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DISCUSSION PAPER SERIES

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ABSTRACT

The Behavioral Mechanisms of Voluntary Cooperation across Culturally Diverse Societies: Evidence from the US, the UK, Morocco, and Turkey

We examine the role of cooperative preferences, beliefs, and punishments to uncover potential cross-societal differences in voluntary cooperation. Using one-shot public goods experiments in four comparable subject pools from the US and the UK (two similar Western societies) and Morocco and Turkey (two comparable non-Western societies), we find that cooperation is lower in Morocco and Turkey than in the UK and the US. Using the ABC approach – in which cooperative attitudes and beliefs explain cooperation – we show that cooperation is mostly driven by differences in beliefs rather than cooperative preferences or peer punishment, both of which are similar across the four subject pools. Our methodology is generalizable across subject pools and highlights the central role of beliefs in explaining differences in voluntary cooperation within and across culturally, economically, and institutionally diverse societies. Because our behavioral mechanisms correctly predict actual contributions, we argue that our approach provides a suitable methodology for analyzing the determinants of voluntary cooperation of any group of interest.

JEL Classification: C9, H4, C7, D2

Keywords: public goods, voluntary cooperation, ABC method, conditional cooperation, beliefs, punishment, cross-cultural experiments, WEIRD societies

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1. Introduction

Trust and social capital are crucial for economic prosperity, but vary considerably across societies (e.g., Knack and Keefer (1997); Guiso et al. (2008); Tabellini (2008); Fehr (2009); Algan and Cahuc (2013)). Social capital is often expressed as voluntary cooperation in situations where collective welfare and self-interest are in conflict. Here, we take a cross-societal perspective and use laboratory public goods experiments in four countries to investigate two behavioral mechanisms that likely generate variation in voluntary cooperation: (i) conditional cooperation and beliefs, and (ii) punishment.

An important finding from years of behavioral research on voluntary cooperation is that many people are *conditional cooperators*: their own willingness to cooperate increases with the cooperation of others.[1] A second important (and related) finding is that *beliefs* about others' contributions are positively correlated with people's own contributions (e.g., Croson (2007); Fischbacher and Gächter (2010); Gächter and Renner (2018)). To control for the problem of belief endogeneity, Fischbacher et al. (2001) introduced an incentive-compatible method to elicit people's cooperative attitudes, that is, their willingness to cooperate as a function of all levels of cooperation of others. Using this method, Fischbacher and Gächter (2010), Fischbacher et al. (2012), Gächter et al. (2017), Isler et al. (2021), and Gächter et al. (2022) found that cooperative *a*ttitudes (a) and *b*eliefs (b) together explain the observed level of voluntary *c*ooperation (c), i.e., $a(b) \rightarrow c$. Gächter et al. (2017) refer to this approach as the 'ABC of cooperation', which is our first behavioral mechanism. The ABC methodology enables us to see whether the societal background affects a or b, or both, such that it explains the observed societal-level variation in cooperation c. If differences in societal background matter for how people play a one-shot public goods game with identical incentives in each subject pool, then the ABC method should be able to pick it up and pinpoint where differences in cooperation, should they exist, are coming from.

A further robust result is that many people are willing to incur costs to *punish* group members even in one-shot public goods games where a first-stage cooperation game is followed by possibilities of costly peer punishment at the second-stage (e.g., Fehr and Gächter (2002); Walker and Halloran (2004); Casari (2005); Anderson and Putterman (2006); Carpenter (2007); Egas and Riedl (2008); Nikiforakis and Normann (2008); Gächter and

[1] In lab experiments, e.g., Keser and van Winden (2000); Fischbacher et al. (2001); Gächter et al. (2017); Gächter et al. (2022); Bilancini et al. (2022); in lab-in-the-field experiments, e.g., Rustagi et al. (2010); in experiments with representative samples, e.g., Thöni et al. (2012); Fosgaard et al. (2014); in field experiments, e.g., Frey and Meier (2004). See also Gächter (2007) and Thöni and Volk (2018) for reviews.

Herrmann (2011); Weber et al. (2018); Molleman et al. (2019)).[2] Punishment of free riding thus provides a further channel affecting cooperative choices that is independent of cooperative attitudes and cooperative beliefs (Weber et al. (2018)). This can be the case if punishment is a credible threat. Punishment is a credible threat if people believe that too low a contribution might trigger sufficiently strong punishment from other group members (for evidence on this see, e.g., the survey by Gächter and Herrmann (2009)). In this case cooperating becomes a dominant strategy that is independent of one's cooperative attitude and belief in the underlying (first stage) public goods game. Therefore, punishment provides a further reason to cooperate – punishment is our second behavioral mechanism.

With a few exceptions, which we review in Section 2, most results on the two behavioral mechanisms we study here come from the US and Western European subject pools, that is, from societies that Henrich et al. (2010) have labelled WEIRD: Western, Educated, Industrialized, Rich and Democratic (see also Henrich (2020) and Apicella et al. (2020)). How generalizable are these findings to culturally more diverse subject pools? In this paper, we approach this question by using the ABC methodology to compare conditionally cooperative attitudes, beliefs, and punishment in two Western societies—the classically WEIRD societies of the US and the UK—and two non-Western societies—Morocco and Turkey—that are culturally among the most distant countries from the US and the UK in a quantifiable way (based on Muthukrishna et al. (2020), the most comprehensive dataset on cultural distance available; see Section 3.2). We therefore provide a methodological contribution in testing the generalizability of the ABC framework across culturally more diverse subject pools than used in previous research.

Our goal is to go beyond simply observing whether there are differences in voluntary cooperation levels in different societies (there are, see, e.g., Herrmann et al. (2008); Gächter and Herrmann (2009)). Instead, with the ABC methodology we quantitatively measure several factors that plausibly underpin voluntary cooperation and assess the predictive power of our two behavioral mechanisms to explain cooperation. Choosing subject pools with comparable age, education, and socio-economic status in their respective societies (students) allows us to attribute sample differences in our variables of interest to cultural variation while minimizing confounds. Our approach opens the "black box" of voluntary cooperation because it allows us to pinpoint where in the behavioral mechanisms (attitudes, beliefs, and/or punishment) cross-

[2] For reviews see Gächter and Herrmann (2009); Chaudhuri (2011); Fehr and Schurtenberger (2018); Raihani and Bshary (2019).

societal differences in voluntary cooperation occur—if at all, because the incentives are of course identical in all subject pools.[3]

Our paper thus does not aim to investigate how historical, cultural, or institutional factors causally impact voluntary cooperation (for an example of this line of research, see Rustagi (2022)). Our goal is instead to contribute to the literature that aims to better understand the mechanisms of how cultural differences might influence economic outcomes (e.g., Guiso et al. (2006); Alesina and Giuliano (2015))—in our case levels of voluntary cooperation. This literature emphasizes the role of both beliefs and preferences as distinct aspects of culture (see e.g., Greif (1994) on the role of cultural beliefs). Yet, most empirical papers do not, or are unable to, distinguish between beliefs and preferences (see Alesina and Giuliano (2015) for a discussion). By using the ABC approach, we shed light on the relative importance of cooperative attitudes (as a proxy for preferences) and beliefs in accounting for potential differences in voluntary cooperation in comparable subject pools from countries that vary substantially in their societal background.

We use anonymous laboratory one-shot public goods games to study the behavioral mechanisms of ABC and punishment. The one-shot nature of the public goods game allows us to measure the elements of the two behavioral mechanisms without having to deal with potential confounds arising from repeated play. Both mechanisms consist of a sequence of incentivized experiments that all participants play in the same order. To test the first behavioral mechanism (the ABC approach), participants play a one-shot public goods game with no punishment (called the "N-Game") in which we elicit two types of decisions for each participant i: (i) an unconditional contribution c_i to the public good, and (ii) contribution decisions that are a function $a_i(\bar{c}_j), i \neq j$, of all possible rounded average contribution $\bar{c}_j$ of the j other group members. We also elicit *beliefs* b_i (as a point estimate) about the average contribution $\bar{c}_j$ of the j other group members. Based on previous findings (Fischbacher and Gächter (2010); Gächter et al. (2017); Isler et al. (2021); and Gächter et al. (2022)), we predict that cooperative attitudes and beliefs—both of which might be subject-pool specific—jointly determine cooperation: $a_i(b_i) = \widehat{c_i} \approx c_i$, that is, the contribution predicted by the ABC

[3] In using this approach, we anticipate fewer differences in the relative education and income across our four student samples than one would expect when comparing samples drawn from the respective general populations. Fully representative samples also require sample sizes that were infeasible for us to run in a controlled laboratory setting. Because we could only run small samples in the lab, and an important element of our contribution is methodological, we opted for a controlled demographic. See Gächter (2010) for a discussion on using student subject pools. Of course, if large and representative samples are feasible, then demographic variation might result in additional interesting variation across our key ABC variables.

approach, $\widehat{c_i}$, corresponds to the observed contribution c_i, regardless of potential differences in a_i and b_i between subject pools.

For the second behavioral mechanism (punishment), participants play a first-stage one-shot public goods game followed by a second stage with peer punishment (called the "P-game"). We focus on preferences for *enforcement of cooperation* by studying how each participant's expected punishment affects their contribution decision. The one-shot design removes strategic incentives to engage in punishment as well as the possibility of feuds and spill-over effects over rounds (e.g., Nikiforakis (2008); Nikiforakis and Engelmann (2011)). Any willingness to cooperate in the N-Game or pay for punishment in the P-Game cannot be motivated by strategic concerns and is therefore reflecting a "preference".

Our main findings are as follows. Overall, most people have conditionally cooperative attitudes in all subject pools, and the differences between them are small, i.e., 'WEIRDness' has little effect on cooperative attitudes. The same is true for antisocial punishment. The main difference between the subject pools is in beliefs: In both experiments, British and American subjects are more optimistic about the contributions of others and therefore contribute more to the common good than Moroccan and Turkish subjects. When punishment is available, UK and US participants are more likely to expect punishment for free riding.

We have two main conclusions. First, the subject pools we compare here were chosen to span culturally, economically, and institutionally distant countries. Despite these substantial *ex ante* differences of the societies of our subject pools, our empirical findings paint a consistent picture of the underlying behavioral mechanisms: attitudes to conditional cooperation (a) show only small variation, beliefs (b) are different between subject pools, and differences in overall cooperation levels (c) across subject pools are mostly explained by differences in beliefs. The ABC approach can therefore explain cooperation levels in all subject pools. Because in the experiment participants do not know who they interact with, and because the experiment is one-shot and anonymous, the beliefs people hold about others' cooperativeness are likely shaped by everyday experiences of cooperativeness and trustworthiness in one's society. Generalizing from those four countries, a tentative conclusion is that economic and societal factors that influence beliefs (such as trust and trustworthiness) are likely key to explain societal variation in voluntary cooperation.

Second, our results provide an explanation of the key behavioral mechanisms that generate societal differences in voluntary cooperation, but because $a_i(b_i) = \widehat{c_i} \approx c_i$ in all subject pools, they also vindicate the ABC approach more generally. Therefore, the applicability of the ABC methodology extends beyond the cross-societal context in which we apply it here: the ABC methodology is a 'toolbox' that can be used to analyze the voluntary cooperation of any group of people, with or without the aim of comparing groups.

2. Related literature and hypotheses

Our paper builds on and contributes to a literature in behavioral economics that has documented some profound cross-societal differences in social preferences as observed in economic experiments (see, e.g., Gächter et al. (2010); Thöni (2019) for overviews)[4]. In this section, we review the literature most closely related to the behavioral mechanisms of voluntary cooperation. We are particularly interested in how existing societal differences in voluntary cooperation can be explained by the ABC approach, which can account for actual cooperation levels in one-shot games conducted in Western subject pools (e.g., Fischbacher et al. (2012); Gächter et al. (2017); Isler et al. (2021); Gächter et al. (2022)). We also review related literature on our second behavioral mechanism: punishment of free riding.

An important element of our first behavioral mechanism is *conditional cooperation*. Most experiments that have elicited conditionally cooperative attitudes have been conducted in WEIRD societies, that is, the US, UK and other Western societies (Thöni and Volk (2018))[5]. Exceptions include Herrmann and Thöni (2009); Martinsson et al. (2013) and Rustagi et al. (2010). Herrmann and Thöni (2009) conducted experiments in four Russian subject pools. Conditional cooperation was similar between them and also comparable to subject pools in Switzerland (Fischbacher et al. (2001)). Martinsson et al. (2013) elicited conditionally cooperative attitudes in Vietnam and Colombia, again with similar results to those from Western subject pools. Finally, Rustagi et al. (2010) elicited conditional cooperation in community forest groups in Ethiopia and found similar rates of conditional cooperation compared to those reported from Western societies (Thöni and Volk (2018)).

[4] For instance, Henrich et al. (2005) documented differences in ultimatum and dictator game behavior (in small-scale societies), see also Oosterbeek et al. (2004). Bohnet et al. (2008) and Bohnet et al. (2010) showed cross-societal differences in betrayal aversion; Chuah et al. (2016) and Chuah et al. (2023) observed cross-societal differences discrimination in a trust game environment; Romano et al. (2017) investigated ingroup and outgroup trust across 17 societies; Molleman and Gächter (2018) studied cross-societal differences in social learning and cooperation; and Gächter and Schulz (2016) and Cohn et al. (2019) found that honesty differs across societies. The biggest effort in establishing broad knowledge about how economic preferences (time, risk, and social) are distributed around the world is the Global Preference Survey (Falk et al. (2018)). For a seminal paper on cross-societal differences using observational data (on norms of corruption) see Fisman and Miguel (2007).

[5] Of the 18 studies considered in Thöni and Volk (2018), 16 were conducted in six WEIRD societies (USA, UK, Switzerland, Austria, The Netherlands, Denmark); 1 study included Japan (Kocher et al. (2008)); 1 study was done in Russia (Herrmann and Thöni (2009)). Studies not included in Thöni and Volk (2018) are, e.g., Kocher et al. (2015) (Germany); Bigoni et al. (2019) (Italy); Boosey et al. (2020) (USA); Bilancini et al. (2022) (mostly USA, UK, Ireland); Rustagi et al. (2010) (Ethiopia); Rustagi (2022) (Switzerland); and Martinsson et al. (2013) (Colombia and Vietnam).

Beliefs about others' cooperativeness are a further element of our first behavioral mechanism. Beliefs have not been regularly studied in a cross-societal context. Beliefs are particularly interesting in a one-shot situation and among anonymous players who do not know one another because in this case beliefs can only be "home-grown", that is, influenced by daily economic, social, and political experiences outside the lab.

There is some evidence to suggest that we should expect higher levels of cooperative beliefs in our US and UK subject pools than in the Turkish and Moroccan samples. For example, data from the World Values Survey (WVS, Inglehart et al. (2014)) suggest that the proportion of people who believe that 'most people are trying to take advantage of me' is lower in the UK (5%) and US (6%) than in Turkey (14%) and Morocco (20%). More generally, across all countries in the WVS (n = 58), these beliefs are negatively correlated with an indicator of the rule of law (Spearman's rho = -0.38, p = 0.003) and an indicator of government effectiveness (rho = -0.44, p = 0.001). A similar picture emerges for 'generalised trust' (n = 57): here the correlation with the Rule of Law indicator is rho = 0.46, p < 0.001 and with the Government Effectiveness indicator rho = 0.52, p < 0.001. For further details, see Figure A1 in Appendix A. Thus, together with behavioral evidence that trust – as a belief in the benevolent motives of others – has been shown to be positively correlated with cooperation in public goods games (Gächter et al. (2004); Thöni et al. (2012); Balliet and Van Lange (2013); Kocher et al. (2015)), we expect that beliefs about others' cooperation are higher in the UK and the US than in Morocco and Turkey.

Regarding our methodology to study our first behavioral mechanism, a related paper is Bigoni et al. (2019) who study a North-South divide in cooperation in Italy (Bigoni et al. (2016)). They found that conditional cooperation was similar between participants from the North and the South. Beliefs about others' cooperation, however, were higher in the North than in the South. Despite its North-South divide, Italy is one country, with internal migration and a shared linguistic, cultural, and institutional heritage. Our societies arguably differ substantially more between each other than Italy differs internally.[6] Therefore, our study extends the evidence about the scope of cross-societal differences in the behavioral mechanisms underpinning voluntary cooperation by focusing on two countries that are culturally, economically, and institutionally among the most distant from the two prototypical WEIRD societies of the US and the UK.

[6] For other within-country (culture) experiments measuring social preferences, see, e.g., Brosig-Koch et al. (2011), Kim et al. (2017) and Choi et al. (2020).

In summary, evidence on conditionally cooperative attitudes predominantly comes from Western societies but results from the few non-Western studies are similar.[7] However, none of these studies conducted a systematic comparison of cooperative attitudes in Western societies and societies that are culturally distant from them within one comparable design, nor do they elicit beliefs about others' cooperativeness and the willingness to punish other group members. Providing a fully comparable analysis is thus one contribution of our paper.

Based on existing literature, we formulate the following hypotheses: we expect little difference in conditionally cooperative attitudes between our four subject pools (Hypothesis 1a), but higher cooperative beliefs in the UK and US subject pools (Hypothesis 1b), which will lead to higher cooperation in those countries (Hypothesis 1c).

The second behavioral mechanism concerns *punishment*. Closest to us on this dimension are Herrmann et al. (2008) and Gächter and Herrmann (2009) who also studied cooperation and punishment, but did not elicit cooperative attitudes or beliefs. Herrmann et al. (2008) used a repeated game in fifteen (western and non-western) countries around the world. They found little differences in how people punish free riders, but strong differences in "antisocial punishment", that is, how people punish those who contribute the same or more than them. Antisocial punishment was largely absent in their UK and US subject pools but was substantial in their Turkish and Arabic subject pools (see also Bruhin et al. (2020) for a further analysis of this result). Likely explanations include exposure to persistent resource scarcity (Prediger et al. (2014)) or strategic revenge (e.g., Sylwester et al. (2013)), which was possible given the repeated game design. Our one-shot design excludes this possibility.

If antisocial punishment is not only an act of revenge in a repeated interaction, but also a "preference", it might be observed even in our one-shot design. The one-shot experiments of Gächter and Herrmann (2011) in Russia, and Gächter and Herrmann (2009) in Russia and Switzerland, suggest this possibility. Antisocial punishment did occur in their Russian samples but was negligible in their Swiss subject pools. If these results generalize, then we might find no subject-pool differences in the punishment of free riders, and more antisocial punishment in Morocco and Turkey than in the US and the UK. This is our Hypothesis 2a.

Regarding cooperation in the presence of punishment, the results from Gächter and Herrmann (2009) showed that cooperation was higher in Switzerland than in Russia. Similarly,

[7] Comparing the rate of cooperative attitudes across the 20 WEIRD and 5 non-WEIRD samples using data from Rustagi et al. (2010), Martinsson et al. (2013), and Thöni and Volk (2018) shows a similar percentage of conditional cooperators ($M_{\text{WEIRD}} = 59\%$; $M_{\text{non-WEIRD}} = 51\%$; Mann-Whitney $Z = 1.50$, $p = 0.148$) and a significantly higher percentage of free riders in WEIRD societies ($M_{\text{WEIRD}} = 21\%$; $M_{\text{non-WEIRD}} = 12\%$; Mann-Whitney $Z = 1.97$, $p = 0.048$).).

Herrmann et al. (2008) found that cooperation was higher in subject pools with lower antisocial punishment. We therefore expect that cooperation in the presence of punishment will be higher in the UK and US than in Moroccan and Turkish subject pools: our Hypothesis 2b.

3. Conceptual background and methods

3.1. Conceptual background of the behavioral mechanisms of voluntary cooperation

Our first behavioral mechanism, the ABC approach, builds on Fischbacher and Gächter (2010); Fischbacher et al. (2012); Gächter et al. (2017); and in particular Isler et al. (2021). Isler et al. introduced a version of the ABC approach according to which contextual features (framing in their case) can affect attitudes a_i and beliefs b_i, but together a_i and b_i predict c_i equally well for all contextual features. In our case the relevant context is societal background: Individual *i* who lives in society *s* decides their contribution c_i^s as a function of their cooperative attitude a_i^s and beliefs b_i^s about others' average contribution: $a_i^s(b_i^s) \rightarrow c_i^s$. This implies that voluntary cooperation levels c_i^s might differ between societies because a_i^s or b_i^s differ between societies. In this paper we will show that societal variation in c_i^s are largely driven by variation in the beliefs, b_i^s.[8]

Regarding punishment, *i*'s preferences for punishment of another individual *j*, $p_{ij}^s(c_i^s, c_j^s)$, depends on *i*'s and *j*'s contributions and might be society (group/culture) specific (Herrmann et al. (2008); Gächter et al. (2010)). Ultimately, we thus expect voluntary cooperation in an environment with peer-punishment to depend on attitudes, beliefs, and expected punishment: $c_i^s = f(a_i^s(b_i^s), e(p_{ji}^s))$.[9]

Long-run historical processes, such as whether society *s* tends towards an "individualistic" or "collectivistic" culture (e.g., Greif (1994)), can shape the psychological dispositions a_i^s and p_{ij}^s and beliefs b_i^s by which people approach cooperation. Historical processes also shape the institutions around which society *s* organizes its economic and social life (Schulz et al. (2019); Schulz (2022); Henrich (2020); Rustagi (2022)). Beliefs b_i^s play a central role because actual experiences with institutions, combined with processes of cultural and parental transmission of values (e.g., Boyd and Richerson (1985); Boyd and Richerson (2009); Bisin and Verdier (2011); Hauk and Saez-Marti (2002); Guiso et al. (2008); Tabellini

[8] We will also test that predicted contributions ($\hat{c}_i^s = a_i^s(b_i^s)$) are equally well predicted for all societies, that is, the prediction error, $\hat{c}_i^s - c_i^s$, is equally distributed across societies. See Section 4.3.

[9] Based on the results of Weber et al. (2018) who found that conditionally cooperative attitudes and likelihood to punish are unrelated, we expect that one's preference for punishment (p_{ij}^s) is independent of one's cooperative attitude (a_i^s).

(2008); Henrich (2015)), are likely to shape beliefs b_i^s. While we do not investigate the causal role of historical, cultural, or institutional factors on cooperative attitudes and beliefs, by comparing societies that vary substantially along cultural dimensions we contribute to the understanding of the relative importance of the two underlying factors in explaining differences in voluntary cooperation.

Our one-shot experiments are designed to provide measures of the key variables of interest while excluding any strategic incentives that might be present in repeated games. These are: cooperative attitudes a_i^s, beliefs b_i^s, contributions c_i^s, punishment p_{ij}^s, and the expected punishment of i by j, $e(p_{ji}^s)$, from four societies *s*: Morocco, Turkey, UK, and US. Details are in subsection 3.2.

All subjects participate in two games, the N-Game followed by the P-Game. The N-Game measures the first behavioral mechanism $a_i^s(b_i^s) \rightarrow c_i^s$ in the absence of punishment. The P-Game provides the data for our second behavioral mechanism, which measures $c_i^s = f(a_i^s(b_i^s), e(p_{ji}^s))$. In the next section we describe the rationale for our selection of countries and the evidence about their cultural distance. Details are in Sections 3.4 and 3.5.

3.2. The cultural, economic, and institutional distance between the four subject pools

The UK and US share several cultural, economic, and institutional characteristics. These are substantially different from those of Morocco and Turkey, which also share important similarities with each other. Here, we describe the most important ones; the details are in Appendix A and illustrated in Figs. A2 and A3.

Regarding cultural differences, a frequently-used cultural dimension is individualism (e.g., Hofstede and Hofstede (2001)). The prototypically WEIRD countries US and the UK are among the most individualistic societies in the world whereas the non-WEIRD countries Morocco and Turkey are more collectivistic. According to Inglehart and Welzel (2005), the UK and the US have similarly high "self-expression values", whereas Morocco and Turkey, share more "survival values". See Schulz et al. (2019) and Henrich (2020) for recent investigations into the psychology underpinning WEIRD cultures and how they differ from non-WEIRD ones.

To establish the cultural distance between our subject pools as systematically as possible, we rely on the most comprehensive dataset available (Muthukrishna et al. (2020)). Using data on approximately 170,000 individuals from 80 countries, representing approximately 85% of the world's population, Muthukrishna et al. (2020) developed a quantitative measure of cultural distance between these 80 societies. Cultural distance is calculated as the ratio of between- and within-country variance in bilateral country comparisons of individual responses to questions in the World Values Survey (Waves 2005-09 and 2010-14). The questions cover a wide range of values and beliefs (e.g., attitudes to private matters, family and religious values, attitudes to work and political values).

The quantitative measures of *cultural distance* between any pair of countries provide further evidence for the two distinct clusters of the societies we selected. In terms of ranked cultural distance using the US as the baseline, the UK is the 6th closest country to the US; Turkey the 47th; and Morocco the 59th (Egypt is ranked 80th, that is, farthest away from the US). Taking Morocco as the baseline shows that Turkey is ranked 18th; the US is ranked 60th, and the UK is ranked 71st (farthest away is Sweden, ranked 80th).

Our subject pools also differ starkly in their *economic success*. For instance, using the GDP per capita at purchasing power parity as an indicator shows that the US and the UK are among the richest countries in the world, whereas Turkey and Morocco are substantially poorer. *Institutional quality*—as measured by the countries' Government Effectiveness and Rule of Law indicators of the Worldwide Governance Indicators (Kaufmann and Kraay (2016))—, is among the highest in the world in the US and UK, and substantially lower (around the world average) in Turkey and Morocco.

From this diverse set of indicators we conclude that our subject pools come from two culturally, economically and institutionally distant clusters, but share similarities within their respective cluster. The extent to which these *ex ante* similarities and differences in the societies of our subject pools are relevant *ex post* for the behavior of our subject pools is the focus of our study. If we find differences in conditional cooperation, beliefs, and punishment between our subject pools, we expect them to be greater between clusters than within them. Note that the assumption of two cultural clusters is not strictly necessary to test the behavioral mechanisms described above, as it is potentially interesting to compare any two countries. However, there is an important advantage of doing so: If differences between clusters are larger than differences within clusters, then these are likely driven by cultural/societal distance, provided that other subject pool differences are controlled for.

3.3. Participants and procedures

We follow Herrmann et al. (2008) in choosing student samples with comparable age and socio-economic status within their respective society because societies likely differ in their socio-economic profiles. Choosing student samples ensures subject pool comparability (in terms of education levels, and age, which has been shown to positively influence cooperation (see, e.g., List (2004); Gächter and Herrmann (2011); Arechar et al. (2018)). Comparability minimizes confounds that come from the differing socio-demographic composition of the respective subject pools (see also Gächter (2010); Thöni (2019) for conceptual discussions of this point). We measure additional (and unavoidable) variation in our post-experimental questionnaire and use them as controls in our regression analyses. Our objective is more methodological and not to provide representative country-wide measures of cooperation (these would require sample sizes of about 1000 people in each country and would be infeasible for controlled lab experiments such as ours) but rather to document existing differences in cooperation (among *comparable* subpopulations drawn from different countries) and shed light on the behavioral mechanisms that give rise to those differences.

A total of 388 students participated in our study; 93.8% of participants were nationals of their respective country.[10] We recruited 128 students at Stony Brook University in the US; 92 students at the University of Nottingham in the UK; 80 students at the École Nationale d'Agriculture de Meknès in Morocco; and 88 students at Istanbul Bilgi University in Turkey. Table 1 summarizes the characteristics of our samples.

The experiments were computerized and conducted with z-Tree (Fischbacher (2007)). At the École Nationale d'Agriculture de Meknès the experimenters recruited participants from the local student population. At the other three universities, we used the recruitment software ORSEE (Greiner (2015)) to invite participants. In all samples, subjects could only participate once in the experiment.

We follow the established rules for conducting cross-societal economic experiments (Roth et al. (1991); Thöni (2019)). In all four laboratories, the experiments were run by local research assistants. The instructions and software used the same experimental currency units across all laboratories and were presented in the local language.[11] Participants made their decisions in private with visual separations between workstations. The sessions lasted approximately 90 minutes and were conducted according to a strict protocol to minimize the differences in the way sessions were run across countries. We paid participants in private at the end of each session. Experimental currency was transferred into the local currency using

[10] We excluded 28 participants from the sample of 388 students (22 participants from the US, 4 participants from the UK and 2 participants from Turkey) who indicated in the post-experimental questionnaire that they were not citizens of the respective countries. All main results of this paper hold independently of their inclusion.

[11] The instructions are available in Online Appendices J and K. We translated the instructions from English into Arabic or Turkish and had them back translated by another person in order to make sure that instructions were as identical as possible (Brislin (1970)).

different exchange rates. The exchange rates were chosen to reflect local purchasing power and student wages so that, in real terms, the possible real earnings were similar across subject pools. The average payoffs in local currency are reported in Table 1.

Table 1
Characteristics of the four samples.

	US	UK	Morocco	Turkey
Average age (*SD*)	19.56 (2.75)	19.63 (1.85)	20.84 (1.44)	22.02 (1.93)
Female	59%	56%	65%	40%
Business or economics	9%	23%	1%	22%
Urban background	46%	63%	48%	67%
Average number of siblings (*SD*)	1.69 (1.35)	1.69 (1.37)	3.03 (2.18)	1.79 (2.01)
Middle class	58%	84%	89%	42%
No. obs.	106	88	80	86
Average payoff in local currency (*SD*)	USD 13.87 (3.32)	GBP 11.50 (1.53)	MAD 100.46 (21.64)	TRY 40.93 (7.95)

Notes: Business and Economics: percentage of participants studying business or economics. Urban background: percentage of participants who lived most of their life in a town with at least 10,000 inhabitants. Middle class: percentage of participants who self-reported their family income at age sixteen to be at least average compared to other families.

Each session consisted of two experimental games (the N-Game followed by the P-Game) and a socio-economic questionnaire. Participants were randomly re-matched after the N-Game. We did not provide any feedback after the N-Game to prevent participants from updating their beliefs and to reduce potential income effects and strategic play in the P-Game. However, as will become clear in Section 3.5, in contrast to the N-Game, the P-Game requires feedback on others' contribution, which is why the P-Game always followed the N-Game.

3.4. Public good game with no punishment (N-Game): ABC elicitation

To measure cooperative attitudes, we used the strategy method for public goods games, developed by Fischbacher et al. (2001). Participants were randomly allocated to groups of four. Each received an endowment of 20 tokens and decided how much to contribute to a common "project". Individual payoffs were determined by the following function:

$$\pi_i = 20 - g_i + 0.4 \cdot \sum_{j=1}^{4} g_j. \tag{1}$$

Participant i's contribution to the public good is given by g_i, and the size of the public good is the sum of all contributions. The marginal per capita return of the public good is 0.4

monetary units (MU). Although the social optimum entails full contributions, the individually money-maximizing strategy is to contribute nothing.

Participants made two decisions in the N-Game: they chose an *unconditional contribution* c_i to the project and filled in a *contribution table*. This table allowed for conditioning the participant's own contribution on all rounded average contributions $\overline{c_j} \in \{0, 1, 2, \dots, 20\}$ of her three other group members j and provides us with our measurement of the function $a_i(\overline{c_j})$. To ensure incentive compatibility, the actual contribution for one randomly chosen participant per group was taken from their contribution table according to the average contributions of the three co-players.

After making contribution decisions, we elicited participants' *beliefs* about the other group members' average unconditional contribution. Participants earned three MUs for guessing correctly, two MUs for a deviation of one point, one MU for a deviation of two points and zero MUs for a higher deviation (Gächter and Renner (2010)).[12] We did not provide feedback after the N-Game and fixed this sequence across all sessions to prevent participants' from updating their beliefs about other participants' behavior.

Using the criteria outlined in Thöni and Volk (2018), we classify participants into different types of cooperative attitudes according to their contribution tables. *Conditional Cooperators* (CC) show a positive correlation between their own conditional contributions and the average contributions of their fellow group members (i.e., Pearson's $\rho \geq 0.5$) or at least one increase in their contribution schedule. *Free Riders* (FR) contribute nothing for every possible average contribution of their group members. We refer to participants who are not classified as either CC or FR as *Unclassified Others* (OT). The results from the N-Game provide the data for our first behavioral mechanism $a_i^s(b_i^s) \rightarrow c_i^s$ presented in Section 4.

3.5. Public good game with punishment (P-Game): Punishment elicitation

The P-Game consists of two stages: First, participants choose their contribution in a one-shot public goods game for which the individual payoff function is given by (1). Then participants state their beliefs about the other group members' average contribution to the public good. We did not incentivize beliefs in the P-Game to avoid punishment motivated by disappointment due to wrong beliefs or income effects (Cubitt et al. (2011)). In the second stage of the game, participants learned their individual contributions of their group members

[12] Belief hedging might be a concern in this design. However, we think this is unlikely for two reasons. First, incentives to hedge are minor here. Second, Blanco et al. (2010) find no evidence for belief hedging in a similar social dilemma experiment.

and could assign up to five punishment points to each. Each assigned punishment point cost the punisher one MU and removed two MUs of the targeted person's income. Individual payoffs were determined by the following function:

$$\pi_i = \pi_i^{S1} - \sum_{j=1}^{4} p_{ij} - 2 \cdot \sum_{j=1}^{4} p_{ji}. \tag{2}$$

Participant i's payoff from the first stage is given by π_i^{S1}. The punishment points group member i allocates to group member j are denoted by p_{ij}, and p_{ji} denotes the punishment points allocated by j to i. Each participant received 10 MUs to cover potential losses. In the P-Game, the punishment $e(p_{ji}^s)$ that group member i expects to receive might influence i's contribution.

After assigning punishment points to their group members, participants were asked to indicate how many punishment points they expected to receive from each of their group members. The results from the P-Game provide the data for our second behavioral mechanism $c_i^s = f(a_i^s(b_i^s), e(p_{ji}^s))$ presented in Section 5.

4. Behavioral Mechanism I: Attitudes and beliefs

4.1. Preferences for conditional cooperation (*"attitudes"*)

We first classify the participants according to their individual cooperative attitudes (see Section 3.4) and compare the distributions across societies in Fig. 1a (a_i^s in our behavioral mechanism).[13] Using χ^2 tests, we find that the distributions of cooperative attitudes are statistically significantly different across the four samples ($p = 0.043$). The most common cooperative attitude in all four samples is conditional cooperation (CC), with a statistically similar share of CC across the four subject pools ($\chi^2(3) = 1.70$, $p = 0.637$). However, the shares of free riders (FR; $\chi^2(3) = 9.19$, $p = 0.027$) and the shares of others (OT; $\chi^2(3) = 6.67$, $p = 0.083$) vary somewhat across the four samples.[14]

[13] The results reported here are robust to an alternative classification (see Fig. 1B in Online Appendix B).

[14] CC include perfect conditional cooperators, who exactly match others' contribution (13 in the US, 9 in the UK, 3 in MA, and 3 in TR). OT include unconditional cooperators (3 in the US, 2 in the UK, 0 in MA, 9 in TR), triangle contributors (24 in the US, 16 in the UK, 23 in MA, 6 in TR) and unclassified others (9 in the US, 5 in the UK, 13 in MA, 14 in TR).

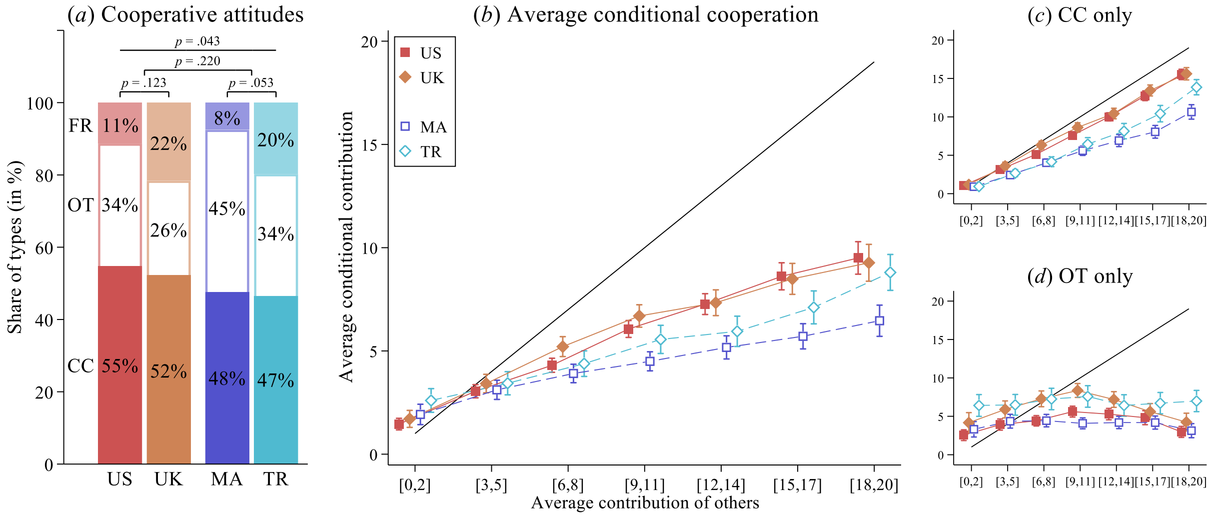

Fig. 1. Cooperative attitudes (a_i^s in our behavioral mechanism). Panel (*a*): The share of conditional cooperators (CC, dark bars), free riders (FR, white bars) and others (OT, light bars); percentages indicate frequency of types; *p*-values from (pooled) χ^2 tests. Panel (*b*): Average contribution schedule by country in the N-Game; all participants. Panel (*c*): Conditional cooperators (CC) only. Panel (*d*): Others (OT) only. The 45°-line corresponds to perfect conditional cooperation. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey. The error bars indicate ±1 *SEM*.

Comparing the UU cluster (pooling the US and UK samples) to the MT cluster (pooling the Morocco and Turkey samples) reveals statistically similar distributions of cooperative attitudes ($p = 0.220$). Within clusters, there are no significant differences between the cooperative attitudes of the US and UK ($p = 0.123$) samples and weakly significant differences between the Morocco (MA) and Turkey (TR) samples ($p = 0.053$).

Another way of investigating sample differences in cooperative attitudes is to compare the *extent* of conditional cooperativeness. We use the average contributions in the contribution table of the N-Game as a measure of conditional cooperativeness (Fig. 1b). Across the four samples, on average participants increase their conditional contributions as the average contribution of others rises, but they only imperfectly match the average contribution of others by undercutting others' contribution. Imperfect conditional cooperation results in average conditional contributions below the 45°-line (which corresponds to perfect conditional cooperation). Fig. 1b also shows that sample differences in average conditional contributions are small in the "behaviorally relevant" interval between 0 and 11 where 91% of the average unconditional contributions of other group members fall. Fig. 1c depicts average conditional cooperation for conditional cooperators (CC) only, and Fig. 1d for others (OT) only.

Finally, we use a regression analysis to test for across-cluster and within-cluster differences in the level and slope of the participants' contribution schedules (Table 2).[15] Again, we refer to the UK and the US as the UU cluster and to Morocco and Turkey as the MT cluster. First, we investigate across-cluster differences in a pooled estimation by regressing the conditional contribution on the average contribution of other group members, a dummy variable for the MT cluster and an interaction term between the dummy and the average contribution of others to measure differences in slopes (Table 2, Col. 1). Additionally, we control for the socio-economic background of participants.

The coefficient for the average contributions of others is positive and highly significant, but smaller than 1 implying imperfect conditional cooperation in the UU cluster. Conditional contributions increase on average by 0.438 for each additional money unit contributed. The negative and highly significant interaction term implies a smaller increase in conditional contributions in the MT cluster. The statistically insignificant MT cluster dummy indicates a similar average conditional contribution in both clusters.[16]

Next, we estimate a similar model with country dummies and country-specific interaction terms to test for within-cluster variation (Table 2, Col. 2). Here, the US sample serves as the comparison group. The statistical insignificance of the UK dummy and its interaction term "Average contribution of others × UK" imply no variation in the slope or levels within the UU cluster comparing the US and UK samples. Additionally, we find no statistically significant differences in the coefficients of "Average contribution of others × MA" and "Average contribution of others × TR" ($F(1, 359) = 2.16$, $p = 0.142$) or the MA and TR dummies ($F(1, 359) = 0.03$, $p = 0.858$). This indicates similar slopes and levels of conditional contributions within the MT cluster.

[15] When estimating the same regression models including only CC, we find slight variations in conditional contributions across the two clusters and within the MT cluster (Table C1 in the Online Appendix C). Using the same method to compare the conditional contributions of OT shows only significant level differences within the UU cluster and, overall, a very poor fit of the regression model (Table C2 in the Online Appendix C).

[16] The estimation results for the UK (Model (2) in Table 3) are similar to those from Weber et al. (2018) who also ran a comparable strategy method public goods game with UK subjects. In their data, the coefficient (*SE*) for average contribution of others is 0.401 (0.022).

Table 2
Conditional contributions across subject pools.

Dependent variable: conditional contribution	(1) By cluster	(2) By country
Average contributions of others	0.438*** (0.034)	0.456*** (0.044)
Average contribution of others × MT cluster	−0.152*** (0.045)	
MT cluster	0.653 (0.509)	
Average contribution of others × UK		−0.040 (0.068)
UK		0.851 (0.588)
Average contribution of others × MA		−0.216*** (0.060)
MA		1.021* (0.593)
Average contribution of others × TR		−0.127** (0.063)
TR		1.171 (0.755)
Socio-economic controls	Yes	Yes
Constant	3.016 (2.655)	3.062 (2.710)
R^2	0.14	0.15
No. obs. (Clusters)	7560 (360)	7560 (360)

Notes: OLS estimation with robust *SE* clustered on individuals in parentheses. The dependent variable is the conditional contribution elicited on the contribution table in the N-Game where participants indicated their own conditional contribution for each of the 21 average contributions of their group members. UU cluster: UK and US; MT cluster: Morocco and Turkey. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. None is significant at any conventional level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

We summarize our findings on cooperative attitudes as follows:

Result 1a: *We find a similar distribution of cooperative attitudes across our four subject pools, but a slightly higher conditional cooperativeness in the UU compared to the MT cluster.*

Result 1a provides mixed support for Hypothesis 1a, which stipulates no differences between subject pools. While the distribution of cooperative attitudes is similar across subject pools, we do find slightly weaker conditional cooperativeness in Morocco and Turkey than in the UK and US. Our next step is to test Hypothesis 1b that beliefs about others' cooperation are higher in the UK and US than in Morocco and Turkey.

4.2. Beliefs and contributions

Fig. 2a shows *beliefs* about unconditional contributions in the N-Game (b_i^s in the ABC framework). We find significant variation in beliefs across the four samples (Kruskal-Wallis test, $\chi^2(3) = 18.58$, $p < 0.001$). Beliefs are significantly higher in the UU cluster compared to the MT cluster. We do not find significant differences in beliefs within the UU cluster. For the MT cluster, we find highly significant differences between the MA and TR samples. The between-cluster difference in beliefs is driven by lower beliefs in the MA sample; beliefs in the TR sample are not significantly different from those held in the US or UK sample (Mann-Whitney $Z = 1.11$, $p = 0.269$; $Z = 0.52$, $p = 0.603$; resp.).[17]

We collect these findings in Result 1b, which confirms our Hypothesis 1b:

Result 1b. *Beliefs about others' cooperation are higher in the UU cluster compared to the MT cluster.*

We now turn to Hypothesis 1c which predicts that cooperation is higher in the UU cluster than in the MT cluster. Fig. 2b illustrates the average unconditional *contributions* in the N-Game (c_i^s in the ABC framework) which vary significantly across the four samples (Kruskal-Wallis test, $\chi^2(3) = 19.62$, $p < 0.001$). Unconditional contributions in the UU cluster are significantly higher than in the MT cluster. There are no differences in unconditional contributions within-clusters when comparing the US and UK samples or the MA and TR samples. The next result summarizes this finding:

Result 1c *Unconditional contributions are higher in the UU than in the MT cluster.*

This supports Hypothesis 1c. Our next step is to explain contributions as a function of cooperative attitudes and beliefs.

[17] We also test for differences in the accuracy of beliefs—defined as deviation from the actual contribution of others—and find a statistically similar belief accuracy across samples (overall average 1.8, Kruskal-Wallis test, $\chi^2(3) = 5.57$, $p = 0.134$; for details see Table D1 in the Online Appendix D).

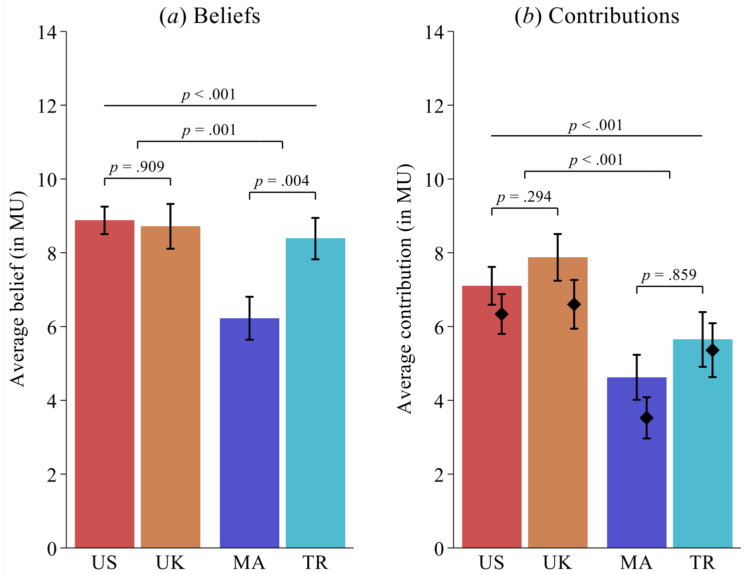

Fig. 2. Average beliefs (Panel *a*); and average unconditional contributions to the public good (Panel *b*) in the N-Game by country. Diamonds (♦) indicate the average predicted contributions based on cooperative attitudes and beliefs (described in section 4.3). US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey. The error bars indicate ±1 *SEM*; *p*-values from Kruskal-Wallis and (pooled) Mann-Whitney tests.

4.3. Explaining contributions as a function of cooperative attitudes and beliefs: $a_i^s(b_i^s) \rightarrow c_i^s$

To explain contributions, we calculate the variable "Predicted contribution" by combining a participant's individual contribution table and their belief about others' contributions ("Belief") as elicited in the N-Game. Formally put, we compute for each individual *i* their predicted contribution $\widehat{c_i}$ as $a_i(b_i) = \widehat{c_i}$. The sample average predicted contributions $\widehat{c^s}$ are shown as diamonds (♦) in Fig. 2b.

The predicted contributions vary significantly across the four samples (Kruskal-Wallis test, $\chi^2(3) = 15.03$, $p = 0.002$) and tend to be lower than the actual contributions (Fig. 2b). Predicted contributions in the UU cluster are significantly higher than in the MT cluster (pooled Mann-Whitney $Z = 3.73$, $p < 0.001$). There are no differences in predicted contributions when comparing the US and UK samples (Mann-Whitney $Z = -0.09$, $p = 0.931$) and the MA and TR samples (Mann-Whitney $Z = -0.65$, $p = 0.517$). However, the predicted contributions are significantly lower than the actual contributions for all samples except Turkey (Wilcoxon signed-rank test $Z_{US} = 2.06$, $p_{US} = 0.040$; $Z_{UK} = 2.88$, $p_{UK} = 0.004$; $Z_{MA} = 1.52$, $p_{MA} = 0.131$; $Z_{TR} = 1.89$, $p_{TR} = 0.059$).

We also test for the accuracy of predicted contributions ($\widehat{c_i^s}$) across samples. Comparing predicted with actual contributions in the N-Game yields accuracy ($\widehat{c_i^s} = c_i^s$) of over 61% for all four societies and no significant differences in the accuracy of predicted contributions across subject pools (Fig. E2 in the Online Appendix E).[18]

To explain the gap between actual and predicted contributions, we follow Fischbacher and Gächter (2010) (see their Table 2) and regress unconditional contributions (c_i^s) on "Predicted contribution" ($\widehat{c_i^s}$), "Beliefs" (b_i^s), a MT cluster dummy and interaction terms in a pooled model (Table 3, Col. 1). We also control for the socio-economic background of participants. "Belief" is included to test for cooperation above $\widehat{c_i^s}$—as observed by Fischbacher and Gächter (2010).

The coefficients "Predicted contribution" and "Belief" are positive and highly significant, confirming an earlier result by Fischbacher and Gächter (2010). This suggests that participants—most of whom are imperfect conditional cooperators with contribution schedules below the 45-degree line—are more cooperative than predicted by their preferences ($\widehat{c_i^s}$) alone. The results show no significant differences in the level of contributions across clusters (MT cluster: $b = 0.164$, $p = 0.850$) when controlling for beliefs, suggesting that the observed differences in behavior may be driven by variation in beliefs. There are also no differences in the way "Predicted contributions" and "Belief" are associated with contributions across clusters. This follows from the insignificant dummy variable "MT cluster", and the interaction terms "Predicted contribution × MT cluster" and "Belief × MT cluster".

The significant influence of beliefs on contributions across both clusters shows that conditional cooperation is greater than the level implied by "Predicted contribution" alone, that is, "Belief" matters in addition to "Predicted contribution", a finding also reported by Fischbacher and Gächter (2010).[19]

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[18] The difference between predicted and actual contributions becomes smaller when looking at conditional cooperators only (Fig. E1 in the Online Appendix E). This observation is consistent with findings by Fischbacher et al. (2012).

[19] Reassuringly, the estimation results for the UK (Col. 1 in Table 3) are similar to those from Weber et al. (2018) who also ran a comparable strategy method public goods game with UK subjects. The coefficient (*SE*) for predicted contribution is 0.532 (0.067) and for beliefs it is 0.392 (0.068).

Table 3
Explaining unconditional contributions in the N-Game.

Dependent variable: unconditional contribution	(1) By cluster	(2) By country
Predicted contribution	0.504*** (0.090)	0.463*** (0.112)
Belief	0.300*** (0.116)	0.397*** (0.141)
Predicted contribution × MT cluster	0.088 (0.150)	
Belief × MT cluster	−0.191 (0.159)	
MT cluster	0.164 (0.863)	
Predicted contribution × UK		0.049 (0.181)
Belief × UK		−0.127 (0.221)
UK		1.616 (1.061)
Predicted contribution × MA		0.225 (0.170)
Belief × MA		−0.536*** (0.174)
MA		2.652** (1.201)
Predicted contribution × TR		0.081 (0.190)
Belief × TR		−0.059 (0.210)
TR		−0.903 (1.144)
Socio-economic controls	Yes	Yes
Constant	2.042 (2.390)	1.026 (2.369)
R^2	0.49	0.50
No. obs.	360	360

Notes: OLS estimates with robust *SE* in parentheses. UU cluster: UK and US; MT cluster: Morocco and Turkey. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. None is significant at any conventional level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Next, we turn to the within-cluster comparisons (Table 3, Col. 2). Within the UU cluster, we find neither level differences in contributions between the US and UK samples, nor significant differences in the way “Predicted contribution” and “Belief” are associated with the contributions. To investigate differences in the MT cluster, we test for significant differences in the coefficients of the MA and TR dummies, as well as the interaction terms with predicted contributions and beliefs. We find significant level differences in contributions ($F(1, 342) = 7.39, p = 0.007$) and a significant difference in the way beliefs are associated with contributions ($F(1, 342) = 6.79$, $p = 0.010$). However, we find no differences in the way “Predicted contributions” influence contributions across the MA and TR samples ($F(1, 342) = 0.51$, $p = 0.474$). This shows considerable within-cluster variation for the MT cluster. Contributions are higher in the MA sample compared to the TR sample, but participants from the TR sample show a greater increase in their contributions for a higher expected average contribution from others.

The results of the first regression model have two important implications: First, when we control for beliefs, we find no significant level differences in contributions between the two clusters (the MT cluster dummy is insignificant). Since “Belief” is highly significant, this suggests that differences in beliefs are an important driver of differences in cooperation between the subject pools. Second, the insignificant interactions between “Predicted contributions” and the cluster dummy indicate that a one-unit increase in “Predicted contributions” increases actual contributions by the same amount across clusters. The same interpretation applies to the non-significant interaction between “Belief” and the cluster dummy. This shows that the relative importance of “predicted contributions” and “Belief” in explaining behavior is similar across clusters. In Online Appendix I we report a simulation analysis that confirms the relative importance of beliefs in explaining differences in contributions across clusters: 37% of the difference is due to beliefs, while only 14% is due to cooperative attitudes.

4.4. Discussion

Regarding our hypotheses on the first behavioral mechanism, we find mixed support for Hypothesis 1a, which predicts similar distributions of conditionally cooperative attitudes a_i^s across the four subject pools. The distribution of conditionally cooperative attitudes, which have previously been elicited mainly in US and Western European subject pools (Thöni and Volk (2018)), generalizes to all our subject pools. However, the mean slopes are slightly lower in the MT cluster than in the UU cluster. Beliefs b_i^s about others’ cooperation are higher in the UU cluster than in the MT cluster, confirming Hypothesis 1b. Beliefs appear to be an important factor explaining contributions in both clusters, including higher contributions in the UU cluster than in the MT cluster, confirming Hypothesis 1c. In summary, with respect to our first behavioral mechanism, the ABC approach $(a_i^s(b_i^s) \rightarrow c_i^s)$, cooperative attitudes and beliefs explain unconditional contributions in all subject pools.

5. Behavioral Mechanism II: Punishment

Our next step is to investigate the second behavioral mechanism—expected $(e(p_{ji}^s))$ and actual punishment (p_{ij}^s)—and their implication for cooperation and beliefs $(c_i^s = f(a_i^s(b_i^s), e(p_{ji}^s)))$.[20] For this purpose, we analyze the P-Game described in Section 3.5 and test Hypotheses 2a and 2b.

5.1. Expected punishment

After participants made their contribution decisions in the P-game and were informed about the contributions of their group members, we elicited expected punishment by asking participants to indicate the number of punishment points they expected to receive from each of their group members. Using the second behavioral mechanism described in Section 3.1, we analyzed expected punishment separately for negative and non-negative deviations from the potential punisher's contribution (Figure 3). Expected prosocial punishment (that is, punishment for negative deviations from the punisher's contribution) differs significantly across the four subject pools. We find highly significant differences in expected prosocial punishment between the UU and MT clusters, with significantly lower expected punishment for free riding in the MA sample than in the other three samples.

Expected antisocial punishment (punishment of *non-negative* deviations from the punisher's contribution) is statistically similar across the four samples. It is also statistically similar when comparing the UU and MT clusters, as well as when comparing the US and UK samples or the MA and TR samples. Tobit regressions that control for the size of the negative or positive contribution deviations, and the socio-economic background of participants, largely confirm the results of our non-parametric analysis (Online Appendix G, Table G1).[21]

[20] In Online Appendix F, we also test—and confirm—the assumption of our behavioral mechanisms that p_{ij}^s is independent of a_i^s—see Section 3.1; and Weber et al. (2018); Molleman et al. (2019) who provide evidence for this assumption.

[21] A further question is whether the accuracy of expected punishment differs across samples. We find a significantly lower accuracy of expected punishment in the UU cluster compared to the MT cluster, due to overestimation of the use of punishment in the US and UK samples. We also find a significant within-cluster difference in accuracy for the MT cluster only (Fig. H1 in the Online Appendix H).

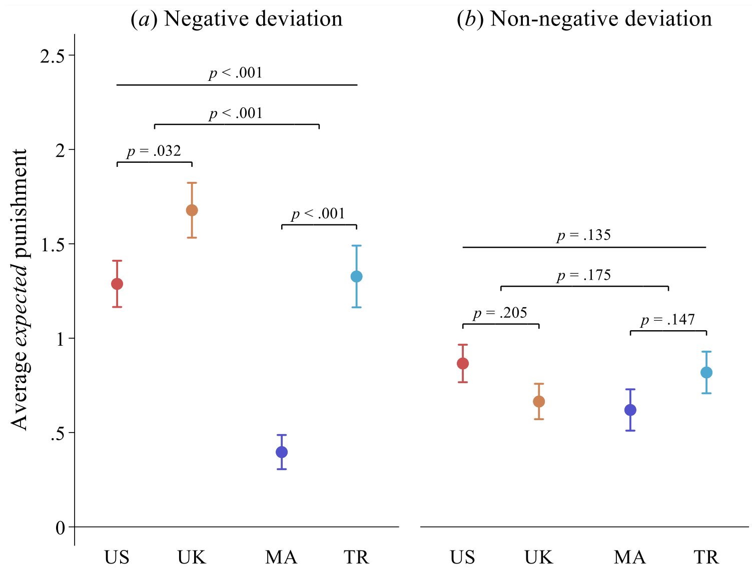

Fig. 3. Average *expected* punishment points by country for a negative deviation (Panel *a*) or a non-negative deviation (Panel *b*) from the punisher's contribution. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey. The error bars show ±1 *SEM* clustered on individuals; *p*-values from Kruskal-Wallis and (pooled) Mann-Whitney tests.

5.2. Actual punishment

Actual punishment indicates a preference ("willingness to pay") to impose costs on a group member. Figure 4 shows actual punishment, again distinguishing between negative and non-negative deviations of the target from the punisher's contribution (i.e., prosocial, and antisocial punishment). Actual prosocial punishment differs weakly significantly across the four subject pools. However, we find statistically similar levels of actual prosocial punishment across the UU and MT clusters, and within the UU cluster when comparing the US and UK samples. Within the MT cluster, actual prosocial punishment is significantly higher in the TR sample than in the MA sample.

Antisocial punishment is statistically similar across the four samples. Although the differences appear small, we find significantly higher antisocial punishment in the UU cluster than in the MT cluster. We do not find significant differences within the UU cluster when comparing the US and UK samples, nor within the MT cluster when comparing the MA and TR samples. Tobit regression analysis broadly confirms these results (Online Appendix G, Table G2).

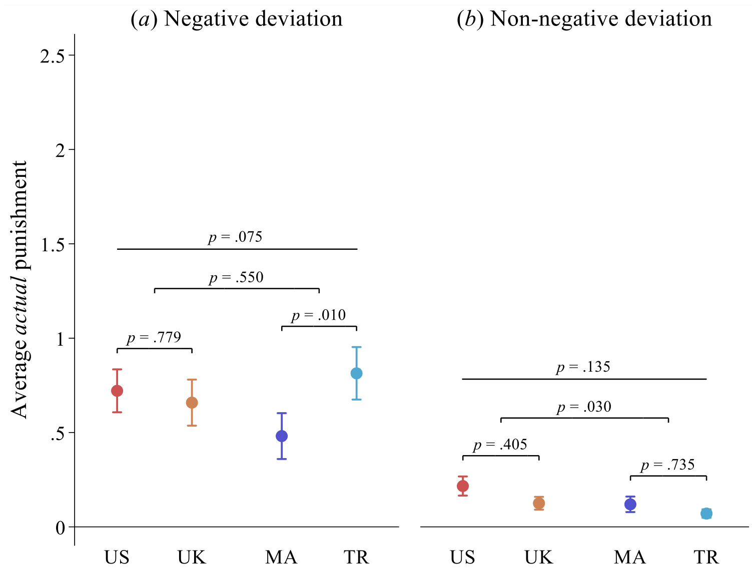

Fig. 4. Average *actual* punishment points by country for a negative deviation (Panel *a*) or a non-negative deviation (Panel *b*) from the punisher's contribution. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey. The error bars show ±1 *SEM* clustered on individuals; *p*-values from Kruskal-Wallis and (pooled) Mann-Whitney tests.

We summarize these findings as:

Result 2a. *Actual punishment of free riding is similar across the two clusters. Antisocial punishment is slightly higher in the UU than the MT cluster.*

These results partially reject Hypothesis 2a. As predicted, we find no differences in actual punishment of free riding. However, contrary to the prediction of Hypothesis 2a, we find slightly lower antisocial punishment in the MT cluster than in the UU cluster.

Our final step is to explain contributions in the P-Game and to test Hypothesis 2b, which predicts higher cooperation in the UU than the MT cluster.

5.3. Explaining contributions in the P-Game

Fig. 5a illustrates average beliefs about others' contributions (b^s) per subject pool s in the P-Game. Beliefs differ significantly between the four subject pools. Beliefs are significantly higher in the UU cluster than in the MT cluster. Within clusters, beliefs are weakly significantly higher in the UK than in the US sample and statistically similar in the MA and TR samples.[22]

[22] Accuracy of beliefs—defined as the deviation from the actual contribution of others ($c_i^s - b_i^s$)—across the four subject pools is higher in the UU cluster than in the MT cluster (average accuracy is 0.65 in the UU cluster vs. 2.13 in the MT cluster). The difference in inaccuracy between clusters is significant, whereas differences within clusters are not (Table D.1 in the Online Appendix).

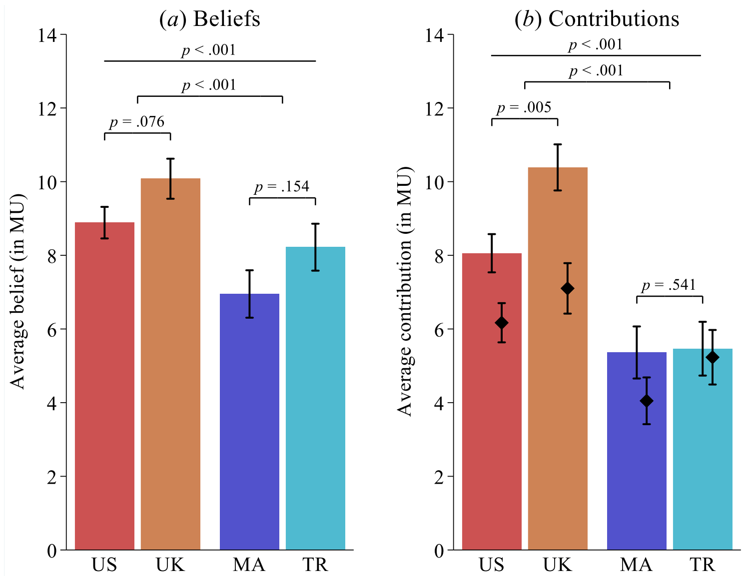

Fig. 5. Average beliefs about others' contributions (Panel *a*) and contributions to the public good (Panel *b*) in the P-Game by country. Diamonds (♦) indicate the average predicted contributions based on cooperative attitudes (from the N-Game) and beliefs. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey. Error bars indicate ±1 *SEM*; *p*-values from Kruskal-Wallis and (pooled) Mann-Whitney tests.

Fig. 5b shows the average contributions in the P-Game which differ significantly between the four samples. We also find significantly higher contributions in the UU cluster compared to the MT cluster. A comparison within the UU cluster shows significantly higher contributions in the UK sample compared to the US sample, but we find no differences within the MT cluster.

We also compare contributions in the N-Game with contributions in the P-Game. Interestingly, contributions in the P-Game are significantly higher than in the N-Game for the US (8.06 vs. 7.10, $Z_{\mathrm{US}} = -2.42$, $p_{\mathrm{US}} = 0.015$) and the UK (10.39 vs. 7.88, $Z_{\mathrm{UK}} = -3.65$, $p_{\mathrm{UK}} < 0.001$), but not for Morocco (5.36 vs. 4.63, $Z_{\mathrm{MA}} = -0.78$, $p_{\mathrm{MA}} = 0.438$) and Turkey (5.47 vs. 5.65, $Z_{\mathrm{TR}} = -0.45$, $p_{\mathrm{TR}} = 0.658$; all tests are Wilcoxon signed-rank tests).

We summarize these observations in the next result, which supports Hypothesis 2b:

Result 2b. *In the presence of punishment, beliefs and contributions are higher in the UU than in the MT cluster.*

Next, we identify and test for two channels through which punishment can affect cooperation: First, participants might expect others to contribute more when punishment is available (i.e., higher cooperative beliefs in the P-Game than in the N-Game), leading to increased contributions from (imperfect) conditional cooperators. Yet, we find relatively weak support for this channel. Beliefs in the P-Game appear statistically similar to the N-Game for the US (8.89 vs. 8.88, $Z_{US} = 0.39$, $p_{US} = 0.702$), Morocco (6.95 vs. 6.22, $Z_{MA} < 0.01$, $p_{MA} = 0.999$) and the Turkish sample (8.22 vs. 8.38, $Z_{TR} = 0.96$, $p_{TR} = 0.342$), and only weakly significantly higher for the UK sample (10.08 vs. 8.72, $Z_{UK} = -1.72$, $p_{UK} = 0.086$; all tests are Wilcoxon signed-rank tests). The share of participants who report a higher belief in the P-Game relative to the N-Game is 34% in the US, 41% in the UK, 31% in Morocco and 31% in the Turkish sample, with most participants reporting the same or a lower belief. Yet, participants who report a higher belief in the P-Game are also more likely to raise their contribution as changes in beliefs and contributions are positively and significantly correlated in all but the MA sample (Spearman's $\rho_{US} = 0.45$, $p_{US} < 0.001$; $\rho_{UK} = 0.53$, $p_{UK} < 0.001$; $\rho_{MA} = -0.01$, $p_{MA} = 0.940$; $\rho_{TR} = 0.31$, $p_{TR} = 0.004$).

Second, punishment reduces the expected payoff from free riding and thus induces participants to closely match what they expect others to contribute. The importance of beliefs—relative to cooperative attitudes—in explaining actual cooperation thus increases as imperfect conditional cooperators and free riders align their actual contribution more closely with their belief than suggested by their contribution schedules. To test for this channel, we apply the first behavioral mechanism to explain contributions as a function of cooperative attitudes in the N-Game and beliefs in the P-Game ($c_i^s = f(a_i^s(b_i^s))$). The resulting predicted contributions (indicated by diamonds (♦) in Fig. 5b) vary significantly across the four samples (Kruskal-Wallis test, $\chi^2(3) = 13.83$, $p = 0.003$). Predicted contributions in the UU cluster are significantly higher than in the MT cluster (pooled Mann-Whitney $Z = 3.68$, $p < 0.001$). There are no differences in our within-cluster analysis of predicted contributions when comparing the UK and US samples (Mann-Whitney $Z = -0.91$, $p = 0.362$) or the MA and TR samples (Mann-Whitney $Z = 0.25$, $p = 0.806$). However, the predicted contributions are significantly lower than the actual contributions for all samples (Wilcoxon signed-rank test $Z_{US} = 4.02$, $p_{US} < 0.001$; $Z_{UK} = 4.89$, $p_{UK} < 0.001$; $Z_{MA} = 1.73$, $p_{MA} = 0.084$; $Z_{TR} = 1.95$, $p_{TR} = 0.051$).

To explain the gap between actual and predicted contributions in the P-Game, we regress, in analogous fashion to Table 3, contributions (c_i^s) on predicted contributions ($\widehat{c_i^s} = a_i^s(b_i^s)$), beliefs ($b_i^s$), the MT cluster dummy and interaction terms pooling the four samples (Table 4, Col. 1). The coefficients "Predicted contribution" and "Belief" are highly significant, and the coefficient for "Belief" appears larger than the coefficient in Table 3. This confirms the importance of the second channel and implies that, in the presence of punishment, beliefs become more important for explaining contributions. Matching the expected contribution of others may be a strategy to avoid punishment in this game. The weakly significant positive coefficient "Predicted contribution × MT cluster" and the highly significant negative coefficient "Belief × MT cluster" indicate differences in the effect of predicted contributions and beliefs across clusters.

The within-cluster analyses of the UU cluster reveal no significant differences in the effect of predicted contributions, beliefs or level differences in conditional contributions when comparing the US and UK samples (insignificant interactions between "Predicted contributions" or "Belief" and the respective country dummy; insignificant country dummies; Table 4, Col. 2). Similarly, we find no significant within-cluster variation in the effect of predicted contributions, beliefs or level differences within the MT cluster ($F(1, 342) < 0.01$, $p = 0.967$; $F(1, 342) = 0.03$, $p = 0.863$; $F(1, 342) = 1.03$, $p = 0.310$; resp.). A simulation analysis confirms the increased importance of beliefs—relative to cooperative attitudes—in explaining cluster differences in contributions when punishment is available (Online Appendix I). Here, 38% of the cluster difference can be attributed to beliefs, but only 5% to cooperative attitudes.

5.4. Discussion

Punishment in a one-shot game is a costly expression of a dislike of others' contributions that cannot be rationalized as a strategic investment because there are no future interactions. Nevertheless, our subjects did punish those group members who contributed less than them. However, surprisingly, antisocial punishment was lower in the MT subject pools than in the UU subject pools, partially rejecting Hypothesis 2a. Yet, these differences in antisocial punishment pools are small. Like in the situation without punishment, the biggest difference we observe is regarding beliefs about others' cooperativeness, where we confirm Hypothesis 2b of higher beliefs and higher cooperation in the UU cluster than the MT cluster.

Table 4
Explaining unconditional contributions in the P-Game.

Dependent variable: unconditional contribution	(1) By cluster	(2) By country
Predicted contribution	0.205*** (0.059)	0.277*** (0.089)
Belief	0.828*** (0.081)	0.732*** (0.125)
Predicted contribution × MT cluster	0.231* (0.120)	
Belief × MT cluster	−0.477*** (0.137)	
MT cluster	0.580 (0.858)	
Predicted contribution × UK		−0.147 (0.122)
Belief × UK		0.164 (0.176)
UK		0.540 (1.055)
Predicted contribution × MA		0.160 (0.166)
Belief × MA		−0.395* (0.205)
MA		1.266 (1.236)
Predicted contribution × TR		0.169 (0.164)
Belief × TR		−0.357* (0.194)
TR		−0.056 (1.100)
Socio-economic controls	Yes	Yes
Constant	−2.930 (2.223)	−2.488 (2.493)
R^2	0.59	0.60
No. obs.	360	360

Notes: OLS estimates with robust *SE* in parentheses. UU cluster: UK and US; MT cluster: Morocco and Turkey. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. None is significant at any conventional level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

6. Concluding discussion

This paper contributes to our understanding of behavioral mechanisms that explain voluntary cooperation in one-shot public goods games. We present two behavioral mechanisms and apply them to test their cross-societal generalizability: (1) cooperative attitudes and beliefs about others' cooperativeness jointly explain cooperation (the ABC methodology); and (2) peer punishment. In public goods experiments conducted in the UK and the US, and two culturally, economically, and institutionally different societies, Morocco and Turkey, we found that conditionally cooperative attitudes (as a proxy for cooperative preferences) are mostly similar across the four subject pools, and it is differences in beliefs that explain a significant fraction of the variation in cooperative behavior. In a second peer punishment experiment, we found strong differences in how participants responded to the presence of punishment. Only participants in the UK and US significantly increased their contributions in the game with punishment compared to the game without punishment. We found that the actual punishment was similar in all four samples.

Our results have several implications for understanding human cooperation. First, conditional cooperation is prevalent in all four subject pools studied here (and previously – see Section 2) and is thus not restricted to US and Western European subject pools, where most of the previous related research has been conducted. Second, our results from the public goods experiments with and without punishment suggest that the observed differences in cooperation across societies are only to a small extent due to differences in the distribution of cooperative preferences across societies but are mostly driven by differences in beliefs about the cooperativeness of others. We thus provide a proof of concept for the importance of beliefs in explaining societal differences, albeit in the relatively narrow context of our public goods game. Our results highlight the importance of beliefs about others' cooperativeness and how they may be a channel through which voluntary cooperation can be promoted in different societies, which also has practical implications. Beliefs are likely more malleable than one's own cooperative preferences, which are likely to be stable over time (e.g., Bruhin et al. (2019); Chuang and Schechter (2015); Carlsson et al. (2014); Volk et al. (2012); Gächter et al. (2022)).

Third, we found very little antisocial punishment (close to zero in Morocco and Turkey, and slightly positive in the UK and US). This is interesting because it contradicts previous research reporting substantial antisocial punishment across societies in repeated games (Herrmann et al. (2008)) and one-shot games (Gächter and Herrmann (2009); Gächter and Herrmann (2011)). In repeated games with peer punishment, several mechanisms can explain the observed pattern of antisocial punishment. First, the punishment of high contributors who do not fully contribute to the public good might result from a strategic intention to maintain or increase the contributions of others. Second, antisocial punishment can result from the desire of a low contributor to retaliate pre-emptively against expected punishment from a higher contributor. Third, antisocial punishment might be an expression of inequality aversion (Thöni (2014)). Finally, antisocial punishment can be revenge for previous game play and thus take on the characteristics of a multi-round feud (Nikiforakis and Engelmann (2011)). The one-shot design of the present study excludes any strategic incentive to punish, does not allow for within-period retaliatory punishment (since there is only one punishment stage), and excludes the possibility of retaliation across periods. Therefore, we interpret punishment as an elicitation of a preference for sanctioning group members, mostly free riding behavior. We found no systematic variation in such preferences across our culturally diverse subject pools.

It is important to note that for some of our measures we find greater within-cluster variation for the Morocco and Turkey cluster compared to the US and UK cluster. While our analysis does not require that the within-cluster variation is similar, the question arises as to what explains this variation. One candidate is substantial differences in positive and negative reciprocity (as measured by Falk et al. (2018)), which may be particularly important for behavior and beliefs in cooperation games (Online Appendix Figure A2f).

In summary, given that the four countries from which we drew our samples differ along many cultural and institutional dimensions, we can argue for our two main findings: First, differences in beliefs about others' cooperativeness are more important than differences in cooperative preferences in driving differences in cooperation across the subject pools we study here, with two Western societies, the UK and the US, having higher beliefs than the two non-Western societies, Morocco and Turkey. Second, punishment behavior is similar across subject pools, suggesting that people have similar preferences for enforcing cooperation regardless of the society they live in.

We conclude with three remarks about our contribution and future research. First, a main contribution of this paper is methodological: we show that the ABC approach (and punishment) can explain voluntary cooperation, including differences in the level of cooperation across different subject pools. While our evidence is limited to four subject pools, they span a considerable cultural, economic, and institutional distance. Differences in beliefs turn out to be more important than differences in cooperative preferences and punishment. Based on the evidence presented in this paper, we believe that the ABC approach is transferable across different cultural contexts. Future research should use this approach to further investigate the origins of cooperation differences across societies.

Second, our results suggest that future research should apply our behavioral mechanisms in more countries (and ideally with representative subject pools) to obtain more comprehensive evidence on the relative importance of cooperative preferences, beliefs, and punishment across the globe. Based on our findings, we predict less variation in cooperative preferences than in beliefs across societies. Evidence on perceptions of trust from the World Values Survey can be used as a proxy for cooperative beliefs (see the discussion of beliefs in Section 2 and, for example, Thöni et al. (2012)). Since there is little variation in attitudes towards cooperation even between very different societies, perceptions of trust and trustworthiness will shape beliefs and predict relative cooperation in particular societies.

Third, we measure preferences, beliefs, and behavior in the specific context of a public goods game. Therefore, any application might be limited to situations with similar incentive structures. However, our behavioral mechanisms are not limited to the specific context in which we have applied them here. Future research can therefore use our behavioral mechanisms to analyze the behavioral determinants of voluntary cooperation of any group and should investigate whether our findings hold in other contexts.

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Author contributions TW and SG designed the study; TW organized the UK experiments; JS the US experiments; BB the Turkey experiments; and FLL the Morocco experiments. TW analyzed the data. TW, SG and JS wrote the paper. BB and FLL provided critical comments.

Data availability Data, software, and analysis codes are available at https://osf.io/m3u7v/ [made public upon acceptance of the paper].

Statements and declarations The authors declare that they have no conflict of interest.

References

Alesina, A., Giuliano, P., 2015. Culture and Institutions. Journal of Economic Literature 53, 898-944.

Algan, Y., Cahuc, P., 2013. Trust and Growth. Annual Review of Economics 5, 521-549.

Anderson, C. M., Putterman, L., 2006. Do non-strategic sanctions obey the law of demand? The demand for punishment in the voluntary contribution mechanism. Games and Economic Behavior 54, 1-24.

Apicella, C., Norenzayan, A., Henrich, J., 2020. Beyond WEIRD: A review of the last decade and a look ahead to the global laboratory of the future. Evolution and Human Behavior 41, 319-329.

Arechar, A. A., Gächter, S., Molleman, L., 2018. Conducting interactive experiments online. Experimental Economics 21, 99-131.
Balliet, D., Van Lange, P. A. M., 2013. Trust, Conflict, and Cooperation: A Meta-Analysis. Psychological Bulletin 139, 1090-1112.
Bigoni, M., Bortolotti, S., Casari, M., Gambetta, D., 2019. At the Root of the North-South Cooperation Gap in Italy: Preferences or Beliefs? Economic Journal 129, 1139-1152.
Bigoni, M., Bortolotti, S., Casari, M., Gambetta, D., Pancotto, F., 2016. Amoral Familism, Social Capital, or Trust? The Behavioural Foundations of the Italian North-South Divide. Economic Journal 126, 1318-1341.
Bilancini, E., Boncinelli, L., Celadin, T., 2022. Social value orientation and conditional cooperation in the online one-shot public goods game. Journal of Economic Behavior & Organization 200, 243-272.
Bisin, A., Verdier, T., 2011. Chapter 9 - The Economics of Cultural Transmission and Socialization. In Benhabib, J., et al., (Eds.), Handbook of Social Economics. North-Holland, pp. 339-416.
Blanco, M., Engelmann, D., Koch, A., Normann, H.-T., 2010. Belief elicitation in experiments: is there a hedging problem? Experimental Economics 13, 412-438.
Bohnet, I., Greig, F., Herrmann, B., Zeckhauser, R., 2008. Betrayal aversion. Evidence from Brazil, China, Oman, Switzerland, Turkey, and the United States. American Economic Review 98, 294-310.
Bohnet, I., Herrmann, B., Zeckhauser, R., 2010. Trust and the reference points for trustworthiness in Gulf and Western countries. Quarterly Journal of Economics 125, 811-828.
Boosey, L., Mark Isaac, R., Norton, D., Stinn, J., 2020. Cooperation, contributor types, and control questions. Journal of Behavioral and Experimental Economics 85, 101489.
Boyd, R., Richerson, P. J., 1985. Culture and the evolutionary process. University of Chicago Press, Chicago.
Boyd, R., Richerson, P. J., 2009. Culture and the evolution of human cooperation. Philosophical Transactions of the Royal Society B: Biological Sciences 364, 3281-3288.
Brislin, R. W., 1970. Back-Translation for Cross-Cultural Research. Journal of Cross-Cultural Psychology 1, 185-216.
Brosig-Koch, J., Helbach, C., Ockenfels, A., Weimann, J., 2011. Still different after all these years: Solidarity behavior in East and West Germany. Journal of Public Economics 95, 1373-1376.
Bruhin, A., Fehr, E., Schunk, D., 2019. The many Faces of Human Sociality: Uncovering the Distribution and Stability of Social Preferences. Journal of the European Economic Association 17, 1025-1069.
Bruhin, A., Janizzi, K., Thöni, C., 2020. Uncovering the heterogeneity behind cross-cultural variation in antisocial punishment. Journal of Economic Behavior & Organization 180, 291-308.
Carlsson, F., Johansson-Stenman, O., Nam, P. K., 2014. Social preferences are stable over long periods of time. Journal of Public Economics 117, 104-114.
Carpenter, J. P., 2007. The demand for punishment. Journal of Economic Behavior & Organization 62, 522-542.
Casari, M., 2005. On the design of peer punishment experiments. Experimental Economics 8, 107-115.
Chaudhuri, A., 2011. Sustaining cooperation in laboratory public goods experiments: a selective survey of the literature. Experimental Economics 14, 47-83.
Choi, S., Kim, B.-Y., Lee, J., Lee, S., 2020. A tale of two Koreas: Property rights and fairness. Journal of Economic Behavior & Organization 170, 112-130.
Chuah, S.-H., Gächter, S., Hoffmann, R., Tan, J. H. W., 2023. Who discriminates? Evidence from a trust game experiment across three societies. Journal of Economic Psychology 97, 102630.
Chuah, S. H., Gächter, S., Hoffmann, R., Tan, J. H. W., 2016. Religion, discrimination and trust across three cultures. European Economic Review 90, 280-301.
Chuang, Y., Schechter, L., 2015. Stability of experimental and survey measures of risk, time, and social preferences: A review and some new results. Journal of Development Economics 117, 151-170.
Cohn, A., Maréchal, M. A., Tannenbaum, D., Zünd, C. L., 2019. Civic honesty around the globe. Science 365, 70-73.
Croson, R., 2007. Theories of commitment, altruism and reciprocity: evidence from linear public goods games. Economic Inquiry 45, 199-216.

Cubitt, R., Drouvelis, M., Gächter, S., 2011. Framing and free riding: emotional responses and punishment in social dilemma games. Experimental Economics 14, 254–272.
Egas, M., Riedl, A., 2008. The economics of altruistic punishment and the maintenance of cooperation. Proceedings of the Royal Society B - Biological Sciences 275, 871-878.
Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., Sunde, U., 2018. Global Evidence on Economic Preferences. Quarterly Journal of Economics 133, 1645–1692.
Fehr, E., 2009. The economics and biology of trust. Journal of the European Economic Association 7, 235-266.
Fehr, E., Gächter, S., 2002. Altruistic punishment in humans. Nature 415, 137-140.
Fehr, E., Schurtenberger, I., 2018. Normative foundations of human cooperation. Nature Human Behaviour 2, 458-468.
Fischbacher, U., 2007. z-Tree: Zurich toolbox for ready-made economic experiments. Experimental Economics 10, 171-178.
Fischbacher, U., Gächter, S., 2010. Social preferences, beliefs, and the dynamics of free riding in public good experiments. American Economic Review. 100, 541–556.
Fischbacher, U., Gächter, S., Fehr, E., 2001. Are people conditionally cooperative? Evidence from a public goods experiment. Economics Letters 71, 397-404.
Fischbacher, U., Gächter, S., Quercia, S., 2012. The behavioral validity of the strategy method in public good experiments. Journal of Economic Psychology 33, 897-913.
Fisman, R., Miguel, E., 2007. Corruption, Norms, and Legal Enforcement: Evidence from Diplomatic Parking Tickets. The Journal of Political Economy 115, 1020-1048.
Fosgaard, T. R., Hansen, L. G., Wengström, E., 2014. Understanding the nature of cooperation variability. Journal of Public Economics 120, 134-143.
Frey, B. S., Meier, S., 2004. Social comparisons and pro-social behavior. Testing 'conditional cooperation' in a field experiment. American Economic Review. 94, 1717-1722.
Gächter, S., 2007. Conditional cooperation: Behavioral regularities from the lab and the field and their policy implications. In Frey, B. S., Stutzer, A., (Eds.), Psychology and Economics: A Promising New Cross-Disciplinary Field (CESifo Seminar Series). The MIT Press, Cambridge, pp. 19-50.
Gächter, S., 2010. (Dis)advantages of student subjects: What is your research question? Behavioral and Brain Sciences 33, 92-93.
Gächter, S., Herrmann, B., 2009. Reciprocity, culture, and human cooperation: previous insights and a new cross-cultural experiment. Philosophical Transactions of the Royal Society B – Biological Sciences 364, 791-806.
Gächter, S., Herrmann, B., 2011. The limits of self-governance when cooperators get punished: Experimental evidence from urban and rural Russia. European Economic Review 55, 193-210.
Gächter, S., Herrmann, B., Thöni, C., 2004. Trust, voluntary cooperation, and socio-economic background: survey and experimental evidence. Journal of Economic Behavior & Organization 55, 505-531.
Gächter, S., Herrmann, B., Thöni, C., 2010. Culture and cooperation. Philosophical Transactions of the Royal Society B: Biological Sciences 365, 2651-2661.
Gächter, S., Kölle, F., Quercia, S., 2017. Reciprocity and the tragedies of maintaining and providing the commons. Nature Human Behaviour 1, 650-656.
Gächter, S., Kölle, F., Quercia, S., 2022. Preferences and perceptions in Provision and Maintenance public goods. Games and Economic Behavior 135, 338-355.
Gächter, S., Renner, E., 2010. The effects of (incentivized) belief elicitation in public goods experiments. Experimental Economics 13, 364-377.
Gächter, S., Renner, E., 2018. Leaders as role models and 'belief managers' in social dilemmas. Journal of Economic Behavior & Organization 154, 321-334.
Gächter, S., Schulz, J. F., 2016. Intrinsic honesty and the prevalence of rule violations across societies. Nature 531, 496-499.
Greif, A., 1994. Cultural beliefs and the organization of society: A historical reflection on collectivist and individualist societies. Journal of Political Economy 102, 912-950.
Greiner, B., 2015. Subject pool recruitment procedures: organizing experiments with ORSEE. Journal of the Economic Science Association 1, 114-125.

Guiso, L., Sapienza, P., Zingales, L., 2006. Does culture affect economic outcomes? Journal of Economic Perspectives 20, 23-48.
Guiso, L., Sapienza, P., Zingales, L., 2008. Social Capital as Good Culture. Journal of the European Economic Association 6, 295-320.
Hauk, E., Saez-Marti, M., 2002. On the Cultural Transmission of Corruption. Journal of Economic Theory 107, 311-335.
Henrich, J., 2015. The Secret of Our Success: How Culture is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter. Princeton University Press, Princeton.
Henrich, J., 2020. The WEIRDest People in the World: How the West Became Psychologically Peculiar and Particularly Prosperous. Farrar, Strauss and Giroux, New York.
Henrich, J., Boyd, R., Bowles, S., Camerer, C. F., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Henrich, N., Hill, K., Gil-White, F., Gurven, M., Marlowe, F. W., Patton, J. Q., Tracer, D., 2005. "Economic man" in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. Behavioral and Brain Sciences 28, 795-855.
Henrich, J., Heine, S. J., Norenzayan, A., 2010. The weirdest people in the world? Behavioral and Brain Sciences 33, 61-83.
Herrmann, B., Thöni, C., 2009. Measuring conditional cooperation: a replication study in Russia. Experimental Economics 12, 87-92.
Herrmann, B., Thöni, C., Gächter, S., 2008. Antisocial punishment across societies. Science 319, 1362-1367.
Hofstede, G. H., Hofstede, G., 2001. Culture's consequences: Comparing values, behaviors, institutions and organizations across nations. Sage Publications, Thousand Oaks, CA.
Inglehart, R., Haerpfer C., Moreno A., Welzel C., Kizilova K., Diez-Medrano J., Lagos M., Norris P., Ponarin E., (eds.), P. B. e. a., 2014. World Values Survey: Round Five - Country-Pooled Datafile Version: www.worldvaluessurvey.org/WVSDocumentationWV5.jsp. Madrid: JD Systems Institute.
Inglehart, R., Welzel, C., 2005. Modernization, Cultural Change, and Democracy. The Human Development Sequence. Cambridge University Press, Cambridge.
Isler, O., Gächter, S., Maule, A. J., Starmer, C., 2021. Contextualised strong reciprocity explains selfless cooperation despite selfish intuitions and weak social heuristics. Scientific Reports 11, 13868.
Kaufmann, D., Kraay, A., 2016. Worldwide Governance Indicators. Dataset retrieved from: http://www.govindicators.org.
Keser, C., van Winden, F., 2000. Conditional cooperation and voluntary contributions to public goods. Scandinavian Journal of Economics 102, 23-39.
Kim, B.-Y., Choi, S., Lee, J., Lee, S., Choi, K., 2017. Do Institutions Affect Social Preferences? Evidence from Divided Korea. Journal of Comparative Economics 45, 865-888.
Knack, S., Keefer, P., 1997. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. Quarterly Journal of Economics 112, 1251-1288.
Kocher, M. G., Cherry, T., Kroll, S., Netzer, R. J., Sutter, M., 2008. Conditional cooperation on three continents. Economics Letters 101, 175-178.
Kocher, M. G., Martinsson, P., Matzat, D., Wollbrant, C., 2015. The role of beliefs, trust, and risk in contributions to a public good. Journal of Economic Psychology 51, 236-244.
List, J. A., 2004. Young, selfish and male: Field evidence of social preferences. Economic Journal 114, 121-149.
Martinsson, P., Pham-Khanh, N., Villegas-Palacio, C., 2013. Conditional cooperation and disclosure in developing countries. Journal of Economic Psychology 34, 148-155.
Molleman, L., Gächter, S., 2018. Societal background influences social learning in cooperative decision making. Evolution and Human Behavior 39, 547-555.
Molleman, L., Kölle, F., Starmer, C., Gächter, S., 2019. People prefer coordinated punishment in cooperative interactions. Nature Human Behaviour 3, 1145-1153.
Muthukrishna, M., Bell, A. V., Henrich, J., Curtin, C. M., Gedranovich, A., McInerney, J., Thue, B., 2020. Beyond Western, Educated, Industrial, Rich, and Democratic (WEIRD) Psychology: Measuring and Mapping Scales of Cultural and Psychological Distance. Psychological Science 31, 678-701.

Nikiforakis, N., 2008. Punishment and counter-punishment in public good games: Can we really govern ourselves? Journal of Public Economics 92, 91-112.

Nikiforakis, N., Engelmann, D., 2011. Altruistic punishment and the threat of feuds. Journal of Economic Behavior & Organization 78, 319-332.

Nikiforakis, N., Normann, H., 2008. A comparative statics analysis of punishment in public goods experiments. Experimental Economics 11, 358-369.

Oosterbeek, H., Sloof, R., van de Kuilen, G., 2004. Cultural differences in ultimatum game experiments: Evidence from a meta-analysis. Experimental Economics 7, 171-188.

Prediger, S., Vollan, B., Herrmann, B., 2014. Resource scarcity and antisocial behavior. Journal of Public Economics 119, 1-9.

Raihani, N. J., Bshary, R., 2019. Punishment: one tool, many uses. Evolutionary Human Sciences 1, e12.

Romano, A., Balliet, D., Yamagishi, T., Liu, J. H., 2017. Parochial trust and cooperation across 17 societies. Proceedings of the National Academy of Sciences 114, 12702-12707.

Roth, A. E., Prasnikar, V., Okuno-Fujiwara, M., Zamir, S., 1991. Bargaining and market behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: an experimental study. American Economic Review. 81, 1068-1095.

Rustagi, D., 2022. Historical Self-Governance and Norms of Cooperation. CeDEx Discussion Paper 2022-04, University of Nottingham.

Rustagi, D., Engel, S., Kosfeld, M., 2010. Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management. Science 330, 961-965.

Schulz, J. F., 2022. Kin Networks and Institutional Development. The Economic Journal 132, 2578-2613.

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

Sylwester, K., Herrmann, B., Bryson, J. J., 2013. *Homo homini lupus*? Explaining antisocial punishment. Journal of Neuroscience, Psychology, and Economics 6, 167-188.

Tabellini, G., 2008. The scope of cooperation: Values and incentives. Quarterly Journal of Economics 123, 905-950.

Thöni, C., 2014. Inequality aversion and antisocial punishment. Theory and Decision 76, 529-545.

Thöni, C., 2019. Cross-cultural behavioral experiments: potential and challenges. In Schram, A., Ule, A., (Eds.), Handbook of Research Methods and Applications in Experimental Economics. Edward Elgar Publishing, Cheltenham.

Thöni, C., Tyran, J.-R., Wengström, E., 2012. Microfoundations of social capital. Journal of Public Economics 96, 635-643.

Thöni, C., Volk, S., 2018. Conditional Cooperation: Review and Refinement. Economics Letters 171, 37-40.

Volk, S., Thöni, C., Ruigrok, W., 2012. Temporal stability and psychological foundations of cooperation preferences. Journal of Economic Behavior & Organization 81, 664-676.

Walker, J. M., Halloran, M. A., 2004. Rewards and sanctions and the provision of public goods in one-shot settings. Experimental Economics 7, 235-247.

Weber, T. O., Weisel, O., Gächter, S., 2018. Dispositional free riders do not free ride on punishment. Nature Communications 9, 2390.

ONLINE APPENDIX
The behavioral mechanisms of voluntary cooperation across culturally diverse societies: Evidence from the US, the UK, Morocco, and Turkey

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A. Cultural, economic, and institutional distance between subject pools

A.1. Cross-cultural and institutional indicators

Fig. A1 illustrates the link between proxies of societal beliefs related to cooperation and institutional indicators discussed in Section 2 of the main text (data are from Inglehart, et al. (2014) and Kaufmann and Kraay (2016)). Panel (*a*) illustrates the link between perceived risk of being taken advantage of (% of people agreeing with the statement "most people are trying to take advantage of me") and a Rule of Law indicator, and panel (*b*) with an indicator of Government Effectiveness. Panels (*c*) and (*d*) illustrate the link between the same institutional indicators and perceived trust, that is, % of people who agree with the statement "most people can be trusted". Fig. A1 shows that the US and UK are close together and distant from Turkey and Morocco.

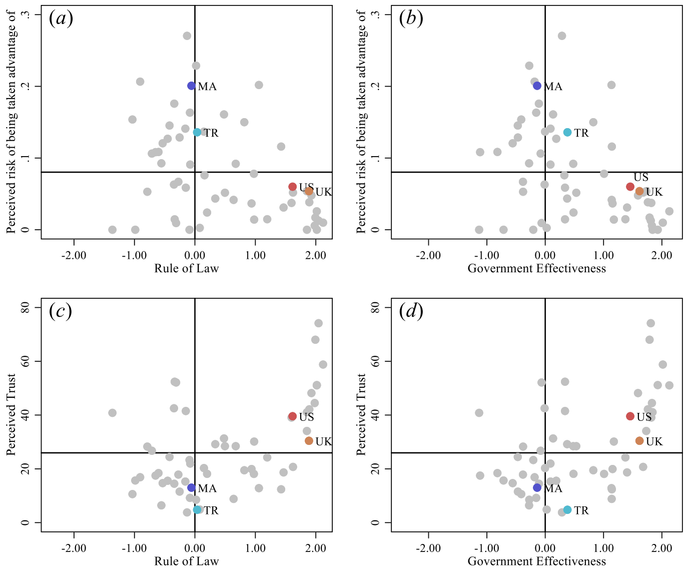


Fig. A1. Proxies for societal beliefs of cooperativeness and institutional indicators for the United States (US), United Kingdom (UK), Morocco (MA) and Turkey (TR). The grey dots represent all other countries for which data was available. The black lines indicate the sample average values. Perceived risk of being taken advantage of: percent of people who agree with the statement "most people are trying to take advantage of me" ($n = 58$) and Perceived Trust: percent of people who agree with the statement "most people can be trusted" ($n = 57$) by Inglehart, et al. (2014). Rule of Law (−2.39 = lowest rule of law; 2.12 = highest rule of law) and Government Effectiveness (−2.48 = lowest government effectiveness; 2.19 = highest government effectiveness) from the 2014 Worldwide Governance Indicators (Kaufmann and Kraay (2016)).

The rest of Appendix A provides support for claims made in Section 3.2 of the main text. To establish cultural, economic, and institutional similarity and distance between our subject pools, we proceed in two steps. First, we rely on established indicators. Second, we use a new dataset to establish a quantitative summary statistic of cultural distance between our subject pools.

Consistent with Fig. A1, Fig. A2 shows that our subject pools come from societies that belong to two distinct cultural clusters regarding twelve frequently used quantitative characterizations of societies. On eleven of the twelve dimensions, the US and UK are culturally distant from Morocco and Turkey. Panels (*a*) and (*b*) show four indicators often used in cross-cultural research (value orientations and cultural dimensions); panels (*c*) and (*d*) display four indicators of the quality of institutions (government effectiveness; prevalence of rule violations; rule of law; and GDP per capita); and panels (*e*) and (*f*) depict trust and norms of civic cooperation, and preferences for negative and positive reciprocity, with the latter variable being the only one that is not culturally clustered.

Inglehart and Welzel (2005) measure cultural values using responses from the World Values Survey (WVS). They argue that societal differences can be measured using two dimensions: *traditional values versus secular-rational values* and *survival values versus self-expression values*. The first dimension measures the importance of authority, traditional family values and religion in a society. The second dimension indicates the valuation of self-expression, individual well-being, and quality of life. The two dimensions are extracted from the WVS responses using factor analysis and together account for 71% of the cross-national variation (Inglehart and Welzel (2005)). Both, the US and the UK score high on self-expression values, but the importance of traditional and secular-rational values differs. The US scores higher on traditional values whereas the UK scores higher on secular-rational values. Morocco and Turkey score below the sample average in both dimensions showing a high emphasis on traditional values and survival values.

Hofstede's cultural dimensions (Hofstede and Hofstede (2001)) are a long-established set of dimensions to quantify cultural differences: *Individualism* measures the importance of the collective versus the individual. The degree of individualism or collectivism is a fundamental characteristic of any society (Greif (1994)). *Power distance* measures how unequal or egalitarian a society is. For the US and UK, individualism scores are amongst the highest of the sample and they score below the sample average for power distance. Both, Morocco and Turkey, score above the sample average for power distance. For individualism, Turkey is just below and Morocco slightly above the sample average.

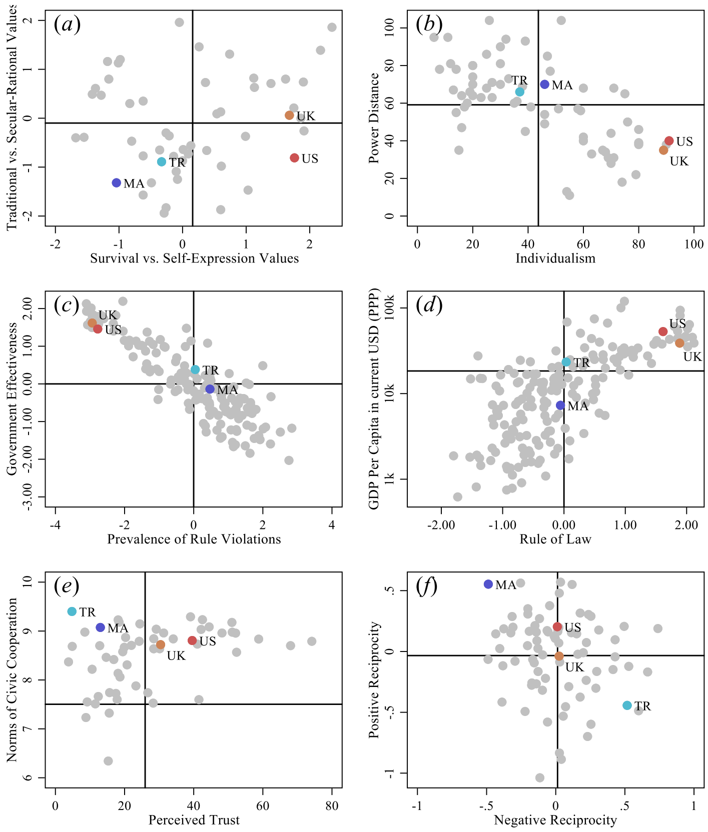


Fig. A2. Institutional and cultural indicators for the United States (US), United Kingdom (UK), Morocco (MA) and Turkey (TR). The grey dots represent all other countries for which data was available. The black lines indicate the sample average values. Panel (*a*): *Traditional vs. Secular-Rational Values* (−1.94 = strongest emphasis on traditional values; 1.96 = strongest emphasis on secular-rational values) and *Survival vs. Self-Expression Values* (−1.68 = strongest emphasis on survival values; 2.35 = strongest emphasis on self-expression values) from Inglehart and Welzel (2005); Panel (*b*): Cultural dimensions *Power Distance* (11 = lowest; 104 = highest) and *Individualism* (6 = least individualist; 91 = most individualist) from Hofstede and Hofstede (2001); Panel (*c*): *Government Effectiveness* (−2.48 = lowest government effectiveness; 2.19 = highest government effectiveness) from the 2014 Worldwide Governance Indicators (Kaufmann and Kraay (2016)) and *Prevalence of Rule Violations* (−3.10 = lowest; 2.84 = highest) from Gächter and Schulz (2016); Panel (*d*): World Bank *GDP Per Capita* in current USD (PPP) for 2015 and *Rule of Law* (−2.39 = lowest rule of law; 2.12 = highest rule of law) from the 2014 Worldwide Governance Indicators (Kaufmann and Kraay (2016)); Panel (*e*): *Norms of Civic Cooperation* (1 = very weak norm of civic cooperation; 10 = very strong norm of civic cooperation) from Knack and Keefer (1997), and *Perceived Trust*: percent of people who agree with the statement "most people can be trusted" by Inglehart, et al. (2014); Panel (*f*): *Positive Reciprocity* (−1.04 = lowest positive reciprocity; 0.57 = highest positive reciprocity) and *Negative Reciprocity* (−0.49 = lowest negative reciprocity; 0.74 = highest negative reciprocity) from the Global Preference Survey (Falk, et al. (2018)).

Amongst the indicators of institutional quality are *Government effectiveness* and *Rule of law*. They are drawn from the Worldwide Governance Indicators 2015 (Kaufmann and Kraay (2016), Kaufmann, et al. (2011)) and measure institutional quality. The US and UK score higher than the sample average for government effectiveness and rule of law. Morocco and Turkey score close to the sample average for government effectiveness and below the average for rule of law. These measures are directly linked to the quality of formal institutions such as the government and the judicial system. The *GDP per capita* (PPP) of both, the US and UK, is far above the sample average, whereas that of Morocco and Turkey lies below the sample average. *Prevalence of rule violations* (PRV, Gächter and Schulz (2016)) measures how common rule violations like corruption, tax evasion or political fraud are in a society. PRV is close to the sample average for the US and UK but lies below the average for Morocco and Turkey.

In addition to measures of culture and institutional quality, we draw on indicators of social capital and social preferences to measure the distance between societies. *Norms of civic cooperation* and *Perceived trust* relate to the strength of social norms in a society and are taken from the WVS. We calculate scores for norms of civic cooperation based on data from Wave 5 of the World Values survey (Knack and Keefer (1997)). The scores measure the acceptability of claiming government benefits one is not entitled to, fare-dodging on public transport and cheating on taxes (rescaled average value of WVS items V198-V200). All four countries' scores for norms of civic cooperation are higher than the sample average. Perceived trust in the US and UK lies above the sample average, whereas the scores for Morocco and Turkey are lower than the world average. The propensity to act in a positively and negatively reciprocal way might be an important factor of cooperation success in a society. We report *positive reciprocity* and *negative reciprocity* scores from the Global Preference Survey (Falk, et al. (2018)). We find a large societal variation in positive and negative reciprocity across the four societies with no clear pattern across the two cultural clusters.

A.2. Measuring cultural distance

Our second step is a quantitative measure to characterize the *cultural distance* between the countries of our subject pools. This acknowledges the fact that WEIRD and non-WEIRD is a continuum and not a dichotomy (Henrich, et al. (2010); Apicella, et al. (2020)). To calculate cultural distance, we turn to Muthukrishna, et al. (2020) who provide the most recent and most comprehensive data available. Using data from about 170,000 individuals from 80 countries, which represent approximately 85% of the world population, Muthukrishna *et al*. developed a quantitative measure of cultural distance between these 80 societies. Cultural distance is calculated as the ratio of the between-country and within-country variance in bilateral country comparisons of individual responses to questions in the World Values Survey (Waves 2005-09 and 2010-14). Questions are about a wide range of values and beliefs (e.g., attitudes to private affairs; family and religious values; attitudes to work; and political values).[1]

[1] Muthukrishna, et al. (2020) calculated cultural distance analogous to measures of the genetic distance of populations (e.g., Cavalli-Sforza, et al. (1994)). Cultural distance is calculated it as $(H_T - H_g)/H_T$ where H_T is the pairwise differences in answers of the WVS questions between two countries and H_g is the average number of pairwise differences in answers between two individuals from the same country. A cultural distance of 0 therefore

The cultural distance measures as calculated by Muthukrishna, et al. (2020) are illustrated in Figure A2. The data are taken from http://culturaldistance.com. Panel (*a*) illustrates cultural distance from the US; panel (*b*) from the UK; panel (*c*) from Morocco and panel (*d*) from Turkey. Taking the US as the baseline, the cultural distance to the UK is 0.05; whereas the cultural distance of the US to Turkey it is 0.12 and to Morocco it is 0.15. The country with the largest cultural distance from the US is Egypt with a distance of 0.23. Taking Morocco as the baseline shows that the cultural distance of Morocco to Turkey is 0.06; the cultural distance to the US is 0.15 and to the UK it is 0.23. The country with the largest cultural distance from Morocco is Sweden with a distance of 0.34. To put these numbers into perspective, note that the largest cultural distance in Muthukrishna *et al.*'s data set is 0.57 (between Egypt and Norway), and the smallest is 0.01 (between Ukraine and Russia).

The quantitative measures of cultural distance between any pair of countries provide further evidence for the two distinct clusters of the societies we selected. In terms of ranked cultural distance using the US as the baseline, the UK is the 6th closest country to the US; Turkey is ranked 47th; and Morocco is ranked 59th (Egypt is ranked 80th, that is, farthest away from the US). Taking Morocco as the baseline shows that Turkey is ranked 18th; the US is ranked 60th, and the UK is ranked 71st (farthest away is Sweden, ranked 80th).

From this diverse set of indicators, we conclude that our two clusters (UK & US vs Morocco & Turkey) come from two distant clusters, but share cultural similarity within their respective cluster. Thus, to the extent that we see differences in conditional cooperation, beliefs, and punishment between our subject pools, we expect them to be bigger between the clusters than within them.

means that countries share the exact same cultural values and beliefs; a value of 1 would imply two homogenous countries with entirely separate cultural values and beliefs.

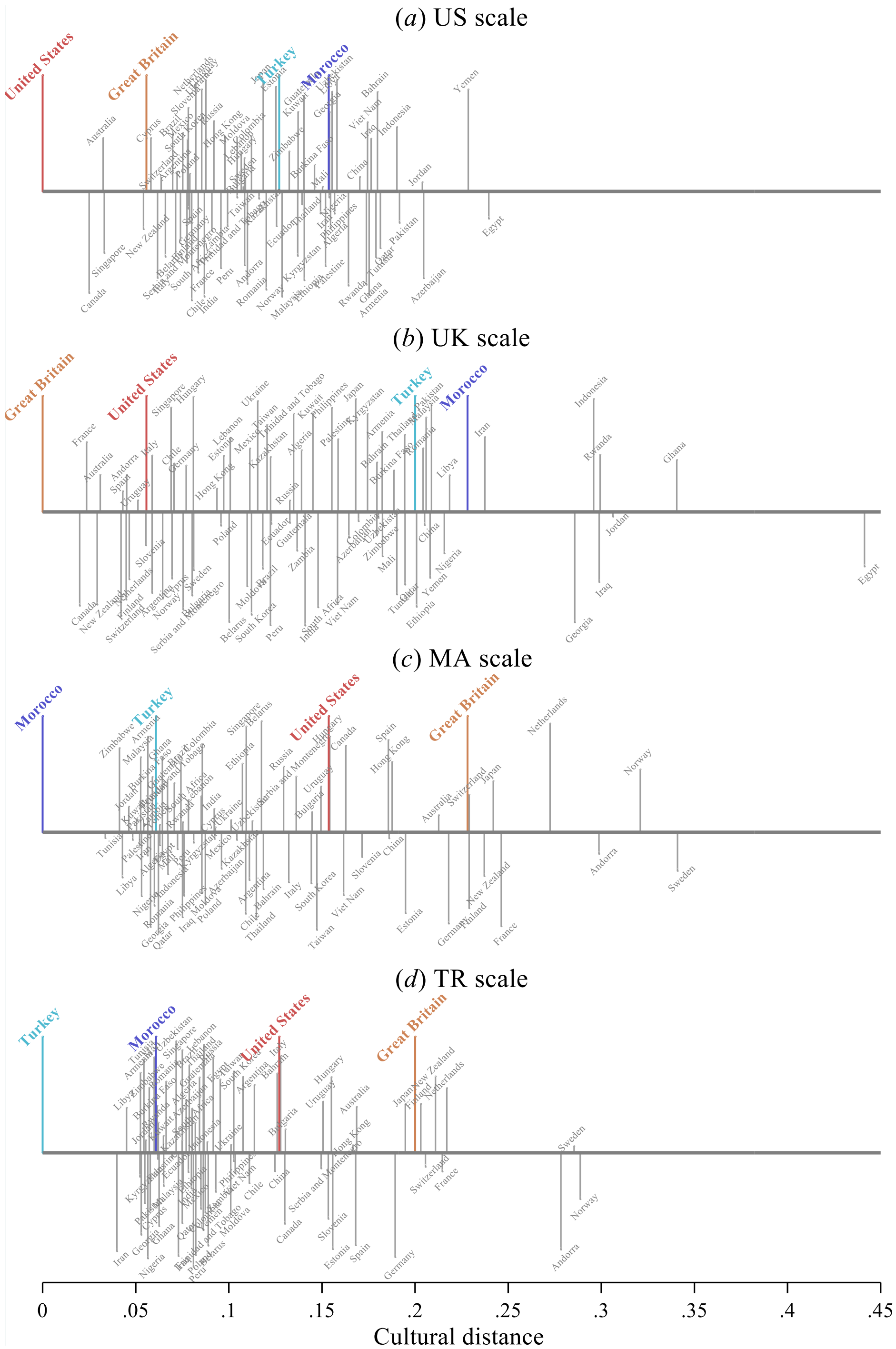


Fig. A3. Cultural distance from the respective benchmark country as calculated by Muthukrishna, et al. (2020). US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey.

B. Alternative classifications of cooperative attitudes

To check the robustness of our findings, we compare the distribution of cooperative attitudes across the four samples using the original classification of types by Fischbacher, et al. (2001). Again, we find that conditional cooperators (CC) account for the largest share of participants in all four samples with no significant difference in the share of CC across the four subject pools ($\chi^2(3) = 2.97$, $p = 0.396$). The shares of free riders (FR; $\chi^2(3) = 9.19$, $p = 0.027$) and the shares of unclassified others (OT; $\chi^2(3) = 7.63$, $p = 0.054$) vary across the four samples.

The distributions of cooperative attitudes are statistically significantly different across the four samples ($\chi^2(6) = 14.33$, $p = 0.026$). Comparing the UU and the MT cluster reveals weakly significant differences in the distributions of cooperative attitudes. Within clusters, there are no significant differences when comparing the distributions between the US and UK samples and weakly significant differences in the distribution of cooperative attitudes between the MA and TR samples.

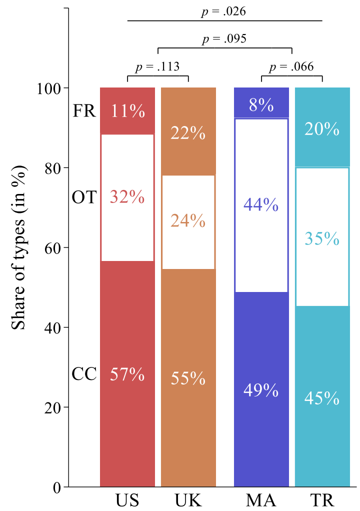


Fig. B1. The share of conditional cooperators (CC), free riders (FR) and others (OT) according to the classification by Fischbacher, et al. (2001)); p-values from a (pooled) χ^2 tests. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey.

C. Conditional contributions across subject pools

Table C1
Conditional contributions by CC across subject pools.

Dependent variable: conditional contribution	(1) By cluster	(2) By country
Average contributions of others	0.801*** (0.029)	0.802*** (0.037)
Average contribution of others × MT cluster	−0.193*** (0.048)	
MT cluster	0.242 (0.482)	
Average contribution of others × UK		−0.004 (0.059)
UK		0.728 (0.602)
Average contribution of others × MA		−0.284*** (0.062)
MA		0.892 (0.541)
Average contribution of others × TR		−0.109* (0.066)
TR		0.365 (0.712)
Socio-economic controls	Yes	
Constant	4.181 (2.532)	4.542* (2.618)
R^2	0.52	0.53
No. obs. (Clusters)	3822 (182)	3822 (182)

Notes: Includes only CC. OLS estimation with robust *SE* clustered on individuals in parentheses. The dependent variable is the conditional contribution elicited on the contribution table in the N-Game where participants indicated their own conditional contribution for each of the 21 average contributions of their group members. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. In Col. 1, only child is negative and weakly significant. In Col. 2, age is negative and weakly significant. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C1 Column 2 shows a statistically insignificant interaction term "Average contribution of others × UK" and UK dummy, indicating no within-cluster variation for the UU cluster. We find some within-cluster variation for the MT cluster with a lower increase of conditional contributions for a higher average contribution of others in the MA sample ($F(1, 181) = 5.71$, $p = 0.018$) but similar levels of conditional contributions in the MA and TR samples ($F(1, 181) = 0.62$, $p = 0.431$).

Table C2
Conditional contributions by OT across subject pools.

Dependent variable: conditional contribution	(1) By cluster	(2) By country
Average contributions of others	0.028 (0.034)	0.049 (0.039)
Average contribution of others × MT cluster	−0.029 (0.039)	
MT cluster	0.027 (0.999)	
Average contribution of others × UK		−0.054 (0.073)
UK		2.707** (1.333)
Average contribution of others × MA		−0.064 (0.050)
MA		0.304 (1.133)
Average contribution of others × TR		−0.032 (0.042)
TR		2.010 (1.397)
Socio-economic controls	Yes	Yes
Constant	−2.044 (6.226)	−2.946 (6.120)
R^2	0.03	0.06
No. obs. (Clusters)	2604 (124)	2604 (124)

Notes: Includes only OT. OLS estimation with robust *SE* clustered on individuals in parentheses. The dependent variable is the conditional contribution elicited on the contribution table in the N-Game where participants indicated their own conditional contribution for each of the 21 average contributions of their group members. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. None is significant at any conventional level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C2 Column 2 shows a statistically insignificant interaction term "Average contribution of others × UK" but a positive and significant UK dummy, indicating a higher level of conditional contributions in the UK compared to the US sample. For the MT cluster, we find no evidence for within-cluster variation with a statistically similar increase of conditional contributions for a higher average contribution of others ($F(1, 123) = 0.79$, $p = 0.376$) and statistically similar levels of conditional contributions in the MA and TR samples ($F(1, 123) = 1.03$, $p = 0.311$).

D. Accuracy of beliefs

Across the four samples, participants are on average imperfect conditional cooperators who condition their own kindness on their expected behavior of others. This conditional cooperation strategy works best if people can predict the behavior of others correctly. Furthermore, the accuracy of beliefs might be an important indicator for the saliency of contribution norms within a society. We define belief accuracy as the deviation of beliefs about other group members' unconditional contributions from others' actual unconditional contribution (Table D1). In the N-Game, we find a similar accuracy of beliefs across samples (Kruskal-Wallis tests, $\chi^2(3) = 4.31$, $p = 0.230$). Thus, for this game, there is some uncertainty about other people's behavior, but this uncertainty does not vary across the UU and MT cluster.

In the P-Game, we find significant differences in belief accuracy across samples (Kruskal-Wallis tests, $\chi^2(3) = 8.93$, $p = 0.030$). These differences stem from significantly different belief accuracies across clusters (pooled Mann-Whitney $Z = -2.46$, $p = 0.014$). We find no significant within-cluster differences in belief accuracy for the UU cluster (Mann-Whitney $Z = 1.52$, $p = 0.129$) or the MT cluster (Mann-Whitney $Z = -1.02$, $p = 0.308$).

Table D1

Deviation of beliefs from actual unconditional contributions (i.e., belief accuracy).

	N-Game	P-Game
United States ($N = 106$)	2.17 (4.88)	1.00 (5.38)
United Kingdom ($N = 88$)	0.79 (6.34)	−0.22 (6.16)
Morocco ($N = 80$)	1.60 (6.45)	1.59 (6.67)
Turkey ($N = 86$)	2.64 (6.41)	2.63 (6.74)

Notes: A positive value indicates that on average beliefs about others' unconditional contributions exceed others' actual unconditional contributions. *SD* in parentheses.

E. Accuracy of predicted contributions

Here we repeat the comparison of predicted contributions and the mean unconditional contributions reported in Section 4.3 of the main text for conditional cooperators only (Figure E1). Only conditional cooperators are expected to systematically condition their contributions on their beliefs about the contribution of others. For conditional cooperators, predicted contributions are comparable to actual unconditional contributions for all but the MA sample (Wilcoxon signed-rank test $Z_{\mathrm{US}} = 1.04$, $p_{\mathrm{US}} = 0.302$; $Z_{\mathrm{UK}} = 1.21$, $p_{\mathrm{UK}} = 0.231$; $Z_{\mathrm{MA}} = 1.05$, $p_{\mathrm{MA}} = 0.300$; $Z_{\mathrm{TR}} = 1.94$, $p_{\mathrm{TR}} = 0.051$).

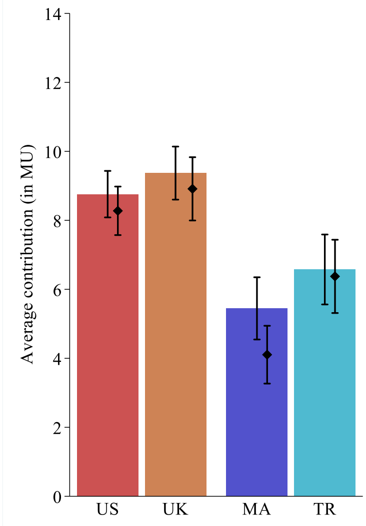


Fig. E1. Average unconditional contributions to the public good by CC types only in the N-Game by country. Diamonds (♦) indicate the average predicted contributions based on cooperative attitudes and beliefs. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey. The error bars indicate ±1 *SEM*.

Following Fischbacher, et al. (2012), we calculate the predicted unconditional contribution for each participant using their schedule and unconditional belief. We then calculate the deviation between the predicted and the actual contribution (Figure E1). 61% in the US, 61% in the UK, 61% in the MA and 63% in the TR sample are consistent with predicted contributions, allowing for a deviation of ±2 tokens. The average deviation from predicted contributions is not significantly different across the four samples (Kruskal-Wallis test, $\chi^2(3) = 1.14$, $p = 0.768$).

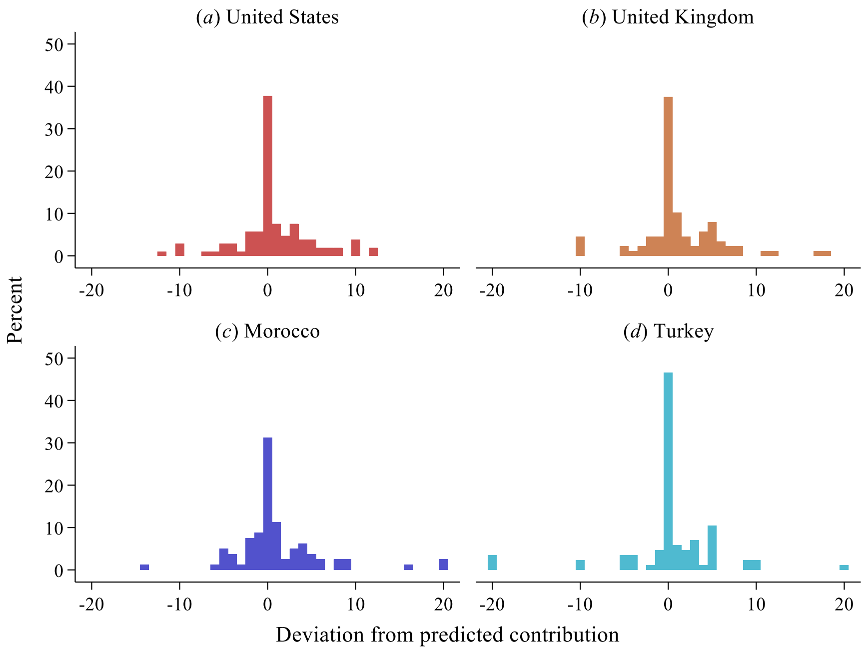


Fig. E2. Deviations from predicted contributions in the four countries. A positive value indicates that the actual contributions exceed predicted contributions.

F. Testing the independence of cooperative attitudes and punishment

Here we test the assumption that an individual's preference for punishment of others is independent from their cooperative attitudes (that is, p_{ij}^{s} is independent of a_{i}^{s}—see Section 3.1 in the main paper; Weber, et al. (2018); and Molleman, et al. (2019)). We find similar prosocial punishment expenditures when comparing the two most prevalent types of cooperative attitudes in the UU cluster (pooling US & UK; $M_{CC} = 0.57$, $M_{FR} = 0.79$; Mann-Whitney $Z = 0.42$, $p = 0.690$; each participant as an independent observation) and MT cluster (pooling Morocco & Turkey; $M_{CC} = 0.78$, $M_{FR} = 0.36$; Mann-Whitney $Z = 0.57$, $p = 0.695$; each participant as an independent observation). Furthermore, similar proportions of the two types engage in prosocial punishment in the UU cluster (41% CC vs. 31% FR; $\chi^2(1) = 0.51$, $p = 0.477$) and MT cluster (34% CC vs. 20% FR; $\chi^2(1) = 0.40$, $p = 0.525$). We therefore conclude that the assumption that p_{i}^{s} is independent of a_{i}^{s} is justified for the UU and MT samples included in this study. This means that in all samples studied here, free riders and conditional cooperators are equally likely to punish those who free ride.

G. Regression analysis of expected and realized punishment

We use Tobit regression models to test for differences in expected punishment across the UU and MT cluster (Table G1). Although some authors suggest a two-stage regression model in order to separate between the likelihood of punishment and the punishment severity (Nikiforakis and Engelmann (2011); Weber, et al. (2018)), splitting the regression analysis in two steps is not feasible due to a small sample size and relatively few punishment incidences in our one-shot game.

As independent variables, we include the absolute negative deviation in the contribution levels between the punisher and the person receiving the punishment. Additionally, we include the positive contribution deviation between the punisher and the person receiving the punishment. We first estimate the models separately for the four societies (Table G1; Col. 1-4). In all but the MA sample, subjects expect a significant increase in punishment for larger negative deviation from the punisher's contribution. In the US and TR samples, subjects' expected punishment also increases in the positive deviation from the punisher's contribution.

We also estimate a pooled model with further explanatory variables to test for differences between cultural clusters (Table G1; Col. 5). We include a dummy variable for the MT cluster and interaction terms between the dummy variable and the contribution deviation.

Additionally, we include socio-economic controls (age, gender, urban background, middle class, single child, economics, or business student). We find weakly significantly lower levels of expected punishment in the MT compared to the UU cluster ($b = -0.691$, $p = 0.089$). The highly significant negative interaction term "Absolute negative deviation × MT cluster" indicates a lower expected punishment for negative contribution deviations in the MT cluster ($b = -0.131$, $p = 0.009$). The statistically insignificant interaction term "Positive negative deviation × MT cluster" suggests similar reactions to positive contribution deviations across clusters ($b = 0.015$, $p = 0.812$).

To test for within-cluster differences, we run a similar pooled regression model with UK, MA and TR dummies and the respective interaction terms (Table G1; Col. 6). The weakly significant negative interaction term "Positive deviation × UK" suggests lower expected punishment for positive contribution deviations in the UK compared to the US sample ($b = -0.149$, $p = 0.070$). We find no evidence for differences in the expected punishment for negative contribution deviations ($b = -0.001$, $p = 0.988$) or level differences in expected punishment within the UU cluster ($b = 0.775$, $p = 0.118$).

Next, we check for within-cluster differences in the MT cluster by testing for significant differences in the coefficient sizes of the MA and TR dummies as well as their respective interaction terms. We find a significantly lower expected punishment for negative contribution deviations in the MA compared to the TR sample ($F(1, 1063) = 5.05$, $p = 0.025$), but a statistically similar expected punishment for positive contribution levels ($F(1, 1063) = 0.64$, $p = 0.426$) and expected punishment levels ($F(1, 1063) = 0.72$, $p = 0.396$).

To investigate societal differences in realized punishment, we estimate Tobit models with a similar specification as discussed above (Table G2). Now, the dependent variable is the number of actual punishment points. The absolute negative deviation now refers to the deviation of a group member from the punisher and shows prosocial punishment. A positive deviation indicates higher contributions compared to the punisher which implies antisocial punishment.

Table G1
Regression analysis of *expected* punishment.

Dependent variable: expected punishment	(1) US	(2) UK	(3) MA	(4) TR	(5) By cluster	(6) By country
Absolute negative deviation	0.205*** (0.048)	0.205*** (0.044)	−0.002 (0.081)	0.195*** (0.059)	0.240*** (0.035)	0.235*** (0.051)
Positive deviation	0.087 (0.056)	−0.043 (0.051)	−0.001 (0.094)	0.072 (0.060)	0.027 (0.042)	0.100* (0.059)
Absolute negative deviation × MT cluster					−0.131*** (0.050)	
Positive deviation × MT cluster					0.015 (0.062)	
MT cluster					−0.691* (0.406)	
Absolute negative deviation × UK						−0.001 (0.066)
Positive deviation × UK						−0.149* (0.082)
UK						0.775 (0.495)
Absolute negative deviation × MA						−0.238*** (0.082)
Positive deviation × MA						−0.108 (0.095)
MA						−0.535 (0.650)
Absolute negative deviation × TR						−0.057 (0.069)
Positive deviation × TR						−0.034 (0.081)
TR						0.081 (0.538)
Socio-economic control variables	No	No	No	No	Yes	Yes
Constant	−0.859** (0.391)	−0.360 (0.337)	−2.492*** (0.793)	−1.473*** (0.509)	−2.061 (1.385)	−2.079 (1.407)
Pseudo R^2	0.03	0.06	< 0.01	0.02	0.04	0.05
No. obs. (Clusters)	318 (106)	264 (88)	240 (80)	258 (86)	1080 (360)	1080 (360)

Notes: Tobit coefficients. Robust *SE* clustered on individuals. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. In Col. 5, middle class is negative and significant, economist is negative and weakly significant. In Col. 6, female is positive and weakly significant, economist is negative and significant. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

First, we estimate regression analyses for each society separately (Table G2; Col. 1-4). For all but the MA sample, the punishment expenditure increases significantly for a larger negative contribution deviation. For the TR sample, punishment decreases significantly if the other group member contributes more than the punisher.

Comparing differences across the UU and MT clusters yields no significant level differences in punishment expenditure ($b = 0.048$, $p = 0.944$; Table G2; Col. 5). Yet, the negative and weakly significant interaction term "Absolute negative deviation × MT cluster" ($b = -0.171$, $p = 0.070$) and the negative and significant interaction term "Positive deviation × MT cluster" ($b = -0.276$, $p = 0.015$) indicate lower punishment of negative and positive deviations in the MT compared to the UU cluster. This shows that there is less punishment of free riding and less antisocial punishment in the MT cluster.

To investigate differences in punishment expenditure within clusters, we estimate a similar regression model with UK, MA and TR dummies and their respective interaction terms (Table G2; Col. 5). The statistically insignificant UK dummy and interaction terms "Absolute negative deviation × UK" ($b = 0.069$, $p = 0.603$) and "Positive deviation × UK" ($b = 0.087$, $p = 0.486$) reveal no variation in punishment expenditure within the UU cluster.

Next, we test for within-cluster differences in the MT cluster by testing for significant differences in the coefficient sizes of the MA and TR dummies as well as their respective interaction terms. We find no evidence for differences in punishment of negative contribution deviations ($F(1, 1063) = 2.65$, $p = 0.104$), positive contributions ($F(1, 1063) = 0.01$, $p = 0.926$) or level differences in punishment expenditure ($F(1, 1063) = 0.23$, $p = 0.629$).

Table G2
Regression analysis of *actual* punishment.

Dependent variable: expected punishment	(1) US	(2) UK	(3) MA	(4) TR	(5) By cluster	(6) By country
Absolute negative deviation	0.304*** (0.106)	0.334*** (0.102)	−0.008 (0.165)	0.237*** (0.090)	0.325*** (0.072)	0.293*** (0.095)
Positive deviation	0.004 (0.083)	0.078 (0.083)	−0.352 (0.261)	−0.206** (0.104)	0.047 (0.063)	0.007 (0.081)
Absolute negative deviation × MT cluster					−0.171* (0.095)	
Positive deviation × MT cluster					−0.276** (0.113)	
MT cluster					0.048 (0.688)	
Absolute negative deviation × UK						0.069 (0.133)
Positive deviation × UK						0.087 (0.125)
UK						−1.093 (0.958)
Absolute negative deviation × MA						−0.288* (0.147)
Positive deviation × MA						−0.250 (0.177)
MA						−0.040 (1.000)
Absolute negative deviation × TR						−0.054 (0.125)
Positive deviation × TR						−0.233* (0.131)
TR						−0.608 (0.921)
Socio-economic control variables	No	No	No	No	Yes	Yes
Constant	−4.220*** (0.980)	−4.441*** (1.086)	−5.554** (2.465)	−3.850*** (1.050)	−9.832*** (2.587)	−9.358*** (2.652)
Pseudo R^2	0.05	0.09	0.02	0.09	0.7	0.08
No. obs. (Clusters)	318 (106)	264 (88)	240 (80)	258 (86)	1080 (360)	1080 (360)

Notes: Tobit coefficients. Robust *SE* clustered on individuals. Socio-economic control variables: age, female, urban background, middle class, single child, economics/business student. In Col. 5-6, age is positive and significant. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

H. Accuracy of expected punishment

We investigate whether there are differences in the accuracy of expected punishment (defined as the deviation of expected punishment from actual punishment) across the four samples (Figure H1). In the US sample, 48% of beliefs about punishment are correct and 40% over-predict punishment. In the UK sample, 47% of instances are correctly predicted and 44% are overestimated. In the MA sample, 70% of punishment actions are correctly predicted. Here, participants overestimate the number of punishment points in 22% of instances. In the TR sample, 51% of punishment actions are correctly predicted and 38% are overestimated. Comparing the accuracy of beliefs about punishment across subject pools reveals highly significant differences (Kruskal-Wallis test, $\chi^2(3) = 18.93$, $p < 0.001$). These differences stem from highly significant across-cluster differences (pooled Mann-Whitney $Z = 2.97$, $p = 0.003$) and highly significant differences within the MT cluster (Mann-Whitney $Z = -2.91$, $p = 0.004$). We find a similar accuracy of beliefs within the UU cluster (Mann-Whitney $Z = -1.25$, $p = 0.212$). These results hint at differences in the salience of punishment norms across countries. In the MA sample, punishment is less prevalent, and a large share of people correctly predict the number of punishment points they actually receive. Therefore, the norm to punish defectors seems to be relatively weak. In the UK sample, punishment of defectors is more severe, but people overestimate the use of punishment.

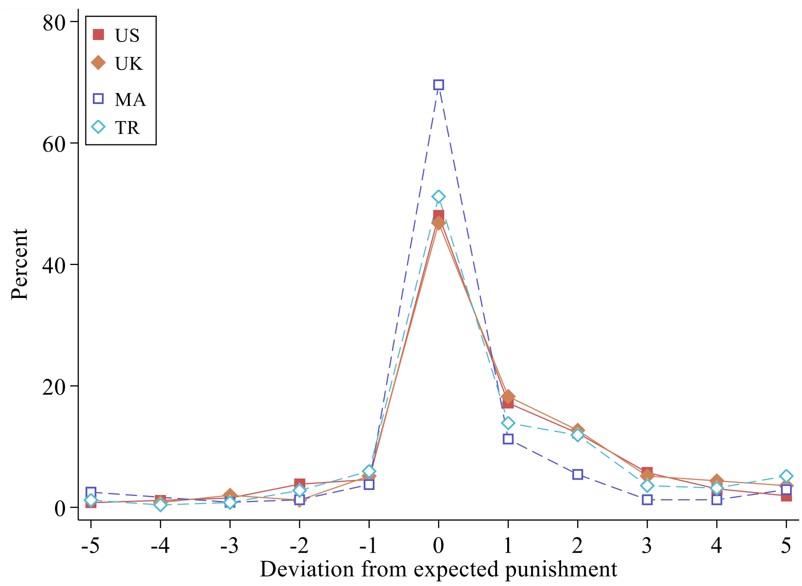


Fig. H1. Accuracy of expected punishment. If the deviation of expected punishment from the actual punishment equals zero, then beliefs are correctly predicted. A positive deviation shows an overestimation of punishment and a negative deviation indicates an underestimation. US = United States; UK = United Kingdom; MA = Morocco; TR = Turkey.

I. Assessing the relative importance of cooperative attitudes and beliefs for cooperation

The regression analyses of contribution behavior provided in Tables 3 and 4 of the main paper include predicted contributions ($\widehat{c_i}$), based on the experimental measures of cooperative attitudes (a_i^s) and beliefs (b_i^s). These regression models therefore do not readily disentangle the relative effects of a_i^s and b_i^s on contributions. To separate the effects, we conduct a simulation inspired by Fosgaard, et al. (2014). This procedure consists of the following steps:

1. We estimate the following OLS regression on the full sample:

$$Y_i = \beta_0 + \beta_1 PredC_i + \beta_2 b_i + \beta_3 MT_i + \epsilon_i.$$

In this regression equation the dependent variable Y_i is either the unconditional contribution in the N-Game or contribution in the P-Game. The independent variables are the predicted contribution $PredC_i$ ($= \hat{c}_i = a_i(b_i)$) as explained in the main text. The linear regression model reflects the assumption of a linear relationship between the independent variables and the dependent variable. For simplicity, we do not use a censored model as the predicted values very rarely fall outside the assumed contribution range. Table I1 shows the regression results which are used to calculate the predicted contributions in the next step.

Table I1
Explaining contribution behavior.

Dependent variable: contribution	(1) N-Game	(2) P-Game
Predicted contribution	0.558*** (0.073)	0.318*** (0.059)
Belief	0.195** (0.078)	0.573*** (0.073)
MT cluster	−0.905* (0.487)	−2.042*** (0.498)
Constant	2.129*** (0.481)	1.614*** (0.523)
R^2	0.48	0.56
No. obs.	360	360

Notes: OLS estimation with robust *SE*. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

2. We randomly draw (with replacement) 90 contribution tables from the N-Game (our measure of cooperative attitudes a_i^c and proxy for preferences) and 90 beliefs b_i^c from

each cluster $c \in \{UU, MT\}$. 90 corresponds to the average country sample size in the experiment.

3. The following four sets of predicted contributions are calculated using the coefficients from Table I1. Thus, this step will generate 90 predicted values for each of the four estimations explained below.
    a. *Estimation 1*: We calculate predicted contributions based on the 90 pairs of randomly drawn beliefs and contribution tables from the UU cluster with the dummy variable set to zero. These values represent our predicted behavior in the UU cluster and serve as our baseline against which further predicted values are compared.
    b. *Estimation 2*: We calculate predicted contributions based on beliefs from the MT cluster, but contribution tables from the UU cluster and the dummy variable set to zero.
    c. *Estimation 3*: We calculate predicted contributions based on beliefs and contribution tables from the MT cluster, but with the dummy variable set to zero.
    d. *Estimation 4*: We calculate predicted contributions based on beliefs and contribution tables from the MT cluster and with the dummy variable set to one (reflecting the MT cluster).
4. For each of the four predicted contributions from Estimations 1-4, we calculate the average over the 90 predicted values.
5. In a standard bootstrapping approach, Steps 2-4 are repeated 100 times. Figure I1 shows the actual average unconditional contributions in the UU cluster as well as the average predicted contributions obtained in the bootstrapping procedure.

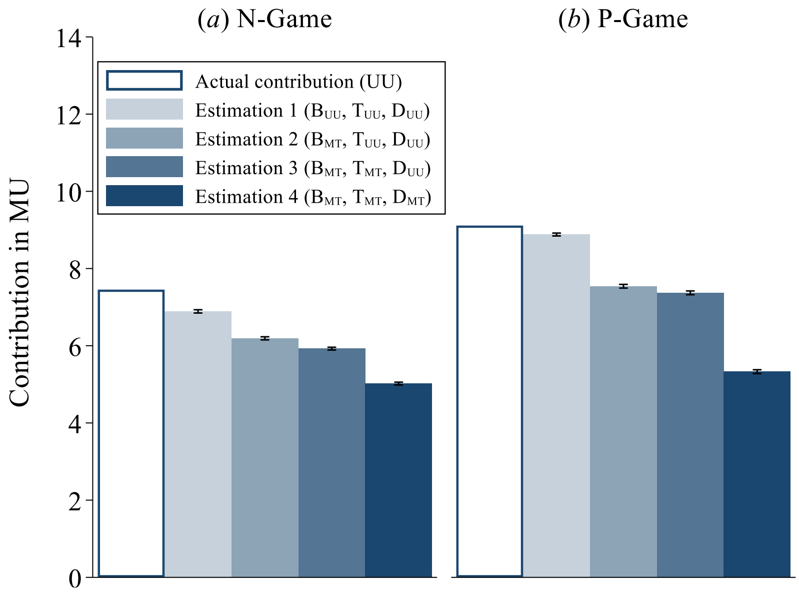


Fig. I1. Average predicted contributions from the bootstrapping procedure for the N-Game (Panel *a*) and the P-Game (Panel *b*). The error bars indicate ±1 bootstrapped *SEM*.

6. Finally, we decompose the total difference in predicted contributions between the two clusters in the belief effect, preference effect and remaining unexplained effect:
   a. *Estimation 4 – Estimation 1* = Total effect
   b. *Estimation 2 – Estimation 1* = Belief effect
   c. *Estimation 3 – Estimation 2* = Preference effect
   d. *Estimation 4 – Estimation 3* = Remaining unexplained effect

Thus, the predicted total effect of cross-cluster differences on contributions can be decomposed in the belief effect, preference effect and the remaining unexplained effect captured by the dummy variable. For example, the belief effect is the difference in predicted contributions in Estimation 1 and Estimation 2 weighted relative to the average contribution in the UU cluster.

For the N-Game (Figure I2a), we find a −25% difference in contributions (relative to the sample average) in the MT compared to the UU cluster. This total effect can be split into a 9 percentage points belief effect (i.e., 37% of the contribution gap), 4 percentage points preference effect (i.e., 14% of the contribution gap) and 12 percentage points are unexplained. Put differently, the belief effect in explaining the contribution differences is 2.6 times larger than the preference effect. In the P-Game (Figure I2b), the predicted cluster differences in contributions amount to −39% (relative to the sample average) in the MT compared to the UU cluster, comprising a −15 percentage points belief effect (i.e., 38% of the contribution gap), −2 percentage points preference effect (i.e., 5% of the contribution gap) with −22 percentage points remaining unexplained. Therefore, the simulation confirms that beliefs emerge as the relatively more important factor than preferences in explaining across-cluster differences in contributions in both games.

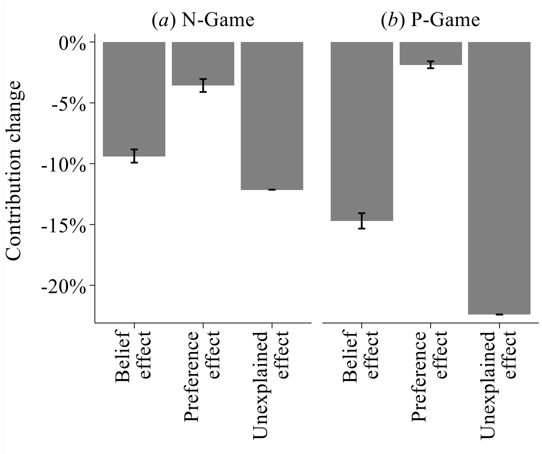


Fig. I2. Decomposing the cross-cluster difference in contribution behavior into the belief, preference, and unexplained effect for the N-Game (Panel *a*) and the P-Game (Panel *b*). The negative effects reflect that the UU cluster serves as the baseline. Percentage change relative to the sample average contribution in the respective game. The error bars indicate ±1 bootstrapped *SEM*.

J. Instructions for the N-Game

This version of the instructions was used in the UK and the US. The Arabic and Turkish translations are available on request.

You are now taking part in an economic experiment. Depending on the decisions made by you and other participants, you can earn a considerable amount of money. It is therefore very important that you read these instructions with care.

These instructions are solely for your private use. **It is prohibited to communicate with other participants during the experiment.** If you have any questions, please raise your hand. A member of the experiment team will come and answer them in private. If you violate this rule, you will be dismissed from the experiment and you will forfeit all payments.

During the experiment, we will not speak in terms of Pounds, but in Guilders. At the end your entire earnings will be calculated in Guilders. The total amount of Guilders you have earned will be converted to Pounds at the following rate:

1 Guilder = 0.20 Pounds

After this experimental session, your entire earnings from the experiment will be paid to you privately in cash.

At the end of the session, you will be asked to fill in a questionnaire. The answers you provide in this questionnaire are completely anonymous. They will not be revealed to anyone either during the experiment or after it. Furthermore, your responses to the questionnaires will not affect your earnings during the experiment.

The groups
At the beginning of the experiment, all participants will be randomly divided into groups of four. Apart from you, there will be three other members in your group. **You will not learn who the other people in your group are at any point.**

The decision situation
Each participant receives an endowment of **20 tokens**. You have to decide how many of these 20 tokens you will contribute to a group project, and how many you will keep for yourself. The three other members of your group have to make the same decision. They can also either contribute tokens to the project or keep tokens for themselves. You and the other members of the group can each choose any amount between 0 and 20 tokens to contribute (including 0 and 20).

The payoffs
The income of every member of the group is calculated in the same way. Your income consists of two components:

(1) The first component is the amount of tokens that you keep for yourself. Every token that you do not contribute to the project automatically belongs to you and earns you one Guilder.

(2) The second component is your personal return from the group project. For all of the tokens contributed to the project the following happens: the project's value will be multiplied by 1.6 and this amount will be divided equally among all four members of the group.

For example, if 1 token is contributed to the project, the project's value increases to 1.6 Guilders. This amount is divided equally among all four members of the group. Thus every group member receives 0.4 Guilders.

The following function illustrates your income in Guilders:

$$\textit{Your Total Income} = 20 - \textit{Your Contribution} + 0.4 \times (\textit{Group Project})$$

In order to explain the income calculation we will give some examples. Please read them carefully. At the end of the introductory information, you will be asked to answer several computerised control questions which are designed to check that you have understood the decision situation.

Example 1
If each of the four members of the group contributes 0 tokens to the project, all four will receive an income from their private account of 20. Nobody receives anything from the project, because no one contributed anything. Therefore the total income of every member of the group is 20 Guilders.

Calculation of the total income of every participant: $(20 - 0) + 0.4 \times (0) = 20$

Example 2
If each of the four members of the group contributes 20 tokens, there will be a total of 80 tokens contributed to the project. The income from the private account is 0 for everyone, but each member receives an income from the project of $0.4 \times 80 = 32$ Guilders.

Calculation of the total income of every participant: $(20 - 20) + 0.4 \times (80) = 32$

Example 3
If you contribute 20 tokens, the second member 10 tokens, the third member 5 and the fourth 0 tokens, the following incomes are calculated:

Because the total contribution to the project is 35 tokens, everyone will receive $0.4 \times 35 = 14$ Guilders from the project.

You contributed all your 20 tokens to the project. You will therefore receive 14 Guilders in total at the end of the experiment.

The second member of the group also receives 14 Guilders from the project. In addition, she receives 10 Guilders from her private account, because she contributed 10 tokens to the project. Thus, her total income is 24 Guilders altogether.

The third group member receives 14 Guilders from the project as well. Additionally, this group member will receive 15 Guilders from her private account. The total income therefore adds up to 29 Guilders.

The fourth member of the group, who did not contribute anything, also receives the 14 Guilders from the project and additionally the 20 Guilders from the private account, which means her total income is 34 Guilders.

Calculation of your total income: (20 - 20) + 0.4 × (35) = 14
Calculation of the 2nd group member's total income: (20 - 10) + 0.4 × (35) = 24
Calculation of the 3rd group member's total income: (20 - 5) + 0.4 × (35) = 29
Calculation of the 4th group member's total income: (20 - 0) + 0.4 × (35) = 34

Example 4
The three other members of your group contribute 20 tokens each to the project. You do not contribute anything. In this case the incomes will be calculated as follows:

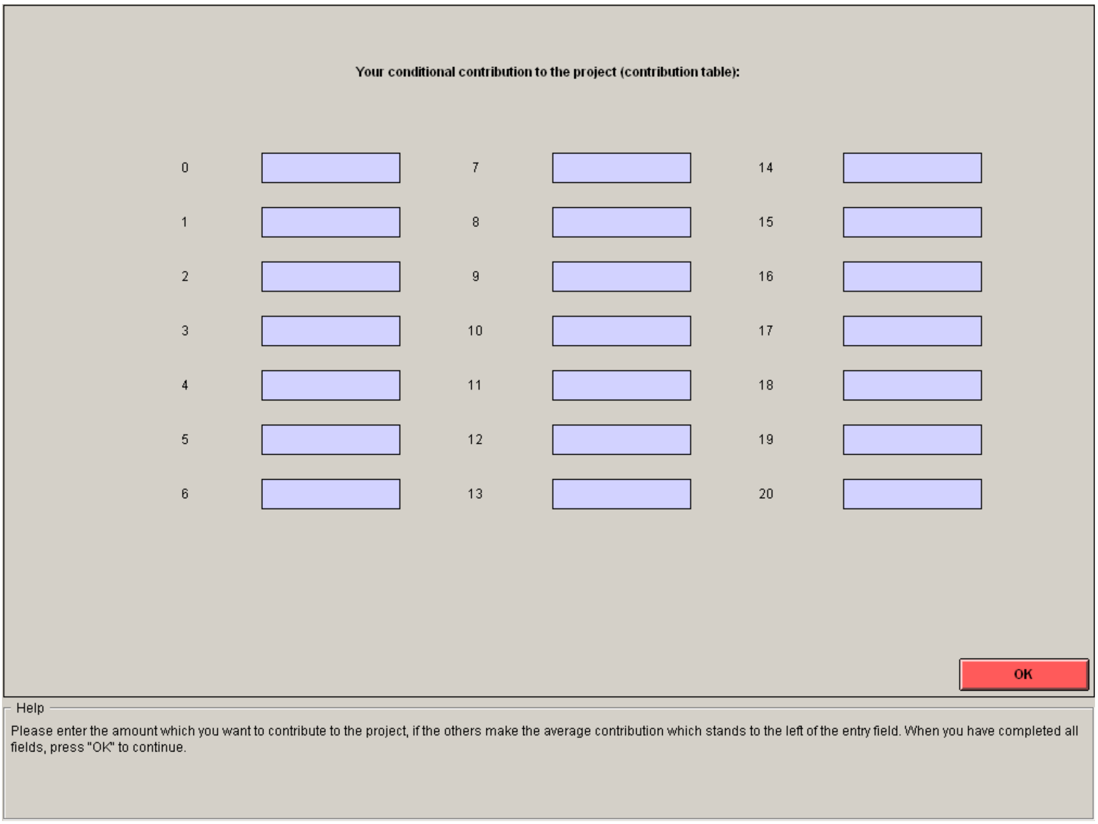
Calculation of your total income: (20 - 0) + 0.4 × (60) = 44
Calculation of the total income of each other group member: (20 - 20) + 0.4 × (60) = 24

The experiment
The experiment is based on the decision situation just described to you, conducted **only once**. In this experiment you will make two types of decisions: an **unconditional contribution** and filling in a **contribution table**.

When making your **unconditional contribution**, the following screen will appear:

As mentioned above, your endowment in the experiment is 20 tokens. You have to decide how many tokens you contribute to the project by typing a number between 0 and 20 (including 0 and 20) in the box. This box can be reached by clicking on it with the mouse. By deciding how many tokens to contribute to the project, you automatically decide how many tokens you keep for yourself. After entering the amount of tokens you want to contribute you must click on the "*OK*" button. Once you have done this, your decision can no longer be revised.

Your second task is to fill in a **contribution table** on the following screen:



The contribution table indicates **how many tokens you want to contribute to the project for each possible average contribution of the other group members** (rounded to the nearest integer). The table allows for conditioning your contribution on that of the other group members.

The numbers to the left of the input fields are the possible average contributions of the **other** group members (rounded to the nearest integer). You have to enter how many tokens you want to contribute to the project - conditional on the indicated average contribution of the other group members. **You must enter a number between 0 and 20 (including 0 and 20) into each box.**

For example, in the first box you enter the amount of tokens you want to contribute to the project in case the average contribution to the project of the other three group members is 0 tokens. In the next boxes you enter how much you contribute for an average contribution of 1, 2, 3, … tokens. After entering your decisions, you must click on the "*OK*" button.

After all participants of the experiment have made an unconditional contribution and have filled their contribution table, a random mechanism will select one member from every group. For **this group member, the contribution table** will be used to determine the contribution to the project. Whereas for **the other three group members, their unconditional contributions** will define the amount of tokens they add to the project.

You will not know whom the random mechanism will select before you make your unconditional contribution and fill in the contribution table. Therefore you must think carefully about both decisions. Either of them could determine your actual contribution to the project.

Example 5
Suppose that the **random mechanism selects you**; and that the other three group members made unconditional contributions of 0, 2, and 4 tokens, respectively. The average contribution of these three group members is, therefore, 2 tokens. If you indicated in your contribution table that you will contribute 1 token if the others contribute 2 tokens on average, then the total contribution to the project is given by $0 + 2 + 4 + 1 = 7$ tokens. Each group member would, therefore, earn $0.4 \times 7 = 2.8$ Guilders from the project plus their respective income from their own private account. If, instead, you indicated in your contribution table that you would contribute 19 tokens if the others contribute 2 tokens on average, then the total contribution of the group to the project would be given by$0 + 2 + 4 + 19 = 25$ tokens. Each group member would earn $0.4 \times 25 = 10$ Guilders from the project plus their respective income from their own private account.

Example 6
Suppose that the **random mechanism does not select you**; and that your unconditional contribution is 16 tokens, while those of the other two group members not selected by the random mechanism are 18 and 20 tokens respectively. Your average unconditional contribution and that of these two other group members is, therefore, 18 tokens. If the group member whom the random mechanism did select indicates in her contribution table that she will contribute 1 token if the other three group members contribute on average 18 tokens, then the total contribution of the group to the project is given by $16 + 18 + 20 + 1 = 55$ tokens. Each group member will therefore earn $0.4 \times 55 = 22$ Guilders from the project plus their respective income from their own private account. If, instead, the randomly selected group member indicates in her contribution table that she contributes 19 if the others contribute on average 18 tokens, then the total contribution of the group to the project is $16 + 18 + 20 + 19 = 73$ tokens. Each group member would therefore earn $0.4 \times 73 = 29.2$ Guilders from the project plus their respective income from their own private account.

The random mechanism
Each group member is assigned a Group Member ID between 1 and 4, which denotes this participant's number inside her group. Moreover, participant number 2 was randomly selected at the very beginning of the experiment. This participant will draw a ball from an urn after all participants have made their unconditional contribution and have filled out their contribution table. Each ball in the urn has a different colour and each colour corresponds to a Group Member ID: orange = 1, blue = 2, yellow = 3, green = 4. The resulting number will be entered into the computer. If your Group Member ID is drawn, then your contribution table will determine your contribution to the project. For all other members of your group, the unconditional contributions will be relevant. Otherwise, your unconditional contribution determines your contribution.

If you have any questions, please raise your hand and a member of the experiment team will come and answer them in private.

K. Instructions for the P-Game

This version of the instructions was used in the UK and the US. The Arabic and Turkish translations are available on request.

You are now taking part in a second experiment. Your payoff from this experiment is completely unrelated to the decisions you have made in the previous one. The money you earn in this experiment will be added to what you earned in the first experiment. As before the Guilders you have earned will be converted to Pounds at the following rate:

1 Guilder = 0.20 Pounds

As in the previous experiment, all participants will be randomly divided into groups of four. However, the composition of the group is entirely new. **You will not learn who the other people in your group are at any point.**

The decision situation

The decision situation is the same as the one described on the first instruction sheet: Each participant receives an endowment of **20 tokens**. You have to decide how many of these 20 tokens you contribute to a group project and how many you keep for yourself. The three other members of your group have to make the same decision. However, this time you will make only an unconditional contribution to the project. There will be no contribution table.

After the contribution decision, there will be a **second stage**. At this stage, you will see how many tokens each of the other three group members has contributed to the project and their corresponding income from this contribution decision. Nonetheless, the identities of your group members will not be revealed at any stage. You can either **decrease** or **leave unchanged** the income of each other group member by assigning **deduction points** to them. The other group members can also decrease your income, by allocating deduction points to you, if they wish to do so.

Deduction points

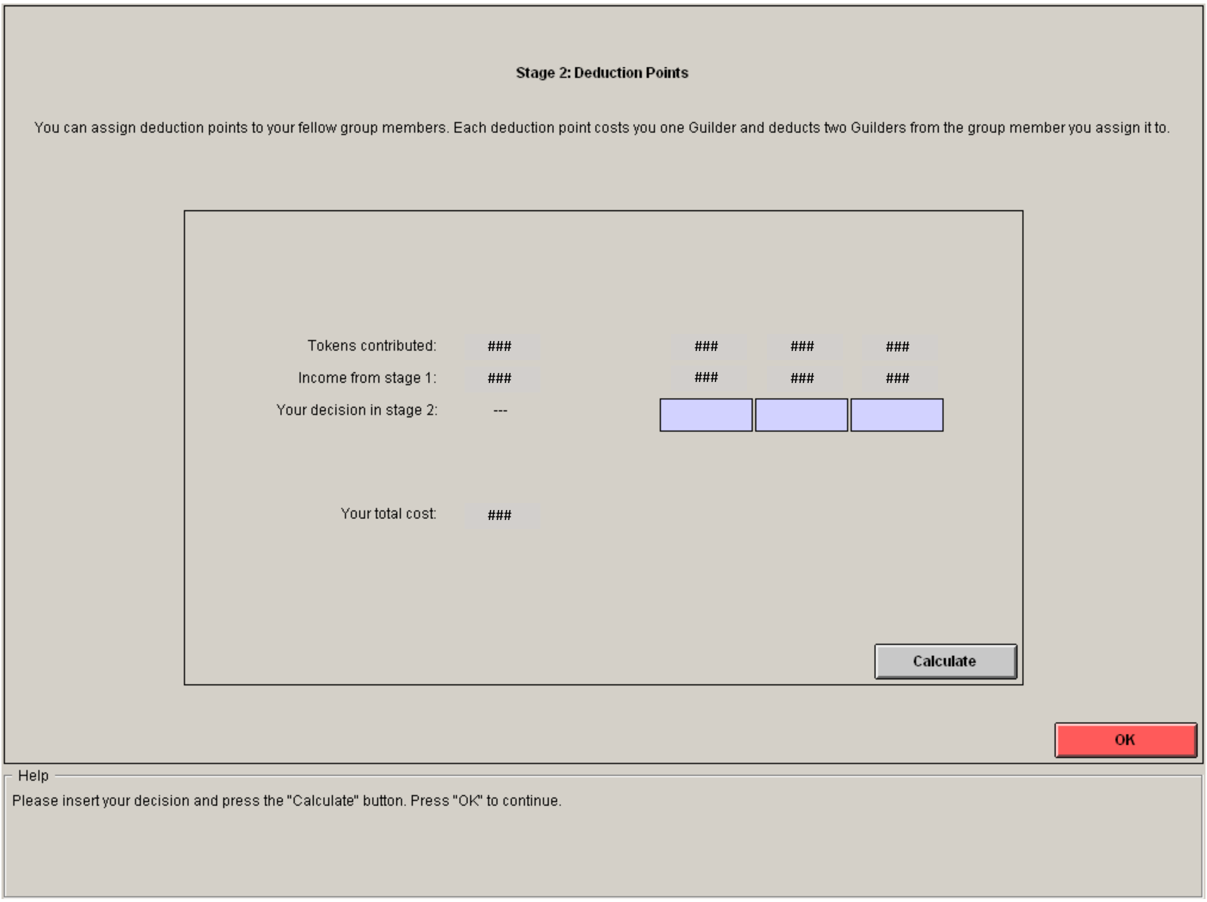
In stage 2, you can assign **between 0 and 5 deduction points to each other group member.** The maximum number of deduction points, you can allocate to the other group members together is therefore 15 deduction points.

For each deduction point that you assign, there is a cost to you of one Guilder. Thus, the total cost to you in Guilders of assigning deduction points to other group members is given by the total number of deduction points that you assign.

For each deduction point that you assign to a particular group member, you will decrease their income by 2 Guilders unless their income is already exhausted. For example, if you give a group member 2 deduction points, you will decrease this group member's income by 4 Guilders.

Your **own income will be reduced by 2 Guilders for each deduction point that is assigned to you** by the other three group members. If all of your income from the first stage of this experiment is exhausted, it cannot be reduced any further by other group members.

You will see the following screen at stage 2:



The column on the left shows your contribution and your income from the first stage. The other three columns indicate the contribution of your group members and their income from the first stage.

If you do not wish to change the income of the other group members, type "*0*" into the fields next to *"Your decision in stage 2"*. In case you want to assign deduction points, enter the number of deduction points you want to assign into this field. You must enter a decision into every field and press the "*Calculate"* button. This will display the cost of your decision. Until you press the "*OK*" button, you can still change your decision. To recalculate the costs after making a change, simply press the "*Calculate*" button again.

The payoffs

Your total income in Guilders from the two stages will be calculated as follows:

Your Income From Stage 1 = 20 – *Your Contribution* + 0.4 × (*Group Project*)

Total Income After Stage 2 = *Income From Stage 1* **(1)**
– 2 × (*Sum Of Deduction Points Assigned To You*) **(2)**
– (*Deduction Points Assigned By You*)
if (1) + (2) is greater or equal to 0.

Total Income After Stage 2 = 0 – (Deduction Points Assigned By You)
if (1) + (2) is less than 0.

Please note that your income in Guilders after stage 2 can be negative, if the cost of deduction points assigned by you exceeds your income from stage 1 less any reduction in your income caused by other group members.

However, at the end of the experiment and in addition to the calculation just given, you and the other members of your group will each receive a lump sum payment of **10 Guilders.** This payment is to cover losses that you could incur.

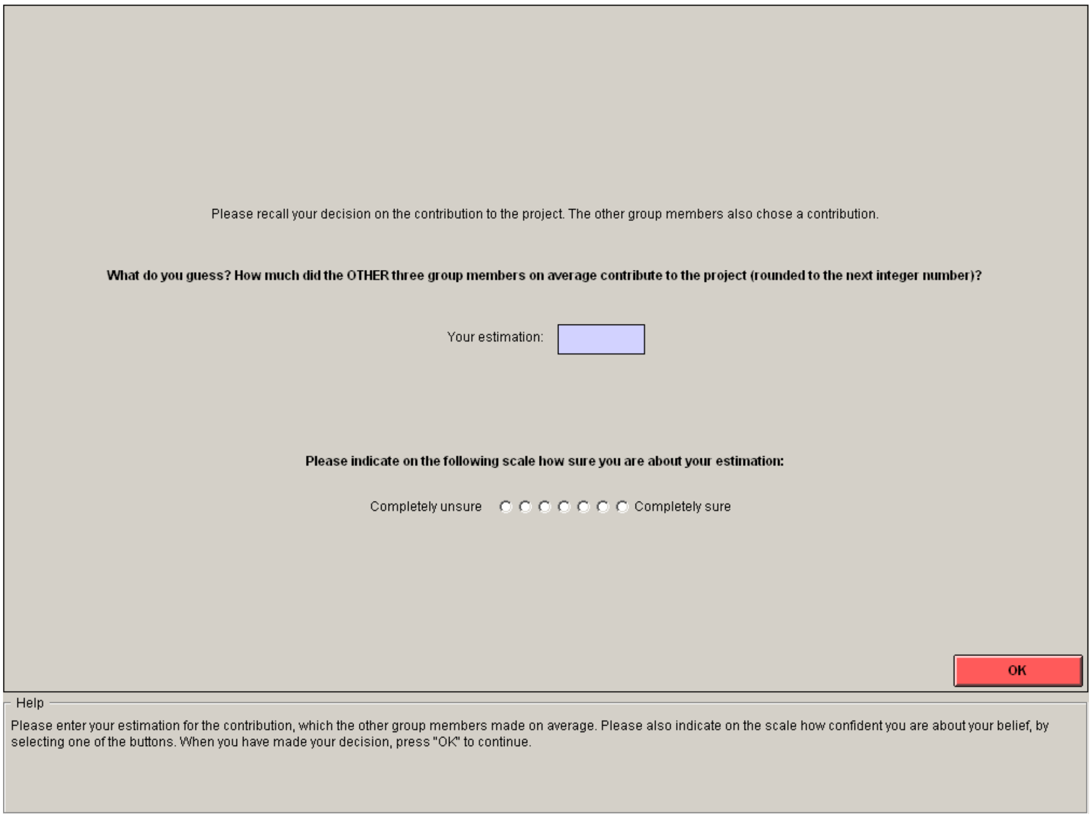
If you have any questions, please raise your hand and a member of the experiment team will come and answer them in private.

L. Decision screens not included in the instructions

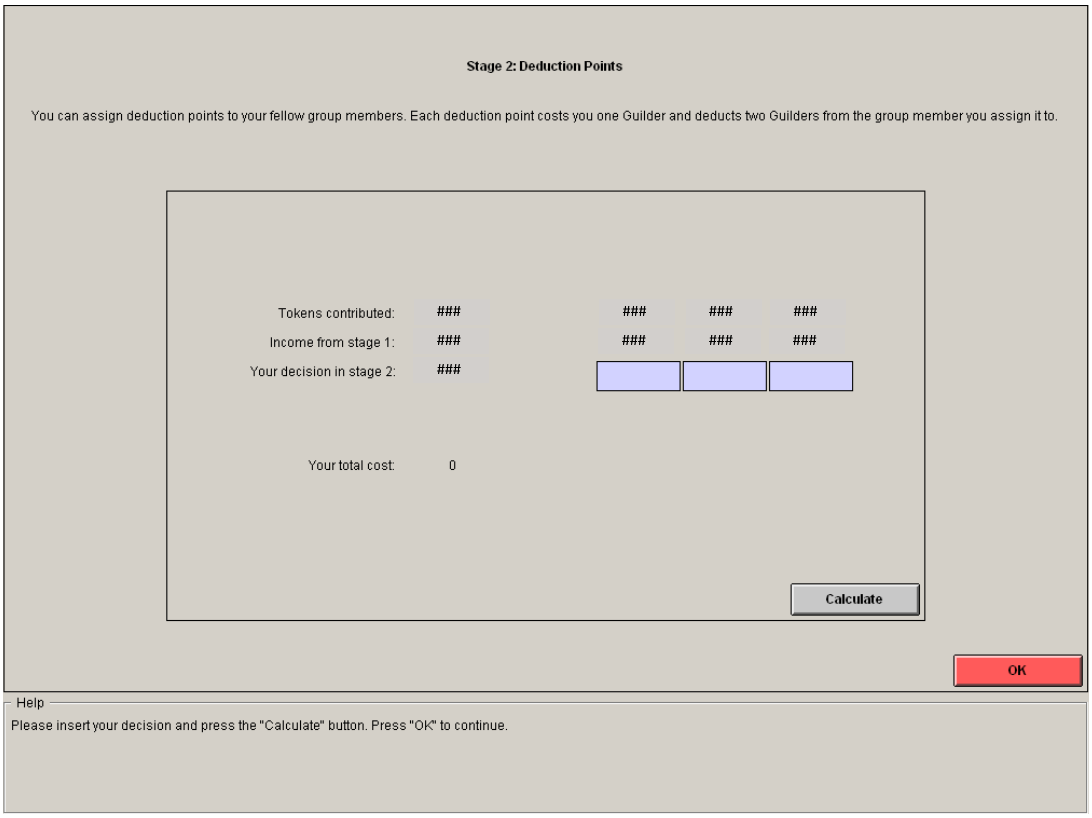
N-Game: Belief elicitation

P-Game: Contribution decision

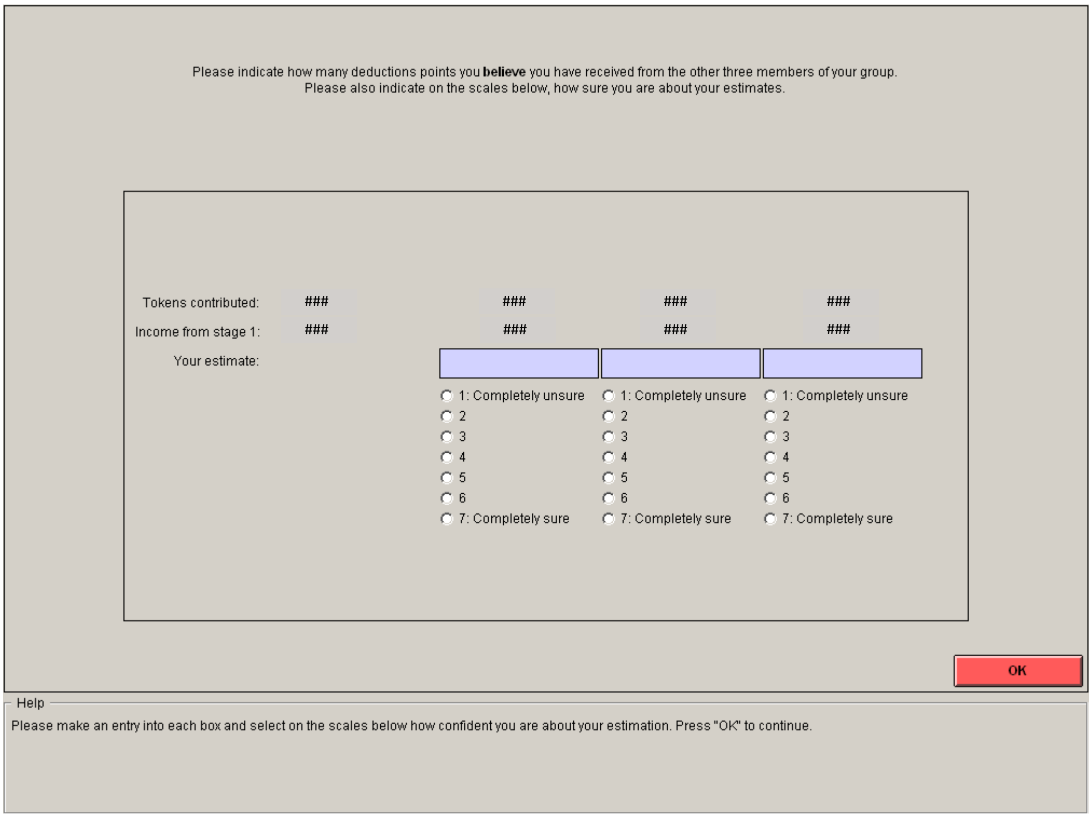
P-Game: Belief elicitation



P-Game: Punishment decision



P-Game: Elicitation of expected punishment



M. Socio-economic background questionnaire

We use the following questions from the socio-economic background questionnaire as controls in the regression analyses. The answer options of multiple-choice questions are provided in parentheses.

Your gender? (male/female)

How old are you?

What is your marital status? (single/married/widowed/divorced/prefer not to say)

If you are a student, what is the major area of your studies? (Natural Sciences/Engineering or Computer Science/Medical Science/Law/Humanities/Economics/Business Studies/Political Sciences/Social Sciences (other than Economics/Business)/Not a student). We combine the options "Economics" and "Business Studies" to create the dummy variable "Economics/ Business student".

How large was the community where you spent the most time of your life? (up to 2,000 inhabitants/2,000 to 10,000 inhabitants/10,000 to 100,000 inhabitants/more than 100,000 inhabitants). We combine the options "10,000 to 100,000 inhabitants" and "more than 100,000 inhabitants" to create the dummy variable "Urban background".

How many siblings do you have? We use the answers to this question to create the dummy variable "Single child".

When you were 16 years of age, what was the income of your parents in comparison to other families in [*Country*]? (Far below average/Below average/Average/Above average/Far above average/Prefer not to say) We combine the options "Average", "Above average" and "Far above average" to create the dummy variable "Middle class".

We use the following question from the socio-economic background questionnaire to exclude participants who indicated that they were not citizens of the respective countries:

What is your nationality?

Supplementary references

Apicella, C., Norenzayan, A., & Henrich, J. (2020). Beyond weird: A review of the last decade and a look ahead to the global laboratory of the future. *Evolution and Human Behavior*, *41*, 319-329.

Cavalli-Sforza, L., Menozzi, P., & Piazza, A. (1994). *The history and geography of human genes*. Princeton NJ: Princeton University Press.

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., & Sunde, U. (2018). Global evidence on economic preferences. *The Quarterly Journal of Economics*, *133*, 1645-1692.

Fischbacher, U., Gächter, S., & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, *71*, 397-404.

Fischbacher, U., Gächter, S., & Quercia, S. (2012). The behavioral validity of the strategy method in public good experiments. *Journal of Economic Psychology*, *33*, 897-913.

Fosgaard, T. R., Hansen, L. G., & Wengstrom, E. (2014). Understanding the nature of cooperation variability. *Journal of Public Economics*, *120*, 134-143.

Gächter, S., & Schulz, J. F. (2016). Intrinsic honesty and the prevalence of rule violations across societies. *Nature*, *531*, 496-499.

Greif, A. (1994). Cultural beliefs and the organization of society: A historical and theoretical reflection on collectivist and individualist societies. *Journal of Political Economy*, *102*, 912-950.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*, 61-83.

Hofstede, G. H., & Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Thousand Oaks, CA: Sage Publications.

Inglehart, R., Haerpfer C., Moreno A., Welzel C., Kizilova K., Diez-Medrano J., Lagos M., Norris P., Ponarin E., & (Eds.), P. B. E. A. (2014). World values survey: Round five - country-pooled datafile version: Www.Worldvaluessurvey.Org/wvsdocumentationwv5.Jsp. Dataset

Inglehart, R., & Welzel, C. (2005). *Modernization, cultural change, and democracy. The human development sequence*. Cambridge: Cambridge University Press.

Kaufmann, D., & Kraay, A. (2016). Worldwide governance indicators. Dataset

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The worldwide governance indicators: Methodology and analytical issues. *Hague Journal on the Rule of Law*, *3*, 220-246.

Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff? A cross-country investigation. *Quarterly Journal of Economics*, *112*, 1251-1288.

Molleman, L., Kolle, F., Starmer, C., & Gachter, S. (2019). People prefer coordinated punishment in cooperative interactions. *Nature Human Behaviour*, *3*, 1145-1153.

Muthukrishna, M., Bell, A. V., Henrich, J., Curtin, C. M., Gedranovich, A., Mcinerney, J., & Thue, B. (2020). Beyond western, educated, industrial, rich, and democratic (weird) psychology: Measuring and mapping scales of cultural and psychological distance. *Psychological Science*, *31*, 678-701.

Nikiforakis, N., & Engelmann, D. (2011). Altruistic punishment and the threat of feuds. *Journal of Economic Behavior & Organization*, *78*, 319-332.

Weber, T. O., Weisel, O., & Gächter, S. (2018). Dispositional free riders do not free ride on punishment. *Nature Communications*, *9*.