Journal of Economic Psychology 85 (2021) 102384

Contents lists available at ScienceDirect

Journal of Economic Psychology

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

Brief Report

People are conditional rule followers

Pieter T.M. Desmet [a,*], Christoph Engel [b]

[a] *Erasmus University Rotterdam, the Netherlands*
[b] *Max Planck Institute for Research on Collective Goods, Bonn, Germany*

ARTICLE INFO

JEL:
A13
C91
D03
D63
K42

Keywords:
Conditional rule following
Deontological motives
Conditional cooperation
Experiment

ABSTRACT

Experimental participants are more likely to follow an arbitrary rule the more others in their reference group do so as well. The effect is most pronounced for individuals who follow few rules when not knowing others' behavior. Unlike what is observed for conditional cooperation, learning that only few others follow a rule does not reduce rule following.

1. Introduction

Societies are governed by a myriad of formal and informal rules. Many of these rules are hardly enforceable, like the informal rule not to cut in line. Other, formal rules are enforced so rarely, or sanctions are so mild, that profit maximizers would violate them. Pedestrians crossing a red traffic light are a case in point. Nonetheless, most individuals abide by most rules most of the time. People may have utilitarian motives to do so: given the rule, the game has a different equilibrium. The rule might shape their conviction about what constitutes a fair outcome. Yet experiments show that individuals even follow arbitrary rules, like the one to "stop" at a virtual traffic light, depicted on a computer screen (Kimbrough & Vostroknutov, 2016). Then utilitarian motives are implausible. Participants must have a deontological motive: the rule should be followed simply because it is the rule.

For utilitarian motives it has been shown that social information is critical. Most people are conditional cooperators (Fischbacher, Gächter et al., 2001, Fischbacher & Gächter, 2010). They only cooperate if they are sufficiently optimistic that others cooperate as well. For cooperation, social information can therefore be detrimental. We ask the analogous question for rule following: Do individuals condition their own decision to follow an arbitrary rule on social information about others following the same rule? If so, is social information beneficial or detrimental? We test this question experimentally.

Adding conditionality to the nascent literature on rule following is our contribution. Earlier experiments studied the effect of social norms (Bicchieri, 2006, Burks & Krupka, 2012, Krupka & Weber, 2013, Schram & Charness, 2015). Yet in these papers, social information informs individuals about the existence or the interpretation of a social norm. Other papers have introduced norm following into the utility function (Bicchieri, 2006, Dufwenberg, Gächter et al., 2011, Kessler & Leider, 2012). Yet these papers are not interested

* Corresponding author at: Rotterdam Institute of Law and Economics, Erasmus School of Law, Burgemeester Oudlaan 50, 3000DR Rotterdam, the Netherlands.

E-mail address: desmet@law.eur.nl (P.T.M. Desmet).

https://doi.org/10.1016/j.joep.2021.102384
Received 23 April 2020; Received in revised form 15 April 2021; Accepted 15 April 2021
Available online 17 May 2021
0167-4870/© 2021 The Author(s). Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

in the potential conditionality of this motive.

Bicchieri and Xiao (2009) tell dictators that, in an earlier experiment, 60% of all dictators implemented an equal split. They compare choices to a baseline where they inform dictators that, in an earlier experiment, 60% have kept the endowment. In the treatment, 52% split the endowment approximately equally, while in the baseline only 33% do. This demonstrates that social information matters. But it is information about the willingness to care about others (which might follow from social preferences), not social information about rule following.

In a binary dictator game, Krupka and Weber (2009) inform participants about the choices that four other participants made. The more prosocial choices participants observe, the more likely they are to make the prosocial choice themselves. This shows an effect of social information, but does not allow participants to *condition* their own choice on the choices of others. Also, in their experiment, the norm is utilitarian, whereas in our experiment it can only be deontological. The same holds for Dimant (2019) and the theory paper by López Pérez (2008).

2. Hypothesis

Participants earn money for each of $a_i \leq a_{max} = 48$ sliders they shift to the midpoint of a line (Gill & Prowse, 2011). Hence profit $\pi_i = \beta a_i$, where $\beta = .1€$ is the piece rate. Yet there is an arbitrary, unenforced upper bound $\widetilde{a}$.[1] Using the strategy method (Selten, 1967), $\widetilde{a}$ equals 5, 11, 23, 32 or 41. In the treatment, participants may condition respecting the relevant rule on the fraction $r = \frac{\sum_j I(a_j \leq \widetilde{a})}{N-1}$ of others in their reference group of $N = 6$ participants who obey.

Individual i's utility is defined by

$$u_i = \beta a_i - \gamma_i(r) \max\left\{ \frac{a_i - \widetilde{a}}{\widetilde{a}}, 0 \right\}, \tag{1}$$

If $\gamma_i > 0$, the individual suffers disutility from breaking the rule ($a_i > \widetilde{a}$). She chooses $a_i = \widetilde{a}$ if $\frac{\gamma_i}{\widetilde{a}} > \beta$: the more demanding the rule (the smaller $\widetilde{a}$), the more the individual is likely to break the rule. As the model is linear in a_i, it has a corner solution: either the individual respects the rule, or she chooses the maximum activity level. Individual i is a *conditional* rule follower if $\gamma_i = f(r)$. This leads to our

> **Hypothesis:** The more members of their reference group are known to follow an arbitrary rule, the more an individual is likely to follow the rule herself.

3. Design

Each participant chooses twice; we counterbalance order. In the *independent* condition, participants decide on their own. This measures their individual specific degree of rule following. For each level of $\widetilde{a}$, the participant chooses a maximum a_i to which he commits.

In the *dependent* condition, participants are randomly matched to groups of 6. First all participants make (another) *unconditional* choice, for each rule. Subsequently, each of them decides conditional on the number of the remaining group members who follow the respective rule. For one group member the conditional choice determines payoff, for the randomly chosen rule. This procedure is a direct analogue of the canonical procedure introduced by Fischbacher, Gächter et al. (2001) to measure conditional *cooperation*. Per participant, we have 5 (rules) × 6 (0 to 5 other group members) conditional choices. By observing conditional choices and comparing them with unconditional choices, we can infer whether social information matters and whether it has positive or negative consequences.

After the complete experiment it is randomly determined which rule applies and whether the unconditional or the conditional choice is payoff relevant. Only then participants may move sliders. Therefore, participants cannot condition their choices in the respective second part of the experiment on their individual experience with fulfilling the task. This also excludes contamination from feedback. The one participant whose conditional choice is payoff relevant only learns how many others have followed the rule immediately before actually moving sliders. There is no time limit, so that differences in skill are neutralized. Participants are free to move less sliders than their chosen maximum, but no participant does. This indicates that they do not consider the task to be overly laborious.

Our research question forces us to induce an experimenter demand effect (Zizzo, 2010). We therefore caution against interpreting the absolute level of rule following, and focus on treatment effects.

We administer several post-experimental tests. Specifically, (in this order) we elicit beliefs about *independent* choices, measure social value orientation (Liebrand & McClintock, 1988), risk preferences (Holt & Laury, 2002), the Big5 (Rammstedt & John, 2007), the portraits value questionnaire (Schmidt, Bamberg et al., 2007), and ask for demographics. Participants are paid for the first and second part of the main experiment, for beliefs, social value orientation and risk preferences. In the main experiment, they are paid for

[1] Our task is similar to Kimbrough and Vostroknutov (2016); they had asked participants to "stop" at a traffic light on the computer screen. Yet with our task, we can more easily manipulate the cost of rule following, and the rule is free from framing. This avoids a confound with, e.g. traffic habits.

the randomly chosen situation.

To avoid anticipation effects, at the beginning of the experiment we only inform participants that the experiment has six parts, not what these parts are about. Feedback from all parts of the experiment is withheld until all tests have been completed. Consequently, there is no dependence across individuals.

120 students of Hamburg University participated, mean age 25.69, 40.83% female. They on average earned 16.00€ (16.88$ on the first day of the experiment). The experiment was programmed in zTree (Fischbacher, 2007). Participants were invited using hroot (Bock, Baetge et al., 2014).[2]

4. Results

In the *independent* version of the experiment, the more the rule is demanding, the less it is obeyed (Table 1).[3] 67.50% participants decide to violate all rules. Only 15% follow all 5 rules. This is why mean choices are high on all problems.[4]

Fig. 1 reports effects of social information on the extensive (left panel) and the intensive margin (right panel). Social information (0 to 5 others obeying) is on the x-axis. Lines capture differently demanding rules. On the y-axis the fraction of participants who follow the rule (left panel) and their activity level (right panel) are reported. If participants know that no other member of their group of 6 follows the rule, conditional choices closely mirror unconditional choices (leftmost dots). Yet descriptively, already a single other rule follower makes a difference. With rule5, the probability to follow the rule increases from 17.5% to 19.17%, with rule41 from 36.67% to 39.17%. If all others follow the rule, 24.17% follow rule5, and 53.33% follow rule41. Effects on the activity level (right panel) are less pronounced, but analogous.

Table 2 tests how participants' conditional choices differ from their unconditional choice, informing us whether and when social information is beneficial or detrimental.[5] Remarkably, on average, having the possibility to condition on the choices of others never hurts. Even if participants know that no other group member follows the rule, they are not less likely to follow the rule (the constants are insignificant).[6] If a majority (3 or more members) follow the rule, this significantly influences their behavior. If they know that all others obey, participants are 11.7% more likely to also obey, compared with their unconditional choice.[7] In the notation of (1) the coefficients for 1 … 5 other members who follow the rule inform us about the sensitivity of γ to r. The model is linear in the activity level, and therefore predicts: either participants obey the rule, or they choose the maximum number of sliders. In line with this prediction, we find more pronounced (significant) reactions on the extensive margin (*obey*) than on the intensive margin (*choice*).

The significant coefficients for 3 … 5 others following the rule support the hypothesis:

> **Result**: Individuals are more likely to follow a costly, arbitrary rule when they know that sufficiently many others in their reference group do so as well.

The left panel of Fig. 2 provides further support: even if (in the *independent* condition) they have no hard information, participants are closely guided by their beliefs about the propensity of others to follow the rule. The right panel illustrates for which participants social information matters most. Lines capture the number of rules (5 … 41) the participant has obeyed unconditionally. If the line has a positive slope, rule following increases with the number of others who follow (x-axis). The right panel illustrates that the effect is strongest for those who follow few rules unconditionally.

The regressions in Table 3 provide a statistical test.[8] The more rules participants follow unconditionally, the more they do so when they can condition on the rule following of others (first coefficient). The less demanding the rule, the more it is obeyed (second coefficient). This relation is more pronounced for those that follow more rules unconditionally (interaction of number of problems with rules). The more others follow the rule, the more it is obeyed (fourth coefficient). The critical new information is the negative interaction between the number of rules followed unconditionally and the number of rule followers (fifth coefficient): the less a participant is following rules unconditionally, the more he/she is inclined to condition on others. Yet this only holds for the categorical

[2] Calculating power for random effects models is difficult, which is why we use simulation. We take the distribution of the individual specific error (SE = 0.286) and of residual error (SE = 0.265) from the regression reported in Table 2, and simulate a data generating process with a constant of 0 and a treatment effect (which can either be the effect of a rule, or the effect of one more group member following the rule). At the conventional levels of $\alpha = 0.05$ and $\beta = 0.8$, we have power to find an effect of size 0.096. Simulations are available from the authors upon request.

[3] Order does not have a significant effect, except for the unconditional choice as a group member. If it is elicited as the second choice, it is lower. To be on the safe side, for all comparisons we use the choice when acting alone. Here we do not find an order effect. We always report stated choices, i.e. the maximum number of sliders a participant commits to move.

[4] It is rare for a participant to violate a less demanding rule if they have been obeying a more stringent rule: we have 2 participants who violate rule11, but obey rule5, and 1 participant who violates rule41, but obeys rule32.

[5] Since this is the cleanest test, we compare with the *independent* version of the experiment. Results look similar if we instead compare with the unconditional choice as a group member.

[6] With the most stringent rule 5, of 120 participants 5 shift towards violating the rule when they learn that no other group member obeys, but 6 shift towards obeying. With the least stringent rule 41, the ratio is 8/14.

[7] It may seem surprising that the coefficients for rule11 and rule41 are significant, while the coefficients for rule23 and rule32 are not, although lines in Fig. 1 are largely parallel. Yet note that the dependent variables in Table 2 are differences, and that the regression controls for the number of group members who follow the respective rule. Hence coefficients capture the effect of moving from rule5 (the omitted category) to the respective rule, for the case when no other group member follows the rule.

[8] Since we use the number of problems on which a participant had obeyed in the independent choices for explanation, the difference between conditional and unconditional choices would be endogenous. This is why, between Table 2 and Table 3, dependent variables differ.

Table 1
Descriptives for independent choices.

Rule	Fraction obey	Mean choice
5	16.67%	37.43
11	16.67%	38.75
23	21.67%	40.46
32	27.50%	41.98
41	31.67%	43.99

Obey: a dummy that is 1 if the participants follows the rule.
Choice: the number of sliders the participant decides to move.

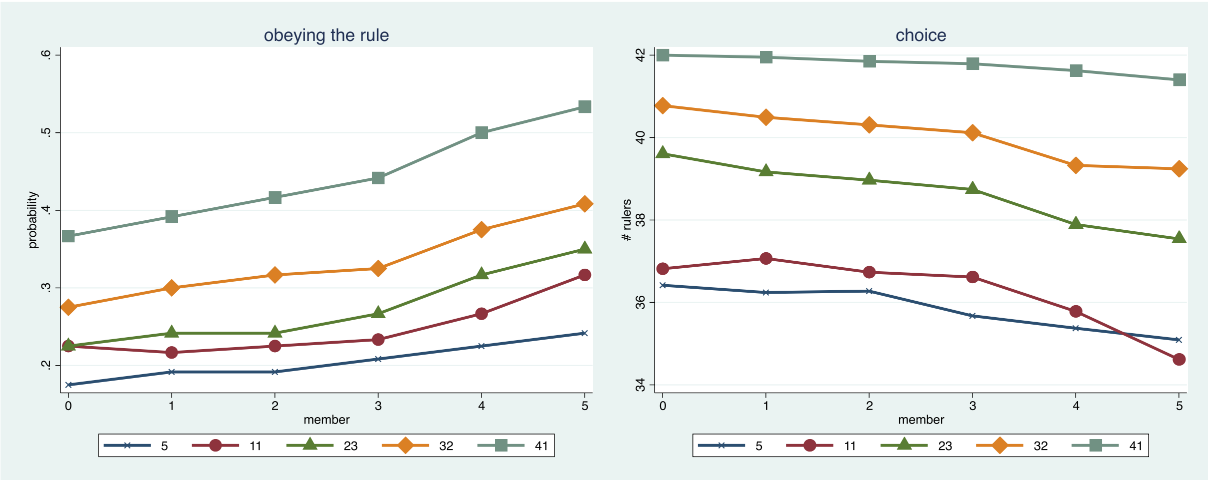

Fig. 1. Descriptives for conditional choices. Left panel: dv is a dummy that is 1 if the participant follows the rule. Right panel: dv is the number of sliders the participant decides to move. x-axis: number of group members who obey the rule.

Table 2
Effect of possibility to condition on rule following of others.

	obey	choice
rule11	0.042** (0.014)	–0.899* (0.357)
rule23	0.018 (0.014)	–0.226 (0.357)
rule32	0.019 (0.014)	–0.361 (0.357)
rule41	0.086*** (0.014)	–0.643^{+} (0.357)
1 member	0.015 (0.015)	–0.14 (0.391)
2 members	0.025 (0.015)	–0.297 (0.391)
3 members	0.042** (0.015)	–0.535 (0.391)
4 members	0.083*** (0.015)	–1.123** (0.391)
5 members	0.117*** (0.015)	–1.545*** (0.391)
cons	–0.008 (0.030)	–0.975 (0.856)
N obs	3,600	3,600
N uid	120	120

Linear random effects, Hausman test insignificant on both models.
dv: conditional choice – unconditional choice on independent problem with same rule.
Obey: a dummy that is 1 if the participant follows the rule.
Choice: the number of sliders the participant decides to move to the middle.
*** $p < .001$, ** $p < .01$, * $p < .05$.

decision to obey the rule, not for the degree by which participants violate the rule.

On the intensive margin (dv *choice*), we find a small additional effect of social value orientation; apparently participants see rule following as socially desirable. By contrast the effect of risk aversion is insignificant.[9] Participants are not concerned about the risk of

[9] Except for choices, but the effect disappears if, in a Tobit model, we take censoring from above (participants decide to move all 48 sliders) into account.

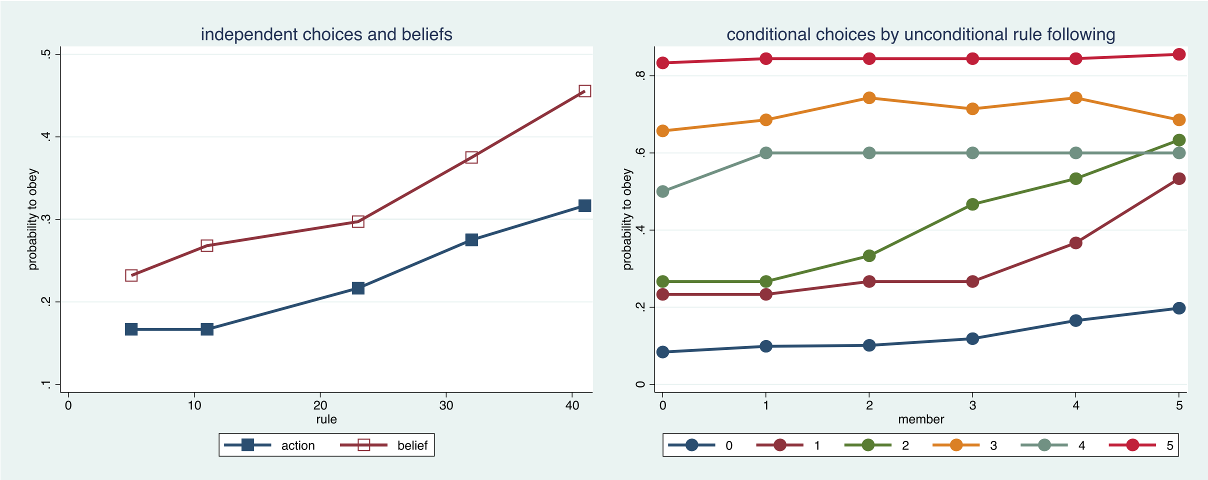

Fig. 2. Explanations. Left panel: independent choices. Action: mean fraction that follows the arbitrary rule. Belief: mean belief about fraction of others that follow the arbitrary rule. right panel: mean conditional decision to follow the rule, by number of other group members who follow rule (x-axis) and by number of rules this participant had followed in independent choice (colored lines).

Table 3
Explanations.

	Obey	Choice
# of problems on which participant followed the arbitrary rule in the *independent* version	0.148*** (0.014)	–7.207*** (0.468)
rule	0.005*** (0.0004)	0.057*** (0.009)
# problems * rule	0.0003 (0.00016)	0.104*** (0.004)
# members who obey	0.027*** (0.003)	–0.371*** (0.070)
# problems * # members	–0.003* (0.044)	0.037 (0.032)
social value orientation score	0.003 (0.0015)	–0.108* (0.051)
risk aversion score	−0.010 (0.047)	0.462 (1.587)
cons	–0.084* (0.041)	44.878*** (1.379)
N obs	3,360	3,360
N uid	112	112

Linear random effects, Hausman test insignificant for both models.
dv obey: dummy that is 1 if participant follows the arbitrary rule.
dv choice: number of sliders participant decides to move.
problems: # of problems on which this participant followed the arbitrary rule.
members: # of members who follow the arbitrary rule on this problem (from strategy method).
*** p < .001, ** p < .01, * p < .05.

being seen as rule breakers.

5. Discussion

We show that individuals are more likely to follow an arbitrary rule the more others in their reference group do so as well. Rule following is conditional. Whereas these results mirror findings on conditional cooperation, we observe an important difference. For social preferences, social information is a double-edged sword. It only helps if conditionally cooperative individuals learn that others are cooperative. By contrast, in our sample social information on average never hurts. It even increases rule following provided the conflict with profit is not too pronounced, and particularly for those who, without such information, are unlikely to follow the rule.

We have chosen our task for two reasons: rules are visibly arbitrary, and the task is scalable. We therefore can test how conditional rule following depends on the severity of the norm. One might be concerned that the task is laborious, and participants might not want to fulfil the complete task in the first place. Yet actually all participants move the maximum permissible number of sliders.

Our experiment relies on the strategy method. This gives us complete reaction functions. While comparisons between direct elicitation and the strategy method have occasionally found differences (see the survey by Brandts & Charness, 2011), for the most part it has been shown to be behaviorally valid (Fischbacher, Gächter et al., 2012; see also Charness, Gneezy et al., 2016). Still we cannot exclude that reactions would be different if participants had observed others, or first had experienced the task themselves.

It depends on definitions whether conditional rule following and conformity are different concepts. They are if conformity is defined by a willingness to follow one's peers, irrespective of what they do. Conformity would then require that individuals are *less* likely to follow a rule if it is widely violated. This is not what we find. On average, social information never hurts.

In (1), the utilitarian concern for the payoff from the experiment, and the deontological concern for rule following, are additively separable. For the purposes of our experiment, there is no need to consider a multiplicative relationship. There is no reason why (unconditionally or conditionally) following the rule might give the individual higher (or lower) utility from profit. If the utilitarian component encompasses social preferences, this could be different. A result by Kimbrough and Vostroknutov (2016) could be explained by such a multiplicative effect. If they sort participants in a public good game by their willingness to follow an arbitrary rule, those who are more likely to follow the rule also cooperate more. To test this one would need to manipulate whether the rule is or is not backed up by social preferences. We leave this for future work.

Our result is of high practical relevance. The willingness of individuals to follow rules is a valuable resource for governing society. Our experiment shows that government may hope that a rule will be followed even if addressees do not know its purpose, at least if it is not too onerous. But it is critical that individuals believe the rule to be followed by other members of society. The law should therefore not only promulgate the rule, but also showcase law abiding, as already advocated by Bentham (1789).

Acknowledgements

Helpful comments by the editor, an anonymous referee, Claudia Cerrone and Alexander Schneeberger on an earlier version are gratefully acknowledged. The experiment has been funded from the regular budget of the Max Planck Institute for Research on Collective Goods, Bonn, Germany. All data, analyses, and instructions are available on https://osf.io/d5an9/ or DOI 10.17605/OSF.IO/D5AN9.

References

Bentham, Jeremy (1789). An Introduction to the Principles of Morals and Legislation. London, Payne.
Bicchieri, Cristina (2006). *The grammar of society. The nature and dynamics of social norms*. Cambridge: Cambridge University Press.
Bicchieri, Cristina, & Xiao, Erte (2009). Do the right thing: But only if others do so. *Journal of Behavioral Decision Making, 22*(2), 191–208.
Bock, Olaf, Baetge, Ingmar, & Nicklisch, Andreas (2014). hroot: Hamburg registration and organization online tool. *European Economic Review, 71*, 117–120.
Brandts, Jordi, & Charness, Gary (2011). The strategy versus the direct-response method. A first survey of experimental comparisons. *Experimental Economics, 14*(3), 375–398.
Burks, Stephen V., & Krupka, Erin L. (2012). A multimethod approach to identifying norms and normative expectations within a corporate hierarchy. Evidence from the financial services industry. *Management Science, 58*(1), 203–217.
Charness, Gary, Gneezy, Uri, & Halladay, Brianna (2016). Experimental methods. Pay one or pay all. *Journal of Economic Behavior & Organization, 131*, 141–150.
Dimant, Eugen (2019). Contagion of pro-and anti-social behavior among peers and the role of social proximity. *Journal of Economic Psychology, 73*, 66–88.
Dufwenberg, Martin, Gächter, Simon, & Hennig-Schmidt, Heike (2011). The framing of games and the psychology of play. *Games and Economic Behavior, 73*, 459–478.
Fischbacher, Urs (2007). z-Tree. Zurich toolbox for ready-made economic experiments. *Experimental Economics, 10*, 171–178.
Fischbacher, Urs, & Gächter, Simon (2010). Social preferences, beliefs, and the dynamics of free riding in public good experiments. *American Economic Review, 100*, 541–556.
Fischbacher, Urs, Gächter, Simon, & Fehr, Ernst (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters, 71*, 397–404.
Fischbacher, Urs, Gächter, Simon, & Quercia, Simone (2012). The behavioural validity of the strategy method in public good experiments. *Journal of Economic Psychology, 33*(4), 897–913.
Gill, David, Prowse, Victoria (2011). A novel computerized real effort task based on sliders. http://ssrn.com/abstract=1732324.
Holt, Charles A., & Laury, Susan K. (2002). Risk aversion and incentive effects. *American Economic Review, 92*, 1644–1655.
Kessler, Judd B., & Leider, Stephen (2012). Norms and contracting. *Management Science, 58*(1), 62–77.
Kimbrough, Erik O., & Vostroknutov, Alexander (2016). Norms make preferences social. *Journal of the European Economic Association, 14*, 608–638.
Krupka, Erin L., & Weber, Roberto A. (2013). Identifying social norms using cordination games. Why does dictator game sharing vary? *Journal of the European Economic Association, 11*(3), 495–524.
Krupka, Erin, & Weber, Roberto A. (2009). The focusing and informational effects of norms on pro-social behavior. *Journal of Economic Psychology, 30*, 307–320.
Liebrand, Wim B., & McClintock, Charles G. (1988). The ring measure of social values. A computerized procedure for assessing individual differences in information processing and social value orientation. *European Journal of Personality, 2*, 217–230.
López Pérez, Raúl (2008). "Aversion to Norm-breaking. A Model." Games and Economic Behavior 64: 237-267.
Rammstedt, Beatrice, & John, Oliver P. (2007). Measuring personality in one minute or less. A 10-item short version of the big five inventory in English and German. *Journal of Research in Personality, 41*, 203–212.
Schmidt, Peter, Bamberg, Sebastian, Davidov, Eldad, Herrmann, Johannes, & Schwartz, Shalom H. (2007). Die Messung von Werten mit dem "Portraits Value Questionnaire". *Zeitschrift für Sozialpsychologie, 38*(4), 261–275.
Schram, Arthur, & Charness, Gary (2015). Inducing social norms in laboratory allocation choices. *Management Science, 61*(7), 1531–1546.
Selten, Reinhard (1967). *Die Strategiemethode zur Erforschung des eingeschränkt rationalen Verhaltens im Rahmen eines Oligopolexperiments* (pp. 136–168). Beiträge zur experimentellen Wirtschaftsforschung. E. Sauermann. Tübingen: Mohr.
Zizzo, Daniel John (2010). Experimenter demand effects in economic experiments. *Experimental Economics, 13*(1), 75–98.