

WHY DOES ANONYMITY MAKE US MISBEHAVE: DIFFERENT NORMS OR LESS COMPLIANCE?

ERYK KRYSOWSKI and JAMES TREMEWAN

In a laboratory experiment we investigate whether bad behavior in anonymous environments results from more lenient social norms or a reduction in the size of the role played by social norms in decision-making. We elicit social norms in two dictator games with different levels of anonymity, estimate subjects' willingness-to-pay to adhere to norms, and test for treatment differences in each factor. Overall, it is a large reduction in the role played by social norms, which results in more unfair dictator choices when anonymous. Interestingly, however, females find making an unfair decision less acceptable when the dictator is unidentified. (JEL A13, C91, Z10)

I. INTRODUCTION

Anonymity has long been thought to encourage bad behavior, either by changing the salient norms (Reicher, Spears, and Postmes 1995), or through reducing the subjective need to adhere to norms by dampening the effect of internal mechanisms such as guilt and shame (Zimbardo 1969). The object of this paper is to rigorously disentangle these possible explanations in a simple laboratory environment.

Different degrees of anonymity apply in many areas of everyday life. For example, a donation box at a church provides more anonymity than passing a plate around during a service. Likewise, when deciding how much to tip, there is a greater degree of anonymity when abroad than when dining at your regular hometown restaurant. As more and more everyday social and economic interactions move to the internet, the degree of anonymity permitted on various platforms is under careful consideration: to address problems of trolling and “cyberbullying,” numerous online newspapers and blogging sites discourage bad behavior by reducing anonymity, only allowing registered users to leave comments on webpages. On the other hand, some websites try to directly influence social norms

by explicitly stating the expected standards of behavior in their online community (“netiquette”).¹ A deeper understanding of the relationship between anonymity and bad behavior can provide evidence on which approach is likely to be more effective.

To test our hypotheses in the clearest possible manner, we base our study on the most straightforward task in common use in experimental economics: subjects play the “Dictator game,” where half the subjects are asked to divide a sum of money between themselves and another participant. In the anonymous treatment, the recipients are informed only of the amount they have been given, whereas in a second treatment they are also shown a picture of the decision-maker and their first name. We follow Krupka and Weber (2013) (henceforth, KW) who define social norms as “jointly recognized beliefs, among members of a population, regarding the appropriateness of different behaviors.” Using their methodology, we are able to disentangle the degree to which behavior is altered under anonymity because of changes in the norms, and changes in people’s

1. See, for example, <https://www.reddithelp.com/en/categories/reddit-101/reddit-basics/reddiquette>.

ABBREVIATIONS

KW: Krupka and Weber
SC: Schram and Charness
WTP: willingness-to-pay

Krysowski: PhD Candidate, Vienna Graduate School of Economics, Department of Economics, Vienna Center for Experimental Economics, A-1090, Vienna, Austria.
E-mail eryk.krysowski@univie.ac.at

Tremewan: Senior Lecturer, Department of Economics, University of Auckland, Auckland, 1010, New Zealand.
E-mail james.tremewan@auckland.ac.nz

“willingness-to-pay” (WTP) to adhere to them.² WTP can be thought of as simply the relative importance of role social norms in the decision-making process.

In line with most of the existing research, we find that subjects give less when the degree of anonymity is increased. On average, across all subjects, we find limited evidence of differences in norms between treatments: subjects view unfair actions as *less* acceptable under anonymity; however, the statistical evidence is meager. The change in behavior appears to be mostly attributable to a large decrease in the WTP to adhere to norms.

Our results also contribute to the literature on gender differences in generosity and sensitivity to norms (see Section 2). Both male and female dictators give significantly less when anonymous; however, the treatment difference is around half the magnitude for the latter. Breaking down these differences we see that the smaller treatment effect is due to both a smaller decrease in WTP for females, and gender differences in social norms: males see no normative difference between the two treatments, whereas females regard making an unfair decision as significantly less acceptable when the dictator is unidentified. Thus for females, the change in norms is in the opposite direction to that required to explain the increase in unfair decisions we observe under anonymity. However, the concomitant reduction in WTP to adhere to norms is large enough to outweigh this effect.

Our results contrast with those of KW, who find a remarkable consistency in WTP across treatments, and that all treatment effects are explained by changes in social norms. We are the first to identify a situation where changes in norms are not sufficient to cause a parallel change in behavior when there is simultaneously a change in WTP to adhere to those norms. Our study differs from KW in that whereas one might expect anonymity to affect WTP, in the experiments examined in KW there was no a priori reason to expect a change in WTP between treatments. Thus we view our results as complementing rather than contradicting the earlier results

2. This method has been used to show the importance of social norms in explaining experimental behavior in different framings of the dictator game (KW), the Bertrand game (Krupka, Leider, and Jiang 2017), as well as to identify different norms in different levels of a corporate hierarchy (Burks and Krupka 2012). Gächter, Nosenzo, and Sefton (2013) use the same method to compare the importance of social norms and social preferences in a three-person gift exchange game.

in demonstrating the usefulness of the norm-elicitation method.

In our experiment we also elicit beliefs about dictator behavior, which provides a robustness test of the norm elicitation procedure. These beliefs about what others *actually* do can be regarded as *descriptive* norms, as opposed to the *injunctive* norms elicited by the KW method, which are about what people think *should* be done. We find noticeable differences between the distributions of elicited beliefs and norms, showing that the two procedures are measuring different things. Furthermore, beliefs are more closely related to actual behavior than norms, as one would expect given that descriptive norms should coincide with actual behavior, while the relationship between injunctive norms and choices is tempered by self-interest. This shows that although there can be a strong relationship between these types of norms, the procedures we use are capable of picking up differences between the two concepts.³

The paper proceeds as follows: Section 2 discusses the current evidence related to our research questions; Section 3 describes in detail the experimental design and states our specific hypotheses; Section 4 provides the results of our experiments; and Section 5 concludes.

II. RELATED LITERATURE

In this section we first outline the literature related to our main hypotheses about how behavior, norms, and sensitivity can differ under anonymity. We then summarize existing work that leads us to expect gender differences with regard to these hypotheses.

There are two prominent theories in the psychology literature as to why anonymity affects behavior. Deindividuation theory (Zimbardo 1969) posits that anonymity reduces both internal and social constraints, increasing the likelihood of anti-normative behavior. In contrast, the social identity model of deindividuation effects (Reicher, Spears, and Postmes 1995) suggests that the lack of interpersonal cues associated with anonymity shifts salience from general norms to situation-specific group norms, evidence for which is provided in a meta-analysis of deindividuation studies (Postmes and Spears 1998). Our study can find support for the

3. For further evidence on the relationship between elicited beliefs and norms, see the online appendix of Krupka, Leider, and Jiang (2017).

former theory through changes to the estimated WTP to adhere to social norms, and the latter through changes in the measured norm itself.

In the field of experimental economics, the effects of anonymity have largely been studied in the context of the dictator game. Most studies find generosity decreases as the degree of anonymity increases (e.g., Bohnet and Frey 1999; Franzen and Pointner 2012; Frey and Bohnet 1997; Koch and Normann 2008). However, Dufwenberg and Muren (2006) find that first-year economics students give *more* when paid in private rather than when paid in front of an assembly of several hundred fellow students. Interestingly, the authors cite a referee who hints at the role of group-specific norms, saying that in the public payment treatment “an aspiring economist may be well advised to conform to the economic stereotype of selfishness.”

The only paper we are aware of that directly addresses the role of norms in anonymous and identified settings is Schram and Charness (2015) (henceforth SC). Despite many similarities, their paper differs from ours both in theoretical framework (and thus the questions they ask) and the method they use to identify the importance of norms in influencing behavior. SC take their definitions from Elster (2007) for whom social norms require observation by others to affect behavior; norms that are likewise socially recognized but respected for purely internal reasons are termed “moral norms.” Thus, whereas we regard social norms as any jointly held normative belief, and seek to identify both whether such norms and the degree to which they are respected differ under anonymity, SC see social and moral norms as fundamentally different and do not seek to separately identify changes in the WTP to adhere to them. Rather than simply measuring norms as we do, SC attempt to experimentally manipulate norms to identify their role in decision-making.

In SC’s experiment, dictators chose one of six allocations for themselves and two other subjects. The allocations could be ranked in terms of self-interest, but different allocations appealed to different ideas of fairness, leaving room for multiple reasonable norms. Dictators were either paid anonymously, or called to the front of the lab to receive payment, with their role, decision, and earnings publicly announced.⁴ In “advice” treatments, each dictator was matched with

4. Note that this form of reduction in anonymity is substantially different from ours. In our experiment, only the recipient learned the identity of their dictator, and this was done via computer. In SC, dictators’ actions were revealed

a group of three advisors who, after a short discussion among themselves, communicated what they thought the dictator *ought* to choose. They find that *both* advice *and* public payment are required to reduce selfish behavior. Interestingly, the advice was to be less selfish when the dictator’s actions were made public, which, if interpreted as authors intend, suggest norms do differ with degree of anonymity.

Croson and Gneezy (2009) review the literature on gender differences in dictator games. The results are far from consistent in terms of which gender is more generous, but the authors do come to the conclusion that women are more sensitive to social context. With respect to anonymity, in a study where anonymity is carefully administered (Eckel and Grossman 1998), females give more than males, but in less anonymous settings, no gender difference is found (Bolton and Katok 1995; Dufwenberg and Muren 2006). Is this because females are more likely to see anonymous situations as normatively different, or because males are more sensitive than females to social disapproval for failing to follow norms? Croson, Handy, and Shang (2010) find a stronger relationship among males between donations to a public radio station and beliefs about the average donation, and identify a causal relationship in a related lab study. However, females have been found to follow perceived norms more closely than males (Kimbrough and Vostroknutov 2016, 2017) and in SC, females were more likely to follow normative advice.

We are unaware of any study that has looked for gender differences in norms under anonymity, which is a contribution of our study. Such a difference might arise from different experiences in anonymous environments. For example, females are more likely to suffer anonymous online abuse and be discouraged from using internet platforms (DeHue, Bolman, and Völlink 2008; Falloos 2005; Meyer and Cukier 2006)⁵ and as a result may view anti-normative behavior as worse when anonymous. On the other hand, frequent exposure to bad behavior online may lead one to accept it as the norm (Cheng et al. 2017). Overall, the existing evidence for gender differences in

to all participants in the session face-to-face, but recipients were not explicitly told the identity of their matched dictator (although there was the possibility this could be deduced if a dictator was the only one in the session to make a particular choice).

5. See also <http://www.haltabuse.org/resources/stats/Cumulative2000-2013.pdf> and <https://www.amnesty.org/en/latest/research/2018/03/online-violence-against-women-chapter-1/>

behavior, normative views, and respect for norms is complex, and while gender differences may be expected, it is not clear in which direction those differences may lie.

III. EXPERIMENTAL DESIGN AND PROCEDURES

This study consisted of two separate experiments, the first for eliciting dictator decisions, the second for eliciting an independent measure of social norms regarding the choices available in the first experiment. The design is summarized in Table 1. Instructions and screenshots can be found in Appendix S1.

A. Experiment 1

Experiment 1 consisted of two parts: the standard dictator game, followed by the elicitation of beliefs about the choices that were made in the first part. The experiment was run in two treatments: *picture*, where a photo of the dictator and their first name was sent to the recipient when they were informed of how much they were given; and *anonymous*, where neither the picture nor first name was sent. After arriving to the laboratory subjects were randomly assigned roles in the experiment: half of the subjects were dictators and the other half were recipients. In *picture* the dictators were photographed holding a printout of their name before they were seated.⁶

Dictator Game. Each dictator made a decision as to how the €10 they received from the experimenter would be allocated between themselves and an anonymous recipient. In the *picture* treatment dictators were informed that at the end of the experiment the recipients would learn the dictator's decision and see the picture which had been taken before the experiment. In the *anonymous* treatment it was emphasized that recipients would learn only the decision, and that the dictators identity would not be revealed to the recipients or anybody else.⁷ Recipients proceeded directly to the belief elicitation procedure.

6. All dictators in *picture* were asked to sign a form indicating that they were willing to have their picture shown to one other participant in the experiment, and were told they could leave the experiment with a show-up fee if they objected. No subject declined to sign the form.

7. At the request of a referee we ran an additional treatment to eliminate the possibility that dictator behavior changed simply as a result of being photographed. In this treatment, the dictators were photographed as in *picture*, after which the experiment proceeded as in *anonymous*. Dictator behavior in this additional treatment was statistically different to *picture*, but indistinguishable from *anonymous*.

TABLE 1
Summary of Experimental Design

	Treatment	Task 1	Task 2	Sessions	Subjects
Experiment 1	Anonymous	Dictator Choice	Beliefs	3	78
	Picture	Dictator Choice	Beliefs	3	84
Experiment 2	Anonymous	Norms	Beliefs	3	74
	Picture	Norms	Beliefs	3	73

Belief Elicitation. In the belief elicitation part of the experiment, subjects were asked to guess the probabilities with which a dictator would choose each of the possible divisions. Recipients were explicitly told that they would not be a recipient of the dictator with whom they would be matched in order to prevent hedging. Guessing was incentivized by the following quadratic scoring rule:

$$\pi_i = 4 + 4 \left(2p_i - \sum_i p_i^2 \right)$$

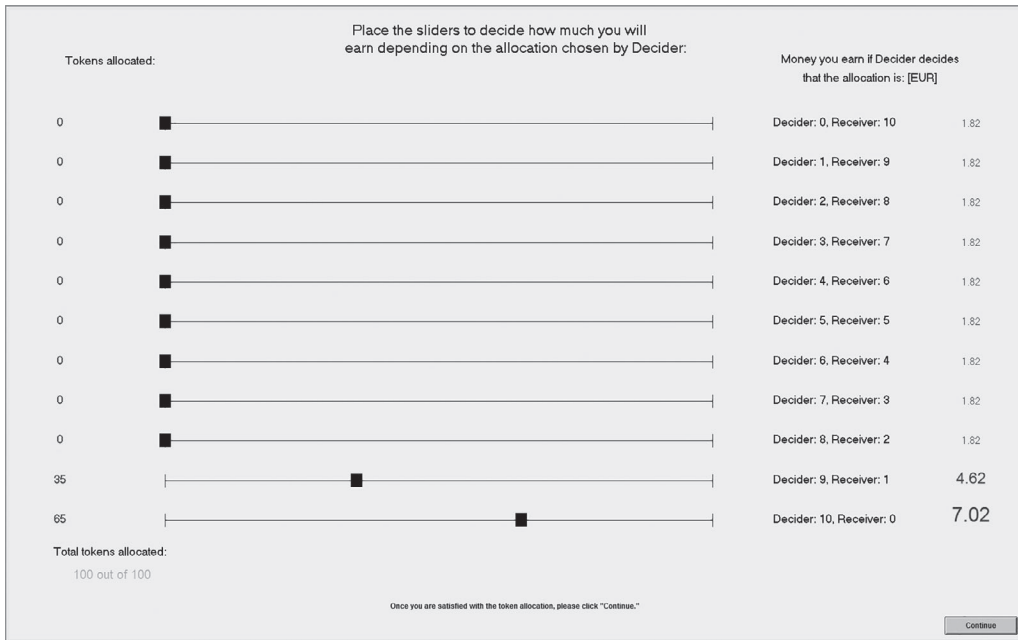
where p_i was the probability assigned to decision i . The chosen parameters meant it was possible to earn at most €8 (for subjects who allocated all tokens to one decision and that decision was indeed made), and a minimum of €0 (for subjects who allocated all tokens to one decision and that decision was not made).⁸

In order to avoid confusing subjects with the mathematical formula we used sliders as shown in Figure 1. The subjects had to allocate 100 tokens which corresponded precisely to indicating subjective probabilities of each of the 11 possible decisions. For each decision the subjects saw the monetary payoffs they would receive if that decision was actually made by the dictator with whom they were matched. In Figure 1 the subject could see that they would earn: €7.02 if the dictator gave nothing, €4.62 if €1 was given to the recipient, and €1.82 otherwise. Before making their decisions, subjects completed a detailed tutorial with control questions to ensure they understood the mechanism.

After the belief elicitation, both dictators and recipients learnt the payoff-relevant decision of the matched dictator and their payoff. Next, all subjects saw the final screen with the summary of payoffs. In the *picture* treatment the recipients saw the payoff from the dictator game along with the picture of the dictator holding a printout of

8. Risk aversion is known to distort responses to the QSR; however, Harrison et al. (2013) show that this is not a significant problem when eliciting a distribution as we are here, rather than probabilities about a binary event.

FIGURE 1
Example Screen of the Belief Elicitation Part



their first name. In the *anonymous* treatment the recipients only saw the decision of the dictator, but did not learn their identity.

B. Experiment 2

Experiment 2 also consisted of two parts: social norm elicitation and belief elicitation. As with Experiment 1, it was run in *picture* and *anonymous* treatments.

Social Norm Elicitation. In the first part, subjects were given a detailed description of the dictator decision in either the *picture* or *anonymous* sessions of Experiment 1 comprising essentially of the full set of instructions received by the dictators in the earlier sessions. They were asked to assess the social appropriateness of each of 11 decisions available to the dictator. The procedure used here was adapted from KW. For each of the 11 possible dictator's decisions subjects had to assign one of four grades to describe the social appropriateness of that action: *very socially inappropriate*, *somewhat socially inappropriate*, *somewhat socially appropriate*, or *very socially appropriate*.⁹

9. We deliberately used very different graphical interfaces for eliciting norms and beliefs to minimize any potential

One of the decisions was later randomly chosen to be payoff-relevant. The task was incentivized as follows: each subject was paid €10 if and only if the grade assigned was identical to the modal grade among all subjects in the session. Theoretically speaking, it is a coordination game, where any outcome in which all subjects assign the same grade for each decision is a Nash equilibrium. However, one can argue that the strongest focal point of this coordination game is to truthfully reveal own beliefs about how other people perceive the social appropriateness of each decision.¹⁰

Belief Elicitation. After the social norm elicitation task subjects proceeded to the belief elicitation task. This part was the same as in Experiment 1 except the subjects were informed that they were making guesses

order effect. We believe that any order effect caused by eliciting norms first would most likely increase the similarity in the shapes of the two measures, so the differences we find between them can be viewed as a lower bound.

10. KW provide convincing evidence that subjects in the lab tend to coordinate on this focal point. The social norms elicited in their experiments using the coordination game vary across different framings of the dictator game and are a good predictor of dictator decisions.

about the choice of a dictator from an earlier session.

C. Hypotheses

We propose three types of hypotheses: the effect of anonymity on actions, norms, and the willingness to pay to adhere to norms. We also hypothesize that the effect of anonymity on these three variables may differ depending on gender. Our first hypothesis tests to see whether we replicate the common finding that greater anonymity leads to dictators giving less.

HYPOTHESIS 1. *Dictators give less in the anonymous treatment than in the picture treatment.*

Assuming such a result is found, we test whether this may be related to a change in social norms, with subjects regarding bad behavior as more acceptable in anonymous environments.

HYPOTHESIS 2. *Subjects report unfair divisions as more socially acceptable in the anonymous treatment than in the picture treatment.*

The other possible explanation is that social norms play a smaller role in an anonymous context. To test this we estimate the amount subjects are willing to pay to take more socially acceptable actions, using the model described in KW. It is assumed that a decision maker cares about both the monetary payoff related to an action and the degree to which the action is collectively perceived to be acceptable. More precisely, the utility function is assumed to be of the form:

$$u(a_k) = \alpha\pi(a_k) + \beta N(a_k)$$

where $\pi(a_k)$ is the profit yielded from choosing action a_k and β represents the importance the individual attributes to the socially perceived appropriateness of that action, $N(a_k)$. The parameters are estimated with a conditional logit, using the chosen actions from Experiment 1 to determine the dependent variables, and the average appropriateness rating elicited in Experiment 2 to proxy for $N(a_k)$. The willingness to pay to change from a very socially unacceptable choice to a very socially acceptable choice can be estimated as $3\beta/\alpha$.

HYPOTHESIS 3. *Subjects have a lower willingness to pay to move from a very socially unacceptable choice to a very socially acceptable choice in the anonymous treatment than in the picture treatment.*

As discussed in Section 2, gender effects have often been observed both in dictator games and with respect to sensitivity to norms across various contexts. It is also reasonable to believe that gender differences may exist in perceptions of norms under anonymity. Thus, we test for gender differences in our three variables of interest. Given the conflicting evidence on these matters, we refrain from stating directional hypotheses.

D. Procedural Details

The two experiments were conducted at the Vienna Center of Experimental Economics. Each experiment consisted of six sessions which took place from January 9 to January 13, 2014. Our sample consisted of 309 subjects and was gender-balanced (51.77% females). At the end of each session, subjects filled out a short questionnaire which included questions about personal characteristics, online activity, and the cognitive reflection test. Each participant earned €4 as a show-up fee in addition to the money earned for making decisions. The average earnings were €13.37 per person.

IV. RESULTS

In section 4.A we examine each of our hypotheses in turn. Section 4.B tests each hypothesis separately by gender, and explores gender differences in actions, norms, and WTP. Finally, in section 4.C we analyze the results of the belief elicitation.

A. Main Results

Figure 2 displays the distributions of dictator decisions from Experiment 1 in the picture and anonymous treatments (no subject shared more than 5). Subjects in *anonymous* shared on average €2.18 compared to €3.88 in *picture*. Anonymity decreased the median amount shared from €5 to €2, and the mode from €5 to €0. A Mann–Whitney test finds the distributions to be significantly different ($p < .01$) and the stochastic inequality test shows that subjects tend to give significantly less when they are anonymous ($p < .01$).¹¹

11. Without the (in this case unrealistic) assumption that the shapes of the two distributions are identical, the Mann–Whitney test only shows a difference in distributions, whereas the stochastic inequality test allows for directional inferences (Schlag 2015).

FIGURE 2
Distribution of Dictators' Choices by Treatment

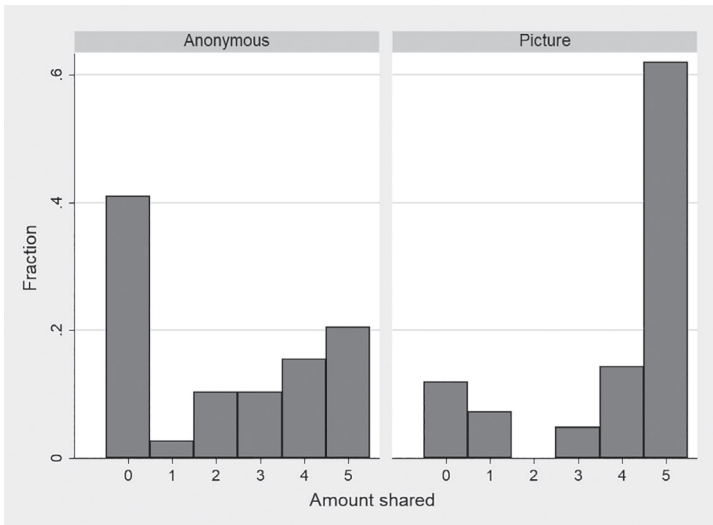
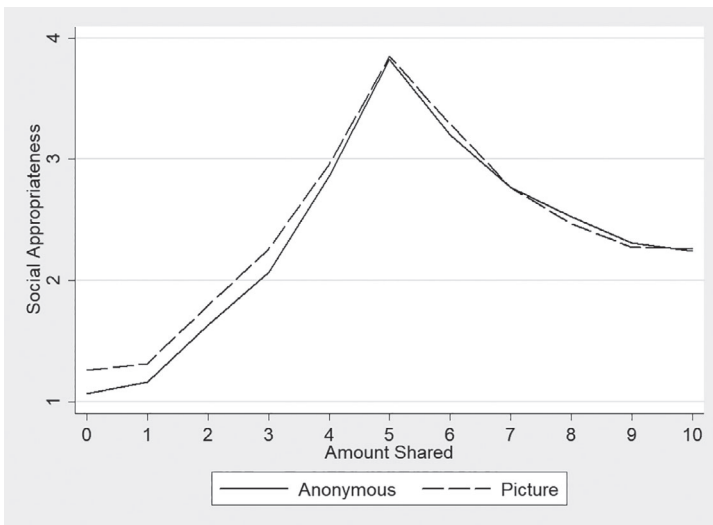


FIGURE 3
Average Acceptability Assessments by Treatment

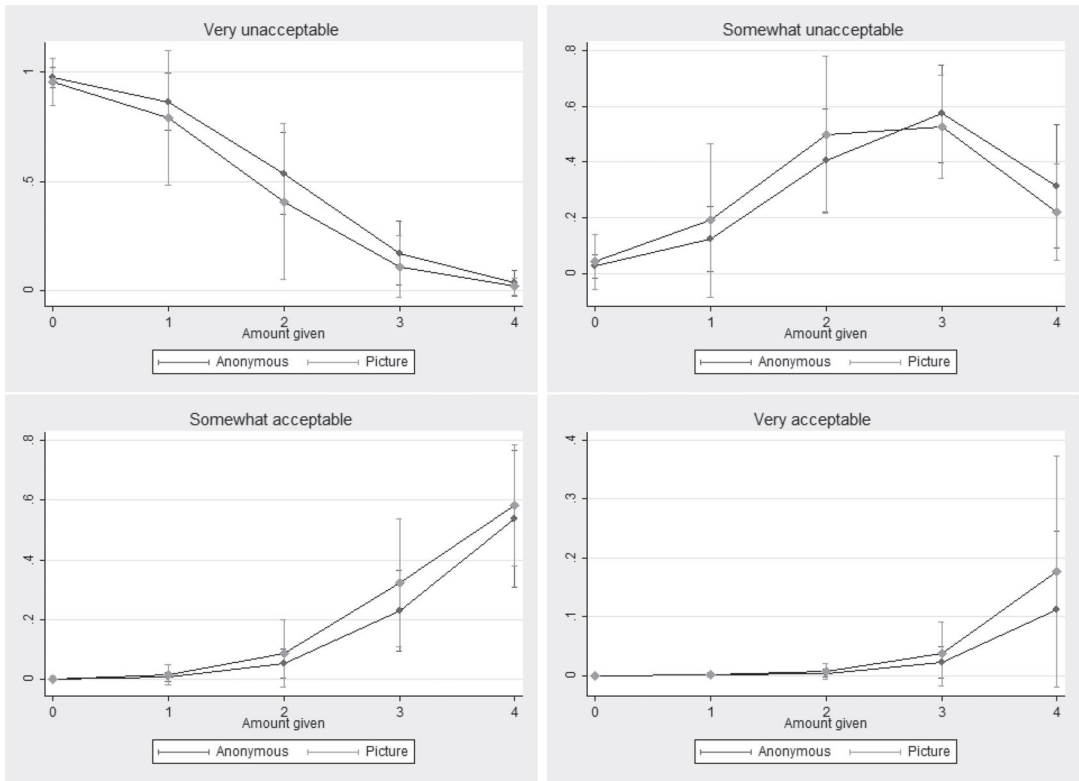


The assessments of acceptability of different choices elicited in Experiment 2 are given numerical values from 1, which means “this action is very socially unacceptable,” to 4, which means “this action is very socially acceptable.” The average levels of acceptability of the 11 possible dictator choices in each treatment are displayed

in Figure 3. The acceptability of all “unfair” divisions, that is, choices where the recipient is given less than half of the dictator’s endowment, is lower in *anonymous*.

We test the statistical significance of the apparent difference in two ways: first we run separate non-parametric tests for each of the 11 dictator

FIGURE 4
 Ordered Logits: Predicted Probabilities of Acceptability Assessments by Treatment with 95% Confidence Intervals—Standard Errors Clustered by Subject



choices; we then estimate ordered logits. The latter have the advantage of being more parsimonious, and also allow us to respect the fact that the difference between rating an action somewhat acceptable and very acceptable, for example, is not comparable to the difference between rating an action somewhat acceptable and somewhat unacceptable.

The results of the Mann–Whitney tests treating each of the 11 choices separately show no significant differences (details can be found in Table A1). The ordered logits are reported in Table 3. Because we are interested in the acceptability or otherwise of unfair offers, we only included assessments for giving amounts less than five.¹² Each of a subject’s five assessments are included as separate observations, with

standard errors clustered at the subject level to account for the resulting non-independence.

The first column includes only the amount given as an explanatory variable, and shows, unsurprisingly, that for amounts less than half, the more given, the greater the probability of giving higher acceptability assessments. Column 2 adds a treatment dummy, which is weakly significant, suggesting that unfair offers tend to get higher acceptability ratings when a picture of the dictator is sent. Each graph in Figure 4 shows the predicted probabilities of an acceptability assessment by treatment across the five different dictator actions under consideration, which allow us to examine in more detail the more lenient attitudes towards unfair choices when decisions are not anonymous. The general pattern is that, compared to *anonymous*, subjects in *picture* are relatively more likely to view very unfair choices (giving 0–2) as somewhat unacceptable rather than very unacceptable, and relatively more likely

12. This also simplifies modeling decisions, as we do not have to account for the hump shape resulting from decline in acceptability for amounts over five.

TABLE 2
Summary of Results

	Full Sample	Female	Male
Amount shared (Picture)	3.88	3.68	4.29
Amount shared (Anon)	2.18	2.41	1.88
Δ Amount shared	-1.70**	-1.27**	-2.41***
WTP (Picture)	6.82	6.75	6.86
WTP (Anon)	5.11	5.29	4.90
Δ WTP	-1.71***	-1.46**	-1.96***
Sample size (Picture)	42	28	14
Sample size (Anon)	39	22	17

Note: Based on Mann–Whitney tests, which test for treatment differences in the distributions (Amount shared), and estimated coefficients from logit regressions (WTP).

* $p < .1$, ** $p < .05$, *** $p < .01$.

to assess less unfair choices (giving 3–4) as either somewhat or very acceptable rather than somewhat or very unacceptable.

The estimated WTPs of subjects to move from the least appropriate to the most appropriate action in the different treatments are shown in Table 2. The conditional logit regressions on which these are based, as explained in Section 3.C, are reported in Table A2.

When dictators can be identified they are on average willing to sacrifice €6.82 for choosing a *very socially appropriate* action instead of a *very socially inappropriate* one. When subjects act under anonymity, they are on average willing to sacrifice €5.11 to choose an action which is considered to be *very socially appropriate* rather than one that is *very socially inappropriate*.¹³ This difference of €1.71 is highly significant ($p < .01$), indicating that anonymity reduces the desire to comply with social norms.

B. Gender Analysis

Figure 5 displays dictator decisions from both treatments, separately for males and females. Mann–Whitney tests identify significant treatment differences in distributions of the amount shared for both genders: females ($\bar{x}_{pict} = 3.68$, $\bar{x}_{anon} = 2.41$, $p = .018$), and males ($\bar{x}_{pict} = 4.29$, $\bar{x}_{anon} = 1.88$, $p < .01$). These results are summarized in Table 2. Stochastic inequality tests are significant for males ($p < .01$), but not for

13. The figure for the anonymous treatment is within the range found by KW—\$4.95 to 5.70, whose treatments were also anonymous. Note that what is important for this comparison is the WTP relative to the dictator's endowment, so the exchange rate is not relevant here.

females. We find no statistical evidence of a gender difference in dictator behavior in either treatment, or a difference in the size of the treatment effect (although this is almost twice as large for males as for females).

With respect to acceptability ratings, Mann–Whitney tests run separately for each dictator choice find the distributions of elicited norms to be (at least weakly) significantly different between treatments among females for giving between two and four Euros (Table A1). There are no significant treatment differences for males. The stochastic inequality test fails to identify any significant differences for either gender.

Columns 3 and 4 of Table 3 display ordered logits using only female and male data, respectively. These regressions are in line with the non-parametric analysis, finding that females give less harsh assessments in *picture* ($p = .010$), but an insignificant treatment effect for males ($p < .968$). The final column uses the full sample, but includes gender and treatment dummies, and the interaction of these two variables.¹⁴ The coefficients are all at least weakly significant, and support the findings of the previous two specifications.

To illustrate the implications of the final model in Table 3, Figure 6 shows the predicted probabilities of acceptability assessments according to gender, treatment, and dictator choice. Three conclusions can be drawn from the graphs: there is no apparent treatment effect for males; the treatment differences for females follow the patterns described for the full sample, in a more pronounced fashion; the gender difference in treatment effects is due to both females viewing unfair choices as more acceptable than males in *picture*, and less acceptable in *anonymous*.

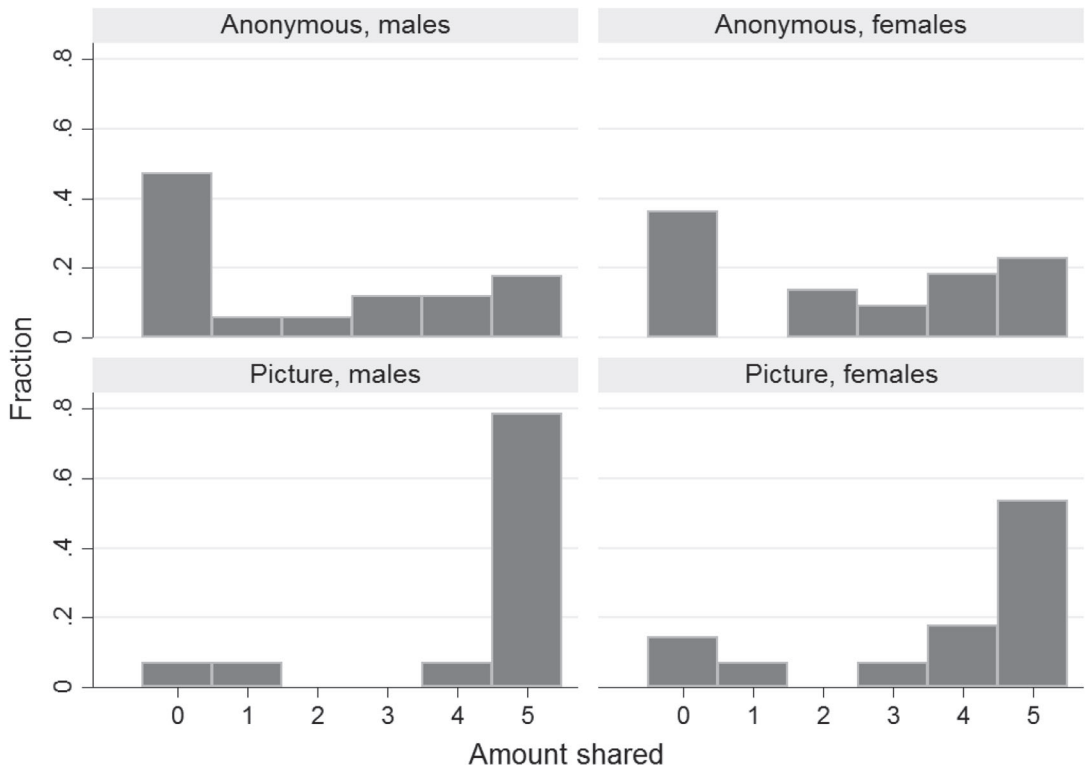
The reductions in WTP caused by anonymity when one disaggregates by gender are 1.46 for females (from €6.75 to €5.29; $p = .014$) and €1.96 for males (from €6.86 to €4.90; $p < .01$). There is no statistical evidence of a gender difference in WTP in *anonymous* ($p = .500$) or *picture* ($p = .884$), nor in treatment effects ($p = .597$).

C. Beliefs

Figure 7 shows the distributions of mean probabilistic beliefs across decisions for each

14. Correct and informative analysis of interaction effects in non-linear models is challenging. Here we follow Greene (2010) in performing statistical tests only for parameters of the model, then analyzing the implications graphically.

FIGURE 5
Distribution of Dictators' Choices by Treatment and Gender



treatment.¹⁵ Mann–Whitney tests show that the distributions of probabilities attached to both giving nothing and giving €5 differ by treatment significantly (at the 5% and 10% level, respectively). The mean probability assigned to giving nothing in *anonymous* is 20%, compared to 14% in *picture*, whereas the respective probabilities for giving €5 are 26% and 34%. Thus, the beliefs move on average in the same direction as actual decisions.

Figures 8 and 9 show the norms and beliefs, and action data from the anonymous and picture treatments, respectively. The most noticeable difference between the distributions of beliefs and norms is the fact that the former tracks actions in having two peaks while the latter has only one. Of subject-level belief distributions over the 11 outcomes, 33.1% have more than one peak, compared to only 6.8% of norm distributions

15. In this section we only use beliefs elicited in Experiment 2, as in Experiment 1 they may have been affected by participating in the dictator game.

TABLE 3
Ordered Logits: Social Acceptability of Actions

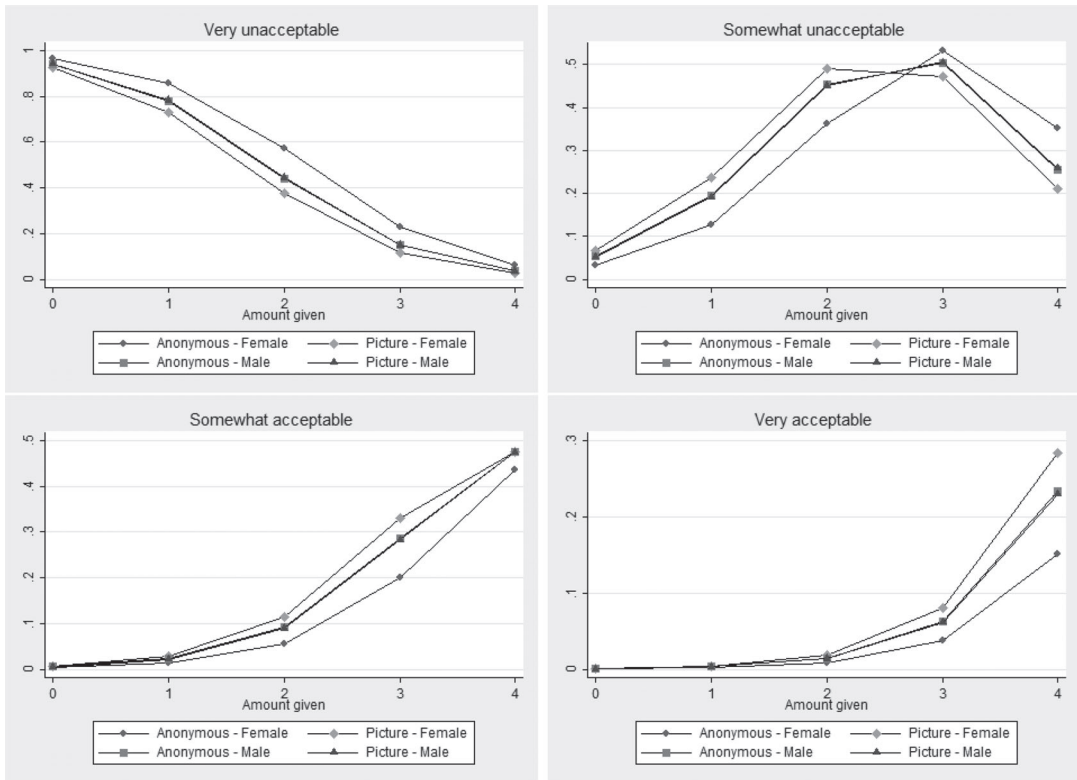
Sample	All	All	Females	Males	All
Amount	1.484*** (0.154)	1.494*** (0.155)	1.674*** (0.237)	1.358*** (0.213)	1.509*** (0.158)
Male					0.535* (0.294)
Picture		0.413* (0.239)	0.865*** (0.335)	-0.0137 (0.347)	0.802** (0.315)
Male#picture					-0.821* (0.492)
Constant cut1	2.805*** (0.345)	3.026*** (0.355)	3.627*** (0.583)	2.527*** (0.447)	3.312*** (0.403)
Constant cut2	5.147*** (0.550)	5.383*** (0.551)	6.272*** (0.867)	4.659*** (0.730)	5.688*** (0.597)
Constant cut3	7.193*** (0.731)	7.444*** (0.728)	8.457*** (1.152)	6.634*** (0.952)	7.764*** (0.765)
Observations	735	735	390	345	735

Note: Robust standard errors clustered at the subject level in parentheses.
*** $p < .01$, ** $p < .05$, * $p < .1$.

(McNemar paired proportions test; $p < .01$). We interpret this as suggestive that the distributions of beliefs and norms are qualitatively different, and that beliefs are more closely related to

FIGURE 6

Ordered Logits: Predicted Probabilities of Acceptability Assessments by Treatment and Gender



actions. This is as one would expect, given the incentive schemes and that subjects should anticipate that not everyone will follow the social norm, and reassures that the elicitation mechanisms are working as intended.

Looking at norms and beliefs at the individual level, the relationship is also far from one-to-one. The correlation coefficient including both treatments and all dictator decisions is 0.13; highly significant ($p < .01$), but rather small. Looking separately at each decision, the Spearman rank correlation coefficient is only positive and significant for three choices (giving 2, 3, and 4 Euros), and is actually *negative* for the majority of choices (giving 0, 1, 6, 7, 8, 9, and 10 Euros).

V. DISCUSSION AND CONCLUSION

Our results replicate the common finding that increasing the degree of anonymity of subjects reduces giving in an experimental dictator game. By eliciting social norms we are able to go further

than earlier studies, and cast some light on why this is the case. We consider two possible reasons why behavior may differ under anonymity: changes in social norms, and a change in the importance of those norms in decision-making.

Overall the changes in behavior are caused by anonymity reducing the degree to which people adhere to social norms. However, we also find evidence that social norms change for females, but in the opposite way to that required to explain the observed changes in behavior: unfair divisions are viewed as less acceptable under anonymity. The reduction in generosity is thus driven entirely by a lower willingness to pay to adhere to social norms when anonymous, a difference sufficiently large to outweigh any change in social norms. The fact that males have been observed to be relatively more selfish as the degree of anonymity increases can be attributed to *both* a larger reduction in WTP for males, as well as females viewing unfair divisions as relatively less acceptable under anonymity.

FIGURE 7
Average Results for Beliefs by Treatment

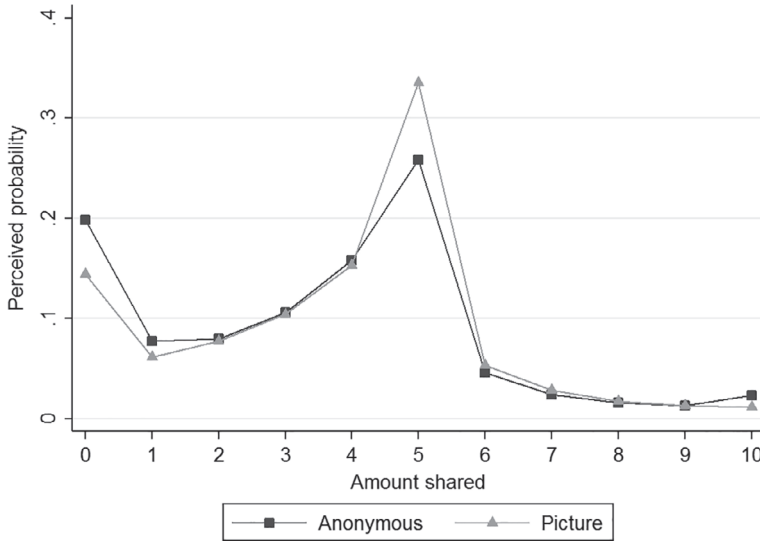
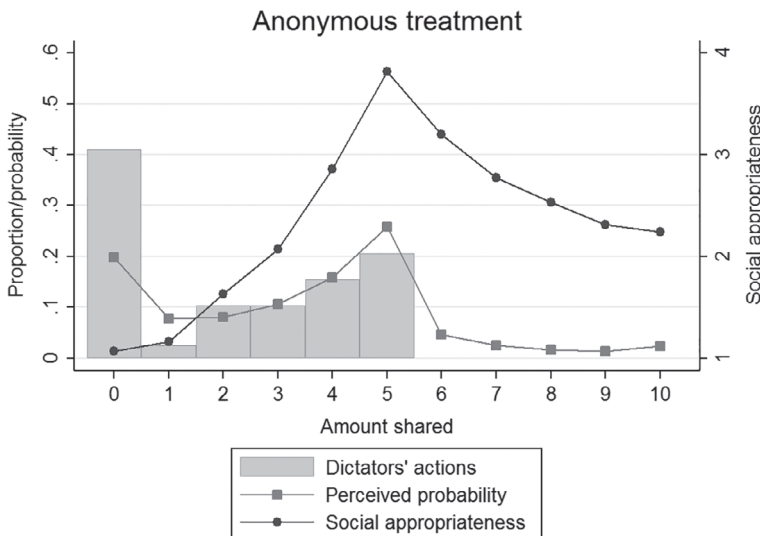


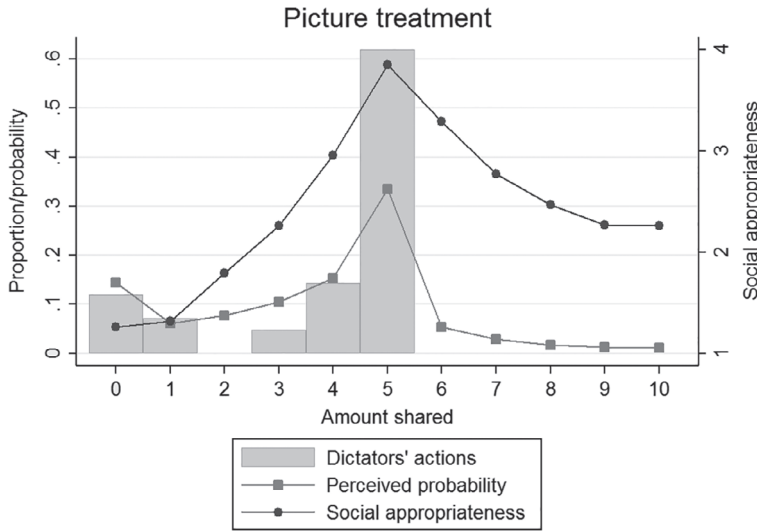
FIGURE 8
Average Results for Actions, Norms, and Beliefs



Our findings add to those of Schram and Char-ness (2015) by separately estimating changes in adherence to norms in addition to simply measuring changes in the norms themselves. SC regard the minimal effect of advice in their private payment treatment as a failure to induce a

norm. However, viewed from the perspective of our study, they may have successfully induced a norm, but one which did not have a large impact on behavior because of a low WTP in the more anonymous environment (as their design did not clearly disentangle changes in norms and

FIGURE 9
Average Results for Actions, Norms, and Beliefs



WTP they could not address this possibility). Interestingly, the shift in norms we identify is in the opposite direction to the shift they find: whereas their subjects thought dictators ought to be more generous when payments were public, we find that unfair decisions are viewed (by females) as more acceptable when the dictators are identified. Due to the many differences in our respective designs it is unclear what underlies this difference. However, SC speculate that the advisors are concerned about the social embarrassment that might result when decisions are revealed in front of a room full of people, a factor which is not present in our design where only the recipient discovers a dictator’s decision, and they never interact face-to-face.

This paper also makes a methodological contribution by providing two robustness tests of the validity of the norm elicitation procedure of Krupka and Weber (2013). In earlier applications there were no compelling a priori reasons for willingnesses to pay to adhere to norms to differ across treatments, and no significant differences were found. Ours is the first experiment where such a difference was to be expected, and indeed was identified. Also, by eliciting beliefs in addition to norms, and finding them to be qualitatively different and more representative of actual dictator choices, we have strengthened the argument that the KW procedure elicits perceptions about what one *should* do (injunctive norms), and not

simply beliefs about what people actually *will* do (descriptive norms).

As pointed out by Dufwenberg and Muren (2006), there are many different aspects to anonymity. Disparate results in the literature, particularly with respect to gender effects, may be due to different responses to different aspects of anonymity. By separately identifying changes in two relevant components of behavior, social norms and the desire to adhere to them, we hope to have added another piece to the puzzle.

APPENDIX A: TABLES

TABLE A1
Social acceptability of actions: Asterisks indicate significance level of Mann-Whitney tests of difference in distribution between treatments

Amount shared	Full sample		Females		Males	
	Anon.	Picture	Anon.	Picture	Anon.	Picture
10	2.24	2.26	2.15	2.31	2.34	2.21
9	2.31	2.27	2.21	2.38	2.43	2.15
8	2.53	2.47	2.38	2.56	2.69	2.35
7	2.77	2.77	2.72	2.87	2.83	2.65
6	3.20	3.29	3.18	3.33	3.23	3.24
5	3.82	3.85	3.82	3.92	3.83	3.76
4	2.86	2.96	2.79	3.08*	2.94	2.82
3	2.07	2.26	1.95	2.36**	2.2	2.15
2	1.63	1.79	1.46	1.82**	1.83	1.76
1	1.16	1.32	1.15	1.28	1.17	1.35
0	1.07	1.26	1.05	1.18	1.09	1.35

***p < 0.01, **p < 0.05, *p < 0.1.

TABLE A2
Logit regressions for dictator choices

CHOICE			Males		Females	
	Anon.	Picture	Anon.	Picture	Anon.	Picture
payoff (α)	1.428*** (0.319)	1.689*** (0.388)	1.535*** (0.505)	2.236** (0.930)	1.343*** (0.409)	1.511*** (0.425)
norm (β)	2.431*** (0.588)	3.840*** (0.707)	2.507*** (0.942)	5.110*** (1.694)	2.367*** (0.748)	3.399*** (0.779)
WTP ($3\beta\alpha$)	5.109*** (0.277)	6.819*** (0.371)	4.900*** (0.429)	6.856*** (0.579)	5.286*** (0.380)	6.748*** (0.461)
Observations	429	462	187	154	242	308
AIC	131.6	107.9	57.31	28.10	77.69	81.74

Note: Standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

REFERENCES

- Bohnet, I., and B. S. Frey. "Social Distance and Other-Regarding Behavior in Dictator Games: Comment." *American Economic Review*, 89(1), 1999, 335–9.
- Bolton, G. E., and E. Katok. "An Experimental Test for Gender Differences in Beneficent Behavior." *Economics Letters*, 48(3–4), 1995, 287–92.
- Burks, S. V., and E. L. Krupka. "A Multimethod Approach to Identifying Norms and Normative Expectations within a Corporate Hierarchy: Evidence from the Financial Services Industry." *Management Science*, 58(1), 2012, 203–17.
- Cheng, J., M. Bernstein, C. Danescu-Niculescu-Mizil, and J. Leskovec. "Anyone Can Become a Troll: Causes of Trolling Behavior in Online Discussions," in *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*. ACM, 2017, 1217–30.
- Crosron, R., and U. Gneezy. "Gender Differences in Preferences." *Journal of Economic Literature*, 47(2), 2009, 448–74.
- Crosron, R. T., F. Handy, and J. Shang. "Gendered Giving: The Influence of Social Norms on the Donation Behavior of Men and Women." *International Journal of Nonprofit and Voluntary Sector Marketing*, 15(2), 2010, 199–213.
- DeHue, F., C. Bolman, and T. Völlink. "Cyberbullying: Youngsters' Experiences and Parental Perception." *Cyberpsychology & Behavior*, 11(2), 2008, 217–23.
- Dufwenberg, M., and A. Muren. "Generosity, Anonymity, Gender." *Journal of Economic Behavior & Organization*, 61(1), 2006, 42–9.
- Eckel, C. C., and P. J. Grossman. "Are Women Less Selfish Than Men?: Evidence from Dictator Experiments." *The Economic Journal*, 108(448), 1998, 726–35.
- Elster, J. *Explaining Social Behavior: More Nuts and Bolts for the Social Sciences*. Cambridge University Press, 2007.
- Fallows, D. *How Women and Men Use the Internet*. Pew Internet & American Life Project 28. Washington, DC: Pew Research Center, 2005.
- Franzen, A., and S. Pointner. "Anonymity in the Dictator Game Revisited." *Journal of Economic Behavior & Organization*, 81(1), 2012, 74–81.
- Frey, B. S., and I. Bohnet. "Identification in Democratic Society." *The Journal of Socio-Economics*, 26(1), 1997, 25–38.
- Gächter, S., D. Nosenzo, and M. Sefton. "Peer Effects in pro-Social Behavior: Social Norms or Social Preferences?" *Journal of the European Economic Association*, 11(3), 2013, 548–73.
- Greene, W. "Testing Hypotheses about Interaction Terms in Nonlinear Models." *Economics Letters*, 107(2), 2010, 291–6.
- Harrison, G. W., J. Martinez-Correa, J. T. Swarthout, and E. R. Ulm. *Scoring Rules for Subjective Probability Distributions*. Technical report. Atlanta, GA: Experimental Economics Center, Andrew Young School of Policy Studies, Georgia State University, 2013.
- Kimbrough, E. O., and A. Vostroknutov. "Norms Make Preferences Social." *Journal of the European Economic Association*, 14(3), 2016, 608–38.
- . "A Portable Method of Eliciting Respect for Social Norms." *Economics Letters*, 168, 2017, 147–50.
- Koch, A. K., and H.-T. Normann. "Giving in Dictator Games: Regard for Others or Regard by Others?" *Southern Economic Journal*, 2008, 223–31.
- Krupka, E. L., and R. A. Weber. "Identifying Social Norms Using Coordination Games: Why Does Dictator Game Sharing Vary?" *Journal of the European Economic Association*, 11(3), 2013, 495–524.
- Krupka, E. L., S. Leider, and M. Jiang. "A Meeting of the Minds: Informal Agreements and Social Norms." *Management Science*, 63(6), 2017, 1708–29.
- Meyer, R., and M. Cukier. "Assessing the Attack Threat Due to Irc Channels," in *International Conference on Dependable Systems and Networks*. IEEE, 2006, 467–72.
- Postmes, T., and R. Spears. "Deindividuation and Antinormative Behavior: A Meta-Analysis." *Psychological Bulletin*, 123(3), 1998, 238–59.
- Reicher, S. D., R. Spears, and T. Postmes. "A Social Identity Model of Deindividuation Phenomena." *European Review of Social Psychology*, 6(1), 1995, 161–98.
- Schlag, K. H. (2015). Who Gives Direction to Statistical Testing? Best Practice Meets Mathematically Correct Tests. <https://homepage.univie.ac.at/karl.schlag/research/statistics/exact%20np%201.pdf>
- Schram, A., and G. Charness. "Inducing Social Norms in Laboratory Allocation Choices." *Management Science*, 61(7), 2015, 1531–46.
- Zimbardo, P. G. "The Human Choice: Individuation, Reason, and Order Versus Deindividuation, Impulse, and Chaos," in *Nebraska Symposium on Motivation*. Lincoln, NE: University of Nebraska Press, 1969.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix S1. Instructions and Screenshots for Why does anonymity make us misbehave: different norms or less compliance?