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A Portable Method of Eliciting Respect for Social Norms

A portable method of eliciting respect for social norms*

Erik O. Kimbrough† **Alexander Vostroknutov**‡

March 5, 2018

Abstract

Recent models of prosociality suggest that cooperation in laboratory games may be better understood as resulting from concern for social norms than from prosocial preferences over outcomes. Underlying this interpretation is the idea that people exhibit heterogeneous respect for shared norms. We introduce a new, abstract task to elicit a proxy for individual norm-following propensity by asking subjects to choose from two actions, where one is costly. We instruct subjects that "the rule is" to take the costly action. Their willingness to incur such a cost reveals respect for norms. We show that choices in this task are similar across five countries. Rule-following is correlated with norm-consistent behavior in dictator games, providing support for our interpretation.

JEL classifications: C91, D03
Keywords: experimental economics, norms, prosocial behavior, social preferences

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1 Introduction

We present a new method for measuring the propensity to adhere to social norms, a propensity which parameterizes many recent models of prosocial behavior (Cappelen *et al.*, 2007; López-Pérez, 2008; Kessler and Leider, 2012; Krupka and Weber, 2013; Kimbrough and Vostroknutov, 2016). In such models, individuals evaluate the appropriateness of own behavior by comparing it to exogenously defined and commonly known injunctive social norms, that is, to a set of shared beliefs about the appropriateness of possible actions available in the setting. Each possible action has both direct payoff consequences and a normative valence, which enter additively in the utility function. Social norms are assumed to vary with context, and when norms and self-interest conflict, individuals face a trade-off between following the norm and maximizing their payoff. Crucially, individuals may differ in the degree to which they suffer from norm violations (or gain from norm adherence). This can be captured in a single parameter that assigns a weight to the normative component of utility. Thus, heterogeneous behavior *within* a given game can be explained via heterogeneity in these weights, while heterogeneous behavior *across* games, or across contexts, can be explained by the fact that norms vary with the setting.[1] In order to correctly account for both effects, it is, therefore, necessary to separately measure normative beliefs and norm-following propensity, since social behavior deviating from payoff maximization is a joint product of both norms and the weight assigned to them.

The task we introduce is a variant of the rule-following task used in Kimbrough and Vostroknutov (2015, 2016), in which subjects' willingness to follow an experimenter-stated rule at personal cost provides a measure of norm-following propensity. The new task is abstract unlike its predecessor, which embedded measurement of norm-following in a traffic light context. It thus facilitates empirical testing of the social norms hypothesis across diverse social environments, where some norms (e.g., traffic conventions) are likely to vary substantially. We have conducted a number of experiments that included this task in five countries (Canada, Italy, the Netherlands, Turkey, USA). We observe similarly-shaped distributions of norm-following propensity across countries. Moreover, in some countries (Canada, the Netherlands, and USA), we also subsequently collected data in a variant of the Dictator game, while in the other two countries subjects made other social decisions which plausibly have normative valence. Our findings broadly support the norm-driven social behavior hypothesis and demonstrate that the new task offers a portable method of eliciting individual-level respect for social norms across cultures and experiments.

[1] Norm-dependent preferences were introduced, in part, to help account for such "context effects," which cannot be easily rationalized in typical social preference models where utility is defined only over payoffs.

2 The Rule-Following Task

In the rule-following task participants drag-and-drop balls one-by-one into two buckets: yellow or blue. For each ball in the yellow bucket they receive 10 cents and for each ball in the blue bucket they receive 5 cents (see Figure 1). The current earnings from the two buckets are shown above them. The total earnings in this task is the sum of earnings from the buckets. The position of the buckets on the screen is randomized across individuals.

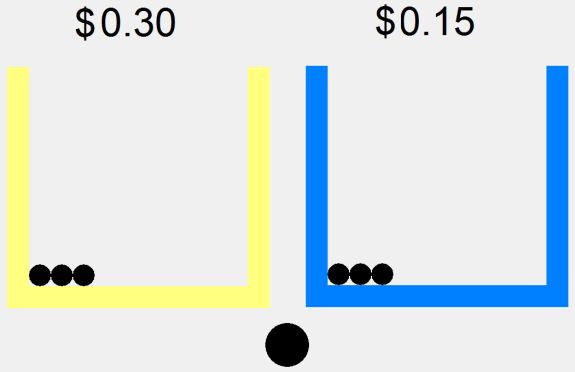

Figure 1: Presentation of the rule-following task.

The instructions explicitly state that *"the rule is to put the balls into the blue bucket"* (see Appendix C). Participants have a fixed number of balls to allocate (say 100); thus, their earnings can vary from $5, if they follow the rule to the letter, to $10, if they break the rule with each ball.[2] Across a variety of experiments we have elicited rule-following task behavior from 1,090 subjects.

3 How to Use the Rule-Following Task

As Kimbrough and Vostroknutov (2016), we use the cost incurred following the rule as a measure of an individual's propensity to follow norms in other environments. For intuition, consider a norm-dependent utility of subject i in the rule-following task. Suppose, for simplicity, that the blue bucket gives $0 and the yellow bucket $1 for each ball. Assume i gets linear consumption utility from money and incurs costs from not following the norm. The costs are higher the fewer balls are in the blue bucket. The utility from having x balls in the yellow bucket can be written as follows:

$$U_i(x) = x + \phi_i g(x).$$

[2]When subjects ask for clarification about the statement that *"the rule is..."*, we always answered that "this is the rule of the experiment," and when they ask whether anything will happen to them if they don't follow the rule, we told them that all information they need to make their decision is in the instructions.

Here $\phi_i \geq 0$ is the propensity of i to follow norms and $g : \mathbb{R}_+ \to [-1, 1]$ is a function that assigns a normative *social appropriateness* (or inappropriateness) to each *action* x.[3] Function $g(x)$ is assumed to capture the unique norm shared by all members of the society which, importantly, is assumed to be independent from individual parameter ϕ_i.

In the rule-following task $g(x)$ is decreasing in x. Suppose that subject i maximizes her utility. Then, given appropriate assumptions on the shape of $g(x)$, we would have the following equation $\phi_i = -1/g'(x^*)$, where x^* is the optimal choice (observed by us in the experiment). Thus, we obtain a positive monotonic relationship between unobserved ϕ_i and observed x^*. In this sense we consider the observations in the rule-following task as a proxy for ϕ_i.

Consider now a Dictator who keeps x dollars in the Dictator game and has the same norm-dependent utility $U_i(x)$. The only difference is that now $g(x)$ reflects the social appropriateness of action x in the Dictator game. The social appropriateness of each action can be directly measured using the norm elicitation task introduced in Krupka and Weber (2013), which uses a coordination game to measure beliefs about norms.[4] Figure 2 illustrates.

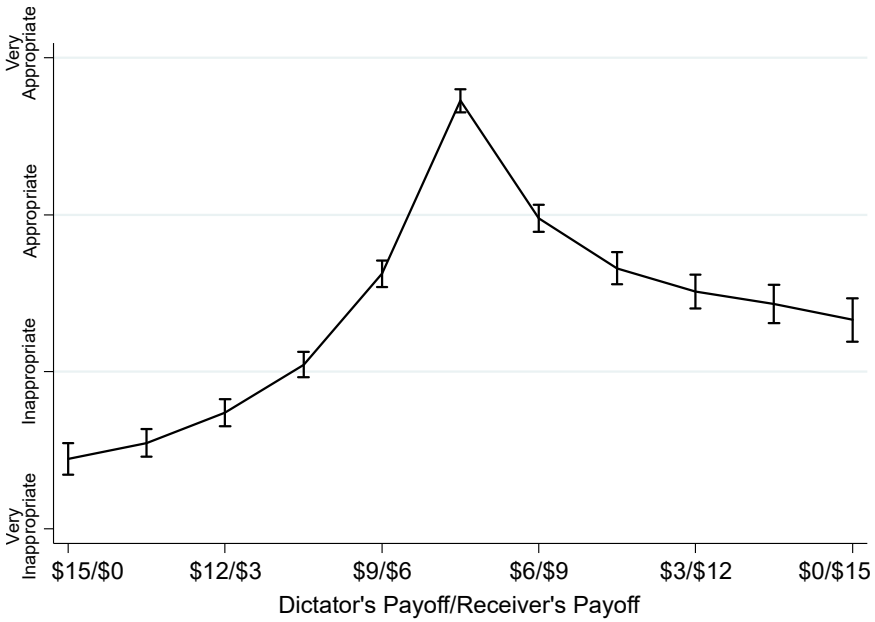

Figure 2: Elicited norms in the dictator game (US/Canadian data, $N = 88$, from Kimbrough *et al.* (2017)). Bars indicate ± 1 SE.

The "very socially inappropriate" rating corresponds to $g(x) = -1$ and "very socially appropriate" rating to $g(x) = 1$. One can see that giving half in the Dictator game is considered highly appropriate and giving nothing is thought highly inappropriate. Thus, norm-dependent utility maximizers with high ϕ_i should tend to choose closer to the half/half distribution and utility maximizers with low ϕ_i should choose closer to keeping the entire pie.

[3] When defining norms for games it is crucial that $g(x)$ is a function defined on the action space and not on the outcome space, which coincide in case of the rule-following task and the Dictator game, but not in general.

[4] Evidence suggests that subjects perceive a consistent injunctive norm (on average) when they are asked to identify the norm from the perspective of second- and third-parties (Erkut *et al.*, 2015).

4 Results

4.1 Rule-Following in Five Countries

Figure 3 shows the distributions of rule-following in the Netherlands, USA, Canada, Turkey, and Italy. Appendix B reports descriptive statistics. Strikingly, all distributions have point masses at full rule-following and full rule-breaking, though the heights of these peaks differ somewhat (a Kruskal-Wallis test on the five samples gives $p = 0.012$). Pairwise comparisons via Kolmogorov-Smirnov tests, corrected for multiple comparisons, reveal significant differences only between the USA and Canada, and the USA and Turkey. In Appendix B we report regression analysis of rule-following in which we explore whether demographic differences (conditional on country) can account for these observations and find limited evidence. Overall, the task appears quite portable across countries.

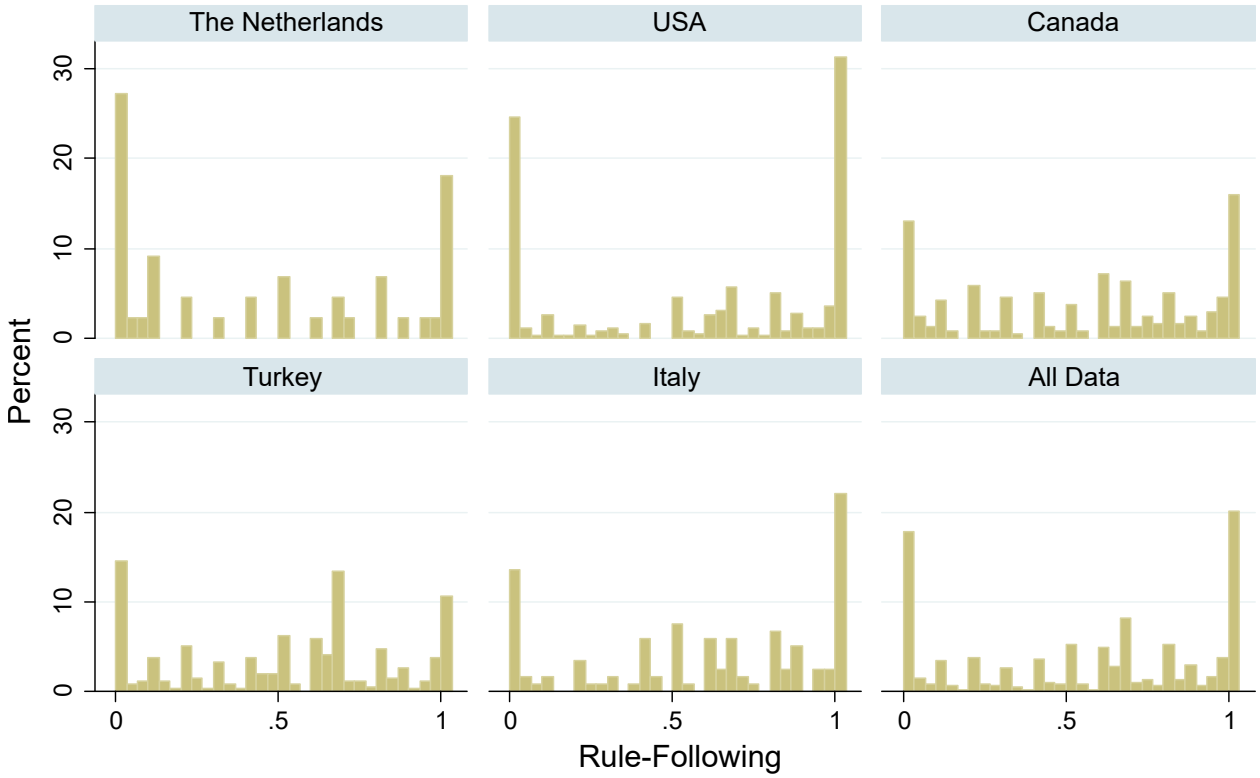

Figure 3: Rule-following propensity (percentage of balls in blue bucket) in five countries. Number of observations: 44 in the Netherlands; 354 in USA; 238 in Canada; 336 in Turkey; 118 in Italy; 1,090 overall.

4.2 Rule-Following and Behavior in the Dictator Game

Next we report correlations between rule-following task and Dictator game choices (see Appendix A for the details of the Dictator game design). In all sessions that also contained a Dictator game, the rule-following task was presented first. In the pooled data from USA, Canada, and

the Netherlands Spearman's rank correlation coefficient between the amount sent to the recipient and the share of balls placed into the blue (costly) bucket is highly significant and positive ($\rho = 0.31$, $p < 0.0001$, $N = 180$). This result is much stronger than the analogous correlation ($\rho = 0.191$, $p = 0.061$, $N = 67$) reported in Kimbrough and Vostroknutov (2016) where the rule-following task involving traffic lights was used.

When we analyze the data within-country, we find a strong correlation between behavior in the rule-following task and Dictator game choices in the Netherlands and USA, but not in Canada. Spearman's correlation coefficient in the Netherlands is $\rho = 0.42$, $(p = 0.006, N = 44)$; in the USA: $\rho = 0.51$, $(p < 0.0001, N = 70)$, and in Canada: $\rho = 0.06$, $(p = 0.62, N = 66)$. We regress the difference between the amount sent and the equal split on rule-following, country dummies and interactions to further support these findings (Table 1). Wald tests reveal that the coefficient on rule-following is significant in the Netherlands ($\beta = -0.151, p = 0.035$) and the USA ($\beta = -0.171, p < 0.001$), but not in Canada ($\beta = -0.078, p = 0.251$), though the coefficient has the predicted sign. Moreover, in the USA the subjects give slightly less overall ($\beta = 0.087, p = 0.068$).

Distance of the amount sent from equal split norm		
RF	–0.138***	–0.151**
	(0.033)	(0.071)
USA	0.073**	0.087*
	(0.034)	(0.048)
USA × RF		–0.020
		(0.083)
CAN	0.018	–0.024
	(0.038)	(0.060)
CAN × RF		0.073
		(0.098)
constant	0.363***	0.368***
	(0.031)	(0.040)
N	180	180

Table 1: OLS regression of sharing in the Dictator game. Errors are robust. Significance: * – $p < 0.1$; ** – $p < 0.05$; *** – $p < 0.01$.

Similar patterns are found in Turkish and Italian samples where different games were coupled with the rule-following task. In Italy subjects chose in a series of mini-Dictator games which consisted of a choice between two allocations with constant sum of payoffs. The average number of non-selfish choices (when a subject chooses an allocation that gives her less money than the alternative) correlates with the measure of rule-following: Spearman's $\rho = 0.41$, $p < 0.0001, N = 118$ (Panizza *et al.*, 2017). In Turkey subjects were repeatedly choosing an amount of tax to contribute to a common pool that was equally redistributed among them (without enforcement or punishment, but with an explicitly stated non-binding rule that they

should contribute all their income to the tax). The rule-following propensity is correlated with the average amount contributed in the late periods even after experiencing a lot of free-riding: Spearman's $\rho = 0.22$, $p = 0.0126$, $N = 128$ (Gürdal *et al.*, 2017).

Significant correlations between the rule-following task and various second-stage designs reported above, thus, allow us to conclude that the task is portable across different experiments and is not only limited to Dictator games.

4.3 Independence of Rule-Following Behavior and Normative Beliefs

Our data facilitates a test of the as-yet untested assumption that subjects' rule-following propensities (ϕ_i) and elicited normative beliefs ($g(x)$) are independent, which underlies simple models of norm-dependent utility. The subjects, whose norm elicitation data were presented in Figure 2, also completed the rule-following task, so we can compare rule-followers' beliefs to rule-breakers' beliefs. Figure 4 shows elicited norms separately for rule-followers and rule-breakers (split by the median rule-following). The data reveal common agreement that the equal split is most appropriate and selfishness is inappropriate. However, rank-sum tests show significant differences in normative evaluations of five dictator actions (from giving nothing to giving almost half), with rule-breakers rating these actions less inappropriate than rule-followers ($p = 0.048$, $p = 0.001$, $p < 0.001$, $p < 0.001$, $p = 0.016$, respectively). This suggests that rule-followers and rule-breakers agree on the *content* but not necessarily on the *strength* of the norm. One plausible interpretation is a self-serving bias among rule-breakers who deem less generous actions more socially appropriate than rule-followers in order to rationalize their selfishness (Di Tella *et al.*, 2015).

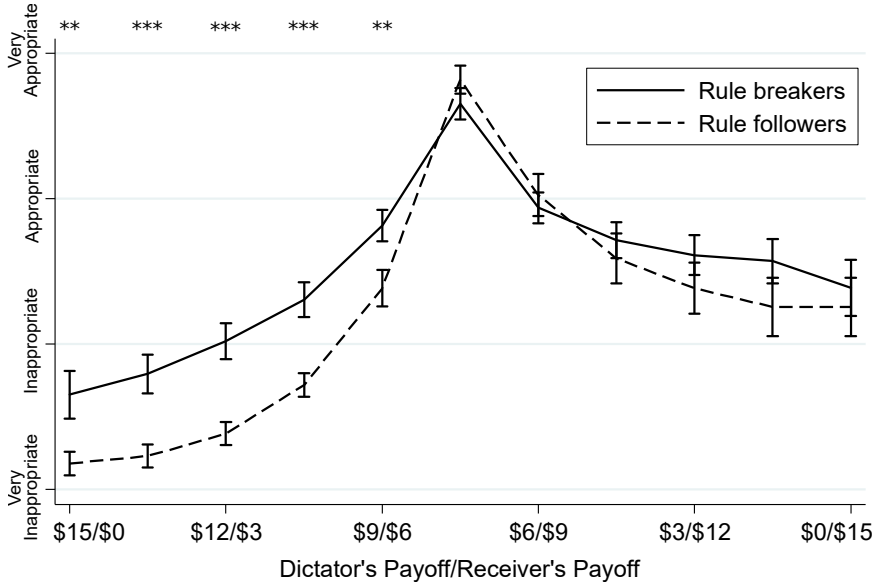

Figure 4: Elicited norms in the Dictator game for rule-followers and rule-breakers. Bars indicate ±1 SE. Significance of rank-sum tests: ** – $p < 0.05$; *** – $p < 0.01$.

If ϕ_i and $g(x)$ are not always (or fully) independent, one solution is eliciting norms, norm-following propensity, and behavior in the relevant game within-subjects (D'Adda *et al.*, 2016; Thomsson and Vostroknutov, 2017). Such data also facilitates more sophisticated analysis than when norms and behavior are elicited from different subjects.

5 Conclusion

We introduce a new rule-following task for eliciting individual propensity to follow social norms that is designed to be portable across cultures and experiments. We see similarly-shaped distributions of rule-following across five countries and observe a correlation between the elicited norm-following propensity and prosocial (norm-consistent) behavior in four out of five countries, suggesting that the task serves its purpose. Choices in this task are better predictors of norm-consistent behavior in Dictator games than the original rule-following task in Kimbrough and Vostroknutov (2016). We thus suggest that researchers seeking a method of measuring norm-following use this one. Finally, our data also facilitate a test of the assumption that norm-following propensity and normative beliefs are independent; we find some evidence that the *strength*, but not the content, of normative beliefs is correlated with norm-following propensity.

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Appendix (for online publication)

A The Dictator Game

In some experiments, a Dictator game was played after the rule-following task. A visually and structurally similar two buckets design was used (Figure 5). Subjects chose whether to put the balls in their "own" bucket or the bucket of "another player." The difference between the Dutch version and the US/Canadian version of the Dictator game was that in the Dutch version the buckets were originally empty, and the subjects had to make a choice to which bucket to put each of the 100 balls. In the US version, the buckets were filled with an equal number of balls and subjects had to decide *for each ball* whether to keep it in the bucket where it began or to move it to ("give to" or "take from") another bucket. All subjects made choices as if they were dictators, but subjects were randomly paired and half of the decisions were implemented. Instructions are available in the Appendix. In total we have 180 dictator observations (44 NDL, 70 USA, 66 CAN); this task was always performed immediately after the rule-following task, so that we can test the model.

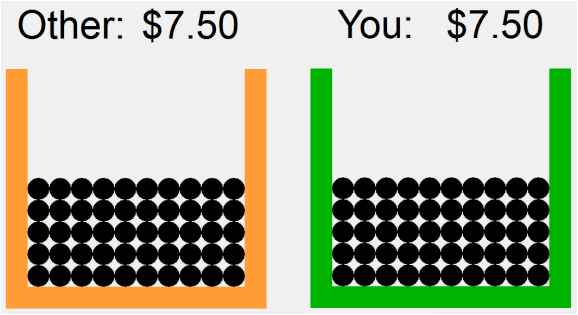


Figure 5: Presentation of the dictator game (USA and Canada).

B Demographics

In this appendix we explore the connection between our behavioral measures and various demographic characteristics. Table B1 shows summary statistics of the demographic data.[1] The samples are relatively similar in age, percentage of males and years of study, with the Dutch students having slightly fewer years at University on average. Also, though Economics and related fields are the most common in all five countries, the US sample has fewer other Social Science students and somewhat more in the Arts and Humanities. The Italian sample has the highest percentage of Social Sciences and the lowest share of students studying Natural Sciences. Self-reported ethnic composition varies widely across the samples, with the Dutch sample being mostly composed of Europeans, the American sample mostly composed of whites and "Americans," and the Canadian sample divided roughly 1/3 to 2/3 between "Canadians" and Asians. The Italian sample is composed almost exclusively of Italians, and the Turkish sample is composed entirely of Turks.

	Full RF Sample					DG Sample		
	NDL	USA	CAN	TUR	ITA	NDL	USA	CAN
Num. Subjects	44	354	238	336	118	44	70	66
rule-following	44.5%	58.5%	54.8%	52.0%	60.1%	44.5%	60.3%	61.2%
Dictator Giving						19.9%	18.8%	22.7%
Demographics								
Males	52.3%	57.6%	55.0%	56.6%	47.4%	52.3%	58.6%	57.6%
Years of Study	2.11	2.76	2.80		2.94	2.11	2.63	2.70
Age	21.75	21.77	21.84	21.35	22.36	21.75	21.44	22.08
Field of Study								
Economics/Business	63.6%	58.2%	38.7%	38.4%	50.0%	63.6%	58.6%	39.4%
Social Sciences	15.9%	5.9%	19.3%		34.7%	15.9%	10.0%	4.5%
Arts & Humanities	9.1%	13.0%	8.4%		5.1%	9.1%	10.0%	9.1%
Natural Sciences	11.4%	22.6%	32.8%		7.6%	11.4%	21.4%	45.5%
Other				61.6%	1.7%	11.4%	21.4%	45.5%
Ethnicity								
"American"		48.6%	1.7%				44.3%	
"Canadian"		0.3%	30.3%					22.3%
White/European	88.6%	24.6%	5.5%		100%	88.6%	27.1%	4.5%
Hispanic		6.0%	1.7%				8.6%	3.0%
Black		7.3%	1.3%				7.1%	
Asian	11.4%	13.0%	58.8%	100%		11.4%	12.9%	70.0%

Table B1: Summary statistics of behavioral and demographic data.

Table B2 shows an OLS regression of the (normalized) number of balls in the blue bucket (i.e. the extent of rule-following) regressed on economics/business field, ethnicity, gender, and age. The baseline of the regression is female from the Netherlands, with undeclared ethnicity, with field of study being not economics or related fields (see Table B3 for details). Wald tests indicate that subjects in the US and Italy are more rule-following than Dutch subjects. All other country comparisons are insignificant. And, consistent with our observations in Kimbrough and Vostroknutov (2016), males are more rule-breaking.

[1] See Table B3 for the classification of fields of study and nationalities.

Rule Following		
	β	Std.Err.
Economics/Business	–0.027	(0.023)
"American"	0.142	(0.261)
"Canadian"	0.150	(0.257)
White	0.165	(0.261)
Hispanic	0.249	(0.267)
Black	0.099	(0.267)
Asian	0.135	(0.255)
Male	–0.090***	(0.023)
Age	0.002	(0.003)
USA	0.156**	(0.069)
Canada	0.119	(0.078)
Turkey	0.100	(0.077)
Italy	0.144**	(0.068)
Constant	0.309	(0.273)
N	1,090	

Table B2: OLS regression of the rule following propensity. Errors are robust. * – $p < 0.1$; ** – $p < 0.05$; *** – $p < 0.01$.

Field of Study	**Definition**
Economics (baseline)	Economics, finance, business, international business, business economics, accounting, marketing, econometrics (and operations research), human decision sciences, supply chain management, banking, actuarial, economics and psychology, business and psychology, human resource management, public administration
Social Sciences	Psychology, sociology, cognitive science, hospitality management, anthropology, law, political science
Arts & Humanities	Arts, journalism, University College Maastricht, music, languages, european studies, architecture, sports studies, higher education, international relations, apparel studies, history, geography
Natural Sciences	Computer science, informational systems, biology, animal science, environmental sciences, engineering of all types, (bio)chemistry, physics, mathematics, biomedical research, health sciences, communication disorders, kinesiology, dietetics, nutrition studies, nursing
Ethnicity	**Definition**
N/A (baseline)	Not specified
"American"	Ethnicity specified as "American"
"Canadian"	Ethnicity specified as "Canadian"
White	All White Europeans including Spanish and Portuguese, Caucasian or white Americans and Canadians
Hispanic	All Spanish (Portuguese) speaking non-Europeans (Latin and Southern America)
Black	African Americans, African Canadians and Africans
Asian	All nations from Middle East and Asia and Native Americans

Table B3: Classification of fields of study and ethnicities.

C Instructions

C.1 RF Task Instructions

General information You are now participating in a decision making experiment. If you follow the instructions carefully, you can earn a considerable amount of money depending on your decisions and the decisions of the other participants. Your earnings will be paid to you in CASH at the end of the experiment

This set of instructions is for your private use only. During the experiment you are not allowed to communicate with anybody. In case of questions, please raise your hand. Then we will come to you and answer your questions privately. Any violation of this rule excludes you immediately from the experiment.

Part I In Part I of this experiment, you will decide how to allocate 100 [50] balls between two buckets.

Your task is to put each of the balls, one-by-one, into one of the two buckets: the blue bucket or the yellow bucket. The balls will appear in the center of your screen, and you can allocate each ball by clicking and dragging it to the bucket of your choice. For each ball you put in the blue bucket, you will receive 5 cents, and for each ball you put in the yellow bucket, you will receive 10 cents.

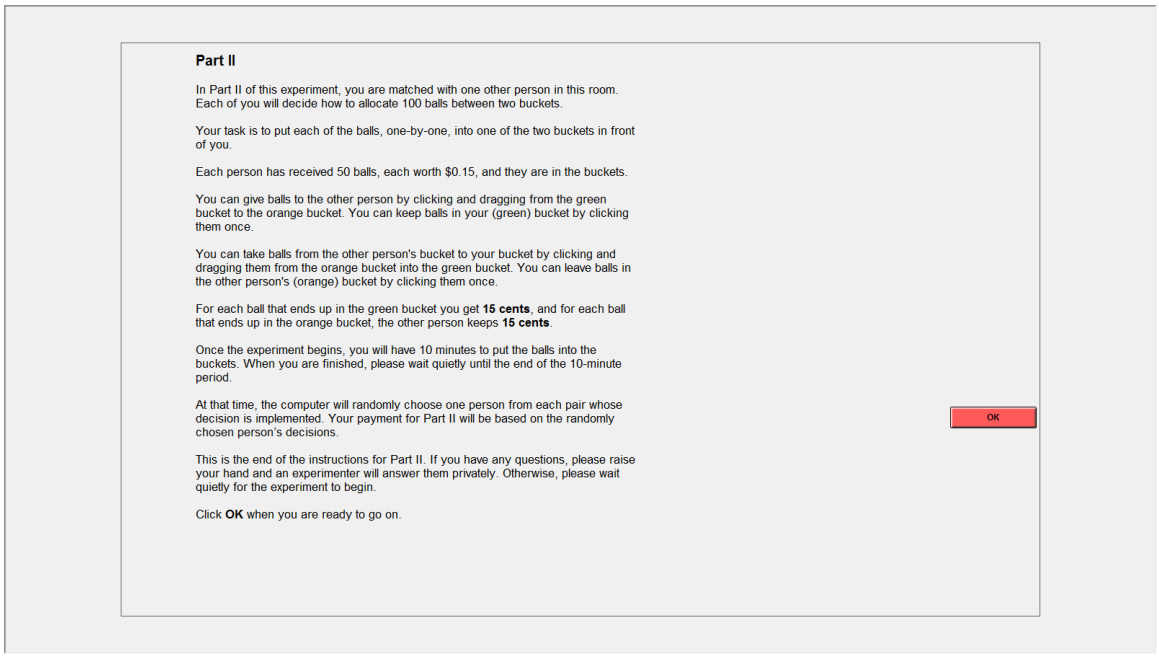
The rule is to put the balls in the blue bucket.

Once the experiment begins, you will have 10 minutes to put the balls into the buckets. When you are finished, please wait quietly until the end of the 10-minute period.

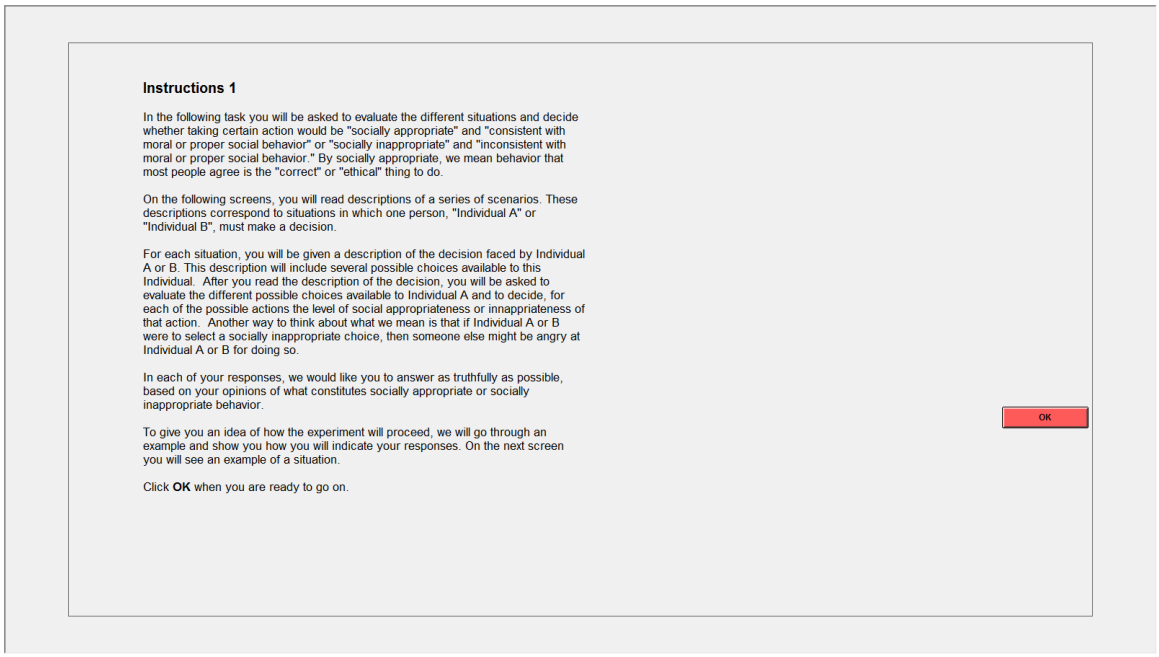
Your payment from Part I will be based on your decisions: it is the sum of payments from the blue and yellow buckets.

This is the end of the instructions for Part I. If you have any questions, please raise your hand and an experimenter will answer them privately. Otherwise, please wait quietly for the experiment to begin.

C.2 DG Instructions (USA)



C.3 Norm Elicitation Instructions (USA)



Instructions 2

In what follows, you will read a description of each scenario. Then, you will indicate your appropriateness rating by placing a check mark in the corresponding box.

At the end of the experiment today, the computer will randomly select one of the situations. For this situation, the computer will also randomly select one of the possible choices that the Individual could make. Thus, we will select both a situation and one possible choice at random. Each choice is equally likely to be selected.

For the choice selected, we will determine which response was selected by the most people here today.

If you give the same response as that most frequently given by other people, then you will receive an additional $10. This amount will be paid to you, in cash, at the conclusion of the experiment.

For instance, if we were to select the example situation from the last screen and the possible choice "Leave the wallet where it is," and if your response had been "somewhat socially inappropriate," then you would receive $10, in addition to the $7 participation fee, if this was the response selected by most other people in today's session. Otherwise you would receive only the $7 participation fee.

Your payment depends only on whether your response corresponds to the most common response to the chosen and DOES NOT depend on the decisions made by individual A or B.

OK

Please click **OK** when you are ready to go on.

If you have any questions, please raise your hand and wait for the experimenter.

Example Situation

Individual A is at a café. While there, Individual A notices that someone has left a wallet at one of the tables. Individual A must decide what to do. Individual A has four possible choices: take the wallet, ask others nearby if the wallet belongs to them, leave the wallet where it is, or give the wallet to the bartender.

Individual A can choose only one of these four options. The table on the right presents a list of the possible actions available to Individual A. For each of the actions, please indicate whether you believe choosing that option is very socially inappropriate, somewhat socially inappropriate, somewhat socially appropriate, or very socially appropriate. To indicate your response, please click on the corresponding cell.

Please make sure you make an assessment for each possible choice in each row of the table.

In what follows, you will be asked to assess the appropriateness of the actions in two other scenarios. For each action please indicate the extent to which you believe taking that action would be "socially appropriate" and "consistent with moral or proper social behavior" or "socially inappropriate" and "inconsistent with moral or proper social behavior." By socially appropriate we mean behavior that ***most people*** agree is the "correct" or "ethical" thing to do.

Individual A's Action	Very Socially Inappropriate	Somewhat Socially Inappropriate	Somewhat Socially Appropriate	Very Socially Appropriate
Take the wallet				√
Leave the wallet where it is			√	
Give the wallet to the bartender		√		
Ask others nearby if the wallet belongs to them	√			

OK

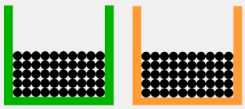
Scenario 1

Individual A has been invited to an experiment and paired with another anonymous individual B so that neither individual will ever know the identity of the other individual with whom he/she is paired.

In the experiment, Individual A will make a choice, the experimenter will record this choice, and then both individuals will be informed of the choice and paid money based on the choice made by Individual A, as well as a small participation fee. Suppose that neither individual will receive any other money for participating in the experiment.

Individual A observes two buckets on the computer screen. One of the buckets is green and labeled "You" and one of the buckets is orange and labeled "Other". Each bucket contains 50 balls.

You: $7.50 Other: $7.50



Individual A reads the following instructions: *"Each person has received 50 balls, each worth $0.15, and they are in the buckets. You can give balls to the other person by clicking and dragging from the green bucket to the orange bucket. You can keep balls in your (green) bucket by clicking them once. You can take balls from the other person's bucket to your bucket by clicking and dragging them from the orange bucket into the green bucket. You can leave balls in the other person's (orange) bucket by clicking them once. For each ball that ends up in the green bucket you get* ***15 cents****, and for each ball that ends up in the orange bucket, the other person keeps* ***15 cents****."*

Now, look at the table on the right side of the screen and consider eleven possible actions that Individual A could take.

For each of the actions, please indicate whether you believe choosing that action is very socially inappropriate, somewhat socially inappropriate, somewhat socially appropriate, or very socially appropriate.

Remember: when we select a scenario and an action for payment, you will only receive the additional $10 if your response is the same as the most frequent response made by other people.

Individual A's Action	Very Socially Inappropriate	Somewhat Socially Inappropriate	Somewhat Socially Appropriate	Very Socially Appropriate
Take 50 balls to the green bucket, leave 0 balls in the orange bucket: A gets $15, B gets $0			√	
Take 40 balls to the green bucket, leave 10 balls in the orange bucket: A gets $13.5, B gets $1.5				√
Take 30 balls to the green bucket, leave 20 balls in the orange bucket: A gets $12, B gets $3			√	
Take 20 balls to the green bucket, leave 30 balls in the orange bucket: A gets $10.5, B gets $4.5		√		
Take 10 balls to the green bucket, leave 40 balls in the orange bucket: A gets $9, B gets $6	√			
Keep 50 balls in the green bucket, leave 50 balls in the orange bucket: A gets $7.5, gets B $7.5		√		
Keep 40 balls in the green bucket, Give 10 balls to the orange bucket: A gets $6, B gets $9			√	
Keep 30 balls in the green bucket, Give 20 balls to the orange bucket: A gets $4.5, B gets $10.5				√
Keep 20 balls in the green bucket, Give 30 balls to the orange bucket: A gets $3, B gets $12			√	
Keep 10 balls in the green bucket, Give 40 balls to the orange bucket: A gets $1.5, B gets $13.5		√		
Keep 0 balls in the green bucket, Give 50 balls to the orange bucket: A gets $0, B gets $15	√			

OK