Reciprocity or Community? Different Cultural Pathways to Cooperation and Welfare

Gunnthorsdottir, Anna; Thorsteinsson, Palmar; Olafsson, Sigurdur P.

Reciprocity or Community? Different Cultural Pathways to Cooperation and Welfare

Anna Gunnthorsdottir[1,2] , Palmar Thorsteinsson[3,#] , and Sigurdur P. Olafsson[4]

Abstract

We compare efficiency-enhancing cooperation and its underlying motives in Iceland and the US. The two countries are distinct along all measures of national culture known to us. They are however both developed democracies with similar GDP/capita (PPP adjusted). These similarities make it possible to hold constant aspects of culture related to wealth and institutions. In an experimental Voluntary Contribution Mechanism (VCM), we prime the participants with different social foci, emphasizing either their directly co-operating team or their wider social unit. With a team focus, cooperation levels do not differ between the two cultures, but this superficial similarity masks deep-seated differences: When the focus is on the wider social unit cooperation increases in Iceland and declines in the US. Both when the contribution levels are the same and when they differ, members of the two cultures differ in their motives to cooperate: Icelanders tend to cooperate unconditionally, and US subjects conditionally with a strong emphasis on

[1]Center for the Philosophy of Freedom, University of Arizona, Tucson, AZ, USA
[2]Department of Economics, University of Iceland, Reykjavik, Iceland
[3]Central Bank of Iceland, Reykjavik, Iceland
[4]Copenhagen Business School, Frederiksberg, Denmark

[#]The views expressed are those of the author and do not necessarily reflect those of the Central Bank of Iceland.

Corresponding Author:
Anna Gunnthorsdottir, Center for the Philosophy of Freedom, University of Arizona, Social Sciences, room 2131145 E South Campus Dr Tucson, AZ 85721, USA.
Email: annagu@hi.is

reciprocity. Our findings indicate that different cultures can achieve similar economic and societal performance through different cultural norms and suggest that cooperation should be encouraged through culturally tailored persuasion tactics.

Introduction

Cultural Economics

Standard neoclassical economics has not addressed the impact of culture on economic performance. In recent years however, awareness of cultural differences that give rise to diverse values and preferences has made inroads into economics and has enriched the accounts of the differences in economic performance observed around the globe. In this paper, we experimentally compare, across two distinct cultures, cooperation levels and their underlying motives. We select two established Western democracies with developed market economies, the US and Iceland, whose per capita GDP (PPP adjusted) is very close (OECD, 2020; World Bank, 2019). Their superficial commonalities remove confounds associated with the economic and political environment such as familiarity with a market economy or wealth, which have been tied to aspects of culture such as reciprocity or self-expression (Henrich & Ensminger, 2014; Inglehart & Welzel, 2005). Similarities in their institutions and welfare levels notwithstanding, the two countries differ significantly along all established survey-based measures of national culture. A comparison between these two countries allows factoring out the more fluid market-and welfare-related aspects of culture and identify slow-moving aspects of culture driven by history, demographics, and possibly, geography.[1] The cooperation levels and efficiency achieved by subjects in both countries are superficially similar but digging deeper we find differences in the motives to cooperate, and consequently, in the response to social primes. Our results show that different cultural mindsets can underlie similar levels of economic and societal performance and point to the importance of culturally tailored messages to encourage cooperation.

We define culture in a manner that emphasizes its persistent aspects, as "a set of customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation" (Guiso et al., 2006, p. 23). Constrained by the human genetic makeup and cultural group selection, it gives rise to diversity in values and behavior across geography and history (Cronk, 1999; Soltis et al., 1995). Passed on within the family or community, it shapes a specific set of internalized norms and preferences, lenses through which the world is interpreted, and thoughts and feelings about what one experiences or observes (Cavalli-Sforza & Feldman, 1981; Cronk, 1999; Fernández, 2008; Henrich & Ensminger, 2014; Storr & John, 2019; Tabellini, 2010).

Since culture influences how individuals process interpersonal exchange it impacts social capital (Coleman, 1988; Fukuyama, 2001; Guiso et al., 2004) and is an indirect determinant of economic performance at the macro level (Gershman, 2017).[2] For example, norms of generalized trust and trustworthiness reduce transaction costs (Coleman), and many transactions are outright impossible without broad norms of honesty and reciprocity (Banfield, 1958; Putnam et al., 1993; Tabellini, 2010). Similarly, strong norms of voluntary cooperation make a social unit cohesive and competitive (Ostrom, 1990; Torgler, 2004).

Measuring Culture with Surveys and Experiments

National culture is often assessed via international surveys of values and norms such as the World Values Survey (WVS) or the European Values Survey (EVS). Readers are probably familiar with survey-based quantifications of culture such as Inglehart's cultural map (Inglehart & Baker, 2000) or Hofstede's (2001) cultural dimensions. Economists often know Knack and Keefer's (1997) index of national civic attitude. Other established scales include GLOBE (House et al., 2004), Schwartz Values (Schwartz, 1992), and Group-Grid Cultural Theory (Douglas & Wildavsky, 1983). Recently, simple, widely used experimental economics paradigms have been proposed as complements or even alternatives to these survey-based measures, especially for the comparison of narrowly delineated aspects of culture such as levels of trust, reciprocity, perceptions of fairness, and willingness to cooperate voluntarily around the provision of public goods and team goods (Chai et al., 2009; Gershman, 2017; Guiso et al., 2006; Henrich & Ensminger, 2014; Thöni, 2019).

In economics experiments, all participants anonymously play the same, easy to grasp, context-free game, and have cross-culturally comparable monetary incentives.[3] This way, the experimental environment is stripped of the reputational pressures that often constrain behavior and constrain it differently across different cultures. Cross-cultural experiments thus greatly

reduce social desirability effects and reveal culture-specific internalized norms.

Since culture is a mindset, cultural differences translate into behavioral differences only indirectly (Cronk, 1999, p. XI). If members of different cultures behave similarly it can be because they view a specific aspect of the world in the same way, or because they behave seemingly the same but are driven by culturally different motives. This might undermine the role of cross-cultural experiments which, after all, compare observed behavior. Experimental cross-cultural comparison is however not limited to behavioral comparison. It is possible to dig deeper and econometrically analyze decision factors, motives, and values deeply or even unconsciously held that underlie the observed choices. An econometric comparison of decision processes across cultures is to the best of our knowledge a new approach.[4] We use it here to compare the motives for voluntary cooperation around the provision of public goods. We next discuss the role of such voluntary cooperation for a social unit's success. This is followed by a description of how experiments help assess the willingness to cooperate voluntarily.

Voluntary Public Goods Provision, Cooperation, and Welfare

Public goods produced through voluntary cooperation are widespread, important, and diverse.[5] They include for example the quality of the environment and other shared resources (Hardin, 1968), tax revenue (Camerer, 2003, p. 46), public safety and order, or defense. A rationally self-interested actor does not voluntarily contribute to a public good but "snatches a selfish benefit" (Samuelson, 1954, p. 389) from others' contributions. A culture's ability to instill norms that curb such selfishness is a significant determinant of its effectiveness, the welfare of its members, and even its long-term survival (Ahn & Ostrom, 2008; Boyd & Richerson, 1985, 2002; Knack & Keefer, 1997, pp. 27–29; Soltis et al., 1995). A large body of field observations (e.g., Ostrom, 1990) has generated a rich set of hypotheses about which aspects of culture help or hinder voluntary cooperation. Laboratory experiments with the Voluntary Contribution Mechanism (VCM) allow testing these hypotheses under controlled conditions.

The Voluntary Contribution Mechanism

The VCM's (Isaac et al., 1985) simplicity and versatility have made it the work horse to examine voluntary cooperation experimentally.[6] We describe the most common version of the game, used in this paper.

There are $i = 1, \ldots, n$ symmetric group members. Each player i has a monetary endowment e. Each i contributes $x_i \in [0, e]$ to a group account which represents the public good and leaves the remainder $(e - x_i)$ in a personal

account. The return on investment in the group account differs from the personal account's return. For simplicity and without loss of generality, set the return from the personal account to one. The group account contributions by all *n* group members are summed up and multiplied by a factor *g* which represents the benefits from cooperation, before being equally divided among all *n* members. g/n is the Marginal Per Capita Return (**MPCR**) to each group member from an investment in the group account. Each group member's payoff is:

$$\Pi_i = (e - x_i) + \left(\sum_{i=1}^{n} x_i \right) \times g/n \tag{1}$$

If $1 < g < n$ aggregate welfare is maximized if all participants contribute their entire endowment *e* to the group account. However, a rationally self-interested player's dominant strategy is to contribute nothing while still getting an equal share of the total in the group account. Parameterized this way, the VCM models the tension between individual and collective interest.[7]

A Typical VCM Experiment. Groups of size $n = 3$ to $n = 5$ are most common (Zelmer, 2003). The number of groups, *G*, most often varies between two and five. To eliminate reputation concerns the game is played anonymously: It is common knowledge that no player knows the others' identity, and never will. Participants are visually separated from each other. To allow them to learn about the game and each other's choices the game is repeated at least 10 times, often much more. In each round, after all players have allocated their funds each player *i* receives private feedback with her earnings for the round, and information about the contributions of the other group members.[8] Over repeated rounds, grouping can be arranged in one of two ways: (1) participants are might be randomly assigned to a new group at each round, in an attempt to create in a series of one-shot interactions (this is the approach in the current study). In so-called "Partners" treatments players stay in the same group in all rounds.[9] After the last round of a VCM experiment each participant is privately paid her cash earnings.

Stylized VCM Results from Western University Students

The overwhelming majority of VCM experiments has been conducted with university students in Western industrialized countries. These studies have produced three robust results (Davis & Holt, 1993; Ledyard, 1995; Zelmer, 2003).

1. Cooperation levels exceed the dominant strategy equilibrium of non-contribution by all. In the first round, the mean contribution is about $1/2e$ (Camerer, 2003, p. 46).
2. Over repeated rounds, mean contributions gradually approach the equilibrium. The decay is mainly because those who initially contributed get discouraged by free riders in their midst (Gunnthorsdottir et al., 2007; Page et al., 2005).
3. There is substantial variability in the contributions, especially in the early rounds (Gunnthorsdottir et al., 2007; Isaac et al., 1984; Kurzban & Houser, 2005).

Cross-Cultural VCM Experiments

Recently, experiments with participants from outside the common subject pools have indicated that the seemingly robust findings from VCM experiments reflect not human universals but rather, a unique culture: Across history and geography, Western university students are outliers in lifestyle and values. In an extensive discussion, Henrich et al. (2010) label these subjects as WEIRD (Western, Educated, Industrialized, Rich, Democratic). Outside Western universities and even between WEIRD subject pools, substantial cultural differences have since been discovered for example in the perception of what is fair, willingness to punish transgressors, and in the levels of voluntary cooperation (Henrich et al., 2001, 2005; Herrmann et al., 2008).

Cross-cultural economics experiments have often been exploratory, with the choice of subjects determined by researchers' access to them. They often simply aimed to check whether cultural differences existed, without prior directional hypotheses. There are exceptions, mostly for the Ultimatum Game,[10] and to a lesser extent also for the VCM. The most prominent deductive approach to cultural differences in experimental games is arguably the Market Integration Hypothesis which suggests that a society's economic practices shape its values and norms (see In Ensminger & Henrich, 2014, for an overview; see also Chen & Tang, 2009; Gurven, 2004; Henrich et al., 2005, p. 811). We next provide a brief overview of cross-cultural VCM studies whose results can be summarized as follows:

1. Cross-cultural variation in contributions is substantial.
2. Two of the robust findings from VCM experiments with WEIRD subjects generalize: There are large individual differences in contributions especially in the early rounds, and contributions decline over repeated rounds.

International Comparisons. A pioneering examination of cultural diversity in VCM contributions is Henrich et al.'s (2001, 2005) study of six

geographically diverse small-scale societies with traditional economies, from self-sufficient agriculturists to hunter-gatherers with a high level of cooperation. In their one-round experiments the mean contributions range from 22% among self-sufficient family farmers to 65% in close-knit tribal societies with a tradition of voluntary cooperation such as pooling food. Among Blackwell and McKee's (2010) student subjects Russians contribute the most followed by Kazakhs, with the US a distant last. Gächter and Herrmann (2009) report nation-level effects in the VCM contributions of Swiss and Russian university students: Contributions did not differ between each country's universities, but Russian students cooperated less than Swiss students. Gächter et al. (2010) compare the cooperation rates of 1120 university students from 16 countries including some that are not democratic or are developing. Their study demonstrates the impact of culture on cooperation rates: Contributions are similar between related cultures but differ between locations that are culturally distinct. (The Cultural World Map describes their study in more detail.) Ehmke et al. (2010) compare university students in France, two US states, China and Niger. Contribution patterns in the two US locations and in China are near identical, and French contributions are somewhat similar to them. Oddly, Nigerien cooperation levels start below those of the other countries but do not decline over rounds.

Comparisons Between "WEIRD" Regions. Our study falls into this category. Both Iceland and the US are established democracies. Their per capita GDP (PPP adjusted) has long been close (OECD, 2020; World Bank, 2019). Yet, as our study will also show, noteworthy cultural differences can exist between WEIRD cultures. Ockenfels and Weimann's (1999) report that East German students contribute much less than West German students, presumably because their post-WWII ideological and economic divergence impacted civic attitudes, a process that is often slow to reverse (Alesina & Fuchs-Schündeln, 2007; Gershman, 2017). The East German mean first round contribution (roughly 22%) is about as low as the contribution by self-sufficient Amazonian farmers reported by Henrich et al. (2005). In Bigoni et al.'s (2016) experiments, Southern Italians cooperate less than Northern Italians; this is not surprising since the two regions have long differed historically, economically, and culturally (see e.g., Putnam et al., 1993). Castro (2008) finds that British students contribute more than Italian students. Weimann (1994) reports lower cooperation among US students than German students in a "partners" VCM. In a study that is not cross-cultural but whose econometric approach inspires the current study, Ashley et al. (2010) conducted an econometric analysis of the structure of contribution decisions in two classic VCM experiments with US students in two different states.[11] The coefficients of the variables subjects consider in their contribution decision are similar in both locations. However, Eckel et al. (2015) do find a state-based difference among US subjects: within

the state of Texas students contribute similarly and more than their peers in other states.

VCM Experiments Where No Cultural Differences were Found. Ehmke et al.'s (2010) cross-cultural study mentioned in International Comparisons contains an interesting null result: US contribution levels do not differ from China's even though there is no doubt that these cultures are quite different. In a meta-analysis of VCM experiments conducted in East Asia and the US, Pang and Bowles (2006) similarly report no significant differences. Brandts et al. (2004) find no statistically significant country effects between the contributions of Spanish, Dutch, Japanese and US students. Henrich et al. (2010) suggest that such behavioral parallels might be due to university students increasingly sharing a global culture. An alternative explanation is that since culture is a shared world view that impacts behavior but does not equal behavior (Cronk, 1999) culturally different thought processes can result in either different behavior or in superficially similar behavior. Recall for example that the cooperation rates Henrich et al. (2001, 2005) found among self-sufficient tribal South American farmers resemble those of Ockenfels and Weimann's (1999) East German students.

In the next section, we develop hypotheses about cultural differences between Iceland and the US regarding observed cooperation levels as well as the underlying cognitions. In Results we return to the question of whether different cultures can attain similar levels of efficiency through different culturally driven mental processes.

Hypotheses Based on Survey Measures of National Culture

Cross-cultural economic experiments are quite new. We therefore base our hypotheses on two established survey measures often known to economists: the world map of cultures (introduced by Inglehart, 1997), and Knack and Keefer's (1997) index of civic attitudes. The two scales lead us to hypothesize that VCM contribution levels and the underlying motivational processes differ between the US and Iceland (Inglehart & Baker), and that in Iceland, a focus on the wider social unit increases cooperation more than in the US (Knack & Keefer).[12]

The Cultural World Map. In the cultural world map (Figure 1) introduced by Inglehart and Baker (2000), two orthogonal axes are constructed from responses to the WVS.[13] The vertical axis captures the tension between "traditional" and secular-rational values. A "traditional" culture favors nationalism, religion, and authority, while a secular-rational culture favors agnosticism and science. The horizontal axis captures the tension between survival and self-expression: Security-focused survival values prioritize safety and predictability while
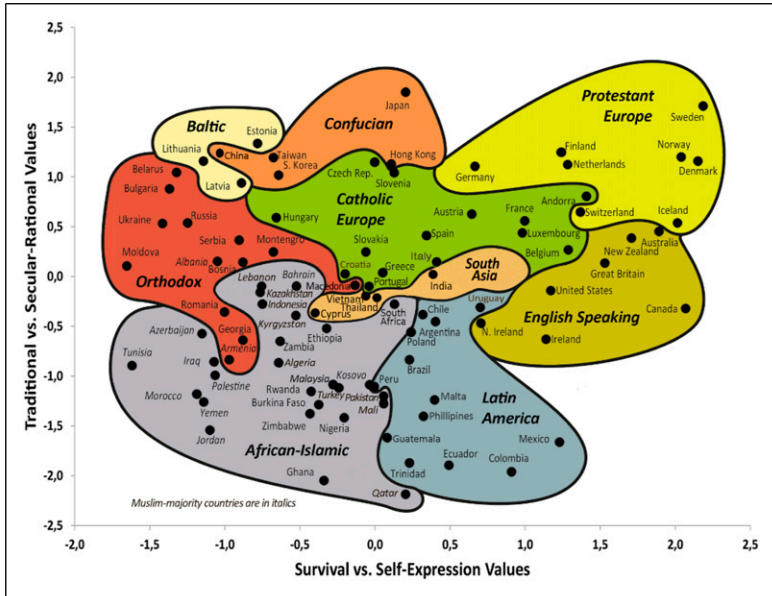
Figure 1. The 2010–2014 Inglehart-Welzel world map of cultural values (World Values Association, 2020b).

post-materialistic emancipative self-expression values favor individualistic unfolding (Inglehart & Welzel, 2005; Welzel, 2013). Most importantly for us here, Figure 1 shows that national cultures form clusters of related cultures based on a factor analysis of survey responses. The clusters illustrate culture's persistence over time: Religious commonalities and historic links shape present-day cultural similarity. Inglehart and collaborators have extensively written about change in certain values as economies develop. Especially, with increasing wealth cultures tend to move from the traditional, security focused lower left corner of the map toward the secular-rational, individualist upper right corner of the map (Inglehart, 1997; Inglehart & Baker, 2000; Inglehart & Welzel, 2005; Welzel, 2013). Such movement notwithstanding, the clusters have remained consistent.[14] Figure 1 depicts the 2014 version of the map since our data were collected in late 2014 and in early 2015. The figure shows that the US belong to the English-speaking cluster while the Nordic countries including Iceland belong to the Protestant cluster.

Findings from VCM Experiments. In a large international VCM study in 16 locations spanning six of Inglehart's culture clusters Gächter et al. (2010) report that the clusters account substantially for the observed variation in contributions while contributions are remarkably similar *within* clusters. Their

analysis is general and focused on overall sources of variability between and within clusters, *not* on bilateral differences between clusters. We hypothesize, somewhat tentatively:

Hypothesis 1: *Since Iceland and the US belong to different culture clusters, contribution levels differ between the two countries.*[15]

While culture impacts behavior it does so via values and perceptions (Cronk, 1999). Consider for example the striking classic experiment by Morris et al. (1995) on how differently Far Eastern and Western cultures interpret even simple visual stimuli. Theirs and similar[16] studies underscore how different cultures focus on different aspects of a situation and interpret it differently. Also consider the homogeneity in the interpretation of stimuli *within* cultures (Morris et al.). Regarding situations that call for cooperation, in their econometric decomposition of factors that subjects consider when deciding on their VCM contribution, Ashley et al. (2010) report coefficients that are surprisingly similar for US students in two different states. Kocher et al. (2008) compare, cross-culturally, the drivers of contribution decisions.[17] They report that in the US conditional cooperator types are more common than in Austria or Japan, suggesting that different cultures view the decision to cooperate differently.[18]

Hypothesis 2: *Since Iceland and the US belong to different culture clusters subjects in the two countries process their contribution decision through different cognitive lenses.*

Norms of Civic Cooperation. In a seminal study, Knack and Keefer (1997) link economic growth to a population's pro-sociality, assessed via five questions from the WVS. They call their explanatory variable CIVIC. Table 1 shows the questions CIVIC is composed of. The Table also shows that Iceland is more "CIVIC" than the US, since overall, the anti-social acts listed are less tolerated there. While the CIVIC difference between the two countries seems small, the differences reported by Knack & Keefer are also quite small but correlate significantly with economic growth (p. 1257).

Findings from VCM Experiments. Herrmann et al. (2008) conducted VCM experiments with an added punishment option where each participant could reduce the earnings of any other group member at a cost to self. They report that CIVIC is associated with a willingness to punish free riders. It seems plausible that a culture where free riders get punished by their peers, values cooperation and pro-sociality. Punishment might be an attempt to strategically

Table 1. Mean Responses to Single Statements that Make Up the CIVIC Score, and CIVIC Scores per Country.[19]

How Justified is it to:	Iceland (EVS 2010)	US (WVS 2010–14)
Evade taxes if the opportunity arises	1.98 (v234)	1.91 (v201)
Accept public assistance that you have no right to receive	1.50 (v233)	2.30 (v 198)
Dodge fares on public transport	2.72 (v 247)	2.59 (v199)
SUM	6.2	6.8
CIVIC	**23.8**	**23.2**

WVS/EVS question numbers in parentheses, year of data collection in parentheses.
For individual responses, a response of 1 means "never justified" while 10 means "always justified".
SUM is the summary score of the three questions.
CIVIC is computed as (30 – SUM). CIVIC ranges from 3 to 30; higher values reflect higher pro-sociality.

force free riders to cooperate, but it might also be due to a simple moral aversion to behavior that is considered anti-social.

A closer look at CIVIC reveals that, while it captures attitudes toward co-operation, the questions are not about a directly cooperating team such as in a VCM, but rather, about pro-social behavior toward broad public goods where cooperation is not directly reciprocated but is based on a perceived obligation to behave in a pro-social manner. We therefore put forward the following hypothesis:

Hypothesis 3: *Since Iceland is more "CIVIC" than the US, Icelandic subjects contribute more than US subjects when the information they receive during the experiment focuses them on the wider community rather than just on their directly cooperating team.*

Method

Participants

The US participants were recruited from the student population at the University of Arizona. They were invited for a two-hour experiment with a US$ 5

payment for showing up on time, and further earnings contingent upon the decisions by themselves and others during the experiment. Students who had previously participated in a VCM experiment were excluded. The Icelandic subject pool was the students at the University of Iceland. Their show-up fee was ISK 1000 (about US$7.50).[20] No students were excluded from the invitation since no VCM experiments had been conducted there.

Locations, Facilities, and Software

The US experiments were run in a decision laboratory with networked computers separated by permanent blinders. The Icelandic experiments took place in a multi-purpose computer lab with temporary cubicles installed for the experiment. The software, in Visual Basic, is available from the authors upon request.

Experimental Parameters

For reasons of comparability, we opted for parameters frequently used in VCM experiments (see Zelmer, 2003, for common VCM parameters). The return from the private account was 1. The sum of investments in the group account was multiplied by $g = 2$. The group size n was four so that the MPCR was 0.5 (see equation (1)). There were 12 subjects in each session, divided into $G = 3$ groups which were randomly re-composed at each round. The number of rounds was $t = 80$. At the start of each round each subject received an endowment of $e = 100$ tokens. See Supplemental Material for the instructions.

Design

The design (Table 2) is a fully crossed 2 x 2. The experiments were run in two high-income established democracies that differ culturally. This allows us to keep socio-economic development constant (Inglehart & Welzel, 2005; Welzel, 2013) while observing the impact of long-standing cultural values. In both locations there were two treatments that differ in the end-of round information a subject received:

Table 2. Experimental Design.

	Standard ("Team") Feedback.	Session ("Community") Feedback
Iceland	3 sessions with 12 subjects each	4 sessions with 12 subjects each
US	3 sessions with 12 subjects each	3 sessions with 12 subjects each

- The *group-level("team") feedback* treatment has standard VCM end-of-round information: After each round, a subject was reminded of his own contribution to the individual and group account in that round, the sum of what the other three group members together had contributed, his total earnings in that round, and those earnings broken down according to their source (individual account/group account). Additionally, each participant saw boxes with the group contributions of all $n = 4$ members of his group, with his own contribution highlighted. This setup, where participants know the extent of cooperation within their group, is a simple model of a social unit such as a team, organized for direct, mutually beneficial cooperation.
- S*ession-level ("community") feedback* is designed to assess the effect of focusing subjects not only on their directly cooperating team but also on a wider social unit (Hypothesis 3). In addition to what subjects saw during team feedback, at the end of each round each subject was shown boxes with the contributions not only within her team but by all session participants. The boxes were grouped into three clusters corresponding to the grouping in that round. A subject's own contribution was again highlighted so that her team, and her own contribution, were clearly recognizable. This treatment models a community comprised of organizations with mobile membership, where community members are aware of each other's actions even though they are not necessarily directly impacted by them.

The instructions (Supplemental Material), in English in both locations, were identical across feedback treatments except for the second-to-last paragraph where the treatment-dependent end-of-round feedback is explained.

Procedure

Since lectures and textbooks at *[a large Icelandic university]* are often in English the experiments were conducted in English in both locations, according to the same written protocol, by the same experimenters not previously known to the participants. At the start subjects got paid their show-up fee and were assigned to cubicles at random. Next, an experimenter announced that the experiment had started and that no communication, verbal or otherwise, was permitted. Subjects were instructed to place their bags under their seats, shut off their phones, read and sign the consent forms,[21] and to raise their hand if they had questions which an experimenter would address individually and privately.

Thereafter, the participants read the printed instructions placed in each cubicle. To provide assurance that all players were symmetrical the experimenters pointed out that the instructions were also projected onto a wall

visible to all. The experiment started after all participants had signaled that they understood the instructions and were ready.

At each of the 80 rounds, each player was randomly assigned to a group of $n = 4$ and received a message that she had been allocated $e = 100$ tokens to divide between a private account and a group account. After everyone had made their decision, the individual earnings were computed. Each subject received an earnings message in which the information about others' contributions varied by treatment as described in Design. A new round started after everyone had acknowledged the earnings feedback.

At the end of the session participants returned their written instructions to an experimenter, were asked to not share details of the experiment, and were privately paid their cash earnings.

Payments and Earnings

The show-up fees and earnings were identical across countries in terms of opportunity cost, by approximating the minimum wage at each location. The experiments were run in late 2014 and early 2015 when the [*state*] minimum wage was US\$ 8.05/hour. Iceland does not have a minimum hourly wage, but at that time the guaranteed lowest monthly income ("Lágmarkstekjutrygging") was ISK 245,000.00 (Confederation of Icelandic Enterprise, 2014). With a standard 172 monthly work hours this amounts to 1424 ISK per hour.

The US show-up fee was \$5, or 0.62 minimum wage hours. The Icelandic show-up fee was ISK 1,000, or 0.7 minimally remunerated hours. In equilibrium where everybody keeps all their tokens in the private account each subject earns 100 tokens per round, 8000 tokens over 80 rounds. The equilibrium earnings over 80 rounds correspond to 1.8 minimum wage hours in both locations.[22]

Results

We divide our analysis into 12 short results starting with the contribution levels. We conclude with differences and commonalities in the underlying thought processes.

Result 1:

Under group ("team") feedback, mean contributions over rounds do not differ between the US and Iceland.

Figure 2 depicts the mean contributions per round, country, and treatment. Under group-level feedback (the standard feedback in VCM experiments) there is no overall country difference in the contribution levels,[23] and
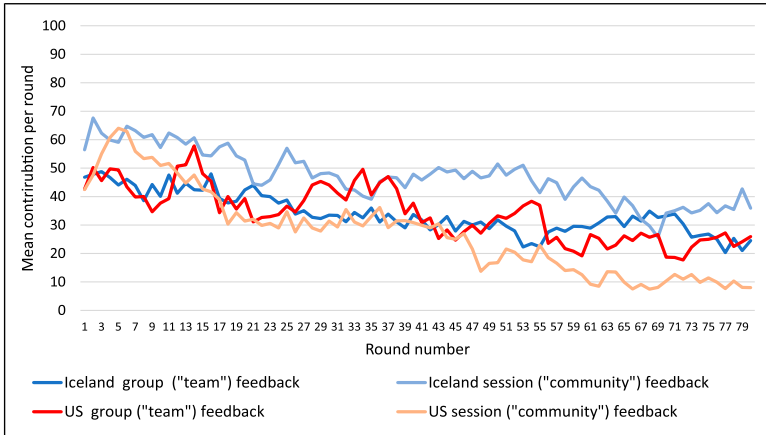
Figure 2. Mean contribution per round, country, and treatment.

Hypothesis 1 is not supported. The mean contribution over all 80 rounds is 34 out of 100 tokens both in Iceland and in the US. The mean first round contribution is 47 tokens in Iceland and 43 tokens in the US, both in the range typically reported from Western students (Davis & Holt, 1993; Ledyard, 1995; Zelmer, 2003), and this difference is also not significant.[24]: By round 80 mean contributions have declined to 25 tokens in Iceland and 26 tokens in the US. As mentioned in VCM Experiments Where No Cultural Differences Were Found, even different cultural lenses might lead to similar cooperation levels. In Results 5, 11, and 12 we show that different cultural lenses underlie these superficially similar contribution patterns.

Result 2:

Under session ("community") feedback contributions are higher in Iceland than in the US.

Informing participants of the contribution of everyone in the session and thus focusing them on a wider community (all session participants), results in a clear country difference (Figure 2). This supports Hypotheses 1 and 3. It is also suggestive of Hypothesis 2 since we observe culturally different responses to what is effectively a priming message about membership in a wider social unit. Recall that the participants know from the instructions, and thus at the very start of Round 1 before they have seen the first post-round feedback, that everybody's contribution will be viewed by all others in the session, albeit anonymously. Already in Round 1, the Icelandic mean contribution of 56 tokens significantly exceeds the US mean of just 42 tokens.[25] Over all 80

rounds, the mean contribution is 56 tokens in Iceland but only 27 tokens in the US. In Round 80, Icelanders still contribute 36 tokens on average while the corresponding US value is only 8 tokens. With the individual subject as he unit of analysis the overall difference between contributions in Iceland and the US is highly significant: Mann-Whitney U (henceforth, **MWU**) normal approximation, $m = 36$, $n = 48$, $z = 3.84$, p(2-tailed) < 0.001.[26] The same test with the session means as the unit of analysis[27] and adapted for small samples (Siegel & Castellan, 1988, Ch. 6.4.3) also shows a significant difference, $m = 3$, $n = 4$, $W_x = 22$, p(2-tailed)<0.05.

Result 3:

In Iceland, session ("community") feedback raises contributions compared to group ("team") feedback. This effect is present in the earliest rounds and is stable over rounds.

   Further in accordance with Hypothesis 3, Figure 2 shows that the Icelandic mean contribution per round under community feedback exceeds the Icelandic team feedback mean in nearly every[28] round. Over all rounds, the mean contribution is 56 tokens under community feedback and 47 tokens under group feedback. MWU tests with the subject as the unit of analysis reject the null hypothesis that the contribution levels are the same in the two feedback conditions.[29] With session means as the unit of analysis this result holds.[30] Already in the first round there is a significant difference in contributions.[31] The fact that the difference in cooperativeness between feedback treatments emerges in the very first round rather than gradually suggests that not just the session-wide post-round feedback but already the treatment-specific instructions focus Icelandic subjects on their wider social unit, and that this primes some sort of a schema, possibly a morally driven community focus.

Result 4:

There are indications that for US subjects, session-level feedback lowers contributions in the later rounds of the experiment.

   For US subjects, the effect of community feedback trends opposite of what is observed in Iceland. The mean contribution over sessions and rounds is lower under community feedback (27 tokens) than under group feedback (34 tokens). Over all 80 rounds this difference is not statistically significant.[32] However, a closer look at Figure 2 reveals a change over time: The contribution levels of group and community feedback are similar until Round 21, and even intersect: In Rounds 3 – 11, 17, and 21 the mean under community feedback exceeds the corresponding group feedback mean. Thereafter, group feedback means reliably exceed community feedback means, with the sole

exception of round 43. If only Rounds 41 to 80 are considered[33] the difference in contribution levels between feedback treatments is statistically significant with the subject as the unit of analysis[34] but not with session means as the unit of analysis.[35]

Result 5:

US subjects' link their contributions more strongly to those of others than Icelanders do. This linkage is in turn is associated with lower cooperation rates. The linkage is most pronounced under community feedback.

In the remainder of this section, we explore reasons for the differences in observed behavior shown in Figure 2, and possible cultural differences in the underlying motives to cooperate. We start with examining simple correlations that show how strongly individuals' contributions are linked to those of others. In Results 6–12 we compare effect sizes and delve deeper into cultural differences and similarities in the motives to cooperate.

Reciprocators are players who tend to match the contributions of others in their group (e.g., Croson, 2007; Keser & Van Winden, 2000; Page et al., 2005).[36] If a sufficient proportion of players match the amounts that other group members contribute it can slow the robustly observed decay in contributions over rounds. Reciprocity does not fully halt the decay because of variability both in the contributions a player observes, and in the degree to which players match others' contributions, if at all. With sufficiently many free riders present reciprocity can even accelerate the decline in cooperation (Gunnthorsdottir et al., 2007; Page et al., 2005). The decline also accelerates if own contributions are somehow systematically associated with those of others, without matching the amounts that others contributed. For example, Sugden (1984) presents a model of systematic "minimum matching" where players match the minimum contribution in their group. The linkage described by Sugden is systematic but cannot sustain cooperation over repeated rounds. In other words, to slow the decline in cooperation over rounds it is not only necessary that players link their contributions to others. Players must also match the actual amounts of the contributions by others.

The correlations in Table 3 indicate how systematically subjects in the different cultures and feedback treatments link their contributions to those of others. In the second row we follow Isaac and Walker's (1988) seminal classification and define an individual who contributes $<1/3e$ (here, 33 tokens or less) as a "free rider" in that round. Table 3 shows a clear pattern. In both cultures, population feedback increases the link between own contribution and others'. More importantly, in each of the two feedback treatments the correlations are much higher for US subjects than for Icelandic subjects. The cell with the highest correlation is US-community feedback, which is also

Table 3. Correlations Between Own Contribution x_{it} and Observed Behavior by Others in the Preceding Round.

Location & Treatment	Iceland Group Feedback	US Group Feedback	Iceland Community Feedback	US Community Feedback
# Subjects (# Obs.)	36 (2844)	36 (2844)	48 (3792)	36 (2844)
Correlation between x_{it} and the number of free riders (where $x_i < 1/3e$) encountered in one's group in round (*t*-1)	−0.08	−0.20	−0.13	−0.42
Correlation between x_{it} and the median contribution by other group members in round (*t*-1)	0.06	0.20	0.13	0.41
Correlation between x_{it} and the number of other session participants contributing zero in round (*t*-1)			−0.16	−0.51
Correlation between x_{it} and the number of other session participants contributing 100 in round (*t*-1)			0.15	0.41

Note. identical figures in the table have been checked for correctness.

the cell with the strongest decline in aggregate contributions over rounds. This shows that a systematic linkage between own contributions and those of others is not a sufficient condition to maintain cooperation in repeated rounds. Using Fisher *r* to *z* transformations (Cohen & Cohen, 1983, Ch. 2). We did pairwise comparisons of the correlation coefficients between treatments within each culture, and between cultures within each treatment. All pairwise differences are statistically significant at standard levels in two-tailed tests, most of them highly significant. (Among all pairwise comparisons the smallest *z* statistic is 2.04 and its associated probability is $p = 0.04$.[37])

Table 4. Double Censored Tobit Regression of Group Contributions in Round t on Decision Factors. (Standard Errors Clustered by Individual, Standard Errors in Parentheses).

	Iceland Group Feedback	US Group Feedback	Iceland Community Feedback	US Community Feedback
Intercept	−.11.56** (4.38)	−32.67** (7.49)	−5.78 (6.77)	−22.85** (5.35)
Own contribution in round $t = 1$	0.28** (0.06)	0.34** (0.09)	0.16 (0.12)	0.19** (0.06)
Own contribution in round t-1	0.70** (0.07)	1.11** (0.11)	0.67** (0.05)	1.07** (0.10)
Own contribution in round t-2	0.25** (0.04)	0.26** (0.08)	0.39** (0.05)	0.43** (0.06)
Over-contribution in round t-1 relative to the group mean[a]	−0.31** (0.10)	−0.42** (0.07)	−0.24** (0.08)	−0.61** (0.12)
Under-contribution in round t-1 relative to the group mean[a]	0.10 (0.06)	0.23** (0.09)	−0.01 (0.07)	0.24 ** (0.08)
Count of zero contributors in the session in round t-1[a]			−1.04** (0.52)	−1.27** (0.49)
Count of full contributors in the session in round t-1[a]			−0.85 (0.63)	−1.19 (0.65)
N	2808	2808	3744	2808
McFadden pseudo R^2	0.07	0.10	0.08	0.13
LLF	−11,043.84	−8574.38	−13,994.88	−7895.32
Correlation observed - predicted	0.65	0.69	0.72	0.79
% Censored at 0	15%	34%	16%	40%
% Censored at 100	4%	12%	14%	8%

**p < 0.01, *p < 0.05 (both 2-tailed).
[a]excludes i.

Result 6:

In both treatments, the structure of the contribution decisions differs between the two cultures.

Result 5 provides initial support for Hypothesis 2, that the two cultures somehow think differently about cooperation. However, what motivates Icelandic subjects to cooperate at an equal or even higher level than US subjects even though their contributions are less associated with those of others? Could there be different cultural lenses, equally effective, that drive cooperation? To address this, we conduct a detailed analysis of the factors that influence contribution decisions in the two cultures.

Table 5. Coefficient Differences Between the Two Cultures and Their Statistical Significance Computed According to Equation (2). The US Coefficients are Subtracted from the Coefficients for Iceland. Cells with Significant Differences ($p \leq 0.05$) are Shaded.

	Group Feedback		Community Feedback	
	Iceland Minus US	Z	Iceland Minus US	z
Intercept	21.11	2.43*	17.07	1.98*
Own contribution in round $t = 1$	−0.06	0.57	−0.03	0.22
Own contribution in round t-1	−0.41	3.17**	−0.40	3.58**
Own contribution in round t-2	−0.01	0.11	−0.04	0.52
Over-contribution in round t-1 relative to the group mean	0.11[a]	0.88	0.37[a]	2.60**
Under-contribution in round t-1 relative to the group mean	−0.13[b]	1.20	−0.25[b]	2.40*
Count of zero contributors in the session in round t-1			0.23	0.32
Count of full contributors in the session in round t-1			0.33	1.20

*$p < 0.05$, **$p < 0.01$, all two-tailed.
[a]After over-contributing at t-1 Icelandic subjects lower their contribution by less.
[b]After under-contributing at t-1 Icelandic subjects raise their round t contribution by less.

Table 4 shows double-censored Tobit regressions of individual group contributions on possible decision factors, by country and feedback treatment. We build on Ashley et al.'s (2010) pioneering econometric analysis of motives to cooperate. We add first ($t = 1$) round contributions as an explanatory variable since they are an indicator of stable individual dispositions (Gunnthorsdottir et al., 2007; Ones & Putterman, 2007). Since there is a subject effect and individuals' residuals are correlated over rounds, we cluster the standard errors by participant. This does not affect the size of the coefficients or the model's overall fit but robustly guards against Type I errors (Kim, 2022; Moffatt, 2016, pp. 84–86; Petersen, 2009; Van Pelt, 2020).[38] Table 5 displays differences in the regression coefficients across cultures. Shaded cells contain statistically significant differences where $p < 0.05$. We apply the most conservative approach to the computation of the significance levels of these differences (Clogg et al., 1995; Paternoster et al., 1998) where

$$z = \frac{\beta_1 - \beta_2}{\sqrt{SE\beta_1{}^2 + SE\beta_2{}^2}} \qquad (2)$$

and since we do not have grounds for directional hypotheses all tests are two-tailed. The shaded cells in Table 5 show that the decision to cooperate is structurally different between the two cultures, which is further support for Hypothesis 2. We next explore Tables 4 and 5 in detail, reporting first on cross-cultural commonalities (Results 7–10), and then on cultural differences (Results 11, 12).

Result 7:

In both countries and in both treatments, subjects are in part guided by a stable personal heuristic.

Subjects bring to the laboratory their habitual behaviors and frames (Henrich et al., 2004, p. 46; Hoffman et al., 1998). In a VCM, this includes their cooperative style. The latter is known to be heterogeneous even within a culture, and includes unconditional cooperation, conditional cooperation, free-riding, or hybrid strategies (Croson, 2007; Isaac & Walker, 1988; Kocher et al., 2008; Kurzban & Houser, 2005). We capture players' cooperative style by their contribution in Round ($t = 1$) and their behavioral stability over rounds by their contributions in Rounds (t-1) and (t-2).

Table 4 shows that the first round ($t = 1$) contribution is an indicator of one's contribution level throughout the experiment, in both cultures and both treatments. Similar results have been reported elsewhere (Gunnthorsdottir et al., 2007; Ones & Putterman, 2007). There is no country difference in how the ($t = 1$) contribution predicts subsequent behavior (Table 5). Furthermore, the coefficients of contributions in Rounds (t-1) and (t-2) are significant in all four columns of Table 4. Table 5 shows that the coefficients of (t-1) contributions are lower in Iceland than in the US in both treatments, but there is no country difference in the impact of (t-2) contributions. The finding that US subjects' (t-1) contributions have a higher impact on their subsequent decision in Round t might reflect individual stability and independence from the group. It could be linked to the fact that the US have the most individualist culture in the world (Hofstede et al., 2010, p. 97).[39]

Result 8:

In both locations and in both treatments, subjects consider the mean of other group members' contributions in the preceding round.

Each 80-round experiment lasted just under 90 minutes, about a minute per round. Without formal time constraints subjects in both countries settled on this relatively fast pace. In addition to their individual type-based heuristics (Result 7) subjects must rely on information that they can process in such limited time. Recall that under group feedback only the individual contributions within one's group were displayed. Under community feedback where all session participants' contributions were displayed, one's own group visually stood out from among the other groups. In both feedback treatments, subjects could thus quickly process the minimum, maximum and possibly, median contribution in their own group of four. In addition to the display of individual contributions, in both treatments the sum of the contributions by the other three group members was shown in a separate message box, so that it was possible to get a sense of their mean. There was also a reminder of one's own contribution, allowing a comparison.

Following Ashley et al.'s (2010) econometric analysis of the cooperative motives of US students, we separate individual deviations from the mean contribution by the other three group members at Round (t-1) into two independent variables (Table 4): "Over-contribution in Round (t-1) relative to the group mean" is the amount by which an individual's contribution exceeded the mean of the other three group members, zero otherwise. "Under-contribution in Round (t-1) relative to the group mean" similarly captures under-contribution. Table 4 shows that participants in both countries and in both treatments are guided by the mean of other group members' contributions in the preceding round. The coefficients for over-contribution and under-contribution in Round (t-1) are highly significant. The sole exception is under-contribution relative to others in the Icelandic community feedback treatment.[40]

Result 9:

In both cultures, players whose contribution in Round (t-1) had been below the mean of what the other group members had contributed made a smaller reciprocal adjustment than players whose contribution had been above the mean. This is consistent with Inequity Aversion.

Inequity Aversion (Ashley et al., 2010; Fehr & Schmidt, 1999) appears cross-cultural in our data. Table 4 shows that consistent with Fehr & Schmidt and many other studies since, players in both countries reciprocate asymmetrically: Comparing the coefficients for "Over-contribution" and "Under-contribution", the downward adjustment after over-contributing at Round (t-1) relative to the other group members is two to three times as large as the upward adjustment after under-contributing. In Iceland under community feedback there is no upward adjustment at all. This difference

in the size of upward and downward adjustments can be accounted for by the alignment, or lack thereof, between two motives: Under-contribution is congruent with self-interest but runs counter to reciprocity/fairness; over-contribution runs counter to both motives (see equation (1)). It will be interesting to eventually see whether Inequity Aversion is a human universal.

Result 10:

In both locations, subjects consider the frequency of zero contributors in the session if this information available.

Under community feedback, subjects in *neither* country considered the central tendency of everybody's contribution in the preceding round. They instead relied on a simpler metric, the count of zero contributors in Round (t-1). The associated coefficients (Table 4) are highly significant in both cultures, and not culturally different (Table 5). The more zero contributors a subject observed the more she reduced her contribution in the round that followed. Subjects might have gone with an absolute count rather than the value of the minima or maxima because their variability was low,[41] so that their value would have provided little reason to adjust one's contribution in the round that followed.

Result 11:

Under community feedback, US subjects make stronger reciprocal adjustments than Icelanders do.

Table 5 shows that if informed of the actions of everybody in the session, US subjects make stronger adjustments following their under-contribution or over-contribution in the preceding round than Icelanders do. The coefficient difference is not significant under group feedback but is significant under community feedback. The coefficient difference is further support for Hypothesis 2 that Americans think differently about cooperation than Icelanders do.

Result 12:

Icelandic subjects have a stronger disposition to contribute unconditionally.

The intercepts capture cooperative tendencies absent of experience, individual cooperative style (captured by contribution in Round t-1), or knowledge of others' actions. The country difference between the intercepts is statistically significant and substantial in both treatments (Tables 4 and 5).

Pairwise comparisons of the intercepts between feedback treatments but within cultures reveal no significant within-culture differences ($z = 0.72$ for Iceland, $z = 1.07$ for the US). The intercepts are thus unrelated to the nature of the feedback but are culture specific. Recall that Icelanders contribute more under community feedback than under group feedback starting in Round 1 (Result 3), which suggests that a principle-based community focus underlies their contributions. Recall also that in Result 5 we find that Icelanders' contributions are less strongly linked to those of others than the contributions of our US subjects.

Discussion

Results Summary

Cross-Cultural Similarities. We had not hypothesized about cross-cultural similarities but found some, including behavioral consistency over rounds (Result 7), being guided by other group members' contributions (Result 8) as well as the count of non-contributors in the wider social unit (Result 10), and maybe most interestingly, Inequity Aversion (Result 9). It remains to be seen whether these commonalities are ultimately culture-specific and shared between the US and Iceland, or whether they are human universals.

Hypothesis 1. Our conjecture that contribution levels differ between the two nations because they belong to different clusters on Inglehart's world map of cultures, is confirmed under community feedback (Result 2) but not under group feedback (Result 1). However, this difference and lack of a difference respectively, is in accordance with Hypothesis 3.

Hypothesis 2. The two subject pools are superficially similar: Students from both nations qualify as WEIRD (Henrich et al., 2010) and the countries' per capita GDP are very close.[42] Hypothesis 2, that the two cultures apply different cognitive lenses to cooperation, is confirmed in both treatments, whether observed cooperation levels differ or not: We first find that the US contributions are more strongly linked to the contributions of others (Result 5). Delving deeper, we find that the motives to cooperate are not the same between the two cultures (Result 6). US students are intense reciprocators who tend to match the contributions of those they directly cooperate with (Result 11).[43] When US subjects are informed of the contributions not only of their team but of the mini community of session participants, their other-oriented focus is sharpened, which accelerates the decline in contributions over time (Result 4). Icelanders in contrast are more inclined to cooperate unconditionally. They act as if on principle and are less sensitive to the contributions of others in their group, especially when primed with a community focus (Results 3, 5, 12).

Hypothesis 3. The greater community focus of Icelanders reflected in their higher score on Knack and Keefer's (1997) scale of civic values gave rise to Hypothesis 3, that they cooperate more if primed about membership in wider social unit than just their team. This is confirmed (see Results 2 and 3). The cultural divergence in the impact of the community priming message provides further support for Hypothesis 2 that the two cultures apply different cognitive lenses to cooperation.

Our Findings and Alternative Scales of National Culture

Group-Grid Cultural Theory. As stated earlier, the US and Iceland differ strongly on all measures of national culture known to us. This includes Grid/Group (GG) cultural theory (Douglas & Wildavsky, 1983). A high Group score reflects a higher value placed on the interest of the collective than the individual; A low Group score indicates an individually competitive culture. In a study of European nations Grendstad (1999) finds that all Nordic countries score high on Group with Iceland the highest. The US are not part of his study. In a critique of various and diverse GG operationalizations, Maleki and Hendriks (2015) point out their diversity and lack of consistency, and that Group is operationalized either as collectivism/groupishness, or as broader collaborativeness, with Grendstad's operationalization probably the latter: Grendstad's Group score is based on two WVS items, about voluntary membership in organizations, and volunteering.

Chai et al. (2009)[44] as well as Chai (undated WP)[45] operationalize GG based on an entirely different and broader (22 total) set of WVS items where Group captures interpersonal trust, the value placed on relationships, and distributive political attitudes. They report a low Group score for the US and again, high Group scores for Nordic countries including Iceland. In experiments, Chai et al. (2011) find that among their subjects, higher individual Group scores are associated with higher contributions in a standard VCM with group-level feedback.

Since Group is operationalized in different ways and preferring to err on the side of caution, we did not base any hypotheses on GG. Ex-post our results, both the culturally different responses to the community priming and the differences in the weight of unconditional cooperation, suggests an association between Grendstad's (1999) group measure on the one hand, and unconditional cooperation and sensitivity so the "society frame" on the other hand. Based on Chai et al.'s prior experimental findings one would predict that Icelanders collaborate more than US subjects in the standard group-feedback VCM, and this was not replicated. There are many open questions here that are beyond the scope of a single paper.

Hofstede's Dimensions. Hofstede's (2001) dimensions of national culture also suggest behavioral differences between the two cultures, but again in a complex way that requires a separate study: Icelandic culture is much lower than the US' both on Masculinity and Individualism (see https://www.hofstede-insights.com/country-comparison/). Both dimensions have been linked to VCM contributions by Blackwell and McKee (2010). As Blackwell & McKee's data, our data also do not allow to isolate the separate impact of these dimensions. All one can say is that based on these prior findings, Icelandic subjects are expected to cooperate more than US subjects.

Conclusion

Our findings contain broad suggestions for practice: Appeals for efficiency-enhancing cooperative behavior should be culturally tailored. In the case of the two cultures studied here, Icelanders probably respond best to moral suasion aimed at a sense of community and social obligation while Americans should be more responsive to appeals to reciprocity and fairness. This is indicated by differences we uncovered in the underlying motives for cooperation, as well as by the finding that a wider community focus (effectively, a distraction from the directly cooperating group) increases cooperation in Iceland but decreases it in the US.

While to the best of our knowledge the finding about cultural differences in thought processes is new it is not unexpected: Culture reflects a society's history and is often persistent (e.g., Putterman & Weil, 2010; see Gershman, 2017, for an overview). The differences in motives to cooperate that we found appear to fit with the two nations' longstanding demographic, social and geographic conditions: In a large, heterogeneous, and highly mobile population such as the US, unconditional cooperators benefit less from being known as such. It would make them vulnerable to rational free riders who are unconcerned about the long-term reputational impact of their selfish acts because they can easily move away. In a large mobile society keeping a close eye on others' cooperative input and directly reciprocating others' action is both individually and collectively functional. Iceland's small homogenous population has historically been stationary on an island. Even people who do not personally know each other often at least know *about* each other. Reputation or "image scoring" (Nowak & Sigmund, 1998; Wedekind & Milinski, 2000) matters for success in a small, relatively isolated society. A heuristic to cooperate unconditionally is functional there, both for the individual and the collective.

Further Research

The Performance of Western Versus East Asian Cultures. The West and East Asia are culturally even more different than Iceland and the US. Their different cognitive and perceptual habits are well demonstrated (see Nisbett & Masuda, 2003, for an overview). One region is highly individualist the other collectivist (Hofstede et al., 2010). However, multiple experimental studies (VCM Experiments Where No Cultural Differences were Found) report similar co-operation levels in these two cultural areas. It would therefore be interesting to compare which factors impact VCM contributions in the West and East Asia. Since many VCM experiments have been run with reciprocity focused US subjects it remains to be seen whether reciprocity is as common as hitherto assumed or whether there exist other equally effective cultural norms that encourage voluntary cooperation.

Culture Versus Human Universals. Finally, since we also find cross-cultural commonalities in how cooperation decisions are processed across the two cultures (Inequity Aversion, personal consistency) it would be worthwhile to explore whether and to which extent these patterns are human universals or ultimately a feature of culture.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

ORCID iDs

Anna Gunnthorsdottir https://orcid.org/0000-0001-7654-3931
Palmar Thorsteinsson https://orcid.org/0000-0001-5924-2731

Supplemental Material

Supplemental material for this article is available online.

Notes

1. See e.g., Fernández, 2008; Diamond, 2006; see also Section 5 of this paper.
2. Seminal classics on the link between history, culture, social capital, and welfare include Banfield's (1958) case study of a South Italian village and Putnam et al.'s (1993) comparison of Southern and Northern Italy. Since then, the link between culture and welfare has been established in greater detail (e.g., Knack & Keefer, 1997; La Porta et al., 1997; Tabellini, 2010; Algan & Cahuc, 2010; see Gershman, 2017, and Spolaore, 2014, for overviews).
3. Within-culture experiments show that as long as the payoff functions are linear transformations of each other, stake sizes are of minor importance (Kocher et al., 2006). However, the added complexity of cross-cultural experiments requires special thoroughness. To avoid possible confounds, the stakes in the game should be equivalent across locations. See Payments and Earnings for our approach to this.
4. Ashley et al. (2010) econometrically analyze US students' motives to cooperate in a similar way but do not compare motivations cross-culturally.
5. For seminal contributions see Hardin, 1968; Olson, 1965; Samuelson, 1954; Pigou, 1932/2017, p. 182).
6. A Google Scholar search for "VCM" on August 25, 2021, returned 2770 matches.
7. If $g > n$ it is both individually and collectively optimal to invest everything in the group account. With $g < 1$ it is both individually and socially optimal that everyone keeps their endowments in their private accounts.
8. Small variations in the nature of the feedback message (for example, information about either aggregate or disaggregated contributions in one's group) have a negligible impact on contributions especially when subjects are assigned to a new group at each round (Cox & Stoddard, 2015).
9. Comparisons between these "partners" treatments and the more common "strangers" treatments where groups are randomly composed at each round have yielded unclear, even contradictory results (for an overview, see Andreoni & Croson, 2008).
10. The Ultimatum Game assesses fairness perceptions: Player 1 proposes how to divide an amount of money, but Player 2 can refuse the proposed division. If Player 2 refuses both players get nothing.
11. University of Arizona (Isaac & Walker, 1988)/University of Wisconsin (Andreoni, 1995).
12. We use these two scales because they offer the clearest hypotheses about voluntary cooperation and the associated thought processes. Hofstede's six-dimensional scale for example is harder to link to VCM behavior because both the dimension of

Individualism and the dimension of Masculinity might predict behavior in VCM experiments, as pointed out by Blackwell and McKee (2010).

13. The WVS questions are subject to regular review and occasional updates (Welzel, 2013, Ch.2). See e.g., World Values Survey (2020b) for the methodology, or Kistler et al. (2017) for a more concise description.

14. See World Values Survey (2020a), https://www.worldvaluessurvey.org/WVSContents.jsp, for a visual representation of changes in the map over the years, and how the culture clusters have remained consistent.

15. The reader will appreciate the rationale for a difference hypothesis rather than directional hypotheses. Linking survey measures of culture to experiments is a new approach. The sole study leading to this hypothesis is Gächter et al.'s (2010), who do not report on bilateral differences between clusters.

16. For an overview of similar studies see Nisbett & Masuda, 2003.

17. While Kocher et al.'s (2008) study uses a VCM, their approach differs from ours: They use the Strategy Method (Selten, 1967), classify individual participants by type (reciprocator, free rider) based on their responses, and report the proportion of types in a population.

18. Related, Thöni and Volk (2018) provide a meta-analysis of studies that analyze proportions of cooperator/defector types albeit not explicitly cross-culturally. For a general (not only focused on cooperation) approach to classifying cultures based on the proportion of types that hold different values and motives see Midgley et al. (2019).

19. Only three of Knack & Keefer's original five questions are part of recent WVS waves. The questions about the following two activities are no longer included in the WVS: "Keeping money that you have found", and "failing to report damage you have accidentally done to a parked vehicle".

20. The show-up fees (and earnings) in the two locations are wage-equivalent. See Payments and Earnings for details.

21. Approved by the University of Arizona Economic Science Laboratory Institutional Review Board and accepted by the Unversity of Iceland's Student Registrar's Office.

22. In Iceland, the conversion rate was 0.32 ISK per token; ISK0.32 * 8000 = ISK 2,560, or 1.8 minimally remunerated hours. The US conversion rate was 0.18 cents per token, US\$ 0.0018 * 8000 = US\$ 14.40, and 1.8 minimum wage hours.

23. Mann-Whitney-Wilcoxon U (henceforth, **MWU**) normal approximation (Siegel & Castellan, 1988), $n = m = 36, z = 0.15, p(2 - tailed) = 0.44$; the unit of analysis is an individual subject's contributions over all rounds.

24. $t(70) = 0.65, p(2 - tailed) = 0.52$.

25. $t(82) = 2.47, p(1 - tailed) < 0.01$.

26. Using Jonckheere tests (Siegel & Castellan, 1988) we further tested the hypothesis that within each round, the medians under group feedback and community feedback are the same against the alternative that the medians of the community

feedback distributions are higher. We find in favor of the alternative at the 5% significance level in 60 out of 80 rounds.

27. We analyze the differences between experimental cells in two ways, with both the subject and the session as units of analysis. To use an expression by Angrist and Pischke (2008), when are the data "close enough to random"? In our design, the probability of the same grouping combination occurring in round t-1 and in round t is only $1/495 = 0.002$. Some might consider it justified in such a setting to treat the individual as the unit of analysis, but opinions vary. Under community feedback a subject sees all the other subjects' behavior in every round, which likely increases dependence. We thank a referee for this thoughtful comment.

28. Rounds 68 and 69 excepted.

29. MWU normal approximation, $n = 36$, $m = 48$, $z = 2.92$, p(1-tailed) = 0.002, the unit of analysis is the mean individual contribution over rounds.

30. MWU test for small samples (see Siegel & Castellan, 1988, Ch. 6.4.3), $m = 3$, $n = 4$, $W_x = 22$, p(1-tailed) < 0.03.

31. Using Jonckheere tests we also examined the hypothesis that within each round, the medians under group feedback and community feedback are the same against the alternative that the medians under community feedback are higher. We find in favor of the alternative at the 5% significance level already in the first 10 rounds, and overall, in 52 of the 80 rounds.

32. $m = n = 36$, $z = 1.2$, p(2-tailed) = 0.22. (MWU, normal approximation, the unit of analysis is an individual subject's mean contribution over rounds.) With session means at the unit of analysis $m = n = 3$, $W_x = 14$, p(2-tailed) = 0.2.

33. Analyzing contributions in blocks of rounds, as here, assesses learning over time. Behavior typically stabilizes in later rounds (e.g., Duffy & Hopkins, 2005).

34. MWU normal approximation, $m = n = 36$, $z = 2.22$, p(2-tailed) = 0.03.

35. Siegel and Castellan's (1988) Mann-Whitney-Wilcoxon test for small samples, $m = n = 3$. $W_x = 13$, p(2-tailed) = 0.4.

36. Kocher et al. (2008) find that the US have the highest proportion of reciprocators.

37. $z = 2.04$ and p(2-tailed) = 0.04 when comparing, between group feedback and community feedback the correlation between x_{it} and the number of free riders encountered in Round (t-1) for Icelanders.

38. In a widely cited paper, Petersen (2009) compares different methods to analyze panel data when the residuals are correlated so that the likelihood of Type 1 error increases. Like Petersen, we find clustered individual standard errors to be the most conservative approach. In selecting the level of clustering the standard errors (individual or session) we follow Kim (2022), Van Pelt (2020), and Moffatt (2016). See Supplemental Material for details on how the appropriate level of clustering the standard errors was determined for this set of data.

39. This cross-cultural coefficient difference, which we did not expect, requires investigation beyond the scope of this paper.

40. The reader might wonder why subjects did not consider a simpler value directly or near-directly displayed on the screen such as the group maximum, minimum, or

median. Additional analyses reject this. Participants in both cultures focused on the mean contribution of the other group members.

41. In Iceland, in 89% of the rounds, the session maximum was 80 tokens or higher. In 76% of the rounds the maximum was 100 tokens. In the US, 60% of the maxima were ≥80 tokens, with 45% at 100 tokens. In Iceland, the round minimum under community feedback was zero in 78% of the rounds, and ≤10 tokens in 92% of the rounds. In the US, 94% of the round minima were zero.

42. PPP adjusted, close both in international rank and in absolute terms (OECD, 2020; World Bank, 2019).

43. Kocher et al. (2008) use a different method but report a similar result: Their US subjects were more frequently conditional cooperators than their Japanese or Austrian subjects.

44. Data from WVS waves three and 4.

45. Data from WVS waves 1–3.

References

Ahn, T. K., & Ostrom, E. (2008). The meaning of social capital and its link to collective action. In D. Castiglione, J. W. Van Deth, & G. Wolleb (Eds.), *The handbook of social capital* (pp. 70–100). Oxford University Press. Ch. 3.

Alesina, A., & Fuchs-Schündeln, N. (2007). Goodbye lenin (or not?): The effect of communism on people. *American Economic Review*, *97*(4), 1507–1528. https://doi.org/10.1257/aer.97.4.1507

Algan, Y., & Cahuc, P. (2010). Inherited trust and growth. *American Economic Review*, *100*(5), 2060–2092. https://doi.org/10.1257/aer.100.5.2060

Andreoni, J. (1995). Warm-glow versus cold-prickle: The effects of positive and negative framing on cooperation in experiments. *Quarterly Journal of Economics*, *110*(1), 1–21. https://doi.org/10.2307/2118508

Andreoni, J., & Croson, R. (2008). Partners versus strangers: Random rematching in public goods experiments. In V. Smith & C. Plott (Eds.), *Handbook of experimental economics results vol. 1. Ch. 82* (pp. 776–782). North-Holland.

Angrist, J., & Pischke, S. (2008). *Mostly harmless econometrics: An empiricists' companion*. Princeton University Press.

Ashley, R., Ball, S., & Eckel, C. (2010). Motives for giving: A reanalysis of two classic public goods experiments. *Southern Economic Journal*, *77*(1), 15–26. https://doi.org/10.4284/sej.2010.77.1.15

Banfield, E. C. (1958). *The moral basis of a backward society*. The Free Press.

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*(594), 1318–1341. https://doi.org/10.1111/ecoj.12292

Blackwell, C., & McKee, M. (2010). Is there a bias toward contributing to local public goods? Cultural effects. *Forum for Social Economics*, *39*(3), 243–257. https://doi.org/10.1007/s12143-010-9073-6

Boyd, R., & Richerson, P. (1985). *Culture and the evolutionary process*. University of Chicago Press.

Boyd, R., & Richerson, P. J. (2002). Group beneficial norms can spread rapidly in a structured population. *Journal of Theoretical Biology*, *215*(3), 287–296. https://doi.org/10.1006/jtbi.2001.2515

Brandts, J., Saijo, T., & Schram, A. (2004). How universal is behavior? A four country comparison of spite and cooperation in public goods games. *Public Choice*, *119*(3/4), 381–424. https://doi.org/10.1023/b:puch.0000033329.53595.1b

Camerer, C. (2003). *Behavioral game theory: Experiments in strategic interaction*. Princeton University Press.

Castro, M. F. (2008). Where are you from? Cultural differences in public good experiments. *The Journal of Socio-Economics*, *37*(6), 2319–2329. https://doi.org/10.1016/j.socec.2008.04.002

Cavalli-Sforza, L. L., & Feldman, M. W. (1981). *Cultural transmission and evolution: A quantitative approach*. Princeton University Press.

Chai, S.-K., Dorj, D., Hampton, K., & Liu, M. (2011). The role of culture in public Goods and other Experiments. *PS: Political Science & Politics*, *44*(4), 740–744. https://doi.org/10.1017/s1049096511001387

Chai, S.-K. *Grid-group variables in the modeling the cultural change and political violence. A preliminary report for the first attempt*. Undated WP, University of Hawaii.

Chai, S.-K., Liu, M., & Kim, M.-S. (2009). Cultural comparisons of beliefs and values. Applying the grid-group approach to the World Values Survey. *Beliefs and Values*, *1*(2), 193–208. https://doi.org/10.1891/1942-0617.1.2.193

Chen, K., & Tang, F.-F. (2009). Cultural differences between Tibetans and ethnic Han Chinese in ultimatum bargaining experiments. *European Journal of Political Economy*, *25*(1), 78–84. https://doi.org/10.1016/j.ejpoleco.2008.09.002

Clogg, C. C., Petkova, E., & Haritou, A. (1995). Statistical methods for comparing regression coefficients between models. *American Journal of Sociology*, *100*(5), 1261–1293. https://doi.org/10.1086/230638

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd Ed.). Erlbaum.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*, S95–S120. https://doi.org/10.1086/228943.

Confederation of Icelandic Enterprise. (2014). *In kaupgjaldskrá SA [Internet]*. [cited 14 March 2015]. Confederation of Icelandic Enterprise. Available from: http://sa.vinnumarkadur.is/kaupgjaldsskra-sa

Cox, C. A., & Stoddard, B. (2015). Framing and feedback in social dilemmas with partners and strangers. *Games*, *6*(4), 394–412. https://doi.org/10.3390/g6040394

Cronk, L. (1999). *That complex whole: Culture and the evolution of human behavior*. Westview.

Croson, R. T. A. (2007). Theories of commitment, altruism and reciprocity: Evidence from linear public goods games. *Economic Inquiry*, *45*(2), 199–216. https://doi.org/10.1111/j.1465-7295.2006.00006.x

Davis, D., & Holt, C. (1993). *Experimental economics*. Princeton University Press.

Diamond, J. (2006). *Collapse: How societies choose to fail or succeed*. Penguin.

Douglas, M., & Wildavsky, A. (1983). *Risk and culture: An essay on the selection of technological and environmental dangers*. University of California Press.

Duffy, J., & Hopkins, E. (2005). Learning, information and sorting in market entry games: Theory and evidence. *Games and Economic Behavior*, *51*(1), 31–62. https://doi.org/10.1016/j.geb.2004.04.007

Eckel, C., Harwell, H., & Castillo, J. G. (2015). Four classic public goods experiments: A replication study. *Replication in Experimental Economics (Research in Experimental Economics*, *18*, 13–40. https://doi.org/10.1108/S0193-230620150000018009.

Ehmke, M., Lusk, J., & Tyner, W. (2010). Multidimensional tests for economic behavior differences across cultures. *The Journal of Socio-Economics*, *39*(1), 37–45. https://doi.org/10.1016/j.socec.2009.06.006

Ensminger, J., & Henrich, J. (Eds.), (2014). *Experimenting with social norms: Fairness and punishment in cross-cultural perspective*. Russell-Sage.

Fehr, E., & Schmidt, K. (1999). A theory of fairness, competition and cooperation. *Quarterly journal of economics*, *114*(3), 817–868. https://doi.org/10.1162/003355399556151.

Fernández, R. (2008). Culture and economics. In Palgrave Macmillan.(Ed.), *The new palgrave dictionary of economics*. Palgrave Macmillan.

Fukuyama, F. (2001). Social capital, civil society and development. *Third World Quarterly*, *22*(1), 7–20. https://doi.org/10.1080/713701144

Gächter, S., & Herrmann, B. (2009). Reciprocity, culture and human cooperation: Previous insights and a new cross-cultural experiment. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *364*(1518), 791–806. https://doi.org/10.1098/rstb.2008.0275

Gächter, S., Herrmann, B., & Thöni, C. (2010). Culture and cooperation. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *365*(1553), 2651–2661. https://doi.org/10.1098/rstb.2010.0135

Gershman, B. (2017). Long-run development and the new cultural economics. In M. Cervelatti & U. Sunde (Eds.), *Demographic change and long-run development* (pp. 221–261). MIT Press. Ch. 9.

Guiso, L., Sapienza, P., & Zingales, L. (2004). The role of social capital in financial development. *American Economic Review*, *94*(3), 526–556. https://doi.org/10.1257/0002828041464498

Guiso, L., Sapienza, P., & Zingales, L. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, *20*(2), 23–48. https://doi.org/10.1257/jep.20.2.23

Gunnthorsdottir, A., Houser, D., & McCabe, K. (2007). Disposition, history, and contributions in public goods experiments. *Journal of Economic Behavior & Organization*, *62*(2), 304–315. https://doi.org/10.1016/j.jebo.2005.03.008

Gurven, M. (2004). Does market exposure affect economic game behavior? In J. Henrich, R. Boyd, S. Bowles, C. Camerer, E. Fehr, & H. Gintis (Eds.), *Foundations of human sociality* (pp. 194–231). Oxford University Press.

Hardin, G. (1968). The tragedy of the commons. The population problem has no technical solution; it requires a fundamental extension in morality. *Science*, *162*(3859), 1243–1248. https://doi.org/10.1126/science.162.3859.1243

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., & Gintis, H. (2004). *Foundations of human sociality: Economic experiments and ethnographic evidence from fifteen small-scale societies*. Oxford University Press.

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., & McElreath, R. (2001). In search of homo economicus: Behavioral experiments in 15 small-scale societies. *American Economic Review*, *91*(2), 73–78. https://doi.org/10.1257/aer.91.2.73

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Smith-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*(6), 795–855. https://doi.org/10.1017/S0140525X05000142

Henrich, J., & Ensminger, J. (2014). Theoretical foundations: The co-evolution of social norms, intrinsic motivations, markets, and the institutions of complex societies. In J. Ensminger & J. Henrich (Eds.), *Experimenting with social norms: Fairness and punishment in cross-cultural perspective*. Russell-Sage. Ch. 2.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *The Behavioral and Brain Sciences*, *33*(2–3), 61–83; discussion 83–135 https://doi.org/10.1017/S0140525X0999152X

Herrmann, B., Thöni, C., & Gächter, S. (2008). Antisocial punishment across societies. *Science*, *319*(5868), 1362–1367. https://doi.org/10.1126/science.1153808

Hoffman, E., Mccabe, K. A., & Smith, V. L. (1998). Behavioral foundations of reciprocity: Experimental economics and evolutionary psychology. *Economic Inquiry*, *36*(3), 335–352. https://doi.org/10.1111/j.1465-7295.1998.tb01719.x

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Sage.

Hofstede, G., Hofstede, G., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). McGraw-Hill.

House, R. J., Hanges, P., Javidan, M., Dorfman, P., & Gupta, V. (2004). *Culture, leadership, and organizations: The GLOBE study of 62 societies*. Sage.

Inglehart, R. (1997). *Modernization and postmodernization: Cultural, economic and political change in 43 societies*. Princeton University Press.

Inglehart, R., & Baker, W. E. (2000). Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, *65*(1), 19–51. https://doi.org/10.2307/2657288

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

Isaac, R. M., & Walker, J. M. (1988). Group size effects in public goods provision: The voluntary contributions mechanism. *Quarterly Journal of Economics*, *103*(1), 179–200. https://doi.org/10.2307/1882648

Isaac, R. M., Walker, J. M., & Thomas, S. H. (1984). Divergent evidence on free-riding: An experimental examination of possible explanations. *Public Choice*, *43*(2), 113–149. https://doi.org/10.1007/bf00140829

Keser, C., & Van Winden, F. (2000). Conditional cooperation and voluntary contributions to public goods. *The Scandinavian Journal of Economics*, *102*(1), 23–39. https://doi.org/10.1111/1467-9442.00182

Kim, D. G. (2022). *Clustering standard errors at the "session" level*. CESifo Working Paper No. 8386.

Kistler, D, Thöni, C., & Welzel, C (2017) (In this issue). Survey response and observed behavior: Emancipative and secular values predict prosocial behaviors. *Journal of Cross-Cultural Psychology*, *48*(4), 461–489. https://doi.org/10.1177/0022022117696799.

Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff: A cross-country investigation. *The Quarterly Journal of Economics*, *112*(4), 1251–1288. https://doi.org/10.1162/003355300555475

Kocher, M. G., Cherry, T., Kroll, S., Netzer, R. J., & Sutter, M. (2008). Conditional cooperation on three continents. *Economics Letters*, *101*(3), 175–178. https://doi.org/10.1016/j.econlet.2008.07.015

Kocher, M. G., Martinsson, P., & Visser, M. (2008). Does stake size matter for cooperation and punishment? *Economics Letters*, *99*(3), 508–511. https://doi.org/10.1016/j.econlet.2007.09.048

Kurzban, R., & Houser, D. (2005). Experiments investigating cooperative types in humans: A complement to evolutionary theory and simulations. *Proceedings of the National Academy of Sciences of the United States of America*, *102*(5), 1803–1807. https://doi.org/10.1073/pnas.0408759102

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Trust in large organizations. *American Economic Review*, *87*(2), 333–338.

Ledyard, J. O. (1995). Public goods: A survey of experimental research. In J. Kagel & A. Roth (Eds.), *Handbook of experimental economics* (pp. 111–194). Princeton University Press.

Maleki, A., & Hendriks, F. (2015). Grid, group, and grade: Challenges in operationalizing cultural theory for cross-national research. *Cross-cultural Research*, *49*(3), 250–280. https://doi.org/10.1177/1069397114555843

Mark Isaac, R., McCue, K. F., & Plott, C. R. (1985). Public goods provision in an experimental environment. *Journal of Public Economics*, *26*(1), 51–74. https://doi.org/10.1016/0047-2727(85)90038-6

Midgley, D. F., Venaik, S., & Christopoulos, D. (2019). Culture as a configuration of values: An archetypal perspective. In A. Gunnthorsdottir & D. Norton (Eds.), *Research in experimental economics* (*20*, pp. 63–88).

Moffatt, P. (2016). *Experimetrics: Econometrics for experimental economics*. Macmillan.

Morris, M. W., Nisbett, R. E., & Peng, K. (1995). Causal attribution across domains and cultures. In D. Sperber, D. Premack, & A. J. Premack (Eds.), *Symposia of the fyssen foundation. Causal cognition: A multidisciplinary debate* (pp. 577–614). Clarendon.

Nisbett, R. E., & Masuda, T. (2003). Culture and point of view. *Proceedings of the National Academy of Sciences of the United States of America*, *100*(19), 11163–11170. https://doi.org/10.1073/pnas.1934527100

Nowak, M. A., & Sigmund, K. (1998). The dynamics of indirect reciprocity. *Journal of Theoretical Biology*, *194*(4), 561–574. https://doi.org/10.1006/jtbi.1998.0775

Ockenfels, A., & Weimann, J. (1999). Types and patterns: An experimental East-West-German comparison of cooperation and solidarity. *Journal of Public Economics*, *71*(2), 275–287. https://doi.org/10.1016/s0047-2727(98)00072-3

OECD. (2020). *Gross domestic product (GDP) (indicator)*. https://doi.org/10.1787/dc2f7aec-en. Accessed on 22 September 2020.

Olson, M. (1965). *The logic of collective action: Public goods and the theory of groups*. Harvard University Press.

Ones, U., & Putterman, L. (2007). The ecology of collective action: A public goods and sanctions experiment with controlled group formation. *Journal of Economic Behavior & Organization*, *62*(4), 495–521. https://doi.org/10.1016/j.jebo.2005.04.018

Ostrom, E. (1990). Governing the commons: *The evolution of institutions for collective action*. Cambridge University Press.

Page, T., Putterman, L., & Unel, B. (2005). Voluntary association in public goods experiments: Reciprocity, mimicry, and efficiency. *Economic Journal*, *115*(506), 1032–1053. https://doi.org/10.1111/j.1468-0297.2005.01031.x.

Pang, C., & Bowles, S. (2006). Can laboratory experiments explain the cultural difference? Working paper. Peking University & Santa Fe Institute.

Paternoster, R., Brame, R., Mazerolle, P., & Piquero, A. (1998). Using the correct statistical test for equality of regression coefficients. *Criminology*, *36*(4), 859–866. https://doi.org/10.1111/j.1745-9125.1998.tb01268.x

Petersen, M. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, *22*(1), 435–480. https://doi.org/10.1093/rfs/hhn053.

Pigou, A. C. (1932/2017). *The economics of welfare*. Routledge.

Putnam, R. D., Leonardi, R., & Nanetti, R. (1993). *Making democracy work. Civic traditions in modern Italy*. Princeton University Press.

Putterman, L., & Weil, D. N. (2010). Post-1500 Population flows and the long run determinants of economic growth and inequality. *The Quarterly Journal of Economics*, *125*(4), 1627–1682. https://doi.org/10.1162/qjec.2010.125.4.1627

Samuelson, P. A. (1954). The pure theory of public expenditure. *The Review of Economics and Statistics*, *36*(4), 387–389. https://doi.org/10.2307/1925895

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, *25*, 1–65. https://doi.org/10.1016/S0065-2601(08)60281-6.

Selten, R. (1967). Die Strategiemethode zur Erforschung des eingeschränkt rationalen Verhaltens im Rahmen eines Oligopolexperiments. In H. Sauermann (Ed.), *Beiträge zur experimentellen Wirtschaftsforschung* (pp. 136–168). Mohr.

Siegel, S., & Castellan, N. J. (1988). *Nonparametric statistics for the behavioral sciences*. McGraw-Hill.

Soltis, J., Boyd, R., & Richerson, P. J. (1995). Can group-functional behaviors evolve by cultural group selection? An empirical test. *Current Anthropology*, *36*(3), 473–494. https://doi.org/10.1086/204381

Spolaore, E. (2014). *Culture and economic growth*. Edward Elgar Publishing.

Storr, V., & John, A. (2019). Why use qualitative methods to study culture in economic life? In *Experimental economics and culture (research in experimental economics Vol. 19)* (pp. 25–52). Emerald.

Sugden, R. (1984). Reciprocity: The supply of public goods through voluntary contributions. *The Economic Journal*, *94*(376), 772–787. https://doi.org/10.2307/2232294

Tabellini, G. (2010). Culture and institutions: Economic development in the regions of Europe. *Journal of the European Economic Associationournal of the European Economic Association*, *8*(4), 677–716. https://doi.org/10.1111/j.1542-4774.2010.tb00537.x

Thöni, C. (2019). Cross-cultural behavioral experiments: Potential and challenges. In A. Schram & A. Ule (Eds.), *Handbook of research methods and applications in experimental economics* (pp. 349–367). Elgar. Ch. 18.

Thöni, C., & Volk, S. (2018). Conditional cooperation: Review and refinement. *Economics Letters*, *171*, 37–40. https://doi.org/10.1016/j.econlet.2018.06.022.

Torgler, B. (2004). Cross-culture comparison of tax morale and tax compliance: Evidence from Costa Rica and Switzerland. *International Journal of Comparative Sociology*, *45*(1–2), 17–43. https://doi.org/10.1177/0020715204048309

Van Pelt, V. (2020). *When and how to cluster standard errors in experimental data?* Accounting Experiments. https://www.accountingexperiments.com/post/clustering/

Wedekind, C., & Milinski, M. (2000). Cooperation through image scoring in humans. *Science*, *288*(5467), 850–852. https://doi.org/10.1126/science.288.5467.850

Weimann, J. (1994). Individual behaviour in a free riding experiment. *Journal of Public Economics*, *54*(2), 185–200. https://doi.org/10.1016/0047-2727(94)90059-0

Welzel, C. (2013). *Freedom rising: Human empowerment and the quest for emancipation*. Cambridge University Press.

World Bank. (2019). *Gross national income per capita*. [cited 3 February 2020]. World Bank. Available from: https://databank.worldbank.org/data/download/GNIPC.pdf

World Values Survey Association. (2020a). *Inglehart-Welzel cultural map*. [cited 1 October 2020]. In: WVS findings and insights [Internet]. Available from: https://www.worldvaluessurvey.org/WVSContents.jsp

World Values Survey Association. (2020b). *Questionnaire and research topics*. [cited 3 March 2021]. In World Values Survey [Internet]. World Values Survey Association. Available from: https://www.worldvaluessurvey.org/WVSContents.jsp

Zelmer, J. (2003). Linear public goods experiments: A meta-analysis. *Experimental Economics*, *6*(3), 299–310. https://doi.org/10.1023/a:1026277420119

Author Biographies

Anna Gunnthorsdottir is an affiliate at the Department of Economics at the University of Iceland and at the Center for the Philosophy of Freedom at the University of Arizona. She has an interest in practical application of game theory for strategy in business, geopolitics and defense, and in the generation of social capital and welfare. Her publications have focused on experimental tests of game-theoretic models, how personality impacts behavior in games, and on the ability of large groups to tacitly coordinate complex equilibria without conscious awareness. Her current work is on the impact of privilege on social productivity, and on cross-cultural differences. Together with Doug Norton she recently edited a volume in the Research in Experimental Economics series about the cross-cultural replicability of economics experiments across cultures.

Palmar Thorsteinsson is an economist in the research department at the Central Bank of Iceland. He is interested in economic modelling, policy including monetary policy, structuring systems that enhance welfare, and the impact of privilege on social productivity.

Sigurdur Pall Olafsson is a PhD candidate at the Department of Economics at Copenhagen Business School. His research focuses on applied econometrics, household consumption and saving behaviour, and pension economics.