The impact of voting rules and communication in groups on the violation of norms: Theory and evidence from the laboratory

March 10, 2018

Abstract

We investigate theoretically and in the laboratory how the willingness to violate a moral norm, implemented as taking money designated for donation, is influenced by groups, voting rules and communication. In our model, we assume that, in addition to the own monetary payoff, utility depends on pecuniary externalities, on internal moral costs from violating a norm which can be reduced by the perception of shared responsibility, and on social image concerns vis-à-vis moral partners. We compare majority rules to and unanimity rules, where each group member has a veto right against the norm violation. In addition, single decision-making is considered as a benchmark. Supporting our hypotheses, the percentage of subjects voting for a transfer is highest under the unanimity rule. This effect is so large that even the actual violation rate exceeds the rate under the majority rule. Our findings thus suggest that unanimity rules against the violation of moral norms should be implemented with caution. Communication increases the percentage of group members voting identically and reduces the difference between the voting rules.

Key words: moral norms, voting rules, group decision-making, laboratory experiment, donation

JEL codes: D02, D71, D73, D83

1 Introduction

Motivation and main results

Recent laboratory experiments suggest that moral norms are more often violated in groups and market settings than with individual decision-making [Falk and Szech (2013); Muehlheusser et al. (2015); Kocher et al. (2017)] and that this can at least partially be attributed to a diffusion of responsibility [Dana et al. (2007); Conrads et al. (2013); Bartling et al. (2014)]. The experimental literature has identified various factors moderating the degree of immoral behavior in group settings including seller competition and information [Bartling et al. (2014)], social information [Irlenbusch and Saxler (2015)] and the probability that the own decision is pivotal [Falk and Szech (2017)]. We contribute to the literature by analyzing how the willingness to violate moral norms in groups depends on the voting rule. We compare majority rules to unanimity rules; both with and without prior communication. Under both rules, the norm is either violated or not violated with certainty when the two group members submit identical votes. In case of different votes, however, the voting rule matters: Under the unanimity rule, each group member can veto the violation of the norm, so that the moral outcome is the default in case of disagreement.[1] By contrast, the norm violation occurs with probability one half under the majority rule.[2] As a benchmark, we also consider single decision-making where the outcome depends solely on the own decision. Our most important experimental finding is that the willingness to violate the norm under the unanimity rule exceeds the one under the majority rule to such a large degree that even the actual violation rate is significantly larger.[3]

Before running the experiment, we structure the different effects at work in a simple behavioral model. We assume that, in addition to the own monetary payoff, the utility depends on three behavioral factors: First, participants assign positive values to the monetary payoffs of other parties, so that they take externalities associated

[1] Falk and Tirole (2016) refer to this as individual veto power against the norm violation.

[2] Any other probability would mean that votes in favor and against the norm violation have different weights, and would thus not be in line with the connotation of a majority rule in case of two group members.

[3] This is notable as the veto right ceteris paribus reduces the violation rate by decreasing the violation probability from one half to zero in case of different votes.

with the violation of the norm into account (consequentialist or utilitarian perspective). Second, they have internal moral costs from taking an action they perceive as immoral, even when disregarding actual externalities or social image concerns (these non-consequentialist costs can be labeled as rule-based.[4] Importantly, we assume in addition that these internal moral costs are decreasing in the probability that the partner could have avoided the immoral outcome. This seems to be a natural extension of the concept of shared responsibility to voting rules and ensures that the degree of (perceived) reduced responsibility in groups depends on the voting rule. Third, we assume that subjects face social image concerns (or, used synonymously here, reputation costs) vis-à-vis partners who obey the moral norm.[5]

The main hypothesis derived from our model is that the frequency of subjects voting for the norm violation is higher under the unanimity than under the majority rule. Our theoretical framework suggests two reasons for that: First, under the unanimity rule, the partner could have prevented the immoral outcome with certainty by vetoing it. This reduces the perception of the own responsibility compared to the majority rule. Second, there are no reputation costs vis-à-vis moral partners as the violation of the moral norm can only happen when the partner votes for it. Our hypothesis on the comparison of the two voting rules, which is strongly supported by the experimental results, is thus based on shared responsibility and on reputation costs which are higher when the partner is perceived as honest. By contrast, the comparison of the two group treatments to the single decision-making case turns out to be ambiguous in our model. To see the factor at work, note first that, if the internal costs of violating the norm could not be reduced through shared responsibility, then the violation rate would be maximal with single decision-making. The reason is that, when saying "yes" instead of "no", then the probability of getting the money increases from zero to 100%, which is not the case in group settings. In our model, it hence depends on the relative importance of shared responsibility compared to the expected marginal increase in payoffs whether

[4]Essentially, the utilitarian perspective in the tradition of Bentham (1789) defines immoral acts with respect to their consequences on others, while the deontological or rule based-perspective describes moral norms as imperatives that need to be obeyed irrespective of their consequences (see e.g. Elster (1989); Krupka and Weber (2013); Alexander and Moore (2015); Falk and Tirole (2016).

[5]Our distinction between internal moral costs and social image concerns resembles the literature on lying costs, which shows that the actual behavior can well be explained by a combination of internal lying costs and reputation costs [Abeler et al. (2018)]. We follow the established terminology.

voting for the norm violation is more frequent in groups or with single decision-making. Experimentally, we find that the frequency is higher under the unanimity rule, while there is no significant difference between singe-decision making and the majority rule.

While our paper mainly contributes to the literature on the moderators of immoral behavior in groups, our findings also seem important from an applied perspective. In many fields including e.g. project assignment in procurement auctions, voting mechanisms in the European Union, shareholder voting or jury voting, different mechanisms with different degrees of veto power are used. Many proposals in the European Union require unanimity, but majority rules are also applied [Cheneval et al. (2015); Crombez et al. (2016); Bouton et al. (2017)]. In procurement auctions, decisions are sometimes made by two officials acting in concert after having communicated, but often also based on independent evaluations with veto power for each participant [OECD (2008); Shikora (2011)]. Falk and Tirole (2016) in section 6 discuss various settings such as unethical accounting or insufficient risk management where each participant can veto the immoral outcome. While participants do not actually "vote" in these cases, the concept of veto power still applies. Intuitively, one might assume that veto power reduces the risk of immoral outcomes as one subject is sufficient to prevent it. Our results, however, suggest that unanimity requirements for the violation of moral norms may backfire to such a large degree that even the actual violation rate is larger.

In our experiment, the violation of the moral norm is implemented by the possibility to transfer money designated for donation to SOS Kinderdorf (SOS Children's Villages) to the own account.[6] Many papers demonstrated that donation is seen as prosocial behavior [Ariely et al. (2009); Bénabou and Tirole (2010); Myers (2013); Cojoc and Stoian (2014)], so that donation settings are often applied in experiments on norm violations [Kirchler et al. (2015); Casal et al. (2017); Feess et al. (2018)]. Donation experiments can be seen as complementary to experiments on misreporting privately observable outcomes from random draws, e.g. from throwing a die or flipping a coin [Fischbacher and Föllmi-Heusi (2013); Abeler et al. (2018); Garbarino et al. (2016); Feess and Kerzenmacher (2018)](Gneezy et al., 2018). While taking the money designated for

[6] In Germany, where the experiment was conducted, SOS Kinderdorf is one of the best-known and most highly esteemed donation agencies. It is purpose is to support children and families in the poorest regions of the world.

donation causes real negative consequences for people in need, lying has no real negative consequences; it just transfers money from the experimenter to the own account [Meub et al. (2016)]. Thus, lying is immoral from a rule-based, but not necessarily from a utilitarian perspective.

Relation to the literature

The literature on norm violation comparing group behavior to single decision-making has pointed to countervailing effects. On the one hand, social image concerns are likely to be more important when not only the experimenter, but also other participants get an up-date on the own behavior [Benabou and Tirole (2012); Bénabou (2012); Falk and Tirole (2016)]. Social image concerns, also referred to as reputation costs in most lying experiments [Abeler et al. (2018)] are thus likely to reduce norm violations in groups compared to single decision-making. In our model, we assume that social image concerns are more important when the partner is perceived as moral, and this is one of the drivers for our hypothesis that violation frequencies are larger under the unanimity rule. On the other hand, group decisions lead to the perception of reduced responsibility, and experiments suggest that this effect dominates social image concerns.[7]

For group decisions, it is useful to distinguish between two settings. In the first setting, group members act in concert by submitting a jointly reached decision to the experimenter. This is often implemented for lying experiments, in which the group members can misreport their private information on the outcome of a random draw from throwing a die or flipping a coin to the experimenter. These experiments typically find that misreporting is more frequent in groups [Chytilova and Korbel (2014); Muehlheusser et al. (2015); Kocher et al. (2017)]. Similar results in other contexts are reported by Ellman and Pezanis-Christou (2010) and Gino et al. (2013a).

In the second setting, which is usually applied in experiments on the willingness for imposing negative externalities on third parties, subjects decide independently and the outcome depends on the decisions of all participants. In the bilateral bargaining setting considered by Falk and Szech (2013), each team member has individual veto power, and the willingness to trigger a negative externality turns out to be larger compared

[7] See Charness and Sutter (2012) and Kugler et al. (2012) for more general surveys on how individual behavior changes in groups.

to the individual setting.[8] Hamman et al. (2010); Bartling and Fischbacher (2011); Oexl and Grossman (2013) find that the possibility of delegating potentially immoral decisions leads to a more selfish behavior. Comparable group effects are found by Bartling et al. (2014); Irlenbusch and Saxler (2015) and Falk and Szech (2017). The effects of shared responsibility are found to be reinforced by self-serving interpretations about what constitutes immoral behavior at all (see the reviews by Ayal and Gino (2011) and Dana et al. (2007).[9] In our model, we account for reduced responsibility by assuming that moral concerns are lower when the partner could have prevented the immoral outcome.

Any subject can unilaterally veto the transfer of the money in the unanimity rule, and is thus pivotal if the partner votes for a transfer. Falk and Tirole (2016) predict that participants may be reluctant to fully impose their own preferences on other group members, and may thus dislike having the pivotal vote when deciding on a group outcome. This is supported by Gerber et al. (2013) who consider a voluntary contribution mechanism where group members need to vote on forming an institution. If the institution is formed, then each member is obliged to fully invest their endowment. They find that the unanimity rule increases the percentage of participants voting for the institution, i.e. participants do not make use of their veto power. In this sense, their finding is similar to our result that voting against a transfer is far less often observed with individual veto power.

In addition to comparing the unanimity and the majority rule, we examine the impact of communication. Intuitively, one should assume that the difference between the two voting rules shrinks with communication as it becomes more difficult to hide behind the partner's voting power after having discussed the issue in a chat window. This intuition is confirmed by our data. In Kocher et al. (2017), both group members observe the same die roll and report numbers with or without communication. In one

[8] In their treatment on bilateral bargaining implemented by a standard double auction, a mouse is saved from being killed, which constitutes the default, if and only if two participants agree on a split of twenty Euros. More mice are killed compared to the individual setting.

[9] Moral concerns in groups are found to be further diminished when the norm violation benefits other group members, which is also the case in our two group settings [Wiltermuth (2011); Erat and Gneezy (2012); Gino et al. (2013b); Danilov et al. (2013); Weisel and Shalvi (2015)]. See also the overview on corruption experiments in Bobkova and Egbert (2013). Gächter et al. (2017), however, find that the behavior of other subjects has a strong impact on what is viewed as morally appropriate in a dictator game, but only a rather limited impact on the actual own behavior.

treatment, they find that communication increases lying in a setting where not only the reports are submitted individually, but where even the own payoff is independent of the other group member's report. Thus, communication itself reduces moral concerns. In another treatment, participants receive a positive payoff if and only if they report the same number. This payment scheme leads to a lying frequency of almost 90% with a clear majority reporting the payoff-maximizing number. Thus, as in Falk and Szech (2013), the necessity of reaching an agreement serves as a device to coordinate on the payoff maximizing outcome.[10] In line with the perspective of communication as a coordination device, we find that communication increases the percentage of teams in which both members submit identical votes.

Our model including internal violation costs, shared responsibility and reputation concerns vis-à-vis moral partners is related to the theoretical frameworks by Falk and Tirole (2016) and Rothenhäusler et al. (2018). Falk and Tirole (2016), who refer to shared responsibility as the "sub-additivity of responsibility", develop a model in which the ranking among groups and single decision-making depends on the details of the payoff structure, the division of decision rights, and the (equilibrium) impact of decisions on the likelihood of an immoral outcome. The model by Rothenhäusler et al. (2018) analyzes voting in a public game and varies the number of participants required for triggering the immoral outcome. Also focusing on shared responsibility, they show that subjects are more willing to vote for the immoral outcome if the threshold increases. The basic intuition is that subjects know that they can only be pivotal if many others vote for the norm violation as well, which then increases the perception of shared responsibility. As in our model, an important assumption is that the perceived level of guilt depends on whether the immoral outcome is reached; we will get back to this in the end of our model section.

Overall, while the literature so far considers a rich variety of factors influencing the willingness of violating moral norms, we are not aware of experimental papers comparing different voting rules, which we hence regard as the main contribution of our paper. The remainder of the paper is organized as follows: Section 2 introduces the

[10] Other papers also find that communication in groups tends to increase selfishness [Bornstein et al. (2004); Maciejovsky et al. (2013)]

model and derives our hypotheses. The experimental design is described in section 3. Section 4 presents our results. We conclude, discuss limitations and point to further research in section 5.

2 Model and Hypotheses

Model and core hypothesis. We consider a behavioral model with two subjects. Each subject can vote for or against transferring an amount of money designated for donation to the own account. As in the experiment, we assume that the amount at stake per capita is the same in all settings. This implies that losses to the donation agency are twice as high in group settings compared to single decision-making. We assume that the actual benefit of the money is largest for the donation agency, so that a utilitarian social planner would prevent the transfer. We assume the following preferences:

- Subjects put weight one on their own monetary payoff. They value gains for their partner by v_P and for the donation agency by v_D, where we assume $v_P, v_D \leq 1$. Thus, subjects care weakly more about their own payoff.

- Social image concerns (negative reputation effects) vis-à-vis partners are denoted by m and arise only when the money is actually transferred and when the partner is assumed to have voted against a transfer. Thus, subjects have no image concerns vis-à-vis partners who themselves violated the moral norm.[11]

- Internal moral costs due to a feeling of guilt or responsibility are denoted t and arise when voting for a transfer and when the transfer occurs. However, t is reduced by the perception of "shared responsibility" when the partner could have avoided the norm violation. Specifically, we assume that the disutility in group settings shrinks to $(1 - lp)\, t$, where p is the probability that the norm violation would not have occurred if the partner had voted against it. $l \leq 1$ is a parameter that expresses the perceived degree in the reduction of responsibility for any p

[11] The only thing that counts in our model is that image concerns vis-à-vis moral partners are larger. We neglect image concerns towards the experimenter as the own vote was observable to us. These reputation costs are thus the same in all treatments and would cancel out when comparing the different settings.

given.

Summing up, the propensity to violate the moral norm depends on the weights put on externalities, on the perceived reduction in responsibility in groups, and on image concerns vis-à-vis moral partners. We assume that subjects differ only in their internal moral costs $t \in [0, t^{\max}]$, which are distributed with continuous density $f(t)$ and cumulative distribution $F(t)$ with full support on $[0, t^{\max}]$.

In the *single decision-making case (rule S)*, each player's decision fully determines whether the money is transferred or not, so that there is no interdependency. The utility when taking the money is[12]

$$U_Y^S = (1 - v_D) - t,$$

since the donation agency's payoff is weighted with v_D and because there are neither reputation costs vis-à-vis a partner nor shared responsibility. As the utility is zero when not taking the money,[13] the critical threshold $\widetilde{t}^U$ such that subjects vote for a transfer if and only if $t \leq \widetilde{t}^U$ is given by

$$\widetilde{t}^S = (1 - v_D).$$

Straightforwardly, the money is more likely to be taken when the weight put on the donation agency (v_D) and (direct) moral costs (t) are low.

Under the *unanimity rule* (rule U), the money is transferred if and only if both vote for it. Thus, utility is zero when voting against a transfer. When voting for a transfer, expected utility is

$$U_Y^U = F\left(\widetilde{t}^U\right)\left[(1 + v_P - 2v_D) - (1 - l)\, t\right]$$

where $F\left(\widetilde{t}^U\right)$ denotes the probability that the partner votes for a transfer. If so, the first part in squared brackets captures the weights put on the three parties' payoffs. Internal moral costs of violating the norm are now reduced to $(1 - l)\, t$, because the other participant could have avoided the immoral outcome by vetoing it (thus $p = 1$). Subjects

[12] Superscript "S" expresses single decision-making, and subscript "Y" expresses voting "Yes".

[13] Adding a positive utility from warm glow when not taking the money would express the same as internal moral costs t.

can hence fully exploit this self-conforming excuse to downplay the own responsibility. Furthermore, there are no reputation costs vis-à-vis moral partners as the money can only be taken if the partner also votes for it.

If subjects care largely about the donation agency (i.e. if v_D is high) and hardly about the partner (i.e. if v_P is low), then $(1 + v_P - 2v_D)$ may be negative, so that even subjects with $t = 0$ would not vote for a transfer. To avoid this uninteresting case, we assume that $(1 + v_P - 2v_D) > 0$. Taking into account that utility is zero when voting against a transfer, the threshold is then

$$\widetilde{t}^U = \frac{(1 + v_P - 2v_D)}{1 - l}.$$

The threshold is independent of the type distribution $f(t)$ since, in case of a transfer, one knows with certainty that the partner has also voted for it.[14] The willingness to vote for a transfer increases in the parameter l which expresses the reduction in moral costs due to the perception of shared responsibility.

The majority rule (rule M) differs from the unanimity rule only in case of different votes, where we assume that a transfer happens with 50% probability. Thus, the money may also be transferred when voting against it. When voting for a transfer, expected utility is

$$U_Y^M = F\left(\widetilde{t}^M\right)\left[(1 + v_P - 2v_D) - \left(1 - \frac{1}{2}l\right)t\right] + \left[1 - F\left(\widetilde{t}^M\right)\right]\frac{1}{2}\left[1 + v_P - 2v_D - t - m\right].$$

With probability $F\left(\widetilde{t}^M\right)$, the partner also votes for a transfer, which then takes place with certainty. As the partner could have reduced the transfer probability to $\frac{1}{2}$ by voting against it, perceived responsibility is reduced to $\left(1 - \frac{1}{2}l\right)t$. Furthermore, there are no image costs in this case. With probability $1 - F\left(\widetilde{t}^M\right)$, the partner votes against the transfer, which then occurs with probability $\frac{1}{2}$. As the partner already did her best to reduce the transfer probability, moral costs are maximum. Finally, there are reputation costs m vis-à-vis the moral partner.

[14] Note that this independency also follows from our assumption that moral costs arise only when the money is actually transferred.

When voting against the transfer, expected utility is

$$U_Y^M = F\left(\widetilde{t}^M\right)\frac{1}{2}\left[1 + v_P - 2v_D\right].$$

With probability $F\left(\widetilde{t}^M\right)$, the partner votes for a transfer, which then happens with probability $\frac{1}{2}$. There are neither moral costs nor social image concerns.

After simplifying, the difference in expected utilities when voting for and against a transfer can be written as[15]

$$\Delta U^M \equiv U_Y^M - U_N^M = \frac{1}{2}\left(1 + v_P - 2v_D\right) - F\left(\widetilde{t}^M\right)\left(1 - \frac{1}{2}l\right)t - \left[1 - F\left(\widetilde{t}^M\right)\right]\frac{1}{2}\left(t + m\right),$$

where setting $t = \widetilde{t}^M$ implicitly defines the critical threshold such that subjects vote for the transfer if $t \leq \widetilde{t}^M$. Note that the first part shows that, irrespective of the partner's vote, the transfer probability when voting for a transfer increases by $\frac{1}{2}$.

For the two group treatments, we apply symmetric Bayesian Nash Equilibrium as a solution concept. Comparing the two group voting rules yields our main result and hypothesis:

Hypothesis 1 (Voting rules)

The frequency of participants voting for a transfer is higher under the unanimity rule than under the majority rule, i.e. $\widetilde{t}^M < \widetilde{t}^U$.

The proof of Result 1 shows that the threshold value $\widetilde{t}^M$ such that all subjects with preference costs of $t \leq \widetilde{t}^M$ vote for transfers is strictly larger under the unanimity rule. There are two reasons for that: First, when getting the money under the unanimity rule, one can fully blame the partner for not having avoided the transfer. The perceived responsibility thus decreases to its minimum level $(1 - l)\,t$. Second, there are no image concerns as the partner must also have voted for a transfer in case one gets the money.[16] The hypothesis derived from our model is thus that more subjects vote for a transfer

[15] This will be shown as part of the proof for the result derived below.

[16] Note that someone voting against a transfer could not get an up-date on the partner's behavior anyway as her veto fully determines the outcome.

under the unanimity compared to the majority rule .

Turning next to the comparison of rules U and S, we see that

$$\widetilde{t}^U > \widetilde{t}^S \Leftrightarrow v_P - v_D + l\,(1 + v_D) > 0,$$

which is in general ambiguous. If there is no reduction in perceived responsibility ($l = 0$), then the norm would be more often violated in the unanimity setting if and only if one cares (weakly) less about the donation agency than about the partner. However, if the perception of shared responsibility is sufficiently large, then the norm is more often violated under rule U also for $v_P < v_D$.

Before we turn to additional hypotheses that do not emerge from our model but are based on the previous literature, an important point to note is that a model where subjects care only about their monetary payment and face moral costs of c whenever they vote for the immoral outcome would lead to different predictions. When taking the money in the single decision-making case, the utility is then $U_Y^S = 1 - c$, compared to $U_Y^U = F\left(\widetilde{t}^M\right) - c$ under the unanimity rule. As the utility is zero in both settings when voting against a transfer, such a simplified behavioral model predicts that the frequency of subjects voting for a transfer is larger with single decision-making. The reason is straightforward: When moral costs arise whenever one votes for a transfer, then the only difference in the objective function with single decision-making to group voting is that one gets the money with certainty in the single decision-making case, but only with some probability in the group treatments. This case is discussed in the chapter 6 of Falk and Tirole (2016). Furthermore, the comparison of the two group voting rules is ambiguous in such a model as the change in the expected utility when voting for instead of against a transfer under the majority rule is $\Delta^M = \frac{1}{2} - c$. Thus, the frequency would be larger under the unanimity rule if and only if $F\left(\widetilde{t}^M\right) > \frac{1}{2}$. Our experimental findings hence support the view that the reduction in the perceived own responsibility due to the possibility to blame partners for the immoral outcome is an important factor (see the findings in Falk and Szech (2013).

Additional hypotheses. While our model allows to predict the ranking between the unanimity and the majority rule, the comparison between groups and single decision-making is ambiguous. As the comparison between the two group voting rules is the core of our paper, we do not want to impose additional (restrictive and questionable) assumptions that yield clear-cut results also for the comparison of groups to single decision-making or for the impact of communication. The literature discussed in the introduction, however, suggests the following additional hypotheses:

Hypothesis 2 (Unanimity and single decision-making)

The frequency of participants voting for a transfer is higher under the unanimity rule than under single decision-making.

Hypothesis 2 is based on the large experimental literature on shared responsibility, which is maximal under the unanimity rule. By contrast, neither our model nor the literature review yields a hypothesis for the comparison of the majority rule to single decision-making: On the one hand, shared responsibility, though lower than under rule U, may still be important enough to increase the frequency compared to single decision-making. But on the other hand, there are now also image concerns towards moral partners, which cannot arise under the unanimity rule.

In the group treatments of our experiment, we apply a two-by-two design with respect to voting rules and communication. The literature discussed in the introduction suggests that communication increases the incentive to maximize the joint payoff at the expense of the donation agency (Hypothesis 3a). Furthermore, communication is likely to reduce the difference between the two group voting rules as it yields an up-date on the partner's intention, which makes it more difficult to reduce the perceived level of own responsibility. And as this reduction in perceived responsibility is more important under the unanimity rule, we hypothesize that communication reduces the difference of the two voting rules (Hypothesis 3b). Third, communication is likely to serve as a coordination device (Hypothesis 3c), which should increase the percentage of identical votes.

Summing up, we get

Hypothesis 3 (Communication)

H3a) Communication increases the frequency of subjects voting for a transfer.

H3b) Communication reduces the difference between the majority rule and the unanimity rule.

H3c) Communication increases the frequency of identical votes.

Finally, under all treatments, it seems reasonable to predict that the violation frequency decreases in the acceptance towards SOS Kinderdorf.[17]

Hypothesis 4 (Trust in SOS Kinderdorf)

The probability that a subject votes for a transfer decreases in the level of trust in SOS Kinderdorf.

Proof of $\widetilde{t}^M < \widetilde{t}^U$ (Hypothesis 1). Recall that the threshold under the unanimity rule is $\widetilde{t}^U = \frac{(1+v_P-2v_D)}{1-l}$, which is independent of $f(t)$. Under the majority rule, we cannot solve explicitly for the threshold without assumptions on the distribution over types. As we want to prove that $\widetilde{t}^M < \widetilde{t}^U$ (less people vote for transfers under the majority rule), we need to consider the maximum possible $\widetilde{t}^M$. Recall from the text that

$$\begin{aligned}\Delta U^M &\equiv U_Y^M - U_N^M = \frac{1}{2}(1+v_P-2v_D) - F\left(\widetilde{t}^M\right)\left(1-\frac{1}{2}l\right)t - \left[1-F\left(\widetilde{t}^M\right)\right]\frac{1}{2}(t+m) \\ &= \frac{1}{2}(1+v_P-2v_D) - F\left(\widetilde{t}^M\right)\left[\left(1-\frac{1}{2}l\right)t + \frac{1}{2}(t+m)\right] - 1\frac{1}{2}(t+m),\end{aligned}$$

where the threshold $\widetilde{t}^M$ is implicitly given by $\Delta U^M = 0$ when setting $t = \widetilde{t}^M$. ΔU^M weakly increases in $F\left(\widetilde{t}^M\right)$ if $\left(1-\frac{1}{2}l\right)t \leq \frac{1}{2}(t+m)$ and decreases in $F\left(\widetilde{t}^M\right)$ otherwise. Thus, the maximum threshold $\widetilde{t}^M$ is implicitly given by either $\Delta U^M\left(F\left(\widetilde{t}^M\right) \to 1\right)$ or $\Delta U^M\left(F\left(\widetilde{t}^M\right) \to 0\right)$. We get

$$\Delta U^M\left(F\left(\widetilde{t}^M\right) \to 1\right) = \frac{1}{2}(1+v_P-2v_D) - \left(1-\frac{1}{2}l\right)t$$

[17] Note also that Hypotheses 4 can easily be derived from our model when considering the impact of v_D on the thresholds $\widetilde{t}$ under the three rules.

and

$$\Delta U^M\left(F\left(\widetilde{t}^M\right)\to 0\right)=\frac{1}{2}\left(1+v_P-2v_D\right)-\frac{1}{2}\left(t+m\right).$$

Setting $\Delta U^M\left(F\left(\widetilde{t}^M\right)\to 1\right)=\Delta U^M\left(F\left(\widetilde{t}^M\right)\to 0\right)=0$ and solving for $\widetilde{t}^M$ yields the thresholds

$$\widetilde{t}^M\left(F\left(\widetilde{t}^M\right)\to 1\right)=\frac{\left(1+v_P-2v_D\right)}{2-l},\ \widetilde{t}^M\left(F\left(\widetilde{t}^M\right)\to 0\right)=\left(1+v_P-2v_D\right)-m,$$

so that the threshold $\widetilde{t}^M$ is bounded above by

$$\widetilde{t}^M_{\max}=\max\left(\frac{\left(1+v_P-2v_D\right)}{2-l},\left(1+v_P-2v_D\right)-m\right).$$

The result now follows from $\widetilde{t}^M_{\max}<\widetilde{t}^U=\frac{(1+v_P-2v_D)}{1-l}$. ■

3 Experimental design

Subjects were recruited through the Frankfurt School of Finance and Management (FS) experimental economics participant pool. The experiment was computer based and programmed with zTree [Fischbacher (2007)]. Each subject participated in only one treatment as the decision in one setting might otherwise influence decisions in other settings, so that we would have had to control for all order effects. We hence restrict attention to a between-subject design.

——————— INSERT TABLES I AND II ABOUT HERE ———————-

Overall, 186 subjects participated in the experiment (see Table I for the distribution among the different treatments). We ensured that the gender composition was close to 50-50 in each treatment as we were also interested in gender effects. On average, sessions lasted for about 45 minutes and participants earned 11.62 Euros, including a show-up fee of five Euros (see tables I and II for the distribution of subjects among treatments

and their respective earnings). We used Experimental Currency Units (ECU) with an exchange rate of 1 ECU = 5 Eurocent. The same instructor read aloud the instructions in each session.

We implemented the potential violation of a moral norm by the opportunity to take pre-specified amounts designated for donation to the charity SOS Kinderdorf, a very well-known and highly respected NGO in Germany. We avoided any explicit reference to the violation of norms by labelling decisions as the "transfer of money to the own account". The experiment consisted of one single decision-making and four group treatments, which the participants were randomly assigned to. In the single decision treatment, each participant had to decide on a transfer for three possible amounts; a low amount of 20 ECU, an intermediate amount of 50 ECU and a high amount of 100 ECU (see the screen shot, English translation of the instructions and the original instructions in the Appendices A, B and C respectively). Participants learned that each of those three amounts would be paid out with the same probability of one third. We ensured that participants understood that the money they did not take would in fact be donated; depending on whether 20, 50 or 100 ECU would be paid out.

INSERT TABLE III ABOUT HERE

For voting rules and communication, we applied a two-by-two design as shown in table III.

The amounts that could be transferred were the same as with single decision making, multiplied by two in order to ensure that the stake per capita is the same in all treatments. Thus, participants could vote for taking 40, 100 and 200 ECU designated for donation, which would then be equally split between them.

In the two no-communication treatments, each participant just indicated on the screen whether she votes for or against a transfer. The decision sheets included all three amounts at once.[18] In the two communication treatments, the two group members

[18]We let the participants choose for three different amounts as we are interested in how the amount affects the willingness to violate the norm, and whether most participants would make the same decision for all three amounts. In order to avoid simultaneous decisions which may be interdependent, we have also thought about letting participants choose any amount between 0 and 200. But then, we would have needed to specify which amount would actually be transferred if participant A wants to take e.g. 10 ECU, while participant B votes for 190 ECU. Taking the average of 100 ECU does not make sense as participant A might have wished to veto such a high amount.

could communicate for three minutes in a chat window. After the chat, however, each group member eventually voted independently for or against a transfer of money, again separated for each of the three amounts.

In all four group treatments, a transfer took place if both participants voted for it, and the money was donated in case both voted against it. In case of different votes, the transfer was blocked with certainty in the unanimity rule. In the majority rule, a transfer took place with 50% probability. In any case, the monetary payoff of the two group members was the same; regardless of who voted for or against the transfer. Participants did not learn the actual vote of the other group member.

After the experiment, participants were asked to fill out a questionnaire including demographics, study subject, life satisfaction, and whether they trust SOS Kinderdorf or not. Asking for the trust in SOS Kinderdorf after the actual decisions bears the risk of ex post-rationalizations of the own behavior by announcing a low trust in the charity agency, but as asking in advance might have influenced decisions, we needed to stick to this order.

4 Results

In all treatments, the number of participants was between 36 and 38. Figure 1 shows the percentage of participants voting for a transfer in the five treatments (see table IV for the exact numbers in all treatments and for all amounts).

——————— INSERT FIGURE 1 ABOUT HERE ———————

The most important result is that the percentage is far higher for the unanimity rule: Aggregating over all amounts, 78.5% of all participants in the two unanimity groups vote for a transfer, compared to only 50.5% in the two majority treatments (the two-sided Fisher's exact test value is less than 0.000, which is used for all comparisons between treatments). When considering both voting rules together, then there is almost no difference between the voting frequencies with and without communication as (65.8% compared to 64%, Fisher's exact test value is 0.766). However, communication reduces the frequency of intended transfers under the unanimity rule from 92.1% to 73.7%

(Fisher's exact test value is 0.197) but increases it from 50% to 63.9% under the majority rule (Fisher's exact test value is 0.102). This is in line with the idea that veto rules reduce the perception of own responsibility due to the fact that the partner could have avoided the transfer with certainty. If one learns from communication that the partner is unlikely to do so, this excuse becomes less important. By contrast, the marginal impact of the own vote on the actual transfer probability is independent of the partnerâĂŹs vote under the majority rule.

With 57%, the frequency in the single decision making treatment is between those for the unanimity and the majority rule (Fisher's exact test values are 0.000 and 0.297, respectively). In all treatments, the highest amount is taken less often: aggregated over all five treatments, the frequencies are 69.4% for the two lower amounts compared to only 51.1% for the highest transfer of 100 ECU. Table IV provides a more detailed description on how the votes of the participants differ for the three amounts.

———————- INSERT TABLE IV ABOUT HERE ———————-

In addition, it turns out that 64% of the participants voted for either "yes" or "no" in all three amounts, and these percentages are neither influenced by the voting rule nor by communication. The majority of the remaining 36% voted for taking only the two lower amounts. A potential interpretation for this is that the subjects somehow share the expected payoff with the donation agency; given that each amount is paid out with the same probability of one third.

———————- INSERT TABLE V ABOUT HERE ———————-

Table V shows results for Fisher's exact tests for the comparison of the five treatments. Thereby, we aggregate over all amounts. Coefficients in cells are the p-values for the differences between the numbers of participants voting for and against transfers. Coefficients significant at least at the 5% level are bold. All results in table II as well as in table V below are qualitatively the same when we use instead the Wilcoxon rank-sum (Mann-Whitney) test or a simple t-test.

As subjects may reduce their perceived responsibility from voting for a transfer for one amount by voting against a transfer for another amount, one might question

whether adding over all amounts is appropriate when testing for significance. The tables in Appendix D therefore consider each amount separately. Results are then most pronounced for the intermediate amount of 50 ECU, and the same comparisons are significant. The differences among the treatments are lowest for the highest amount as, in all treatments, many subjects voted against a transfer for 100 ECU.

Most importantly, Hypothesis 1 on the impact of the unanimity requirement for actual transfers is largely supported by the data: Considering both unanimity treatments, the frequency of subjects voting for transfers is highly significantly larger than under the two majority treatments (Fisher's exact test value is less than 0.001). Furthermore, Hypothesis 2 that the frequency of subjects voting for a transfer exceeds the frequency in the single decision making case is also supported (Fisher's exact test value is less than 0.001).

For the reasons discussed in the model section, we had no hypothesis for the comparison of majority voting to single decision making. Fisher's exact test value is 0.297 when considering both majority treatments, but shrinks to 0.081 when comparing single decision making to the majority rule with communication. Thus, there is some slight evidence that majority rules with communication lead to more votes for violating the norm.

Recall that the three parts of Hypothesis 3 concern the impact of communication in groups (decisions are still made independently). Hypothesis 3a needs to be rejected as there is no difference in the frequency of subjects voting for a transfer when comparing both treatments with communication to both treatments without communication (Fisher's exact test value is 0.766). As seen above, however, the impact of communication differs largely between the two voting rules; with a reduction from 82.5% to 74.6% under the unanimity rule (Fisher's exact test value is 0.197) and in increase from 44.4% to 56.5% under the majority rule (Fisher's exact test value is 0.102). The Fisher's exact test for the difference-in-difference confirms that the impact of communication is highly significantly different for the two voting rules (Fisher's exact test value is 0.005). This supports Hypothesis 3b, which was mainly based on the assumption that communication reduces the perceived diffusion of responsibility under the unanimity rule.

Hypothesis 3c states that the percentage of groups in which both members vote identically increases through communication. Table VI shows the distribution of votes in the four group treatments; aggregated over all three amounts.

———————— INSERT TABLE VI ABOUT HERE ————————

Under the unanimity rule, the reduction in the frequency of disagreements through communication is insignificant (19.3% compared to 24.6%, Fisher's exact test value is 0.424). This can partially be attributed to the fact that the percentage of subjects voting for a transfer is already very high without communication, so that there is not much room left for a coordination device. By contrast, Hypothesis 3c is supported for the majority rule where 83.3% of participants submit identical votes after having communicated; compared to only 48.1% without communication (Fisher's exact test value is less than 0.000). Thus, the data supports findings by Kocher et al. (2017) that communication serves as a coordination device for decisions which are then taken independently.

———————— INSERT TABLE VII ABOUT HERE ————————

We next analyze whether our treatment effects hold when we add control variables. Table VII shows results for probit-models on intended transfers, where the majority rule with communication serves as reference category. All results are qualitatively the same for logit- and linear probability models. Model (1) shows that the difference of 100 ECU to the reference category of 50 ECU is significantly negative at the 1%-level, and it can easily be checked that the same holds for the difference to 20 ECU. By contrast, there is no significant difference for the two lower amounts. In line with the non-parametric tests, model (2) shows that votes for transfers are significantly more likely for both unanimity treatments. All reported coefficients are average marginal effects of all covariates; results with marginal effects at means are qualitatively the same.

In model (3), we add control variables, which drive the coefficient for the unanimity setting with communication insignificant. In this setting, males vote for a transfer more often than females, so that part of the effect is absorbed by the male dummy which is significantly positive at the 5%-level. This is in line with other experiments

on the violation of social norms which often find some, however small and not always significant, gender differences [see Erat and Gneezy (2012); Conrads et al. (2013, 2014); Abeler et al. (2014); Dato and Nieken (2014) and Muehlheusser et al. (2015) for group treatments].

Furthermore, life satisfaction is negative at the 1%-significance level, which supports the intuition that less happy people are more inclined to violate moral norms. In line with our Hypothesis 4, the dummy variable on trust to SOS Kinderdorf is highly significant.[19] As mentioned, however, the coefficient needs to be interpreted with caution as we cannot exclude that participants who vote for taking the money rationalize their own behavior by claiming that they do not trust the donation agency anyway; i.e. reversed causation cannot be excluded.

So far, we have compared the frequency of votes, which can be interpreted as *intended* transfers. Due to the different consequences of disagreements under the majority and the unanimity rule, we next consider the frequency of transfers. This is instructive as it shows whether the higher frequency of participants voting for a transfer under the unanimity rule (over)compensates for the fact that the transfer probability is zero in case of disagreements. Recall that the actual payments to the participants are determined by a random draw when they disagree in the majority rule. For our analysis, however, it is more informative to calculate the expected frequency of transfers by using a probability of 50% as this avoids noise from the random draw.

———————- INSERT FIGURE 2 ABOUT HERE ———————-

Figure 2 summarizes the frequencies of expected transfers; again separated for the five treatments and by the three amounts (see table VIII for the exact numbers in all treatments and for all amounts). Table IX below shows which of the differences are significant in Fisher's exact tests.

———————- INSERT TABLE VIII ABOUT HERE ———————-

The most striking result is that, even though the unanimity rule reduces the transfer probability in case of disagreement from 50% to zero, the expected transfer frequency is significantly higher (Fisher's exact test value is 0.022) in the unanimity treatments

[19] The variable is dichotomous as we asked only whether participants trust or do not trust the agency.

(73.7%) compared to the majority treatments (56.9%). Thus, the requirement of unanimity backfires to such a large degree that it even leads to a higher expected overall frequency of transfers.

———————— INSERT TABLE IX ABOUT HERE ————————

In line with our findings for votes, the result is mainly driven by the unanimity treatment without communication. In fact, the actual transfer probability in the unanimity treatment without communication is significantly lower than in the one with communication (Fisher's exact test value is 0.058). By contrast to the comparison of votes, the comparison of actual transfers to the single decision treatment is insignificant for all group treatments due to the countervailing facts that subjects vote less often for transfers which then, however, are executed with certainty.

5 Conclusion

We analyze how the frequency of subjects voting for taking money designated for donation is influenced by groups, voting rules and communication. Based on previous findings in laboratory experiments on the violation of moral norms and theoretical models by Falk and Tirole (2016) and Rothenhäusler et al. (2018), we develop a simple behavioral model in which subjects (i) care about monetary externalities caused by their behavior, (ii) face internal costs from violating the norm which are decreasing in the probability that the partner could have prevented the immoral outcome and (iii) have moral concerns vis-à-vis partners moral partners. Our model predicts that the frequency of subjects voting for a transfer of money is higher under the unanimity rule than under the majority rule, which is strongly supported by our data. The effect is so large that even the actual expected transfer frequency is maximal under the unanimity rule, so that individual veto rights implemented for reducing norm violations backfi to a large degree. A similar result emerges for the comparison of the unanimity rule to single decision making. By contrast, we find no significant difference between the majority rule and single decision making. Our most important additional findings are that communication increases the percentage of identical votes and reduces the differ-

ence between the unanimity rule and the majority rule. These results suggest that communication serves as a coordination device, but reduces the self-comforting excuse that the partner could have prevented the immoral outcome with certainty due to her veto power. Furthermore, the highest amount of 100 ECU is taken less often, while there is no significant difference between the two lower amounts. Many participants vote for taking the money either just once or twice, which indicates that compromising with the donation agency reduces moral costs. This is in line with results from die roll experiments that often find partial lying (see the meta-study in Abeler et al. (2018), but there are also papers which rather suggest a fixed cost of lying [see Kajackaite and Gneezy (2017) and Benistant and Villeval (2017)].

Concerning our design, the following extensions seem worthwhile: First, recall that the two group members decide independently even in the communication setting. The first worthwhile extension could be to let them first state their intended votes independently, and then require them to act in concert by submitting just one final decision. This would provide information on whether those in favor or against violating the norm dominate the final decision in case of initial disagreement.

As the second extension, it would be interesting to see what changes when considering sequential instead of simultaneous votes. In Gino et al. (2013b), participants can decide whether misreporting private information can be detected or not. In one treatment, they find that second movers tend to mimic the first movers' decisions. Following the literature on social conformity [Charness and Dufwenberg (2006); Diekmann et al. (2015)], which argues that the willingness to violate rules increases in the perceived percentage of other people doing the same, one would expect the percentage of disagreements to shrink (similar to what we find on the impact of communication). This would then further reduce the difference between the unanimity and the majority rule.

The third extension could build on a theoretical model by Bouton et al. (2017) which shows that, in case of incomplete information, rules where voters have three possibilities ("yes", "no", or "veto") outperform simple unanimity rules.[20] In our setting with groups

[20]The reason is that this increases the decision space of voters whose signals are not highly informative. These voters would optimally veto a decision in case of a unanimity rule, but switch to a simple "no" in case they can choose between "no" and "veto".

of just two, this would mean that subjects can decide whether they have a veto right or not. We view this as the most interesting extension as it allows analyzing whether those who are opposed to taking the money are willing to "discipline" their partners by vetoing transfers instead of just voting "no".[21]

Fourth, our setting with only two persons simplifies the communication and makes the design easily understandable for the participants, but it requires implementing a 50%-probability in case of disagreement in the majority rule. This is special in the sense that it creates uncertainty on the final outcome when the votes of the two participants differ. It would hence be interesting to see what changes when increasing the number of participants to three (or to any other uneven number). The "only" difference between the unanimity and the majority rule is then that anyone can be pivotal, depending on the votes of other group members. This makes the perception of reduced responsibility more involved.

Fifth, our setting could be extended to the impact of group identity. While Benistant and Villeval (2017) find no effect in a contest setting, the willingness to vote for taking the money may well increase if group identity is higher. However, there is a countervailing effect as group identity may also increase social image concerns. As the overall effect thus seems a priori unclear, this seems to be a worthwhile extension.

While a donation setting seems suitable for analyzing our research question, it would be interesting to see to which extend our results are domain-specific or carry over to other norm violations. Transferring our voting rules to lying experiments would mean that two participants forming a group never get the high payoff if just one reports a high outcome under the unanimity rule, but with probability one half under the majority rule. Re-running our experiment in the lying framework seems interesting as, in the latter, there are no real externalities, so that the norm is substantiated on rule-based or deontological reasoning, and not grounded in utilitarianism.

[21] One could also reverse our setting by assuming that subjects have the right to veto the compliance with the norm, so that the violation of the norm would be the default in case of disagreement.

6 Acknowledgments

We are grateful to Werner Güth, Yannick Lippe, Florian Kerzenmacher, Hartmut Kliemt, Kai Konrad, Gerd Mühlheusser and Nils Stiglitz for very valuable comments.

References

Abeler, J., Becker, A., and Falk, A. (2014). Representative evidence on lying costs. *Journal of Public Economics*, 113:96–104.

Abeler, J., Nosenzo, D., and Raymond, C. (2018). Preferences for truth-telling. *Forthcoming in Econometrica*.

Alexander, L. and Moore, M. (2015). Deontological ethics. *The Stanford Encyclopedia of Philosophy (Spring 2015 Edition), Edward N. Zalta (ed.)*, http://plato. stanford. edu/archives/spr2015/entries/ethics-deontological.

Ariely, D., Bracha, A., and Meier, S. (2009). Doing good or doing well? Image motivation and monetary incentives in behaving prosocially. *American Economic Review*, 99(1):544–55.

Ayal, S. and Gino, F. (2011). Honest rationales for dishonest behavior. *The social psychology of morality: Exploring the causes of good and evil. Washington, DC: American Psychological Association*, pages 149–66.

Bartling, B. and Fischbacher, U. (2011). Shifting the blame: On delegation and responsibility. *The Review of Economic Studies*, 79(1):67–87.

Bartling, B., Weber, R. A., and Yao, L. (2014). Do markets erode social responsibility? *The Quarterly Journal of Economics*, 130(1):219–266.

Bénabou, R. (2012). Groupthink: Collective delusions in organizations and markets. *Review of Economic Studies*, 80(2):429–462.

Bénabou, R. and Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, 77(305):1–19.

Benabou, R. and Tirole, J. (2012). Laws and norms. *IZA Discussion Paper 6290*.

Benistant, J. and Villeval, M. C. (2017). Unethical behavior and group identity in contests.

Bentham, J. (1789). The principles of morals and legislation.

Bobkova, N. and Egbert, H. (2013). Corruption investigated in the lab: A survey of the experimental literature. *International Journal of Latest Trends in Finance and Economic Sciences*, 2(4):337–349.

Bornstein, G., Kugler, T., and Ziegelmeyer, A. (2004). Individual and group decisions in the centipede game: Are groups more Ş rationalŤ players? *Journal of Experimental Social Psychology*, 40(5):599–605.

Bouton, L., Llorente-Saguer, A., and Malherbe, F. (2017). Get rid of unanimity rule: The superiority of majority rules with veto power.

Casal, S., DellaValle, N., Mittone, L., and Soraperra, I. (2017). Feedback and efficient behavior. *PloS one*, 12(4):e0175738.

Charness, G. and Dufwenberg, M. (2006). Promises and partnership. *Econometrica*, 74(6):1579–1601.

Charness, G. and Sutter, M. (2012). Groups make better self-interested decisions. *Journal of Economic Perspectives*, 26(3):157–76.

Cheneval, F., Lavenex, S., and Schimmelfennig, F. (2015). Demoi-cracy in the European Union: Principles, institutions, policies. *Journal of European Public Policy*, 22(1):1–18.

Chytilova, J. and Korbel, V. (2014). Individual and group cheating behavior: a field experiment with adolescents. Technical report, IES Working Paper.

Cojoc, D. and Stoian, A. (2014). Dishonesty and charitable behavior. *Experimental Economics*, 17(4):717–732.

Conrads, J., Irlenbusch, B., Rilke, R. M., Schielke, A., and Walkowitz, G. (2014). Honesty in tournaments. *Economics Letters*, 123(1):90–93.

Conrads, J., Irlenbusch, B., Rilke, R. M., and Walkowitz, G. (2013). Lying and team incentives. *Journal of Economic Psychology*, 34:1–7.

Crombez, C., Huysmans, M., and Van Gestel, W. (2016). Choosing an influential agenda setter: The appointment of the commission in the european union.

Dana, J., Weber, R. A., and Kuang, J. X. (2007). Exploiting moral wiggle room: Experiments demonstrating an illusory preference for fairness. *Economic Theory*, 33(1):67–80.

Danilov, A., Biemann, T., Kring, T., and Sliwka, D. (2013). The dark side of team incentives: Experimental evidence on advice quality from financial service professionals. *Journal of Economic Behavior and Organization*, 93:266–272.

Dato, S. and Nieken, P. (2014). Gender differences in competition and sabotage. *Journal of Economic Behavior and Organization*, 100:64–80.

Diekmann, A., Przepiorka, W., and Rauhut, H. (2015). Lifting the veil of ignorance: An experiment on the contagiousness of norm violations. *Rationality and Society*, 27(3):309–333.

Ellman, M. and Pezanis-Christou, P. (2010). Organizational structure, communication, and group ethics. *The American Economic Review*, 100(5):2478–2491.

Elster, J. (1989). Social norms and economic theory. *Journal of Economic Perspectives*, 3(4):99–117.

Erat, S. and Gneezy, U. (2012). White lies. *Management Science*, 58(4):723–733.

Falk, A. and Szech, N. (2013). Morals and markets. *Science*, 340(6133):707–711.

Falk, A. and Szech, N. (2017). Diffusion of being pivotal and immoral outcomes. Technical report, Working Paper Series in Economics, Karlsruher Institut für Technologie (KIT).

Falk, A. and Tirole, J. (2016). Narratives, imperatives and moral reasoning.

Feess, E. and Kerzenmacher, F. (2018). Lying opportunities and incentives to lie: Reference dependence versus reputation.

Feess, E., Schildberg-Hörisch, H., Schramm, M., and Wohlschlegel, A. (2018). The impact of fine size and uncertainty on punishment and deterrence: Theory and evidence from the laboratory. *Forthcoming in Journal of Economic Behavior and Organization*.

Fischbacher, U. (2007). z-tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2):171–178.

Fischbacher, U. and Föllmi-Heusi, F. (2013). Lies in disguiseŮan experimental study on cheating. *Journal of the European Economic Association*, 11(3):525–547.

Gächter, S., Gerhards, L., and Nosenzo, D. (2017). The importance of peers for compliance with norms of fair sharing. *European Economic Review*.

Garbarino, E., Slonim, R., and Villeval, M. C. (2016). Loss aversion and lying behavior: Theory, estimation and empirical evidence.

Gerber, A., Neitzel, J., and Wichardt, P. C. (2013). Minimum participation rules for the provision of public goods. *European Economic Review*, 64:209–222.

Gino, F., Ayal, S., and Ariely, D. (2013a). Self-serving altruism? The lure of unethical actions that benefit others. *Journal of Economic Behavior and Organization*, 93:285–292.

Gino, F., Krupka, E. L., and Weber, R. A. (2013b). License to cheat: Voluntary regulation and ethical behavior. *Management Science*, 59(10):2187–2203.

Hamman, J. R., Loewenstein, G., and Weber, R. A. (2010). Self-interest through delegation: An additional rationale for the principal-agent relationship. *The American Economic Review*, 100(4):1826–1846.

Irlenbusch, B. and Saxler, D. (2015). Social responsibility in market interaction. *IZA Discussion Paper*.

Kajackaite, A. and Gneezy, U. (2017). Incentives and cheating. *Games and Economic Behavior*, 102:433–444.

Kirchler, M., Huber, J., Stefan, M., and Sutter, M. (2015). Market design and moral behavior. *Management Science*, 62(9):2615–2625.

Kocher, M. G., Schudy, S., and Spantig, L. (2017). I lie? We lie! Why? Experimental evidence on a dishonesty shift in groups. *Management Science*.

Krupka, E. L. and Weber, R. A. (2013). Identifying social norms using coordination games: Why does dictator game sharing vary? *Journal of the European Economic Association*, 11(3):495–524.

Kugler, T., Kausel, E. E., and Kocher, M. G. (2012). Are groups more rational than individuals? a review of interactive decision making in groups. *Wiley Interdisciplinary Reviews: Cognitive Science*, 3(4):471–482.

Maciejovsky, B., Sutter, M., Budescu, D. V., and Bernau, P. (2013). Teams make you smarter: How exposure to teams improves individual decisions in probability and reasoning tasks. *Management Science*, 59(6):1255–1270.

Meub, L., Proeger, T., Schneider, T., and Bizer, K. (2016). The victim matters–Experimental evidence on lying, moral costs and moral cleansing. *Applied Economics Letters*, 23(16):1162–1167.

Muehlheusser, G., Roider, A., and Wallmeier, N. (2015). Gender differences in honesty: Groups versus individuals. *Economics Letters*, 128:25–29.

Myers, D. G. (2013). *Social psychology*. McGraw-Hill New York.

OECD (2008). *Compendium of country examples and lessons learned from applying the methodology for assessment of national procurement systems: Volume 1-sharing experiences*. Paris: OECD Publishing.

Oexl, R. and Grossman, Z. J. (2013). Shifting the blame to a powerless intermediary. *Experimental Economics*, 16(3):306–312.

Rothenhäusler, D., Schweizer, N., and Szech, N. (2018). Guilt in voting and public good games. *European Economic Review*, 101:664–681.

Shikora, J. (2011). Four essays on corruption and cooperation: Theory and evidence. *Unpublished doctoral thesis. Ludwig-Maximilians-Universität München: Germany.*

Weisel, O. and Shalvi, S. (2015). The collaborative roots of corruption. *Proceedings of the National Academy of Sciences*, 112(34):10651–10656.

Wiltermuth, S. S. (2011). Cheating more when the spoils are split. *Organizational Behavior and Human Decision Processes*, 115(2):157–168.