Journal of Economic Behavior & Organization 127 (2016) 99–114

Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo

Honesty, beliefs about honesty, and economic growth in 15 countries

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ARTICLE INFO

Article history:
Received 29 October 2015
Received in revised form 12 April 2016
Accepted 16 April 2016
Available online 23 April 2016

Keywords:
Honesty
Experiment
Lying

ABSTRACT

The honesty of people in an online panel from 15 countries was measured in two experiments: reporting a coin flip with a reward for "heads", and an online quiz with the possibility of cheating. There are large differences in honesty across countries. Average honesty is positively correlated with per capita GDP. This is driven mostly by GDP differences arising before 1950, rather than by GDP growth since 1950. A country's average honesty correlates with the proportion of its population that is Protestant. These facts suggest a *long-run* relationship between honesty and economic development. The experiment also elicited participants' expectations about different countries' levels of honesty. Expectations were not correlated with reality. Instead they appear to be driven by cognitive biases, including self-projection.

The 19th-century Chinese scholar Feng Guifen attributed British economic success to four causes: utilizing manpower, superior agriculture, control over rulers, and "the necessary accord of word with deed" (quoted in Spence, 2001). These explanations map on to standard answers to the biggest question in economics[1]: why are some countries richer than others? Feng's first two causes relate to the factors of land and labour, and the third to political economy explanations of economic growth (Acemoglu and Robinson, 2013). The fourth and final cause points to a cultural variable: the propensity to tell the truth and keep one's promises, that is, honesty.

Honesty might be good for growth because it encourages economic interactions beyond a narrow circle. When people are honest, bare promises act like contracts, allowing gains from cooperation in situations where formal contracts would be hard to write or enforce. If honesty varies across cultures, as Feng proposes, then this mechanism may explain why levels of wealth vary too. On this account, honesty should be particularly important in environments with weak institutions (so that contracts are hard to enforce) and without technology for monitoring (so that contracts are hard to monitor). That description fits most pre-industrial societies. Modern societies, on the other hand, have relatively effective institutions, plus technological advances that make monitoring easier.[2] In these respects, even today's developing economies are far ahead of where they were in the past. So, we might expect honesty to be most important for economic development early in history. In the context of eighteenth-century Britain, Mokyr (2008) argues: "It is simply not plausible that third-party enforcement was the main institution on which economic progress relied during the Industrial Revolution." Instead, order was provided

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[1] This widely-used phrase appears to come from McCloskey et al. (1990).

[2] Cowen and Tabarrok (2015) list a number of recent technologies that improve monitoring and reduce moral hazard, including online reviews, credit checks, remote attendance monitoring for workers and escrow systems. Earlier advances include double entry accounting, the telegraph and telephone, and on the institutional side speedy access to justice and impartial bureaucracies.

http://dx.doi.org/10.1016/j.jebo.2016.04.012
0167-2681/

by "social conventions and self-enforcing modes of behavior", including "a sense of honesty". By the nineteenth century, though, formal institutions played an increasingly prominent role.

This paper reports experimental research on cross-national differences in honesty. People from 15 countries took part in an online survey containing two incentivized experiments measuring honest behaviour. I use both the well-known coin flip experiment, where subjects report the result of a coin flip and are offered money for reporting "heads", and a new experimental paradigm: an online quiz in which subjects were able to cheat and this could be detected. This dual design lets me check that results are robust to using different honesty measures. This is important, because differences between countries may reflect reactions to one specific experimental paradigm: I discuss a possible example below. I also use an online sample, rather than drawing from university subject pools like much previous research. Though it is still not a true random sample, this sample is more diverse and closer to the population on some demographic variables.

With data from the experiments, I first test Feng's basic intuition that levels of honesty differ between societies. Then, taking country average levels of honesty, I relate them to economic development at different times in history. I also test whether honesty is related to religion, a cultural variable that is often believed to affect economic outcomes, and to a measure of country-level corruption. Contrary to some previous research, I find large differences in honesty between countries. Inter-country differences relate to economic growth before 1950, but are unrelated to growth since then. This seems to support the argument above, that the relationship between honesty and economic growth exists over the historical long run.

The ability to realize gains from trade and cooperation may depend not just on partners' honesty, but also on their mutual trust. People hold beliefs about the honesty of both their fellow citizens, and those in other countries. Under rational expectations, these beliefs would be correct on average. However, a large literature in psychology examines *stereotypical* beliefs about groups (McGarty et al., 2002). Stereotypes may, but need not, be accurate (Jussim et al., 2009). Different groups' beliefs about each other can affect how they interact. For instance, the German public's willingness to support debt bailouts may be affected by stereotypes about Southern Europeans (Soll, 2015). So it is important to understand how these beliefs are formed. Participants in the experiment were asked to predict the average honesty of other participants from different countries. The data support neither rational expectations, nor the alternative hypothesis that people predict others' honesty from their experience in their own country. Instead, these beliefs are driven by biases, including self-projection and, surprisingly, pessimism about the honesty of people in one's own country.

A growing literature in economics uses incentivized experiments to study honesty. Initial experiments examined whether people's unwillingness to lie was related to costs (Gneezy, 2005; Charness and Dufwenberg, 2006; Vanberg, 2008). More recent work has revealed variety in the motivations of liars: people may lie to benefit others (Erat and Gneezy, 2012) or in such a way as to make their lie less obvious (Fischbacher and Föllmi-Heusi, 2013). There is also some evidence for heterogeneity: women are less willing to tell a lie (Dreber and Johannesson, 2008). Abeler et al. (2014) run the coin flip paradigm within a telephone survey of a representative sample of Germans, and find that complete honesty cannot be ruled out.

Within a broader literature comparing social preferences across cultures (e.g. Croson and Buchan, 1999; Henrich, 2004; Henrich et al., 2006; Herrmann et al., 2008), some existing papers have compared honesty across countries. Holm and Kawagoe (2010) run a sender-receiver game in Sweden and Japan, finding no differences in average levels of truth-telling. Pascual-Ezama et al. (2015) report an experiment among university students in 16 countries. Subjects were asked to flip a coin and report the result; reporting heads was rewarded with a chocolate. Cross-country differences in honesty are small and insignificant. Mann et al. (2015) run a "dice rolling" game, similar to the coin flip, in five countries. They find small, marginally significant differences in honesty. Both these studies offered relatively low incentives (a chocolate, and 20 cents average per lie, respectively), which may explain the low levels of dishonesty and small differences they report. Dieckmann et al. (2015) run a "coin flip" game in five European countries and find significant differences in honesty between countries. They also examine subjects' incentivized assessments of different nations' honesty, with results similar to those reported here. In a recent paper, Gächter and Schulz (2016) also find inter-country differences. There are two key differences between their paper and this one: first, they use student subject pools, while I use people from online market research panels; second, I test honesty using two different paradigms, while they use a dice rolling paradigm only. Both choices are discussed further below.

This paper also speaks to the literature on cross-country differences in trust and social capital. Most cross-country comparative research on trust uses survey data (Porta et al., 1997; Knack and Keefer, 1997). A potentially important proximate cause of trust is trustworthiness, including honesty. More than questions on trust, survey questions on trustworthiness face the problem that respondents may not always answer truthfully. Behavioural data can therefore play an important role in measurement, and indeed several papers have used the trust game (Berg et al., 1995) to measure trust and trustworthiness across cultures (Yamagishi, 1988; Buchan et al., 2002; Holm and Danielson, 2005; Bornhorst et al., 2010). The paradigms used here have the advantage over the trust game that they require no interactions between participants, making them simpler to administer. A subtler difference is in what the experiments measure. Responder behaviour in the trust game may be affected by several factors, including altruism towards one's partner, reciprocity and a perceived social norm. In the experiments here, respondents face a simpler choice between honesty and material self-interest. Below, I examine the relationship of honesty with questionnaire and behavioural measures of trust, and find no evidence that they are related at country level.

This paper's contribution, then, is to estimate the honesty of a demographically diverse sample in a large set of countries, using two different incentivized experiments; to relate the country-level results to economic development and cultural background; and to look at expectations about people's honesty in different countries.

1. Design

The experiment was implemented in Qualtrics, an online survey platform. Participants were recruited from 15 countries, in two waves. The first wave consisted of 804 respondents from Brazil, China, Greece, Japan, Russia, Switzerland, Turkey, and the United States. The second wave added 735 respondents from Argentina, Denmark, Great Britain, India, Portugal, South Africa, South Korea, and Turkey.[3] The countries were chosen to provide a mix of regions, levels of development, and levels of social trust. Initial analysis of the first wave of countries showed significant cross-country differences. The second wave was added so as to learn more about the correlates of honesty at country level. For simplicity, the analysis combines data from both waves.

Participants were members of managed online panels. These are typically used by firms for market research. Members are recruited from across the web. They sign up to receive regular invitations to surveys and questionnaires. Recruitment materials usually emphasize both material benefits of taking part ("share your opinion to win gifts, cash and test products") and non-material benefits ("have your say"). Sample frames for individual surveys are then selected and a randomized sample of candidates is invited to participate by email. Sometimes extra participants are recruited directly from the web. To get a particular demographic profile, quota sampling is used: individuals are invited until enough people from a given category (e.g. a particular gender and age group) have completed the survey. So, these panels are not probability samples of the country populations: quota sampling provides balance across gender and age, but respondents could be unrepresentative in other dimensions. For example, all Swiss respondents answered in French, although German was available as a questionnaire language.

How does online sampling compare with the widely-used method of recruiting participants from university lab subject pools? Both methods typically involve a subset of the population (students; internet users), from which participants are recruited to a database and subsequently receive invitations to participate in experiments. Both clearly risk selection on observables and unobservables at each stage. To get a sense of the issues involved, among the 15 sample countries, entry rates into higher education varied from 18.8% in South Africa to 87.8% in Denmark (OECD statistics for 2013); 2014 internet penetration rates varied from 19.2% in India to 96.1% in Denmark (internetlivestats.com). Quota sampling guarantees a reasonable spread of age groups, and other demographics (e.g. education) are likely to be closer to the country population than student samples. In short, student samples may be better at capturing the moral standards of a country's elite, while online panels may better reflect those of ordinary people.

Another difference with a standard laboratory experiment is that no experimenter is present. This reduces control: for example, subjects may have answered in the presence of others. Conversely, it may also reduce experimenter demand and social desirability effects.

The experiment contained two different measures of honesty. In the *coin flip*, respondents were asked to get a coin ready and had to confirm they had done this. On the next screen, they were asked to flip the coin and report the result. They were told that they would get extra money (either $3 or $5) if they reported "heads". So, respondents who flipped "tails" faced a choice between telling the truth and getting paid. This paradigm allows us to estimate aggregate honesty, from the difference between the proportion reporting heads, and the 50% proportion expected if everyone tells the truth. It has been used in several previous experiments (e.g. Bucciol and Piovesan, 2011; Fischbacher and Föllmi-Heusi, 2013; Abeler et al., 2014; Pascual-Ezama et al., 2015).

In the *quiz*, subjects were given a test on the topic of music, consisting of six open-ended questions. They were asked not to look up the answers on the internet, and they had to tick a box confirming they had answered on their own before moving on. Since the survey was web-based, and respondents were not monitored, they could always actually look up the answers online. Participants were offered a money incentive ($3 or $5) if they answered all the questions correctly. So, they faced a temptation: they could cheat by looking the answers up, and lie by ticking the checkbox to affirm they had not done so. The questions were:

1 Who wrote the composition "Für Elise"?
2 What is Lady Gaga's real first name?
3 Name the drummer of the rock group Nirvana.
4 In what year was Claude Debussy born?
5 How many valves are there on a standard modern trumpet?
6 Name the town and state of the US where Michael Jackson was born.

The topic of music was chosen so as to minimize the test's cultural bias: Lady Gaga and Michael Jackson have global name recognition, and classical music is also known in non-Western societies. Questions 2, 4 and 6 were designed to be very easy to look up online: they can be answered, in any of the quiz countries and languages, by typing "Lady Gaga", "Debussy" or

[3] Abbreviations: AR, Argentina; BR, Brazil; CN, China; DK, Denmark; GB, Great Britain; GR, Greece; IN, India; JP, Japan; PT, Portugal; RU, Russia, ZA, South Africa; KR, South Korea; CH, Switzerland; TR, Turkey; US, United States.

"Michael Jackson" into Google.[4] They were also designed to be very difficult for almost anyone to answer without cheating, and I check this below.

The order of the coin flip and quiz experiments was randomized. After completing both experiments, subjects answered a 15 question integrity questionnaire taken from Whiteley (2012). This asks participants to rate whether 15 actions are "always", "sometimes", "rarely" or "never" justified. Typical actions include "making up things on a job application" and "driving faster than the speed limit". Next, subjects were told that some people from one specific country out of the countries in their wave had also taken the coin flip question. They were asked to guess what percentage of people from that country answered "heads". Someone who believed that people in the country were all honest (all dishonest) would guess 50% (100%). Half of the respondents were offered $2 extra if their answer was within 10 percentage points of the true figure (treatment INCENTIVE). The experiment finished with a brief questionnaire on demographics. Wave 2 included additional demographic questions, as well as four questions on self-reported unethical behaviour. Survey materials were professionally translated into the countries' major languages.

The sample within each nation had equal numbers of men and women, and equal numbers of five age groups (18–24, 25–34, 35–44, 45–54, 55+). Payments were made to respondents by Qualtrics in addition to its standard payment to respondents and by the same mechanism: rewards are translated into points which can be spent on various items including vouchers, gift cards, tickets for cash lotteries and so on. This payment mechanism, as well as purchasing power differences, makes it hard to equalize the value of incentives across countries. However, several papers suggest that lying does not respond to incentive size (see above). To check whether incentive sizes would affect my results, I randomized the size of payments offered. Half the subjects were assigned to the HIGH payment treatment. They were offered $5 for reporting heads in the coin flip and $5 for getting all quiz questions right. The remaining subjects were assigned to the LOW payment treatment, where both payments were $3. This difference between payments is about the same as differences in purchasing power between sample countries.[5] If the HIGH/LOW treatments did not affect behaviour, this should make us less worried that differences between countries come from different incentive sizes. The HIGH/LOW and INCENTIVE treatments, and the order of the two honesty experiments, were balanced within countries.

2. Results

Descriptive statistics are shown in Appendix. Only country residents who stated that they were of the country's nationality are included in the analysis (e.g. residents of Turkey who gave their nationality as Turkish), so numbers of respondents vary between countries.[6]

The paper contains multiple tests, with two separate dependent variables. I report unadjusted p values, but in some places I mention p values adjusted for multiple testing within a specific group of tests, using the method of Holm (1979). This adjustment can be used when p values are not independent, and is conservative: an adjusted p value gives an upper bound for the probability, under the null hypothesis, that at least one test in the group gives a false positive result. All analyses use unweighted samples: weighting age/gender groups, to reflect the size of these groups within each country's population, gives essentially unchanged results.

Result 1. Individuals' dishonesty in the coin flip, dishonesty in the quiz, and self-reported unethical actions in the past year, were positively related. However, stated ethical attitudes were not related to dishonesty in the experiments.

We want to be sure that different experimental paradigms capture the same underlying dimension of behaviour. There are two experimental measures of honesty: respondents' reports on the coin flip, and their scores out of 3 on the hard quiz questions, numbers 2, 4 and 6 (henceforth simply "quiz score"). Median quiz scores were 2 for those reporting heads on the coin flip, and 0 for those reporting tails (Mann–Whitney $p < 0.001$). Put another way, proportions reporting heads were 62% for those scoring 0 on the quiz, 65% for those scoring 1, 68% for those scoring 2, and 77% for those scoring 3. If the proportion reporting heads in a group is h, the group's estimated level of dishonest reporting is $2h - 1$, so coin flip dishonesty about doubled between the lowest and the highest quiz scorers, from 24% to 54%.

Subjects in wave 2 were asked whether they had taken four unethical actions within the past 12 months: avoiding a fare on public transport; calling in sick when not actually unwell; making something up on a job application; and downloading music or videos without paying for them. 554 out of 665 subjects reported only zero or one unethical actions. Those who reported heads in the coin flip admitted to significantly more unethical actions (mean 0.79 versus 0.61, Mann–Whitney test $p = 0.039$). Number of actions reported also correlated with higher quiz scores (Spearman's $\rho = 0.09$; $p = 0.02$). This measure is not perfect, as it may capture variation in willingness to admit these actions. Still, these results provide evidence that both experiments tap the same dimension of behaviour, and have some external validity.[7]

[4] Google is not widely used in China, but other search engines give equally easy access to these answers.

[5] A Big Mac cost between $1.83 (India) and $6.82 (Switzerland) among sample countries in July 2015 (The Economist, 2015). In 70 of 105 pairs of countries, the cost ratio was more than 3/5.

[6] There are two exceptions: residents of the US and South Africa who gave their nationality as their ethnicity, e.g. "black", "white", "Hispanic", "Caucasian" etc; and UK residents who gave it as "English", "Scottish", or "Welsh".

[7] Other research has found that the coin flip and similar experiments predict real world dishonest behaviour (Galeotti et al., 2016; Cohn and Maréchal, 2015).

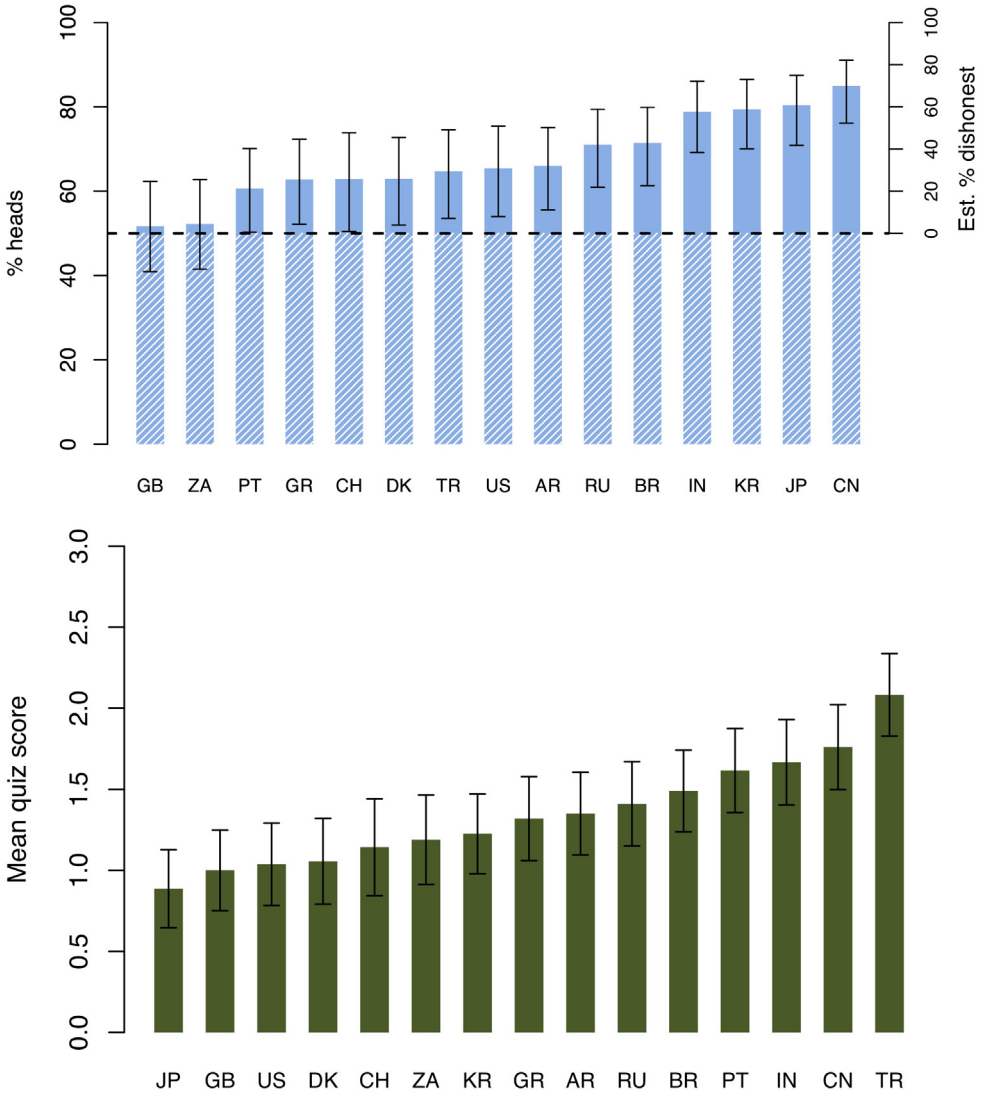

Fig. 1. Experimental measures of honesty per country. Bars show 95% confidence intervals (unadjusted).

By contrast, there is no evidence of a link between people's expressed moral attitudes and their behaviour. Answers in the integrity questionnaire ranged from 1 (an action is "always justified") to 4 ("never justified").[8] Following Whiteley (2012), I created a moral integrity score by summing answers to all 15 questions. Mean integrity scores for those reporting heads and tails were 50.9 and 51.6 respectively. This is marginally significant in one specification (t test $p = 0.054$; Mann–Whitney $p = 0.49$), but the difference is small. The correlation with quiz scores was small and insignificant (Spearman's $\rho = 0.008$; $p = 0.8$).

Result 2. There was significant evidence for dishonesty in all countries.

The first graph in Fig. 1 shows the proportion reporting heads by country. The right hand scale shows estimated levels of lying. In every country except Great Britain and South Africa, we can reject the hypothesis that the proportion reporting heads is 50% at the 0.05 significance level in a binomial test.

The second graph shows mean quiz scores by country. The association between quiz scores and the coin flip makes it plausible that both measures are capturing individuals' levels of dishonesty. Nevertheless, perhaps some subjects could answer the hard questions without cheating. To check this, the quiz was administered to 144 students in a laboratory,

[8] "Straightliners" who gave the same answer for every question were removed from this analysis.

where cheating was difficult.[9] Of the hard questions, while 25 out of 144 students got question 2 right, only two students got question 4 right, and only the same two students got question 6 right. Thus, a score above one on hard questions was extremely hard to achieve without cheating.[10] In each country, more than 30% of subjects scored above one; even if 10% of the population could do this without cheating, much more than in the laboratory sample, the hypothesis of no cheating would be rejected in every country at $p < 0.001$.

Result 3. Levels of honesty varied significantly across countries.

A chi-squared test of proportion reporting heads against nationality rejects equality of proportions ($p < 0.001$). A Kruskal–Wallis test of quiz scores against nationality rejects equality of medians ($p < 0.001$). Thus, both measures of dishonesty vary among nations.[11] Overall differences are large: the level of estimated misreporting in the coin flip varies from 3.4% in Great Britain to 70% in China. But note that standard errors are also large. The sample was designed to test for differences between countries, not to provide tight estimates for any one population, so not too much weight should be placed on any individual country's score.

One concern may be that these results just reflect anti-Western bias – non-Western subjects may care less about lying to Western researchers. Surveys were translated and carried no branding, but participants were told that data from their answers would be stored at the University of Essex, so they could conceivably have drawn inferences from this. A crude check is to correlate country average behaviour with distance from the UK. For per cent reporting heads in the coin flip, the correlation is high (0.507) and just misses 5% significance ($p = 0.054$); for quiz scores, the correlation is essentially zero (0.002, $p = 0.99$). It is hard to explain why anti-Western bias would only have affected behaviour in the coin flip.

To confirm the inter-country differences, I run regressions with controls. Tables 7 and 8 in Appendix show linear regressions of nationality dummies (with omitted category the UK) on the probability of reporting heads and on quiz score. The second column in each table includes as controls gender, age group, attendance at religious services, population density at the respondent's location (estimated from their IP address), incentive size (*Hilow*) and treatment order (*QuizFirst*). The third column includes extra demographic controls which were recorded in the second wave only: income, marital status, children, educational level, and a question on the importance of religion. Effects of nationality are robust. Few other demographic variables are significant. Those who report attending religious services more often are *more* likely to report heads, and score more in the quiz, but this effect is not present within wave 2. Older people scored less in the quiz but were not less likely to report heads. The incentive size treatment had no effect. There is a small order effect in the quiz, with those who answered the quiz first scoring significantly more.

2.1. Country correlates of honesty

Now let us consider the link between country-level averages of dishonest behaviour and some interesting macro-level variables. With just 15 observations, I can only report correlations, leaving causal identification for future work. Another problem is that at country level, the correlation between mean quiz score and proportion reporting heads is positive but not significant (correlation 0.247, $p = 0.37$), despite the significant individual-level association. This is probably due to the small number of countries.

The most obvious result from the coin flip is that the four least honest countries are the four Asian countries, China, India, South Korea and Japan. There are certainly theories that "Asian values" differ from non-Asian values (Zakaria, 1994; Hofstede and Hofstede, 2001). However, the result does not hold in the quiz, where Japan has the *lowest* mean score. A possible explanation is that in Japan, most gambling is illegal. Therefore, Japanese respondents may have perceived the coin flip as intrinsically unethical and been more willing to lie in this context. This suggests that the Asia-other difference is specific to the coin flip paradigm, rather than reflecting a difference in honesty in general. Paradigm-specific reactions like this confirm the importance of having multiple measures of the honesty construct: without the quiz, the data might have led to an unjustified inference. Rather than combining the measures, I report correlations with each of them separately, and place more confidence in results which are robust across the two.

Result 4. Measures of dishonesty are negatively correlated with 2011 GDP per capita. This correlation is mainly driven by GDP growth prior to 1950.

Fig. 2 plots country averages of each measure of dishonesty against logs of three variables: GDP in 2011, GDP in 1950 and GDP growth from 1950 to 2011.[12] Lines from linear regressions are shown. Three facts stand out. First, there is a negative correlation between dishonesty and GDP in 2011, which is significant for the quiz but not the coin flip. Second, this correlation

[9] Participants in the laboratory were from 37 countries. The most common were Romania and the United Kingdom. Subjects earned a £3 reward for getting all six questions right.

[10] Per-country mean quiz scores on "hard" questions were correlated as follows with four alternative measures: mean quiz scores on all questions 0.955; proportions getting all six questions right 0.609; proportions getting more than one hard question right 0.983;, and scores on questions 4 and 6 only 0.984. The key results are unchanged using these alternatives (calculations available on request).

[11] This was also true among the eight wave 1 countries: heads against nationality, $p = 0.0026$; quiz score against nationality, $p \leq 0.001$. All these results easily survive correction for multiple hypothesis testing.

[12] GDP data is from Gleditsch (2002). Russia and South Africa are excluded as they do not have data in 1950.

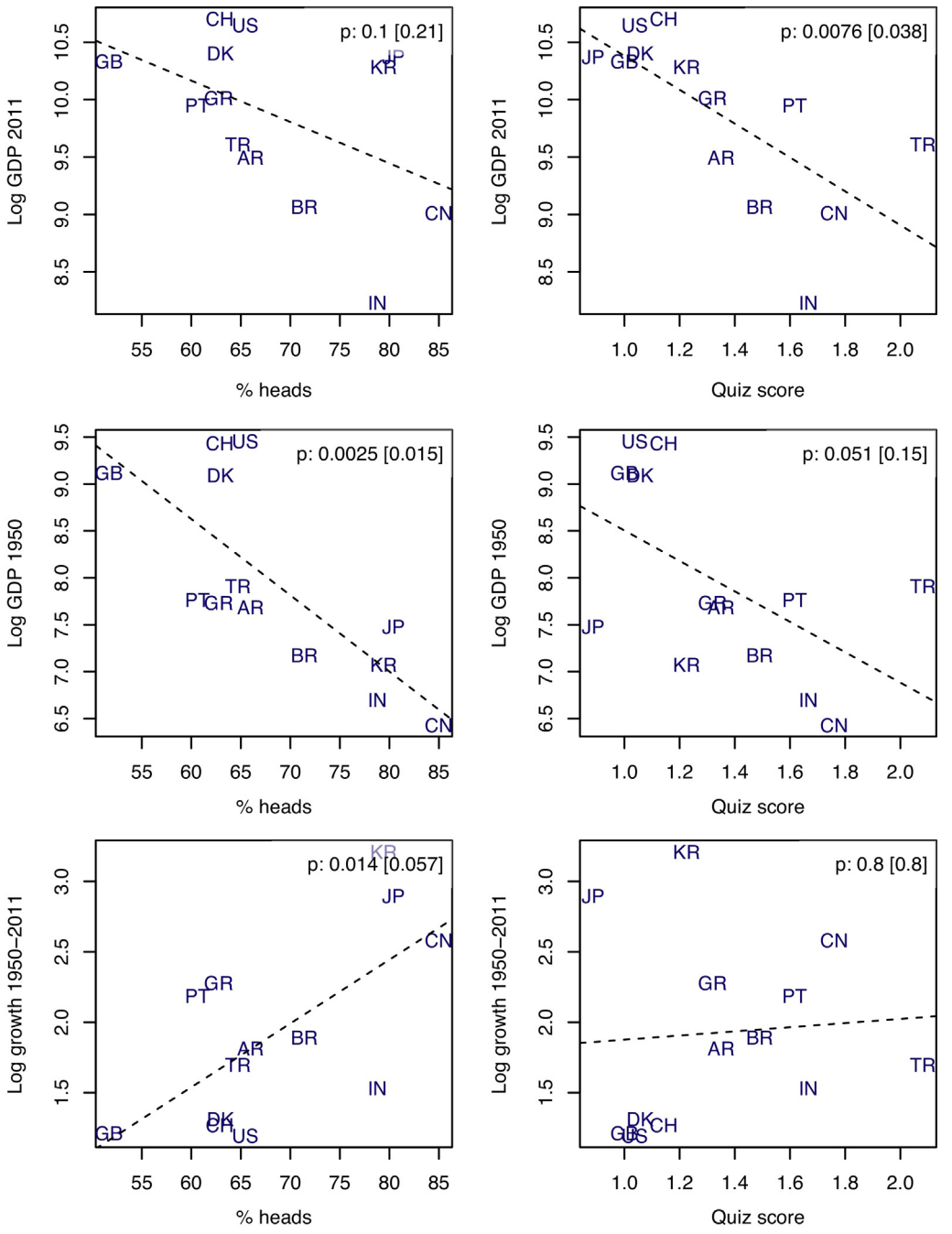

Fig. 2. Dishonesty and per capita GDP. *p* values from correlations [in brackets: adjusted for 6 comparisons].

already exists for 1950 GDP. Lastly, GDP growth from 1950 to 2011 shows either no correlation, or a positive correlation, with dishonesty. Table 1 shows linear regressions. Columns 1–2 and 4–5 show the bivariate relationships for 1950 and 2011 GDP, as in the figure. Columns 3 and 6 add 1950 GDP as a control to the 2011 GDP regression. When I control for 1950 GDP, the coefficient on per cent reporting heads changes sign, while that for quiz scores remains negative and weakly significant, but shrinks. Thus, honesty was related to economic growth over some period up to 1950, but this relationship has been weaker or absent over the past 60 years.

One story that fits this data is as follows: when institutions and technology are undeveloped, honesty is important as a substitute for formal contract enforcement. Countries that develop cultures putting a high value on honesty are able to reap economic gains. Later, this economic growth itself improves institutions and technology, making contracts easier to monitor and enforce, so that a culture of honesty is no longer necessary for further growth. However, since culture is highly persistent,

Table 1
GDP regressions.

	Log GDP 1950	Log GDP 2011	Log GDP 2011	Log GDP 1950	Log GDP 2011	Log GDP 2011
Intercept	13.50 (1.45)***	12.33 (1.41)***	2.95 (3.08)	10.13 (1.03)***	11.85 (0.63)***	7.89 (1.59)***
% heads	−0.08 (0.02)**	−0.04 (0.02)	0.02 (0.02)			
Quiz score				−1.62 (0.74)+	−1.47 (0.45)**	−0.84 (0.44)+
Log GDP 1950			0.69 (0.22)**			0.39 (0.15)*
R^2	0.58	0.22	0.62	0.30	0.49	0.70
Adj. R^2	0.54	0.15	0.54	0.24	0.45	0.64
Num. obs.	13	13	13	13	13	13
RMSE	0.70	0.68	0.50	0.90	0.55	0.44

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
\+ $p < 0.1$ (unadjusted).

Table 2
Correlations with trust and corruption (p values in parentheses).

Measure	N	% heads	Quiz score
Johnson–Mislin trust	11	0.19 (0.58)	−0.19 (0.58)
Johnson–Mislin trustworthiness	11	0.32 (0.34)	0.42 (0.2)
World Values Survey trust	12	0.33 (0.3)	−0.18 (0.58)
Corruption Perceptions Index	15	−0.28 (0.31)	−0.58 (0.025)

the correlation between GDP and honesty remains visible in present-day behavioural data. Of course, other theories also fit the data, for example that the GDP-honesty correlation in 1950 was driven by an unobserved third variable.

One simple explanation for the result would be that respondents in poor countries face a greater temptation to lie, because they value the money reward more. Two pieces of evidence go against this. First, the 66% increase from a $3 to a $5 incentive from the LOW to the HIGH treatment did not increase lying, either in the coin flip (heads reports: 69.4% in LOW, 66.9% in HIGH) or in the quiz (mean scores: 1.39 in LOW, 1.32 in HIGH).[13] Second, respondents in wave 2 reported their monthly income, and this also did not correlate with more lying (variable *Income* in Tables 7 and 8).

Result 5. Measures of dishonesty are negatively correlated with Protestantism at country level.

I next examine a possible root of country-level differences in honesty: religion. Different religions promulgate different norms. The classic study of Weber (2010) argues that Protestant religious teachings encouraged honesty in business dealings. Barro and McCleary (2003) argue that religion affects "traits such as honesty, thrift, willingness to work hard, and openness to strangers." Similarly, Porta et al. (1997) show that country-level measures of trust, from the World Values Survey questionnaire, are related negatively to membership in hierarchical religions: Catholicism, Orthodoxy and Islam.

The percentage of Protestants in each country (Pew Research Center, 2015) is correlated negatively and significantly with both measures of dishonesty (coin flip $\rho = -0.581$, $p = 0.023$; quiz $\rho = -0.571$, $p = 0.026$). Correlations with per cent Catholic are insignificant (coin flip $\rho = -0.23$, $p = 0.41$; quiz $\rho = 0.069$, $p = 0.81$).[14] Not surprisingly, the correlations with Protestantism become insignificant when controlling for 2011 GDP (coin flip $p = 0.35$, quiz $p = 0.055$).

Note that at individual level, there is no evidence that religious adherence is associated with honesty. Indeed, those who claim to attend services regularly, and that religion is very important to them, report heads *more* often and score *higher* in the quiz (appendix Tables 7 and 8). Thus, countries with a Protestant cultural background have higher present-day honesty, but this difference is not necessarily reflected among present-day individuals.

Result 6. At country level, honesty is not correlated with trust, and is negatively correlated with corruption but with weak significance.

I also report correlations with existing measures of trust and corruption. Johnson and Mislin (2011) report a meta-analysis of trust games across 35 countries, including 11 in my sample. I compare honesty in both experiments with both fraction sent ("trust") and fraction returned ("trustworthiness"). The World Values Survey includes a question on trust ("Can most people be trusted?") Lastly, the Corruption Perceptions Index from Transparency International is a widely used measure of country corruption: higher scores indicate less corruption. Results are shown in Table 2. Correlations with the measures of

[13] This null result also held within individual countries. Out of 15 countries, 10 had a lower proportion of heads in the HIGH incentive treatment than in the LOW incentive treatment, and 12 had lower quiz scores. The relationship was significantly positive at 5% only for quiz scores in China. Indeed, if country A reported fewer heads than country B, then in 89 out of 105 cases, the HIGH incentive respondents in country A reported fewer heads than the LOW incentive respondents in country B; for mean quiz scores, this holds in 98 out of 105 cases.

[14] There is not enough variation in the sample of countries to look at Orthodox Christianity. p values corrected for 4 comparisons are: coin flip-Protestant: 0.092; quiz-Protestant: 0.092; coin flip-Catholic: 0.82; quiz-Catholic: 0.82.

trust and trustworthiness are insignificant and change sign. This suggests that honesty captures a different dimension of behaviour from trust. Corruption perceptions are correlated with quiz scores and per cent answering heads, in the expected negative direction, but the correlation is only significant for quiz scores (and this significance would not survive a correction for the 8 tests).

2.2. Beliefs

Result 7. Beliefs about countries' honesty were uncorrelated with their actual honesty.

Each respondent was asked how many respondents out of 100 would report heads in the coin flip, from one target country chosen randomly from all countries in the respondent's wave. Those in the INCENT condition were offered $2 if they guessed within 10 of the true number.

Fig. 3 shows average predictions about each country, by subjects from each country. Each cell is the average of guesses from only about 13 subjects, so standard errors are large. Nevertheless, some patterns in the data are already visible. Predictions vary systematically, both by target country (columns), and guesser's country (rows). And predictions are often higher along the diagonal, when subjects made guesses about their own country.

Subjects' predictions do not reflect reality. Table 3 reports regressions of predicted number of heads in a country on *TargetHeads*, the true percentage. Column 1 shows the bivariate correlation. It has the wrong sign. Column 2 does the same for incentivized guesses only, with the same results. At individual level, less than one in four subjects guessed within 10 percentage points of the true figure, whether in incentivized or unincentivized treatments.

What then drives expectations? The simplest story is that subjects may predict honesty on the basis of experience in their own country. Alternatively, subjects may "project" their own preferences and behaviours on to others: if so, those reporting heads or scoring high in the quiz may expect more dishonesty from others. Relatedly, Dieckmann et al. (2015) suggest that this "social projection" is more pronounced for social groups that are similar to one's own. Lastly, subjects' level of knowledge of other countries may affect their expectations, for example via reports of dishonesty or scandals in the media.

To test these theories, I added the following variables to the belief regression: *Heads*, whether the subject reported heads; subject's own *QuizScore*; *HomeHeads*, the proportion reporting heads in the subject's own country; *TargetIsHome*, which takes the value 1 if the target country was the subject's own and 0 otherwise; and *TargetDistance*, the distance between subject's country and the target country in thousands of kilometers, from the CEPII dataset (variable *distcap*; Mayer and Zignago, 2011). *TargetDistance* is a proxy for subjects' level of knowledge of the target country, and for their judgments of similarity with their own country. The experience theory predicts a positive coefficient for *HomeHeads*. The projection theory predicts a positive

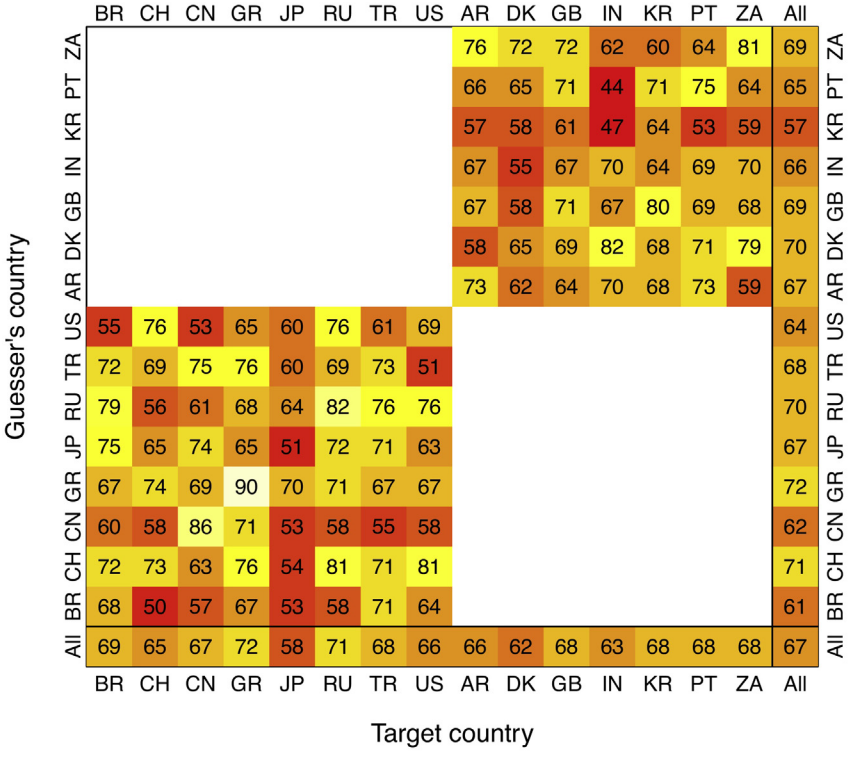

Fig. 3. Average predictions of proportion reporting heads.

Table 3
Coin flip belief regressions.

	All	Incentivized	All	Incentivized	All
(Intercept)	74.91 (4.79)***	75.85 (6.84)***	88.16 (6.33)***	90.34 (9.01)***	88.02 (6.39)***
TargetHeads	−0.13 (0.07)+	−0.16 (0.10)	−0.11 (0.07)	−0.17 (0.10)+	−0.11 (0.07)
Heads			4.10 (1.46)**	2.49 (2.07)	4.19 (1.55)**
QuizScore			2.07 (0.51)***	2.18 (0.73)**	2.08 (0.51)***
HomeHeads			−0.28 (0.07)***	−0.28 (0.10)**	−0.28 (0.07)***
TargetIsHome			5.51 (2.31)*	9.58 (3.25)**	5.99 (3.75)
TargetDistance			−0.23 (0.17)	−0.07 (0.24)	−0.23 (0.17)
Heads:TargetIsHome					−0.69 (4.21)
R^2	0.00	0.00	0.04	0.05	0.04
Adj. R^2	0.00	0.00	0.04	0.04	0.04
Num. obs.	1379	689	1379	689	1379
RMSE	24.92	24.90	24.47	24.45	24.48

S.E.S. clustered by target country and home country.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
+ $p < 0.1$.

coefficient for *Heads* and *QuizScore*, and possibly an interaction between *Heads* and *TargetIsHome*. Social identity theory (Tajfel et al., 1971) claims that humans attribute positive characteristics to their in-group; this would predict a negative coefficient on *TargetIsHome*. Broadly, if knowledge of other countries is relevant to judgments of honesty, coefficients on *TargetIsHome* and *TargetDistance* should be significant.

Result 8. Dishonest subjects believed others would be less honest on average. Subjects in dishonest countries believed others would be more honest. Subjects expected less honesty in their own country.

Column 3 of Table 3 shows the results. The *Heads* and *QuizScore* variables have the expected sign. Subjects who reported heads or scored highly in the quiz expected others to be more likely to report heads.[15] *HomeHeads*, however, has a significant negative sign, contradicting the experience theory: subjects from less honest countries took a more positive view of countries' honesty. *TargetIsHome* is positive and significant: on average, subjects expected their own countries to be less honest. Lastly, the coefficient on *TargetDistance* is negative but not significant. Column 4 repeats the exercise for only incentivized subjects, with essentially unchanged results. Thus, respondents showed three biases. Less honest subjects expected others to be less honest (social projection); subjects expected more honesty in other countries than their own; and subjects from more honest countries expected others to be less honest.

The positive coefficient on *TargetIsHome* runs counter to social identity theory. Dieckmann et al. (2015) suggest an explanation for a similar finding: subjects "socially project" their own behaviour on to fellow citizens more than on to foreigners, and since most subjects report heads, they expect others like them to do the same. To test this, column 5 repeats the regression, adding an interaction between *Heads* and *TargetIsHome*. The interaction is not significant and is negatively signed: subjects who reported heads were not especially pessimistic about their home country. So social projection seems not to be the explanation. The last result, that subjects from more honest countries are more pessimistic, is also puzzling. It is not solely driven by beliefs about foreign countries: it holds even among subjects who guessed about their own countries (results not shown). A possible explanation for both results, which cannot be tested in this data, is media exposure: subjects might be more exposed to news stories about dishonesty in their own country than in other countries, and news stories about dishonesty may be more common or more salient in countries with high levels of honesty.

3. Conclusion

Comparing levels of honesty across 15 countries appears to confirm Feng Guifen's intuition: the connection between word and deed is less necessary in some places than in others. There is also some support for Feng's second claim, that this connection is good for economic development. The relationship with honesty is clearer for earlier economic growth, as summarized in 1950 GDP levels, than for growth since 1950. Finally, there is evidence of a relationship between honesty and Protestantism, as predicted by Weber's classic theory.

In general it is an open question whether national stereotypes are accurate (Jussim et al., 2009). In this data, beliefs about other countries' honesty had little relation to the truth, or even to the average honesty of subjects' own countries. Instead, they appear to be driven by self-projection and other cognitive biases.

[15] An alternative explanation is that subjects who really flipped heads naïvely expected others to do so too. But this does not explain the coefficient on *QuizScore*.

The results here should be interpreted cautiously. Respondents were not a true random sample of national populations, and the two experimental measures of honesty were only weakly correlated at country level. These issues are shared with much cross-cultural experimental research. Experiments on representative samples in multiple countries are still relatively expensive and rare, and experimental economists have probably paid less attention than psychologists to questions of construct validity. To go beyond the current tentative conclusions, better sampling designs and measures will be necessary.

Nevertheless, the large cross-country differences reported here seem unlikely to be explained by sample selection alone. There is a strong case that economic development has cultural roots (Banfield, 1958; Platteau., 2000; Guiso et al., 2006). Experiments can help to isolate cultural differences, holding incentives and institutions constant. These results support the idea that honesty is related to economic development. They also suggest that the relationship is a long run one. There is a similarity here with institutional arguments that economic and political development have long-run historical roots (e.g. Acemoglu et al., 2009). To investigate this, it will be necessary to study how cultural norms have developed historically, perhaps using new sources of textual data, in order to understand when and how culture matters, or mattered, to economic growth.

Acknowledgements

This work was supported byBritish Academy small grant SG122437. Tables were created using the *texreg* R package (Leifeld, 2013). I thank Johannes Abeler, Dan Ariely, Abigail Barr, Daniel Berger, Jonathan Schulz, Ro'i Zultan, seminar participants at UEA, ESA 2015, IMEBESS 2015, NIBS 2015 and Decepticon 2015, and two anonymous referees for constructive comments.

Appendix A. Descriptive statistics

See Tables 4–6.

Table 4
Descriptive statistics.

Variable	Levels	*n*	%	$\sum$ %
Nationality	AR	97	7.0	7.0
	BR	98	7.0	14.0
	CH	70	5.0	19.1
	CN	100	7.2	26.3
	DK	89	6.4	32.7
	GB	89	6.4	39.1
	GR	94	6.8	45.8
	IN	99	7.1	52.9
	JP	97	7.0	59.9
	KR	102	7.3	67.3
	PT	99	7.1	74.4
	RU	100	7.2	81.6
	TR	85	6.1	87.7
	US	81	5.8	93.5
	ZA	90	6.5	100.0
	All	1390	100.0	
Age	18–24	274	19.7	19.7
	25–34	287	20.6	40.4
	35–44	281	20.2	60.6
	45–54	289	20.8	81.4
	55+	259	18.6	100.0
	All	1390	100.0	
Gender	Female	705	50.8	50.8
	Male	682	49.2	100.0
	All	1387	100.0	
ReligAttend	Never	544	39.2	39.2
	Sometimes	637	45.9	85.1
	Weekly	207	14.9	100.0
	All	1388	100.0	
Heads	0	443	31.9	31.9
	1	947	68.1	100.0
	All	1390	100.0	

Table 4 (*Continued*)

Variable	Levels	*n*	%	$\sum$ %
QuizScore	0	588	42.3	42.3
	1	156	11.2	53.5
	2	209	15.0	68.6
	3	437	31.4	100.0
	All	1390	100.0	

Table 5
Descriptive statistics (wave 2 demographics).

Variable	Levels	*n*	%	$\sum$ %
MaritalStatus	Single	283	42.6	42.6
	Married	312	47.0	89.6
	Sep.	12	1.8	91.4
	Div.	43	6.5	97.9
	Wid.	14	2.1	100.0
	All	664	100.0	
HasChildren	0	271	40.8	40.8
	1	393	59.2	100.0
	All	664	100.0	
AgeLeftEduc	16	31	4.7	4.7
	17	36	5.4	10.1
	18	73	11.0	21.1
	19	44	6.6	27.7
	20	48	7.2	34.9
	21+	334	50.2	85.1
	Still in education	90	13.5	98.6
	Under 16	9	1.4	100.0
	All	665	100.0	
Trust	Most people can be trusted	218	32.9	32.9
	You need to be very careful	444	67.1	100.0
	All	662	100.0	
ReligImportance	No religion	133	20.1	20.1
	Not important	173	26.1	46.1
	Quite important	208	31.4	77.5
	Very important	149	22.5	100.0
	All	663	100.0	

Table 6
Descriptive statistics (continuous variables).

Variable	Min	Median	Mean	Max
Integrity	15.0	53.0	51.8	60.0
Guess	0.0	70.0	66.4	100.0
Income	0.0	1.3	2.0	31.4

Appendix B. Regressions

See Tables 7 and 8.

Table 7
Coin flip regressions.

	Pct heads	Pct heads	Pct heads
(Intercept)	0.52 (0.05)***	0.49 (0.06)***	0.28 (0.17)
NationalityAR	0.14 (0.07)*	0.11 (0.07)+	0.10 (0.11)
NationalityBR	0.20 (0.07)**	0.18 (0.07)**	
NationalityCH	0.11 (0.07)	0.10 (0.07)	
NationalityCN	0.33 (0.07)***	0.33 (0.07)***	
NationalityDK	0.11 (0.07)	0.10 (0.07)	0.10 (0.10)
NationalityGR	0.11 (0.07)	0.08 (0.07)	
NationalityIN	0.27 (0.07)***	0.22 (0.08)**	0.40 (0.12)**
NationalityJP	0.29 (0.07)***	0.29 (0.07)***	
NationalityKR	0.28 (0.07)***	0.26 (0.07)***	0.23 (0.10)*
NationalityPT	0.09 (0.07)	0.08 (0.07)	0.06 (0.11)
NationalityRU	0.19 (0.07)**	0.17 (0.07)*	
NationalityTR	0.13 (0.07)+	0.09 (0.07)	
NationalityUS	0.14 (0.07)+	0.12 (0.07)+	
NationalityZA	0.01 (0.07)	−0.03 (0.07)	0.05 (0.11)
GenderMale		0.01 (0.02)	0.04 (0.05)
Age25–34		0.02 (0.04)	0.12 (0.09)
Age35–44		−0.03 (0.04)	−0.11 (0.10)
Age45–54		−0.01 (0.04)	−0.08 (0.10)
Age55+		−0.00 (0.04)	−0.04 (0.11)
ReligAttendSometimes		0.06 (0.03)*	0.13 (0.07)+
ReligAttendWeekly		0.12 (0.04)**	0.15 (0.11)
PopDensity		−0.00 (0.00)	−0.00 (0.00)
QuizFirst		−0.03 (0.02)	0.04 (0.05)
HilowLOW		0.03 (0.02)	0.07 (0.05)
Income			0.01 (0.01)
HasChildren			0.05 (0.07)
MaritalStatusMarried			−0.08 (0.07)
MaritalStatusSep.			0.22 (0.18)
MaritalStatusDiv.			−0.05 (0.11)
MaritalStatusWid.			0.15 (0.18)
ReligImportanceNot important			0.01 (0.09)
ReligImportanceQuite important			0.09 (0.10)
ReligImportanceVery important			0.26 (0.12)*
Education<21			0.01 (0.06)
EducationStudentNow			−0.11 (0.09)
R^2	0.04	0.05	0.13
Adj. R^2	0.03	0.04	0.06
Num. obs.	1390	1385	383
RMSE	0.46	0.46	0.46

Omitted categories: Nationality, GB; Age, 18–24; ReligAttend, never; Education, finished education at 21+; MaritalStatus, single; ReligImportance, no religion. PopDensity is population density at respondent's location (estimated from IP address).

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
\+ $p < 0.1$.

Table 8
Quiz regressions.

	Quiz score	Quiz score	Quiz score
(Intercept)	1.00 (0.14)***	0.90 (0.16)***	1.19 (0.46)*
NationalityAR	0.35 (0.19)+	0.20 (0.19)	0.17 (0.30)
NationalityBR	0.49 (0.19)**	0.40 (0.18)*	
NationalityCH	0.14 (0.20)	0.10 (0.20)	
NationalityCN	0.76 (0.19)***	0.76 (0.18)***	
NationalityDK	0.06 (0.19)	0.02 (0.19)	−0.13 (0.28)
NationalityGR	0.32 (0.19)+	0.14 (0.20)	
NationalityIN	0.67 (0.19)***	0.43 (0.21)*	0.82 (0.33)*
NationalityJP	−0.11 (0.19)	−0.15 (0.19)	
NationalityKR	0.23 (0.18)	0.15 (0.18)	0.32 (0.27)
NationalityPT	0.62 (0.19)***	0.51 (0.19)**	0.46 (0.29)
NationalityRU	0.41 (0.19)*	0.29 (0.19)	

Table 8 (*Continued*)

	Quiz score	Quiz score	Quiz score
NationalityTR	1.08 (0.19)***	0.88 (0.19)***	
NationalityUS	0.04 (0.20)	−0.08 (0.19)	
NationalityZA	0.19 (0.19)	0.03 (0.19)	−0.03 (0.29)
GenderMale		0.03 (0.07)	−0.10 (0.14)
Age25–34		0.13 (0.11)	0.22 (0.25)
Age35–44		−0.15 (0.11)	−0.27 (0.27)
Age45–54		−0.25 (0.11)*	−0.55 (0.28)*
Age55+		−0.46 (0.11)***	−0.71 (0.30)*
ReligAttendSometimes		0.26 (0.08)***	0.02 (0.20)
ReligAttendWeekly		0.35 (0.11)**	0.27 (0.30)
PopDensity		0.00 (0.00)	−0.00 (0.00)
QuizFirst		0.21 (0.07)**	0.07 (0.13)
HilowLOW		0.10 (0.07)	0.18 (0.13)
Income			0.01 (0.03)
HasChildren			0.05 (0.19)
MaritalStatusMarried			−0.22 (0.20)
MaritalStatusSep.			0.96 (0.49)*
MaritalStatusDiv.			−0.10 (0.30)
MaritalStatusWid.			−0.11 (0.48)
ReligImportanceNot important			−0.16 (0.24)
ReligImportanceQuite important			0.19 (0.28)
ReligImportanceVery important			0.04 (0.33)
Education<21			0.17 (0.15)
EducationStudentNow			−0.36 (0.26)
R^2	0.06	0.10	0.15
Adj. R^2	0.05	0.08	0.08
Num. obs.	1390	1385	383
RMSE	1.27	1.25	1.26

Omitted categories: Nationality, GB; Age, 18–24; ReligAttend, never; Education, finished education at 21+; MaritalStatus, single; ReligImportance, no religion. PopDensity is population density at respondent's location (estimated from IP address).

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.
\+ $p < 0.1$.

Appendix C. Experiment instructions

In the next part of the survey, you will be asked to make some decisions. The decisions you make will affect the amount of money that you receive.

You do not have to fill in this part of the survey if you do not want to: in this case, simply leave responses blank. Data from this part of the survey will be stored at the University of Essex and may be released to other researchers. However, this data will not include your name or any other information that could identify you.

I consent to taking part in this part of the survey []

What is your gender?

[] Male [] Female

How old are you?

[] Under 18 [] 18–24 [] 25–34 [] 35–44 [] 45–54 [] 55 or over

In which country do you reside?. . .

Below is a short quiz on the topic of music. We will pay you $INCENTIVE extra if you get all the questions right. This payment will be added to your standard payment for taking the survey. Please answer the questions on your own, without looking them up elsewhere.

Who wrote the composition "Für Elise"?

What is Lady Gaga's real first name?___

Name the drummer of the rock group Nirvana.___

In what year was Claude Debussy born?___

How many valves are there on a standard modern trumpet?___

Name the town and state of the US where Michael Jackson was born.___

I confirm that I answered the quiz on my own, and that I did not look up any answers. []

On the next page you will need to flip a coin.

Please get a coin ready before moving on!

OK, I have a coin ready []

Please now flip the coin. If the coin lands on "heads", we will pay you an extra $INCENTIVE.

This payment will be added to your standard payment for taking the survey.

Did the coin land on heads?

[] Yes [] No

Please think about each of the following actions. In your opinion, is the action always justified, sometimes justified, rarely justified or never justified?

Always justified [] Sometimes justified [] Rarely justified [] Never justified [] Don't know []

Claiming government benefits to which you are not entitled

Buying something which you know is stolen

Taking cannabis

Keeping money that you found in the street

Lying in your own interests

Having an affair when you are married

Having sex under the legal age of consent

Failing to report accidental damage you(tm)ve done to a parked vehicle

Throwing away litter in a public place

Driving under the influence of alcohol

Avoiding a fare on public transport

Cheating on taxes if you have a chance

Someone accepting a bribe in the course of their duties

Driving faster than the speed limit

Making up things on a job application

Some people from RANDOM COUNTRY are answering this questionnaire.

Think back to the coin flip question. People from RANDOM COUNTRY were paid approximately the same amount as you if they flipped heads.

What percentage (%) of people from RANDOM COUNTRY do you think will report that the coin landed on heads?___

[If in INCENTIVIZED GUESS treatment] *We will pay you an extra 2$ if your answer is within 10% of the correct percentage.*

Please enter your nationality:___

Do you attend religious services?

[] Yes, at least weekly [] Yes, sometimes [] No, never

[Only for second wave countries:]

Please indicate your marital status:

[] Single [] Married [] Separated [] Divorced [] Widowed

How many children do you have (including step-children)?

[] 0 [] 1 [] 2 [] 3 [] 4 or more

What is your total monthly income (from all sources, net of tax)?___

Is religion an important part of your life?

[] Yes, very important [] Yes, quite important [] No, not important [] I have no religion

At what age did you complete your education?

[] Under 16 [] 16 [] 17 [] 18 [] 19 [] 20 [] 21 or over [] I have not yet completed my education

Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?

[] Most people can be trusted [] You need to be very careful

Which of these things, if any, have you done in the past 12 months?

[] Done in past year [] Not done in past year

Avoided a fare on public transport

Made something up on a job application

Downloaded music or videos without paying for them

Called in sick to work when not actually unwell

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