mathbf{X}\Gamma_S + \mathbf{D}\Delta_S + \varepsilon_S,$$

where "eye" and "inequality" now denote vectors of observations, $\mathbf{X}$ and $\mathbf{D}$ are matrices of control variables and continental dummies, respectively, $\mathbf{W}$ is the (row standardized) spatial weights matrix, $\mathbf{W}$eye is the spatial lag of the evil eye belief variable and the subscript S stands for "spatial." To proceed one has to specify the spatial weights matrix $\mathbf{W}$. We use two alternative matrices. The first one is based on geographical (great circle) distances between societies. In particular, each entry of the matrix is the (row standardized) squared inverse of the distance between corresponding societies. The second matrix is based on phylogenetic distances between societies. This matrix of proximity between languages spoken by the SCCS societies was constructed by Eff (2008) based on the data from *Ethnologue*. The proximity between each pair of languages is calculated as the distance from the panhuman root of the language tree to the nearest common ancestor of those two languages. These distance matrices are designed to account for the effects of descent and cultural borrowing on the incidence of the evil eye belief. The spatial lag models are estimated via maximum likelihood (Anselin and Hudak, 1992).

Table 8 shows the estimation results. In panel A the spatial weights matrix is based on geographic distances, while in panel B it is based on phylogenetic distances. In all specifications, apart from column (5), the spatial lag of the evil eye belief is insignificant, and the estimates of interest are very close to those reported earlier. Column (5) is the only specification in table 8 which does not include distance controls. Hence, the analysis implies that the inclusion of distance controls effectively takes care of spatial dependence, at least as captured by the spatial lag specifications with two alternative weights matrices.

[43]Estimation of the spatial error model yields very similar results. The spatial lag model seems more appropriate given the possibility of direct transmission of the belief through cross-cultural contact.

Table 8: Spatial lag specifications. ML estimates

A. *Geographic weights*	(1)	(2)	(3)	(4)	(5)	(6)
Stratification dummy	0.720**	0.706**				
	(0.285)	(0.281)				
Specialization			0.349***	0.369***		
			(0.129)	(0.137)		
Agriculture					1.654***	1.012**
					(0.410)	(0.415)
Horticulture					0.564*	0.496
					(0.335)	(0.359)
Pastoralism					2.769***	1.947***
					(0.562)	(0.520)
Spatial lag	−0.325	−0.236	−0.309	−0.215	0.763***	−0.485
	(1.126)	(1.073)	(1.115)	(1.060)	(0.227)	(1.228)
LM-test p-value	0.825	0.866	0.832	0.876	0.020	0.761
B. *Phylogenetic weights*	(1)	(2)	(3)	(4)	(5)	(6)
Stratification dummy	0.730**	0.718**				
	(0.285)	(0.282)				
Specialization			0.350***	0.370***		
			(0.129)	(0.137)		
Agriculture					1.650***	1.008**
					(0.412)	(0.417)
Horticulture					0.626*	0.496
					(0.332)	(0.358)
Pastoralism					2.704***	1.926***
					(0.566)	(0.525)
Spatial lag	0.257	0.272	0.224	0.243	0.673***	0.146
	(0.327)	(0.318)	(0.501)	(0.326)	(0.187)	(0.349)
LM-test p-value	0.487	0.455	0.550	0.508	0.005	0.706
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	Yes	Yes	Yes	Yes	No	Yes
Development controls	No	Yes	No	Yes	No	No
Observations	186	186	186	186	186	186

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Panels A and B use spatial weights matrices based on geographic (great circle) and phylogenetic distances, respectively. e) Foraging is the omitted category for the production mode variable. f) The null hypothesis of the LM-test is $\rho_S = 0$ (no spatial lag), see Anselin and Hudak (1992).

5 Concluding remarks

This paper contributes to the growing literature on the law and economics of superstition by investigating the origins of the evil eye belief which attributes supernatural destructive power to envious glances. We argue that the evil eye belief emerged and persisted as a useful cultural heuristic prescribing sensible envy-avoidance behavior under conditions in which destructive envy is a real threat, that is, when wealth inequality is high and formal institutions enforcing property rights are missing.

Evidence from the Standard Cross-Cultural Sample supports the main theoretical predictions. The incidence of the evil eye belief is substantially higher in unequal, technologically specialized societies. This result is robust to measures of spatial and cross-cultural diffusion, indicators of socioeconomic complexity, exposure to major world religions, and continental fixed effects. Furthermore, the evil eye belief is more likely to be found in agropastoral societies that sustain higher levels of inequality and rely more heavily on visible and vulnerable material wealth relative to foragers and horticulturalists. Reassuringly, we find no evidence that inequality is systematically related to any other supernatural beliefs.

It is plausible that in weakly institutionalized environments in which the belief emerged thousands of years ago its social benefits manifested in conflict reduction and avoidance of envy-motivated aggression were critical for a proper functioning of a community. However, the evil eye belief also creates a substantial social cost since it discourages wealth accumulation and mobility. From a long-run perspective, the development of strong institutions of private property protection is crucial for rendering this superstition obsolete and unleashing the incentives to invest and produce that are constrained by the fear of envy.

Appendices

A Proofs

Lemma 1. Agent i is solving (5) subject to (4). Given Y_j, the following four options may be open to Agent i depending on his endowment, K_i, and his choice of Y_i.

1. If $Y_j/\gamma \leqslant Y_i \leqslant Y_j$, where $\gamma \equiv 1 + 1/\sqrt{\tau\theta}$, neither agent retaliates, that is, $R_i^* = R_j^* = 0$, but Agent i experiences envy. Due to the resource constraint $Y_i \leqslant K_i$, such choice of Y_i is clearly only feasible if $K_i \geqslant Y_j/\gamma$. The utility function of Agent i in this case is given by $U_i = \ln(Y_i) - \theta(Y_j/Y_i - 1)^2 - Y_i/K_i$. It is strictly concave in Y_i and yields the optimum $Y_i^*(Y_j) = \min\{K_i, Y_j\}$, since $U_i' = 1/Y_i - 1/K_i + 2\theta(Y_j/Y_i - 1) \cdot Y_j/Y_i^2 \geqslant 0$ for any $Y_i \leqslant K_i$ in this case. Note that the left derivative of the utility function at point $Y_i = Y_j$ is $U_i'(Y_j^-) = 1/Y_j - 1/K_i$ and the right derivative at point $Y_i = Y_j/\gamma$ is $U_i'(Y_j/\gamma^+) = \gamma/Y_j - 1/K_i + 2\sqrt{\theta/\tau} \cdot \gamma^2/Y_j$.

2. If $Y_j < Y_i \leqslant \gamma Y_j$, neither agent retaliates, that is, $R_i^* = R_j^* = 0$, and Agent i experiences no envy. This case is only feasible if $K_i \geqslant Y_j$. The utility function is then given by $U_i = \ln(Y_i) - Y_i/K_i$. It is strictly concave in Y_i and yields the optimum $Y_i^*(Y_j) = \min\{K_i, \gamma Y_j\}$, since $U_i' = 1/Y_i - 1/K_i \geqslant 0$ for any $Y_i \leqslant K_i$. Note that the left derivative of the utility function at point $Y_i = \gamma Y_j$ is $U_i'(\gamma Y_j{}^-) = 1/(\gamma Y_j) - 1/K_i$ and the right derivative at point $Y_i = Y_j$ is $U_i'(Y_j^+) = 1/Y_j - 1/K_i = U_i'(Y_j^-)$, that is, U_i is differentiable at $Y_i = Y_j$ and $U_i'(Y_j) > 0$ if and only if $K_i > Y_j$. Putting the first two cases together yields the optimum $Y_i^*(Y_j) = \min\{K_i, \gamma Y_j\}$, provided that $K_i \geqslant Y_j/\gamma$.

3. If $Y_i < Y_j/\gamma$, Agent i is envious and retaliates, that is, $R_i^* > 0$. Note that this is the only feasible option if $K_i < Y_j/\gamma$. In this case $1 + R_i^* = \sqrt{\tau\theta}(Y_j/Y_i - 1)$, and the utility function becomes $U_i = \ln(Y_i) - 2\sqrt{\theta/\tau}(Y_j/Y_i - 1) + 1/\tau - Y_i/K_i$. It is strictly concave in Y_i and yields the optimum $Y_i^* = \min\{K_i, Y_j/\gamma\}$, since $U_i' = 1/Y_i - 1/K_i + 2\sqrt{\theta/\tau} \cdot Y_j/Y_i^2 \geqslant 0$ for any $Y_i \leqslant K_i$. In addition, $U_i'(Y_j/\gamma^-) = \gamma/Y_j - 1/K_i + 2\sqrt{\theta/\tau} \cdot \gamma^2/Y_j = U_i'(Y_j/\gamma^+)$, that is, U_i is differentiable at point $Y_i = Y_j/\gamma$ and $U_i'(Y_j/\gamma) > 0$ if $K_i > Y_j/\gamma$.

4. Finally, if $Y_i > \gamma Y_j$, Agent j is envious and retaliates. This option is only feasible if $K_i > \gamma Y_j$. In this case $1 + R_j^* = \sqrt{\tau\theta}(Y_i/Y_j - 1)$, and the utility function is given by $U_i = \ln(Y_i) - \sqrt{\tau\theta}(Y_i/Y_j - 1) - Y_i/K_i$. It is strictly concave in Y_i and yields the optimum $Y_i^* = \gamma Y_j$, since $U_i'(\gamma Y_j{}^+) = 1/\gamma Y_j - \sqrt{\tau\theta}/Y_j - 1/K_i = (1 - \gamma\sqrt{\tau\theta})/\gamma Y_j - 1/K_i < 0$, as $1 - \gamma\sqrt{\tau\theta} = -\sqrt{\tau\theta} < 0$. This implies that it is never optimal for Agent i to allow retaliation on part of Agent j. Note also that $U_i'(\gamma Y_j{}^+) \neq U_i'(\gamma Y_j{}^-)$, that is, U_i has a kink at point $Y_i = \gamma Y_j$. The one-sided derivatives at this point are of different signs iff $K_i > \gamma Y_j$.

Given his initial endowment, Agent i will make the best feasible choice. If $K_i < Y_j/\gamma$, only the third option is available, that is, $Y_i^*(Y_j) = K_i$. If $Y_j/\gamma \leqslant K_i < Y_j$, both the first and the third options are feasible. Given the preceding analysis, he will choose the first option, $Y_i^*(Y_j) = K_i$. If $Y_j \leqslant K_i < \gamma Y_j$, the first three options are feasible, with the second one being optimal: $Y_i^*(Y_j) = K_i$. Finally, if $K_i \geqslant \gamma Y_j$, all four options are available and the optimum is at the kink point: $Y_i^*(Y_j) = \gamma Y_j$. Putting all cases together yields the best-response function in Lemma 1, $Y_i^*(Y_j) = \min\{K_i, \gamma Y_j\}$.

Proposition 2. In the fear equilibrium $Y_1 = K_1$ and $Y_2 = \gamma K_1$. Hence, the utility of Agent 2 making a transfer T, conditional on the game staying in a fear equilibrium after redistribution, is given by $U_2(T) = \ln(\gamma(K_1 + T)) - \gamma(K_1 + T)/(K_2 - T)$. It is concave in T and $U_2'(T) = 1/(K_1 + T) - \gamma(K_1 + K_2)/(K_2 - T)^2$. Note first that $U_2'(\bar{T}) = -(1 + \gamma)/\gamma(K_1 + K_2) < 0$ meaning that the full transfer $\bar{T}$ is never optimal. Next, $U_2'(0) = 1/K_1 - \gamma(K_1 + K_2)/K_2^2 \leqslant 0$ if and only if $k^2/\gamma - k - 1 \leqslant 0$, which implies that $T^* = 0$ if and only if $k \leqslant 2/(\sqrt{1 + 4/\gamma} - 1)$. Otherwise, T^* is the solution to the quadratic equation $U_2'(T^*) = 0$ as stated in (8). Since $\sqrt{\gamma(\gamma + 4)} - \gamma$ is increasing in γ, T^* is decreasing in γ, when positive. But $\gamma \equiv 1 + 1/\sqrt{\tau\theta}$, that is, T^* is increasing in τ and θ, when positive. Finally, an increase in inequality corresponds to higher K_2, with $K_1 + K_2$ unchanged. It then follows from (8) that, when positive, T^* is increasing in k.

B Variables and descriptive statistics

Evil eye belief. Presence of the evil eye belief, coded on an ordinal scale from incontrovertibly absent (1) to incontrovertibly present (8). The binary measure was derived by lumping categories (1)–(4) and (5)–(8) into two: absent and present. *Original source*: Roberts (1976).

Stratification dummy. The original class stratification measure comprises five categories: absence of significant wealth distinctions among freemen (1); wealth distinctions based on the possession and distribution of property, not crystallized into distinct social classes (2); elite stratification, in which an elite class has control over scarce resources, particularly land (3); dual stratification into a hereditary aristocracy and a lower class of ordinary commoners or freemen (4); complex stratification into social classes correlated in large measure with extensive differentiation of occupational statuses (5). Class stratification dummy is equal to 0 for the first category and 1 otherwise. *Original source*: Murdock (1967).

Specialization. The original technological specialization measure comprises five categories: none (1); pottery only (2); loom weaving only (3); metalwork only (4); smiths, weavers, potters (5). This variable is transformed into an ordinal measure equal to 1 for the first category, 2 for categories (2)–(4), and 3 for the fifth category. It is then multiplied by the class stratification dummy. *Original source*: Murdock and Provost (1973), author's calculations.

Distance to Babylon. Great circle distance from the location of an SCCS society, as defined by the geographical coordinates in Murdock and White (1969), to the location of Babylon: (32°35′N, 44°45′E). Computed using the Haversine formula and measured in 1000 km. For the New World (North and South America) this measure is set to zero. *Original source*: Murdock and White (1969), author's calculations.

Distance to Tenochtitlan. Great circle distance from the location of an SCCS society, as defined by the geographical coordinates in Murdock and White (1969), to the location of Tenochtitlan: (19°N, 99°10′W). Computed using the Haversine formula and measured in 1000 km. For the Old World (excludes North and South America) this measure is set to zero. *Original source*: Murdock and White (1969), author's calculations.

Distance to coastline. Great circle distance from an SCCS society, as defined by the geographical coordinates in Murdock and White (1969), to the closest location on the coastline detected using ArcGis software. Computed using the Haversine formula and measured in 1000 km. *Original source*: Murdock and White (1969), author's calculations using the shapefile for the coastline downloaded at `http://www.naturalearthdata.com`.

Population density. Mean population density in the territory controlled or exploited by an SCCS society, on the following ordinal scale: less than 1 person per square mile (1); 1–5 persons per square mile (2); 5.1–25 persons per square mile (3); 26–100 persons per square mile (4); more than 100 persons per square mile. *Original source*: Murdock and Provost (1973).

Urbanization. Average population of local communities, measured on the following ordinal scale: less than 100 persons (1); 100–199 persons (2); 200–399 persons (3); 400–999 persons (4); more than 1000 persons (5). *Original source*: Murdock and Provost (1973).

Settlement pattern. A measure of residence fixity, on the ordinal scale: fully nomadic (1); seminomadic (2); semisedentary (3); sedentary but impermanent (4); sedentary and relatively permanent (5). *Original source*: Murdock and Provost (1973).

Money. Measures the degree of complexity with respect to media of exchange, on the ordinal scale: lack of organized medium of exchange, barter (1); true money is lacking but the society employs domestically usable articles, such as salt, grain, livestock, or ornaments as a medium of exchange (2); the society lacks any form of indigenous money but has long used the currency of an alien people, e.g., that of its colonial rulers (3); indigenous articles of token or conventional value, such as cowrie shells, wampum, or imitation tools, as an elementary form of money (4); indigenous currency in the form of metal coins of standard weight and fineness and/or their equivalent in paper currency (5). *Original source*: Murdock and Provost (1973).

Local hierarchy. Jurisdictional hierarchy of the local community, on the ordinal scale: theoretical minimum of two levels, e.g., family and band (1); three levels (2); four levels, e.g., nuclear family, extended family, clan-barrios and village (3). *Original source*: Murdock (1967).

Inheritance of movables/land. Rules for the distribution of inheritance on the categorical scale: absence of individual property rights on movables/land (0); equal or relatively equal distribution (1); transfer to exclusively or predominantly to the one adjudged best qualified (2); ultimogeniture, i.e., transfer to the junior individual (3); primogeniture, i.e., transfer to the senior individual (4). In the analysis the last three categories are merged into a single group standing for exclusive transfer. *Original source*: Murdock (1967).

Property rights. An indicator of the existence of individual property rights on movables that is set equal to 1 if the above variable for inheritance of movables is greater than 0. *Original source*: Murdock (1967).

Jurisdictional hierarchy beyond local community. An ordinal scale indicating the complexity of political organization in terms of the number of distinct jurisdictional levels recognizable in the society: stateless society, with political authority dispersed even at the local level among households and other small component units (1); stateless society composed of politically organized autonomous local communities (2); one administrative level recognized above that of the local community, as in the case of a petty state with a paramount chief ruling over a number of local communities (3); two administrative levels recognized above that of the local community, as in the case of a small state divided into administrative districts (4); three or more administrative levels recognized above that of the local community, as in the case of a large state organized into provinces which are subdivided into districts (5). *Original source*: Murdock and Provost (1973).

Religion. The seven categories in the detailed classification are: traditional religion, deep islamization, superficial islamization, deep christianization, superficial christianization, Buddhism (includes Mahayana, Hinayana, and Vajrayana), and Hinduism. The aggregated version puts deep and superficial islamization in one single group (Islam) and deep and superficial christianization in another one (Christianity). *Original source*: Korotayev (2004), author's calculations.

Pathogen stress. The pathogens chosen are as follows: leishmanias, trypanosomes, malaria, shistosomes, the filariae, spirochetes, and leprosy. According to Low (1994), these pathogens "meet the criteria of an acute, possibly fatal initial stage of infection, and long-term chronic debilitation or recurrence of acute episodes; further, good worldwide geographic record exists for them." For each pathogen, a three-level code was constructed: absent or not recorded (1), present with no indication of severity (2), present and serious, widespread, or endemic (3). The sum of the scores for all pathogens is used as a measure of total pathogen stress for each society (ranging from 7 to 21). *Original source*: Low (1994).

Variation in rainfall. Measured as coefficient of variation in mean annual rainfall based on 20 years of rainfall data (from weather stations in close proximity of the SCCS societies), mostly taken from the Global Historical Climatology Network. *Original source*: Cashdan (2001).

Theories of illness. Mystical retribution is defined as "acts in violation of some taboo or moral injunction when conceived as causing illness directly rather than through the mediation of an offended or punitive supernatural being." Soul loss refers to "voluntary and more than temporary departure of the patient's soul from his body." Spirit aggression is "direct hostile, arbitrary or punitive action of some malevolent or affronted supernatural being." Sorcery is defined as the "aggressive use of magical techniques by a human being, either independently or with the assistance of a specialized magician or shaman." Witchcraft is the "aggressive action of a member of a special class of human beings believed to be endowed with a special power and propensity for evil." Each phenomenon is coded, based on whether it is used to explain illness, on the following ordinal scale: absence of such as cause (1); minor or relatively unimportant cause (2); an important auxiliary cause (3); predominant cause recognized by the society (4). *Original source*: Murdock et al. (1978).

Production mode (SCCS). The original variable (subsistence economy: dominant mode) contains the following categories: advanced agriculture, horticulture, simple or shifting cultivation, domestic animals, exchange, fishing, gathering, and hunting. The second and third groups are combined in one, "horticulturalists," and the last 4 groups are joined into "foragers" to get the final four-way classification. *Original source*: Murdock and White (1969).

Production mode (EA). The final four-way classification is constructed based on the variables measuring percentage dependence of the economy on gathering, hunting, fishing, animal husbandry, and agriculture. The dominant mode of subsistence economy was defined based on the most important contributing component (50 percent and higher). To classify the agricultural societies data on the intensity of agriculture were used comprising the following categories: casual agriculture (1); extensive or shifting agriculture, long fallow, and new fields cleared annually (2); horticulture, vegetal gardens or groves of fruit trees (3); intensive agriculture, using fertilization, crop rotation, or other techniques to shorten or eliminate fallow period (4); intensive irrigated agriculture (5). The first three groups are horticulturalists, while the other two are agriculturalists. Cases, for which the type of agriculture is unknown, were grouped into the category "other." Societies in which several types of subsistence modes contribute equally were classified as "mixed." *Original source*: Murdock (1967), author's calculations.

Language region/family. A coarse (10 regions) and fine (47 families) classification of indigenous languages spoken by the SCCS societies. *Original source*: Burton (1999).

Table B.1: SCCS by continent and pinpointing date

Continent	Frequency	Percent	Date	Frequency	Percent
Africa	44	23.65	Before 1800	12	6.45
Eurasia	55	29.57	1800–1849	9	4.84
North America	39	20.97	1850–1899	44	23.65
Oceania	22	11.83	1900–1949	90	48.39
South America	26	13.98	1950–1965	31	16.67
Total	186	100	Total	186	100

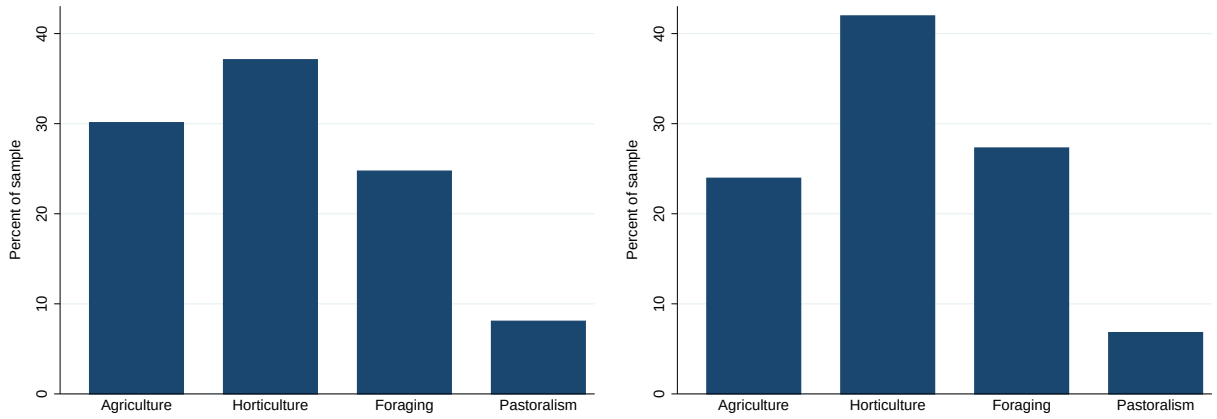

Figure B.1: Production mode: SCCS (left) and EA (right).

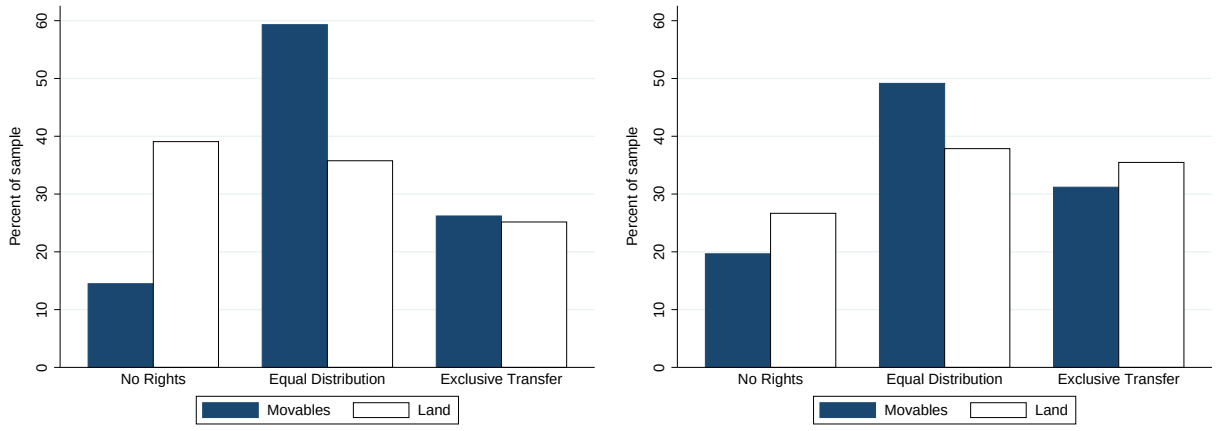

Figure B.2: Inheritance distribution rules: SCCS (left) and EA (right).

Table B.2: Summary statistics: ordinal and continuous variables

Variable	Obs	Mean	SD	Min	Max	Variable	Obs	Mean	SD	Min	Max
Evil eye on full scale	186	4.34	2.20	1	8	Population density	186	2.86	1.56	1	5
Evil eye dummy	186	0.36	0.48	0	1	Urbanization	186	2.59	1.40	1	5
Stratification dummy	186	0.59	0.49	0	1	Settlement pattern	186	3.76	1.56	1	5
Specialization	186	1.26	1.17	0	3	Money	186	2.51	1.48	1	5
Distance to Babylon	121	6.16	3.70	0	17.33	Local hierarchy	186	1.89	1.60	1	3
Distance to Tenochtitlan	65	4.15	1.99	0	8.74	Property rights	152	0.86	0.35	0	1
Distance to coastline	186	0.36	0.44	0	2.05	Political organization	186	2.08	1.25	1	5

Table B.3: Matrix of pairwise correlations: ordinal and continuous variables from tables 1–3

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	Evil eye on full scale	1.00													
(2)	Evil eye dummy	0.91	1.00												
(3)	Stratification dummy	0.29	0.26	1.00											
(4)	Specialization	0.38	0.33	0.90	1.00										
(5)	Distance to Babylon	−0.13	−0.17	0.18	0.07	1.00									
(6)	Distance to Tenochtitlan	−0.32	−0.27	−0.31	−0.34	−0.61	1.00								
(7)	Distance to coastline	0.07	0.07	−0.06	−0.01	−0.26	0.04	1.00							
(8)	Population density	0.23	0.15	0.45	0.52	0.33	−0.49	−0.26	1.00						
(9)	Urbanization	0.16	0.09	0.31	0.44	0.01	−0.27	−0.05	0.56	1.00					
(10)	Settlement pattern	0.09	0.03	0.33	0.39	0.28	−0.33	−0.18	0.71	0.45	1.00				
(11)	Money	0.31	0.26	0.35	0.47	0.15	−0.39	−0.22	0.56	0.38	0.41	1.00			
(12)	Local hierarchy	0.02	0.01	0.14	0.13	0.10	−0.14	0.08	0.24	0.23	0.27	0.14	1.00		
(13)	Property rights	0.22	0.16	0.30	0.33	0.20	−0.41	−0.09	0.32	0.24	0.33	0.23	0.06	1.00	
(14)	Political organization	0.28	0.21	0.46	0.64	0.13	−0.39	0.11	0.50	0.47	0.35	0.52	0.09	0.32	1.00

C Ordered probit estimates

Table C.1: Ordered probit estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Stratification dummy	0.458**	0.446**				
	(0.181)	(0.183)				
Specialization			0.228***	0.237***		
			(0.082)	(0.088)		
Agriculture					0.893***	0.679**
					(0.261)	(0.303)
Horticulture					0.266	0.307
					(0.214)	(0.257)
Pastoralism					1.491***	1.249***
					(0.349)	(0.370)
Continental dummies	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	Yes	Yes	Yes	Yes	No	Yes
Development controls	No	Yes	No	Yes	No	No
Observations	186	186	186	186	186	186

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. e) Foraging is the omitted category in specifications (5) and (6).

Table C.2: Marginal effects for models (1), (3) and (6) from table C.1

Evil eye	1	2	3	4	5	6	7	8
(1)	−0.003	−0.116**	−0.058**	0.017	0.013*	0.032**	0.047**	0.067**
	(0.003)	(0.049)	(0.025)	(0.011)	(0.008)	(0.016)	(0.022)	(0.027)
(3)	−0.001	−0.060***	−0.033**	0.007	0.007*	0.017**	0.026**	0.037**
	(0.001)	(0.023)	(0.014)	(0.005)	(0.004)	(0.008)	(0.012)	(0.015)
(6)	−0.002	−0.149**	−0.107**	0.003	0.014**	0.041**	0.072**	0.129*
	(0.003)	(0.060)	(0.051)	(0.013)	(0.007)	(0.017)	(0.034)	(0.071)
	−0.001	−0.074	−0.045	0.007	0.008	0.021	0.033	0.051
	(0.002)	(0.061)	(0.039)	(0.007)	(0.007)	(0.017)	(0.029)	(0.047)
	−0.002	−0.180***	−0.213***	−0.071	−0.002	0.027	0.096***	0.344**
	(0.002)	(0.037)	(0.056)	(0.044)	(0.012)	(0.019)	(0.029)	(0.141)

Notes. a) Reported are the changes in the probability of falling in one of the eight categories given a change in the corresponding regressor: stratification dummy in (1), specialization in (3), and production mode in (6). b) Robust standard errors in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively.

D Robustness checks

Table D.1: Estimates from the trimmed sample

	Pinpointed after 1800: OLS				Old World: OLS		Evil eye score not equal to 4 or 5: ML			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Stratification dummy	0.822***	0.791**			0.692*		0.237***	0.202**		
	(0.313)	(0.316)			(0.362)		(0.091)	(0.098)		
Specialization			0.411***	0.429***		0.362**			0.112***	0.101**
			(0.144)	(0.154)		(0.164)			(0.041)	(0.049)
Development controls	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes
Observations	174	174	174	174	121	121	151	151	151	151

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale in (1)–(6) and binary scale in (7)–(10). b) Robust standard errors in parentheses. c) Marginal effects displayed for probit specifications. d) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. e) Each specification includes continental dummies and distance controls. f) The Old World excludes the Americas.

Table D.2: Spatially corrected standard errors

			Clustered s.e.		Conley's spatially corrected s.e.						
	OLS	White's	(3)	(4)	(5)	(6)	(7)	Control variables			
	estimate	robust s.e.	lang. region	lang. family	5n band	10n band	20n band	Cont.	Dist.	Dev.	Obs.
Stratification dummy	0.723	0.291**	0.212***	0.285**	0.280***	0.271***	0.253***	Yes	Yes	No	186
Stratification dummy	0.708	0.291**	0.215***	0.254***	0.280***	0.274***	0.260***	Yes	Yes	Yes	186
Specialization	0.350	0.132***	0.052***	0.130***	0.123***	0.118***	0.108***	Yes	Yes	No	186
Specialization	0.370	0.141***	0.054***	0.122***	0.129***	0.125***	0.116***	Yes	Yes	Yes	186
Agriculture	1.010	0.427**	0.480*	0.525*	0.404**	0.401**	0.422**				
Horticulture	0.490	0.368	0.390	0.393	0.346	0.344	0.359	Yes	Yes	No	186
Pastoralism	1.941	0.539***	0.463***	0.433***	0.546***	0.549***	0.541**				

Notes. a) Dependent variable is the evil eye belief on the 1–8 scale. b) Language region and family include 10 and 47 clusters, respectively. c) Foraging is the omitted category for the production mode variable. d) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively.

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