

Kandul, Serhiy; Lanz, Bruno

Working Paper

When social norms and self-image conflict: A public good experiment with social comparison feedback

IRENE Working Paper, No. 18-06

Provided in Cooperation with:

Institute of Economic Research (IRENE), University of Neuchâtel

Suggested Citation: Kandul, Serhiy; Lanz, Bruno (2018) : When social norms and self-image conflict: A public good experiment with social comparison feedback, IRENE Working Paper, No. 18-06, University of Neuchâtel, Institute of Economic Research (IRENE), Neuchâtel

This Version is available at:

<https://hdl.handle.net/10419/191515>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

University of Neuchâtel

Institute of Economic Research

IRENE Working paper 18-06

When social norms and self-image conflict: A public good experiment with social comparison feedback

Serhiy Kandul

Bruno Lanz

unine
UNIVERSITÉ DE
NEUCHÂTEL

Institut de
recherches économiques

When social norms and self-image conflict: A public good experiment with social comparison feedback*

Serhiy Kandul[†]

Bruno Lanz[‡]

This version: September 2018

Abstract

Social comparison feedback, i.e. informing people about the behavior of others, has been shown to influence prosocial behavior in many domains, including tax compliance and energy conservation. We argue that heterogeneity in people's (un)willingness to consult the corresponding information mitigates the effect of these interventions, and hypothesize that self-image concerns can induce people to deliberately ignore feedback about own behavior. We substantiate this idea by introducing social comparison feedback in a standard public good game, and study conditions in which subjects can elect to consult or deliberately avoid feedback information. Our results show that information avoidance is three times higher for feedback on own contributions as compared to feedback on group-level contributions. We further show that social feedback information affects contributions through within-group conditional cooperation, with subjects who choose to ignore individual feedback contributing to a faster breakdown of within-group cooperation.

Keywords: Social comparison feedback; Deliberate ignorance; Public good game; Social norms; Self-image concerns; Prosocial behavior; Externalities.

JEL Codes: C91, D12, D62, D91, H41, Q41.

*Financial support from the Swiss National Science Foundation under grant PYAPP1_173650 is gratefully acknowledged. This research is part of the activities of SCCER CREST (Swiss Competence Center for Energy Research), which is financially supported by the Swiss Commission for Technology and Innovation (CTI) under Grant No. KTI. 1155000154. Excellent research assistance was provided by Fanol Kurteshi and Evert Reins. Any errors are ours.

[†]University of Neuchâtel, Department of Economics and Business, Switzerland. Mail: A.-L. Breguet 2, CH-2000 Neuchâtel, Switzerland; Tel: +41 32 718 15 96; email: serhiy.kandul@unine.ch.

[‡]University of Neuchâtel, Department of Economics and Business, Switzerland. Mail: A.-L. Breguet 2, CH-2000 Neuchâtel, Switzerland; Tel: +41 32 718 14 55; email: bruno.lanz@unine.ch.

1 Introduction

Social comparison feedback is increasingly used as a tool to enhance socially desirable behavior. This class of informational intervention consists in informing people about their behavior relative to the typical (e.g. average) behavior of their reference group. As theories of social norms and general feedback interventions suggest (Elster, 1989; Kluger and DeNisi, 1996; Karlin et al., 2015), people with a preference to conform with norms who learn that their behavior is different from the reference would adjust their behavior without the need for monetary incentives. Such feedback strategies have been exploited to make people adopt prosocial behavior in a variety of domains, from reducing electricity and water consumption to increasing tax compliance and changing nutrition habits (Allcott, 2011; Ferraro et al., 2011; Ayers et al., 2013; Costa and Kahn, 2013; Allcott and Rogers, 2014; Robinson et al., 2014; Hallsworth et al., 2017).

In this paper, we focus on whether people pay attention to social feedback information, which is a central determinant of the impact of the intervention (see e.g. Kluger and DeNisi, 1996). For various reasons, people might choose not to subscribe to receive feedback information, and even if they do, they can easily ignore it (e.g. by simply not reading the mail). Studies on deliberate ignorance show that people use uncertainty about negative consequences of their behavior, a moral wiggle room, to avoid self-image costs and behave selfishly (Dana et al., 2007; Mazar et al., 2008; Matthey and Regner, 2011; Grossman and van der Weele, 2017). As self-image maintenance theory postulates, people engage into a sort of self-deception: uncertainty about the consequences of their actions allows them to believe that they are in fact not harming others, while they feel no moral sentiment of choosing not to resolve that uncertainty. We suggest that not only the consequences of one's behavior for others, but also the comparison of own behavior with a social norm impose self-image costs. Therefore, if the prospect of suffering self-image costs associated with social comparison feedback is high enough, people would simply pay no attention to the information provided.

While individual participation in social comparison feedback programs is difficult to monitor, it is often acknowledged to be an issue. For example, Allcott and Kessler (2015) study a program providing households with free individual social comparison feedback on their energy use, reporting that 34% of participants hold (weakly) negative willingness to pay for participation in one additional year of the program. In order to provide direct evidence about avoidance of social norm comparison, we integrate a similar feedback mechanism in a standard public good

experiment. This puts participants in a social dilemma situation, as the dominant strategy at the individual level is to free-ride on contributions of others, whereas the efficient outcome is maximum contribution by all group members. In this setting, social feedback comparison takes the form of a simple indication about how own contribution compares with the average contribution of other non-group participants in the same experimental session.¹ We then exploit this simple setting to offer subjects a choice to receive this information at no cost, so that we can monitor attentiveness to social feedback comparison.

Based on the idea that self-image cost may lead participants to rationally avoid information about their *individual* relative standing, we propose and test an alternative informational intervention: group-level social comparison feedback. In such an intervention, participants are provided with a comparison of the behavior of their group and the behavior of other groups. This could, for instance, take the form of a comparison between energy/water use in a building or city block and average usage in other buildings or blocks in the area. In our public good experiment, we introduce a treatment with group-level feedback, and allow participants to choose whether they want to receive information comparing total contribution in their group and total contributions by other groups in the same session. Since group-level feedback does not directly allow for individual self-assessment, this information is less relevant for self-image concerns. A comparison of information avoidance in individual vs. group-level feedback provides a first step in understanding deliberate ignorance of social norm information.

Can group-level feedback incentivize prosocial behavior in the same way individual feedback does? Social identity theory suggests that in highly enough cohesive social groups, people care about relative standing (or social image) of their group (Tajfel and Turner, 1986). Moreover, recent studies in social psychology confirm the existence of group-level social emotions, in particular shame for the wrongdoings of the own-group members (Lickel et al., 2005; Welten et al., 2012). If that is the case, receiving information comparing own group behavior with the behavior of other groups might prompt some individuals to adopt more socially desirable behavior. Evidence from the broader literature on public good with feedback suggests that information significantly affects contribution behavior (see e.g. Nikiforakis, 2010; Irlenbusch and

¹ As we discuss in details below, using non-group members makes feedback information payoff irrelevant.

Ter Meer, 2013; Oliveira et al., 2015).² In Boehm and Rockenbach (2013), participants receive information about average contributions either within their group or in another group, showing that inter-group comparison induces relatively higher contributions. A key difference with the feedback mechanism we consider, however, is that they provide exact average contribution in another group, which introduces group-level competition as a motive for contributions. Our intervention instead relies on group-level social norms as a driver of contribution behavior, as we only provide relative standing of own group with respect to all other groups in the session.

Importantly, individual feedback in the field is typically coupled with a reference to injunctive norms (e.g. via signal of social approval with emoticon, see Schultz et al., 2007; Allcott, 2011, for example).³ Contributions in field studies therefore also leverage moral suasion (see also Ito et al., 2018). By contrast, our feedback mechanism excludes any cues as to the interpretation of information and focuses exclusively on preferences to conform with social norms. One implication is that individual feedback information can induce individuals contributing more than the average to reduce their contributions, thereby conforming with the norm (Clee and Wicklund, 1980). This “boomerang effect” for high contributors is driven by a downward adjustment of beliefs about the norm, and may offset a positive impact of feedback information on those who contribute below the norm (see Schultz et al., 2007). Because group-level feedback makes individual relative standing less salient, high contributors are expected to be less inclined to reduce their contributions even if their group is doing better than other groups.⁴ To quantify this, our experiment also includes two treatments where individual and group-level feedback are provided at the end of each round of the public good game, without a possibility for participants to explicitly avoid this information.

This paper makes two main contributions to the literature. First, we employ treatments where subjects explicitly choose to receive social comparison feedback information, which refers

² Note that by comparing group-level and individual-level feedback we focus on informational incentives and depart from discussions about monetary incentives schemes or strategic interactions between individuals and groups (see e.g. Bandiera et al., 2012; Sutter et al., 2013; Babcock et al., 2015; Ladley et al., 2015; Eckel et al., 2016). This is because social comparisons interventions are typically not linked to monetary incentives, so that we do not directly contribute to this discussion in our paper.

³ Interesting for the discussion of self-image concerns of individual feedback information, Allcott (2011, p. 1083, emphasis added) notes that “The “Great” group receives two “smiley face” emoticons, the “Good” group receives one, and the “Below Average” group initially received “frown faces” *until customer complaints* ended this practice.”

⁴ By the same argument, group-level feedback is expected to be less affected by other adverse properties of individual level feedback intervention such as “rebound effect” (Jacobsen et al., 2012; Harding and Rapson, 2017) or moral licensing (Tiefenbeck et al., 2013; Ho et al., 2016). However, we do not address these issues in this paper.

individual or group-level behavior depending on the condition, to quantify information avoidance in a controlled environment. Doing so, we provide evidence about self-image cost associated with individual feedback interventions, which is relevant to our understanding of unobserved exposure in field studies and to inform the design of such interventions. Evidence on the willingness to receive individual and group-level level information also adds to the literature on deliberate ignorance. Second, we provide novel evidence about the role of social feedback information on contributions and conditional cooperation in a public good experiment. As in studies on social norms, we consider the behavior of participants who do not affect each other's payoff (Elster, 1989; Gaechter et al., 2013; Erkut et al., 2015), and explicitly exclude own-group members from social comparison in both individual and group comparisons. Importantly, in our design participants also learn their payoffs at the end of each round, which ensures that individual and inter-group comparison feedback do not differ in the possibility to infer within-group earnings. Based on this, we exploit the repeated structure of the public good game to document how social comparison feedback affects subjects' willingness to adjust their contribution to the contribution of *within-group* members. This is important because patterns of conditional cooperation have been shown to be a key driver of contributions in a public good game setup (Fischbacher et al., 2001; Fischbacher and Gächter, 2010).

In a closely related public good experiment, Bigoni and Suetens (2012) let participants choose to receive information about either individual contributions or individual earnings of own-group members, or alternatively remain ignorant. They find that a majority of participants choose to look at *contributions* of their group members, and those choosing information about earnings are less likely to contribute relative to those informed about contributions or who remained ignorant (see also Nikiforakis, 2010). By contrast, in our setting participants cannot receive detailed within-group feedback, but instead can learn about relative standing with respect to the average contribution of pay-off irrelevant individuals. In turn, feedback information serves as a signal of what is considered appropriate, inducing psychological costs or benefits for (non-)compliance with the norm. Moreover, social comparison is private information, which excludes social (dis)approval as a driver of behavior. Focusing on self-image concerns alone is what distinguishes our paper from studies on social image in public good games (e.g. Andreoni and Petrie, 2004).

Our results can be summarized as follows. First, by introducing an endogenous social feedback mechanism in a public good game, we show that information avoidance in relation to

individual feedback is important. At the end of the last tenth round, 37% of participant in the condition with endogenous individual feedback information chose not to consult feedback. We further show that information avoidance is significantly higher among participants who contribute little to the public good, suggesting that self-image concerns are at work. Second, introducing a social comparison mechanism that relies on group-level behavior, we show that 90% of participant in this condition choose to consult feedback information. Therefore, our results suggest that group-level feedback is less prone to information avoidance, with the likelihood of ignoring social comparison feedback being on average about three times smaller than in the individual-level comparison condition. The large share of participants that consult group-level feedback also suggests that this information is relevant to decision-makers.

On a less positive note, aggregate contributions across treatments, namely endogenous and exogenous feedback at individual and group levels, are very similar to a control condition with no social comparison feedback. In other words, neither individual nor group-level feedback significantly increase contribution above the control group. While absence of injunctive norms from our feedback can at least partly account for this finding, it suggests that social comparison feedback alone is not sufficient to increase contributions in a public good game setting. Our results also confirm the presence of a boomerang effect in individual feedback treatments, whereas this effect is less pronounced in treatments using group-level comparison. Our results further suggest that social norms feedback affects conditional cooperation within groups in two important ways: negative (below average) social feedback mitigates the downwards adjustment of contributions by high within-group contributors, whereas positive (above average) social feedback breaks down the upward adjustment of low within-group contributors. This result is stronger for individual-level feedback, but it is also present for group-level feedback. For both treatments these two countervailing effects cancel each other on aggregate, leading to similar aggregate contribution behavior across conditions.

The remaining of the paper is organized as follows. Section 2 lays out a simple theoretical framework linking public good contributions, preferences for compliance with norms, and self-image concerns. In Section 3, we describe our public good game, alternative treatment conditions, and our working hypotheses. Section 4 summarizes our results. Section 5 provides some discussion and concluding comments.

2 Public good contributions, norm compliance, and self-image

This section considers a simple theoretical framework that rationalizes how feedback on contributions by others can affect own behavior. Doing so, our main objective is to motivate the experimental design documented below. The notation that we develop extends the work of Krupka and Weber (2009) and Gaechter et al. (2017), who both consider how social norms dictated by the behavior of others enter a utility-theoretic framework.

We consider a decision-maker i that is part of a group g , as well as a set of groups G , whereby each individual is assigned to a single group. The set of individuals in group g is denoted by i_g . Individual action a_i (contribution to a public good) determines own monetary payoff m_i , together with the behavior (contributions) by other members $-i_g$ that are part of own group g . As in Krupka and Weber (2009) and Gaechter et al. (2017), we assume that decision-maker i forms expectations about the behavior of within-group members, and denote these as \bar{a}_{-i_g} . Average contributions in group g is denoted by $a_g(a_i)$. Following the same notational logic, we denote expectations about average contributions by non-group members (excluding i and all other members of group g) by \bar{a}_{-g} .

We assume decision-maker i selects a_i by maximizing a utility function that depends on m_i and on preferences for compliance with norms:

$$U_i = m_i(a_i) + \beta \cdot N_w[a_i|\bar{a}_{-i_g}] + \sigma \cdot N_o[a_i|\bar{a}_{-g}] + \gamma \cdot N_g[a_g(a_i)|\bar{a}_{-g}]. \quad (1)$$

This utility function includes three possible sources of interpersonal comparison information, and preferences over these. First, $N_w[a_i|\bar{a}_{-i_g}]$ measures the degree of compliance of own action a_i with the behavior of other *within-group* members. In a public good game setting, information about within-group relative standing is typically available through payoff information after each round, and is the main driver behind conditional cooperation motives (Fischbacher et al., 2001; Fischbacher and Gächter, 2010). Second, $N_o[a_i|\bar{a}_{-g}]$ measures relative standing of own contributions a_i and average contributions by non-group members. Importantly, a_{-g} is payoff irrelevant for individual i , so that variation in a_{-g} does not trigger cooperation or reciprocity motives among members of group g . Because it involves individual contribution a_i , we refer to the information contained in $N_o[a_i|\bar{a}_{-g}]$ as “individual feedback” information. Third, $N_g[a_g(a_i)|\bar{a}_{-g}]$ measures the distance between own-group average contributions and average contributions by members of other groups. Here individual behavior only affects distance to the norm through

$a_g(a_i)$, and we refer to information about relative standing of own group relative to other groups as “group-level feedback” information.

The parameters β , σ and γ are the sensitivity parameters to interpersonal comparison $N_w[\cdot]$, $N_o[\cdot]$ and $N_g[\cdot]$ respectively. Therefore, in this framework, preferences for norm compliance are defined at three possible levels: within-group individual comparison (associated with cooperation and reciprocity), individual comparison with non-group members, and group-level comparison with non-group members. A preference for norm compliance requires preference parameters β , σ and γ to be positive. Following Krupka and Weber (2009) and Gaechter et al. (2017), we assume that the functions measuring norm compliance admit a unique maximum at the point where individual or group behavior is consistent with the relevant norm. Therefore, if information about these norms is available, we expect that it will affect contributions. Measuring the extent to which these norms affect behavior is one of the objective of our empirical strategy.

In our experiment, we make the conventional assumption that $\frac{\partial m_i}{\partial a_i} < 0$, which implies that contributions to public good reduces individual welfare all else equal, and puts i in a social dilemma situation. Further, all our treatment conditions include payoff feedback information at the end of each round, so that usual within-group reciprocity motives is present throughout. What we vary instead is the availability of either individual or group-level feedback. In the presence of such feedback, negative (below average) information together with sufficiently large sensitivity parameters σ and γ would lead individuals to subsequently increase a_i . Conversely, positive (above average) social feedback would lead norm-sensitive individuals to reduce their contributions, causing a boomerang effect (Clee and Wicklund, 1980; Schultz et al., 2007). Note, however, that if sensitivity towards individual-level norm is greater than group-level norm ($\gamma < \sigma$), individual feedback information induces a larger change in contributions relative to group-level feedback, both above and below the norm.

By construction, individual feedback $N_o[a_i|\bar{a}_{-g}]$ uses own contribution for social comparison, whereas in group-level feedback $N_g[a_g(a_i)|\bar{a}_{-g}]$ own contributions affect within-group contributions through $a_g(a_i)$ only. We argue that indirect inference through $a_g(a_i)$ implies that group-level feedback is less prone to self-image costs. In particular, Grossman and van der Weele (2017) suggests that information acquisition under self-image concerns may lead selfish types to remain ignorant about other’s behavior. In our setting, this implies that low contributors may elect to avoid *individual* feedback information and remain ignorant about their relatively

low level of contribution.⁵ With *group-level* feedback, however, the information signal works through the function $a_g(a_i)$, so that acquiring information becomes less of a threat to the self-image. Therefore, we can expect information acquisition behavior to differ between individual and group-level feedback.

3 Experimental procedure and hypotheses

This section describes our standard repeated public good game and how we introduce individual and group-level feedback on contributions. After describing the five treatments included in our experimental design, we discuss a set of key hypotheses that motivates subsequent analysis of the data. The experimental script is provided in Appendix A, and decision screens are reproduced in Appendix B.

3.1 Experimental procedure

Participants invited to a given session are randomly matched in groups of $n = 4$ and stay within the same group throughout the experiment. In each round, participants receive an endowment $w = 60$ tokens, where 1 token = CHF 0.25, and play a linear public good game with the following pay-off function:

$$\pi_i = 60 - a_i + \delta \cdot \frac{\sum_{i_g} a_{i_g}}{n}, \quad (2)$$

where $\delta = 1.6$ is a multiplier. Participants decide how many out of 60 tokens to allocate to private and group accounts.⁶ Because marginal per capita return $\delta/n = 0.4 < 1$, it is individually optimal to contribute $a_i = 0$. However, since the multiplier (or marginal social benefit) $\delta > 1$, the socially optimal equilibrium is full contributions $a_i = 60$ for all $i \in i_g$. The public good game continues for 10 rounds, and one round is randomly chosen for payment.⁷ All participants go through a set of control questions before the game starts.

We specify five experimental conditions that differ in terms of the information that is pro-

⁵ Note there might also be a self-image cost associated with non-disclosure of social norm, which could be related to the negative feeling of not daring to obtain self-image relevant information. As studies on deliberate ignorance implicitly show, however, this cost is likely to be negligible (see e.g. Dana et al., 2007).

⁶ Technically, they decide how much to contribute to the group account, and the remaining amount is automatically put into their private account.

⁷ Each experimental session also included a second part consisting in a simple donation task unrelated to this study. Participants are informed about the two parts of the experiment, but they receive the instructions for the second part only after the first part is finished. They also know that one of the two parts will be randomly chosen for payment. See Appendix A for exact wording.

vided individually after each round of the game. Instructions are similar for all treatments, except for text referring to alternative feedback information (see Appendix A). Starting with the control treatment, participants simply learn their earnings after every round, with no further information provided. In the other four treatments, after every round participants also learn their earnings, and in addition they have access to information about contributions by out-group subjects a_{-g} in that same round. Using a 2x2 between subjects design, we systematically vary both the basis for comparison (a_i or $a_g(a_i)$) and whether obtaining the feedback information is “compulsory” or results from an active choice by subjects. We now provide further details on each of these four treatments.

In the INDIVIDUAL FEEDBACK treatment, at the end of each round participants receive information about how their individual contribution stands relative to average contribution of out-group players \bar{a}_{-g} attending the same session. More specifically, for each participant we compute the average contribution of all non-group members in that same round and session, and provide on-screen information about whether their contribution is *below*, *equal to*, or *above* the average (i.e. their relative standing).⁸ As noted above, excluding own-group members from the calculation of average ensures that the behavior of others (the norm) is payoff irrelevant information.

In the INDIVIDUAL CHOOSE treatment, we endogenize the provision of individual-level comparison feedback. In particular, participants learn about the social comparison procedure (as in the INDIVIDUAL FEEDBACK treatment), but instead of seeing the outcome of the comparison on their screen at the end of each round, they are first given additional options ‘show comparison’ or ‘do not show comparison’ (see Appendix B). Participants have to confirm their choice by clicking on their chosen option. This procedure sets no default option and thus targets lower level of ignorance in comparison to settings where uncertainty is normally set as a default (Dana et al., 2007; Matthey and Regner, 2011; Grossman, 2014). If the respondent chooses to see the comparison, the exact same information as in the INDIVIDUAL FEEDBACK is shown on the screen preceding the information about individual payoff. If he chooses not to see the comparison, only individual payoff is shown. To avoid informational asymmetries within each group, this choice is private. Moreover, participants are explicitly informed that their choice to reveal relative standings does not affect their payoff.

⁸ Note that in all treatments, we provide only relative information and no exact distance to the reference contribution. See Appendix B for screenshots.

In the GROUP FEEDBACK treatment, participants learn how the average contribution within their group $a_g(a_i)$ compares with average contributions in other groups in that session. In other words, they are informed about whether the total contribution in their group is *below*, *above* or *exactly* the average total contributions in other groups in the room in that period. Because the comparison is also carried out with all out-group members in the session, the social norm is in fact the same as in the individual feedback treatments (i.e. \bar{a}_{-g}). Here, however, there is no mention of an individual comparison, as the reference is the average contribution in groups.

In the final treatment, labeled GROUP CHOOSE, we again endogenize feedback, but this time using group-level comparison. As in the INDIVIDUAL CHOOSE treatment, participants can individually choose if they want to obtain the standing of their group relative to other groups by clicking on either 'show comparison' and 'do not show comparison' options. To avoid potential influences of this choice on within-group interaction, we do not reveal which group members choose to know the comparison. The wording is the same in individual and group-level feedback, see instructions in Appendix A and screenshots in Appendix B for further details.

We close this section by noting that, in order to mitigate potential differences in participant's payoff expectations across treatments, we choose to inform participants about their payment in every round. By contrast, without information about the payoffs, participants receiving individual feedback could use it as a predictor for their within-group standing. Such inference would not be possible with group-level feedback. Providing payoff information across all treatments should therefore avoid heterogeneous inference about payoffs among participants.

3.2 Hypotheses

We now lay out expectations about how alternative treatments affect behavior. We start with expected differences in information avoidance.

Hypothesis 1. *Participants in the INDIVIDUAL CHOOSE treatment are more likely to ignore feedback relative to those in the GROUP CHOOSE treatment.*

This hypothesis is based on the fact that individual-level feedback is more relevant for self-image, so that avoiding feedback information mitigates self-image cost of selfish behavior. As mentioned above, field evidence in the context of energy-use feedback information by Allcott and Kessler (2015) suggest that more than a third of respondents would prefer not to receive individual-feedback information.

Our second hypothesis relates self-image cost of social feedback information and deliberate information avoidance.

Hypothesis 2. *Individuals who expect to receive a negative feedback message because they behave more selfishly are more likely to ignore feedback information.*

This hypothesis is consistent with findings studies on the moral wiggle room, where ignorance is typically associated with more selfish allocations (e.g. Dana et al., 2007; Matthey and Regner, 2011). Specifically, if an individual contributes relatively little, but is uncertain about whether his individual contribution is above or below the out-group average, he may be more likely to ignore information in order to avoid self-image cost as compared to contributors. An implication is that, if self-image costs are lower in the group-level feedback as we hypothesize, group-level feedback information would not lead to differences in information avoidance for high and low contributors.

Our third hypothesis relates to the impact of feedback information on contributions.

Hypothesis 3. *Preferences to conform with norms are expected to increase contributions by subjects below the average, whereas those above the average would tend to lower contributions in order to move closer to the norm.*

Based on this, we expect the impact of feedback information to differ depending on whether contributions are above or below the norm. In particular, while individual feedback information can affect contributions positively and negatively (Schultz et al., 2007), in the absence of injunctive norms participants above the average tend to reduce contributions in order to conform with the norm.

Our fourth and final hypothesis relates to a large literature on conditional cooperation in public good games (e.g. Fischbacher et al., 2001; Fischbacher and Gächter, 2010).

Hypothesis 4. *Conditional cooperation that operates within each group is affected by social comparison feedback.*

As the literature suggests, people condition their contribution on the contributions of others, so that those who contribute above (below) the *within-group* average would tend to decrease (increase) their contribution over time. The presence of feedback that informs subjects about out-group contributions is therefore expected to affect within-group dynamics driven by conditional cooperation.

Table 1: Summary statistics of treatments and experimental sessions

Treatment	Sessions	Participants	% females	Average age
Control	3	56	58.9	23.4
INDIVIDUAL FEEDBACK	4	52	61.5	23.8
INDIVIDUAL CHOOSE	3	56	60.7	22.4
GROUP FEEDBACK	3	52	59.6	21.8
GROUP CHOOSE	3	56	64.3	21.9

4 Results

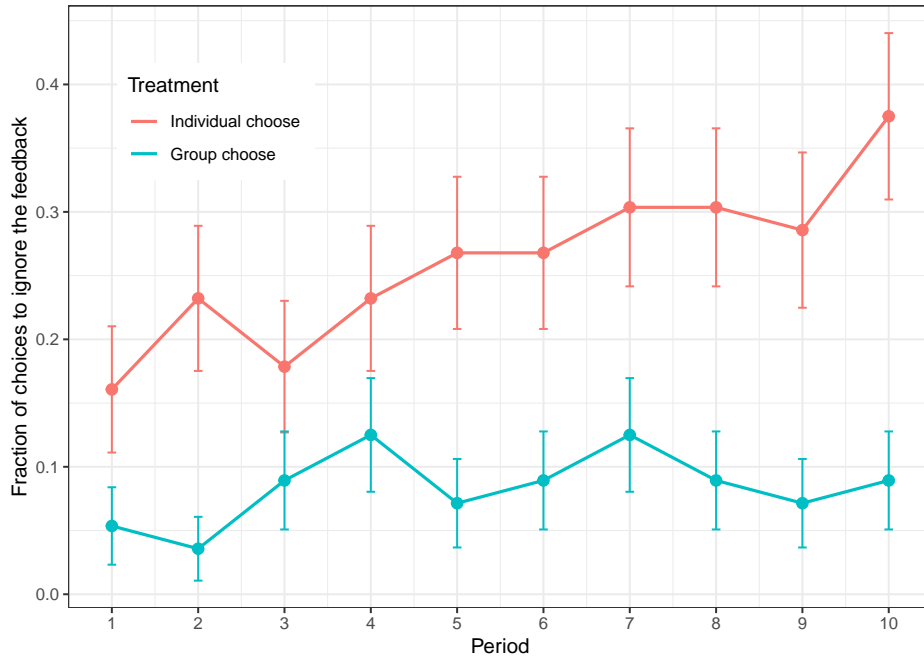
We ran 16 experimental sessions in the laboratory of the University of Neuchâtel in March 2018. Table 1 presents the descriptive summary of our sample. In total 272 participants recruited via a university mailing list took part in the experiment. The experiment is programmed in Ztree (Fischbacher, 2007). Each session lasted about one hour, and the average payment was CHF 17.16.

In the following, we start by reporting results on information avoidance for both treatments with endogenous feedback. We then provide evidence on public good contributions, and how these vary across treatments. Finally, we discuss how alternative feedback information affects conditional cooperation within groups, documenting the dynamics of contributions across time periods and treatments.

4.1 Social comparison and information avoidance

Figure 1 depicts the percentage of participants choosing to ignore social comparison feedback in experimental treatments INDIVIDUAL CHOOSE and GROUP CHOOSE. Recall that these are the two treatments where subjects choose, after each round, whether or not they want to receive feedback about their relative standing. On average across all 10 rounds subjects in INDIVIDUAL CHOOSE condition are around three times more likely to actively ignore feedback as compared to those in the GROUP CHOOSE condition. Specifically, subjects in INDIVIDUAL CHOOSE deliberately ignore information about their relative standing in 26.1% of choice occasions, the corresponding number being 8.4% in GROUP CHOOSE. This finding is in line with Hypothesis 1: participants avoid individual-level comparison of contributions more frequently than the group-level one.

Figure 1: Feedback avoidance by treatment (standard errors in bars)

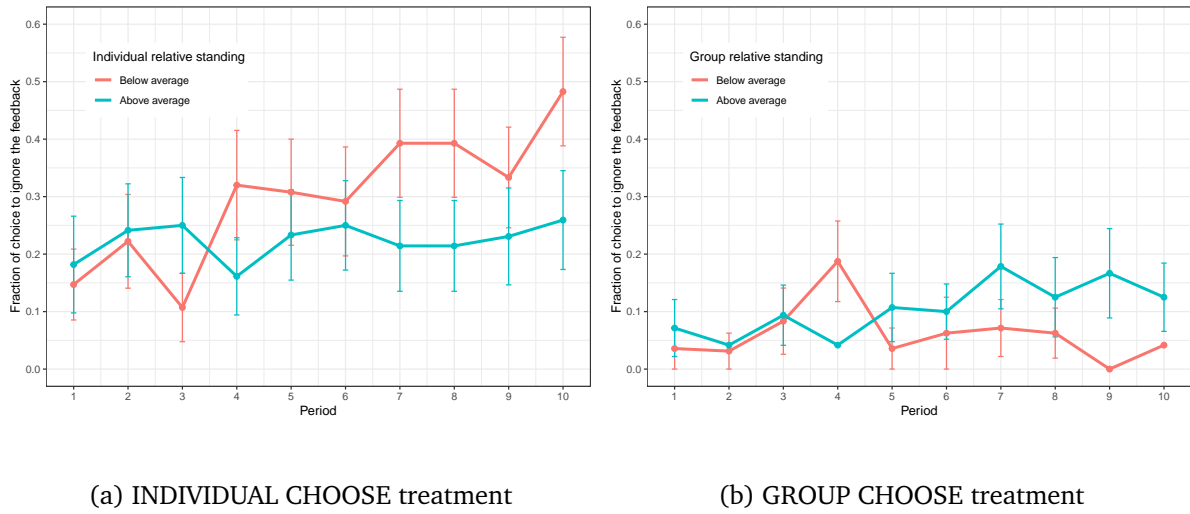


Across the 10 periods of the game, Figure 1 further shows that the difference between the two conditions is large starting from the first period of the game. After the first round, around 95% of subjects in the GROUP CHOOSE condition consult the relative standing of their groups relative to other groups in the session, whereas only 84% of subjects in the INDIVIDUAL CHOOSE treatment consult their standing relative to other (non-group) participants ($p=0.06$, one-sided chi-square test). In subsequent rounds, information avoidance in the GROUP CHOOSE treatment remains low, whereas in INDIVIDUAL CHOOSE treatment information avoidance increases sharply. At the end of the 10 rounds, only 63% of subjects in the INDIVIDUAL CHOOSE treatment elect to consult the feedback, whereas the corresponding share is 91% in GROUP CHOOSE ($p<0.001$, one-sided chi-square test).

We next investigate how contributions affect information avoidance, as put forward in Hypothesis 2. In Figure 2 we again report the proportion of subjects who choose to ignore social information feedback in INDIVIDUAL CHOOSE (Panel a) and GROUP CHOOSE (Panel b), but condition ignorance rate on receiving a feedback that is either positive (i.e. above average) or negative (i.e. below average).⁹

⁹ Note that feedback can also indicate “equal to average.” In the present case, however, no subject is exactly on the average.

Figure 2: Feedback avoidance by treatment and relative standing (standard errors in bars)



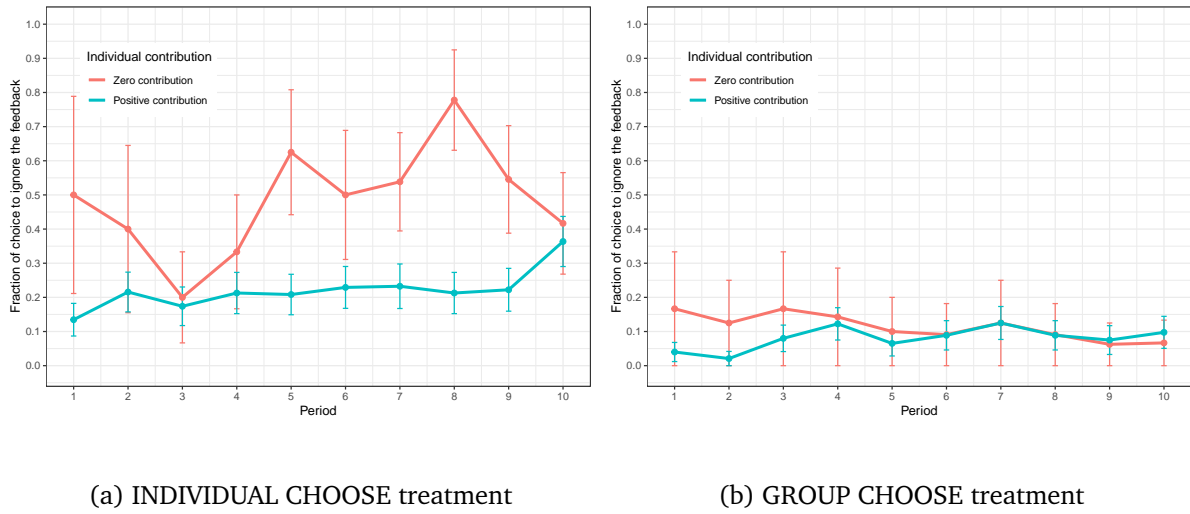
Two main observations can be made from Figure 2. First, ignorance in INDIVIDUAL CHOOSE treatment is significantly higher for both negative and positive feedback information relative to GROUP CHOOSE treatment. Second, for subjects in INDIVIDUAL CHOOSE treatment that contribute *below* out-group average, negative feedback tends to be avoided by a large fraction of subjects. Moreover, information avoidance increases sharply over time, up to almost 50% by the end of the tenth round. This finding is consistent with Dana et al. (2007) and Matthey and Regner (2011), and one interpretation is that, for these subjects, social norm feedback works against self-image, leading them to avoid this cost by ignoring information.

In the GROUP CHOOSE treatment, we observe a lower rate of information avoidance for both negative and positive feedback. We therefore find only partial support for Hypothesis 2, as negative feedback information in GROUP CHOOSE treatment does not lead to higher information avoidance relative to positive feedback. This result is, however, consistent with the view that self-image concerns are less of an issue with group-level feedback.

A final dimension we use to study information avoidance is to condition the choice to receive feedback on whether contributions are zero or positive. Results reported in Figure 3 show that, in INDIVIDUAL CHOOSE, information avoidance among non-contributors is significantly higher than for contributors. By contrast, in GROUP CHOOSE ignorance trajectories are very similar for non-contributors and contributors.

We finish this section by reporting results from a set of random effect OLS regressions for

Figure 3: Feedback avoidance by contribution status (standard errors in bars)



the decisions to ignore feedback. In Table 2, the dependent variable is an 'ignorance' dummy which takes the value of one when a participant chooses to ignore the feedback, zero otherwise; column (1) reports a specification with a treatment dummy for GROUP CHOOSE (see Figure 1), column (2) adds interaction terms for positive feedback information in either GROUP CHOOSE or INDIVIDUAL CHOOSE treatments (see Figure 2), and column (3) introduces interaction terms identifying participants who contributed zero (see Figure 3). All regressions include period fixed effects (first period omitted), and we report standard errors clustered at the group level in parenthesis.¹⁰

Inference derived from regressions largely confirm the evidence summarized above, with a negative and statistically significant coefficient for the GROUP CHOOSE indicator across all specifications. In Column (2), interaction term INDIVIDUAL CHOOSE x Above average provides evidence that participants in INDIVIDUAL CHOOSE treatment who contribute above average are significantly more likely to consider feedback, while in column (3) the coefficient for INDIVIDUAL CHOOSE x Zero contribution suggests that non-contributors indeed avoid feedback information significantly more relative to both contributors and participants in the GROUP CHOOSE treatment. This consolidates the view that those individuals presumably targeted by the informational intervention are also those more likely to discard the feedback and therefore tend to

¹⁰ Because our objective is to do inference on averages across treatments, we use simple OLS regressions. Results are similar if we consider the logit or probit transformations.

Table 2: Feedback ignorance in INDIVIDUAL CHOOSE and GROUP CHOOSE conditions

Feedback avoidance (=1)	(1)	(2)	(3)
Intercept	0.20*** (0.04)	0.23*** (0.04)	0.17*** (0.04)
GROUP CHOOSE	-0.18*** (0.05)	-0.22*** (0.05)	-0.14*** (0.04)
x Above average	-	-0.001 (0.03)	-
x Zero contribution	-	-	0.01 (0.03)
INDIVIDUAL CHOOSE x Above average	-	-0.08*** (0.03)	-
INDIVIDUAL CHOOSE x Zero contribution	-	-	0.23*** (0.05)
R ²	0.0641	0.0689	0.0944

Notes: OLS random effect panel regressions reported. Each regression uses choices by 112 respondents (56 in both INDIVIDUAL CHOOSE and GROUP CHOOSE) over ten periods. Dummies for each time period are included in all specifications. Standard errors are clustered at the group level and reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively.

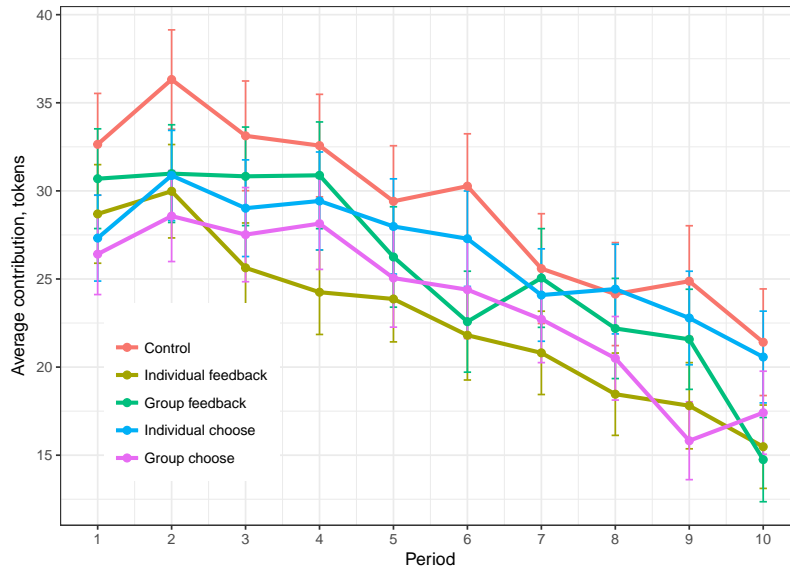
learn their relative standing less frequently than participants with positive contributions.

4.2 Public good contributions

We now quantify how alternative information feedback interventions affect contributions in the public good game. Figure 4 depicts average contributions across periods and experimental conditions. In all conditions, average contributions start at around half of the endowment (30 tokens) and gradually fall to around one third of the endowment (20 tokens) towards the end of the game. The decreasing pattern of contributions reflects a typical cooperation break-down found in public goods literature (Ledyard, 1995; Chaudhuri, 2011). Our data further suggests that contributions are highest in the CONTROL treatment, whereas INDIVIDUAL FEEDBACK performs worst, although differences are small.

To provide further evidence about the impact of feedback information on contributions, Figure 5 reports average contribution trajectories for respondents in individual-level feedback treatments (Panel a) or group-level feedback treatments (Panel b). We condition trajectories on whether subjects have contributed above the average (positive feedback, with expected negative impact on contributions) or below the average (negative feedback, with expected positive impact

Figure 4: Average contributions by treatment (standard errors in bars)



on contributions).¹¹ We also report trajectories for the control condition as a reference, where subjects are grouped either in reference to individual relative standing (Panel a) or group-level relative standing (Panel b).¹²

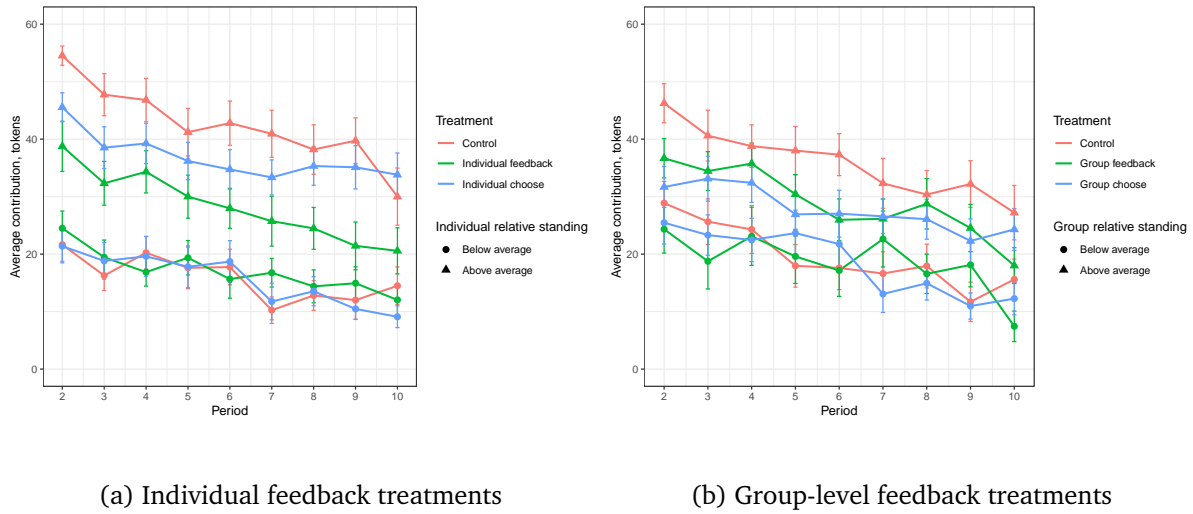
Starting with individual feedback treatments, we find that trajectories for subjects above out-group average (upper part of Figure 5, Panel a) respond to feedback information with significantly smaller contributions relative to the control. This finding is consistent with a boomerang effect documented in Schultz et al. (2007), and can at least partially account for the fact that average contributions are lowest in the INDIVIDUAL FEEDBACK condition. This negative effect of social comparison is also present for group-level feedback, although the magnitude is smaller. This can be explained by the fact that group-level feedback information only includes individual contributions indirectly through within-group average, so that incentives to reduce own contribution is lower.

An unexpected result is that negative (below average) information feedback does not promote contributions. Indeed, trajectories for both individual and group-level feedback reported

¹¹ Information feedback refers to contributions in the previous period. Also, as mentioned in footnote 9, it is possible that subjects are exactly on the average, which is the case for 1 choice occasion in INDIVIDUAL FEEDBACK treatment and 1 choice occasion in GROUP FEEDBACK treatment. For simplicity, these observations (not the participants) are excluded from the analysis.

¹² Note that contribution trajectories for the control condition differs in Panel a and b. The reason is that the basis for average contribution comparisons (individual or group-level) are different in each panel.

Figure 5: Average contribution by treatment and relative standing (standard errors in bars)



in the bottom part of Figure 5, Panels (a) and (b), are very similar to the control condition. One possible interpretation of low sensitivity to feedback is the absence of injunctive norms or moral suasion, which is a typical component of most of the field studies on social norms (e.g. Allcott, 2011; Allcott and Rogers, 2014). In a laboratory study on the influence of social norms on pro-social behavior, relying exclusively on descriptive norms, Gaechter et al. (2013) does not find an effect of the feedback on the aggregated level. Another important feature of our set-up is the payoff interdependence within groups in the public good game. As highlighted in the Section 3, providing feedback on payoffs in all the treatments ensures that individual and group-level social comparisons do not differ in terms of possible inference about one’s payoff. However, information about earnings potentially reduces sensitivity to payoff-irrelevant norms.

We now use a set of OLS random effect panel regressions to test whether the impact of feedback information on contributions is statistically significant. Results are reported in Table 3. Column (1) simply regresses individual contributions on a set of treatment dummies, in line with Figure 4. Columns (2) and (3) focus on the impact of individual feedback compared to the control group. We further split the sample into choices that follow negative (below average, column 2) or positive (above average, column 3) individual feedback, and add an interaction term to identify contribution decisions occurring after feedback was ignored (INDIVIDUAL CHOOSE condition). Columns (4) and (5) follow the same logic but for group-level feedback treatments plus the CONTROL group. All regressions include period fixed effects (first period omitted), and

Table 3: Public good contributions across treatments and feedback types

Contributions (a_{it})	Full sample (1)	Individual feedback		Group-level feedback	
		Below average (2)	Above average (3)	Below average (4)	Above average (5)
Intercept (control)	32.67*** (2.97)	24.55*** (2.32)	48.82*** (2.82)	29.46*** (2.87)	41.32*** (2.86)
INDIVIDUAL FEEDBACK	-6.36 (3.94)	-0.45 (3.51)	-13.04*** (4.08)	-	-
INDIVIDUAL CHOOSE	-2.66 (4.25)	1.48 (3.03)	-7.55* (3.94)	-	-
x Ignore	-	-9.31*** (2.79)	7.50*** (1.65)	-	-
GROUP FEEDBACK	-3.46 (3.47)	-	-	-1.51 (3.63)	-4.49 (3.04)
GROUP CHOOSE	-5.38 (3.75)	-	-	-3.50 (3.27)	-6.87* (3.85)
x Ignore	-	-	-	-2.89 (7.75)	-0.46 (4.51)
Observations	2720	778	697	660	812
R ²	0.0534	0.0767	0.160	0.0524	0.0714

Notes: OLS random effect panel regressions reported. Column 1 includes choices by all 272 participants over nine periods (the first period with no feedback is omitted). Columns 2 and 3 consider only choices by participants in control, INDIVIDUAL FEEDBACK and INDIVIDUAL CHOOSE conditions, with own contribution in previous period respectively below (column 2) and above (column 3) out-group average. Columns 4 and 5 consider only choices by participants in control, GROUP FEEDBACK and GROUP CHOOSE conditions, with own-group contributions in previous period respectively below (column 4) and above (column 5) out-group average. Dummies for each time period are included in all specifications (period 2 omitted). Standard errors are clustered at the group level and reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively.

we report standard errors clustered at the group level in parenthesis.¹³

Regression results in columns (2) and (4) confirm that providing negative feedback has no positive impact on contributions. Results further show that participants in INDIVIDUAL CHOOSE treatment who ignore negative feedback display on average lower contributions, although this is not the case in the GROUP CHOOSE treatment. Columns (3) and (5) focus on positive feedback, confirming that the boomerang effect is much larger for individual feedback relative to group-level feedback. Further, column (3) shows that ignoring positive feedback in INDIVIDUAL CHOOSE is associated with higher contributions. This positive “self-disciplining” function of deliberate ignorance has already gained some attention in the literature (Hertwig and Engel, 2016). By contrast, results for group-level feedback show little difference between GROUP FEEDBACK and GROUP CHOOSE, which is consistent with the result that deliberate ignorance in GROUP CHOOSE is low.

In sum, we find only partial support of Hypothesis 3, as positive feedback decreases contri-

¹³ Contributions are censored at 0 and 60, and we have also estimated the same regressions using tobit specifications. Since results are largely similar, and we are mostly interested in deriving inference about differences in averages, we stick to OLS regressions.

butions, whereas we find little evidence that negative feedback increases contributions.

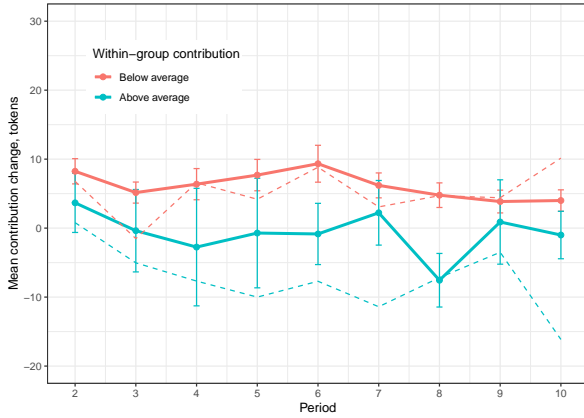
4.3 Conditional cooperation and feedback

Our last set of results quantifies how social comparison feedback affects conditional cooperation in groups. To document this issue, we split subjects according to whether they are below or above *within-group* average, a key driver of conditional cooperation, and look at how contributions increase or decrease from one period to the next depending on the sort of information feedback received. This is documented in Figure 6, which reports average change in contribution from previous to current period ($a_{it} - a_{it-1}$). In all panels dashed lines provide trajectories for the control group as a reference, showing that subjects who contribute above (below) their own-group average tend to decrease (increase) their contributions over time, as conditional cooperation suggests.

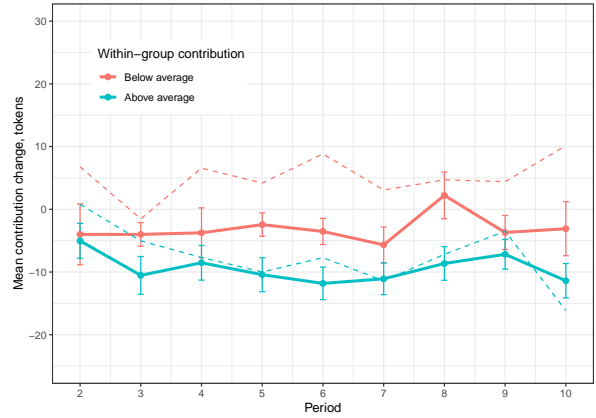
We now discuss the impact of alternative social feedback information on conditional cooperation patterns. Starting with panels (a) and (b), we report changes in contribution for pooled individual feedback treatments, respectively focusing on negative feedback information (below out-group average) in Panel (a) and positive feedback information (above out-group average) in Panel (b). We observe two main departures from the control condition. First, for subjects who contribute above their within-group average and learn that they contribute below the out-group average (Panel a), the decline of contributions associated with conditional cooperation is much less pronounced relative to the control. In other words, if a participant learns that he has contributed a lot within the group, but that the contribution is relatively small relative to out-group average, the pace at which contribution decline is dampened. Second, Panel (b) shows that subjects who contribute below their own-group average and receive positive individual feedback reduce their contributions compared to the previous period, whereas conditional cooperation observed in the control suggests an increase.

Results for group-level feedback treatments, reported in Panel (c) for below out-group average feedback and in Panel (d) for above out-group average feedback, show similar patterns. In particular, for subjects who contribute more than their group average and receive information that their group is below the out-group average, the decline of contributions by these high contributors is mitigated. By contrast, subjects who contribute below their group member average and receive information that their group contributes more than the out-group average dampen increases among low contributors. The figures suggest, however, that these effects are smaller

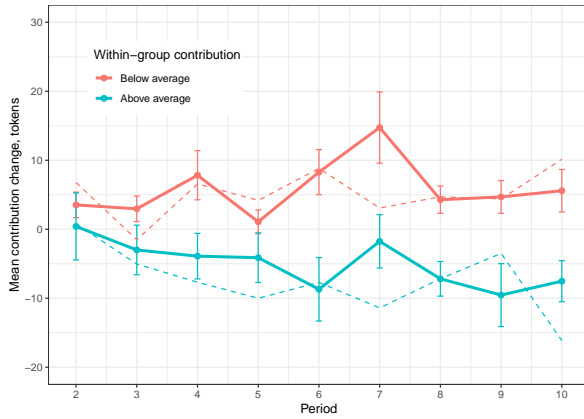
Figure 6: Average change in contribution (control group in dashed lines, standard errors in bars)



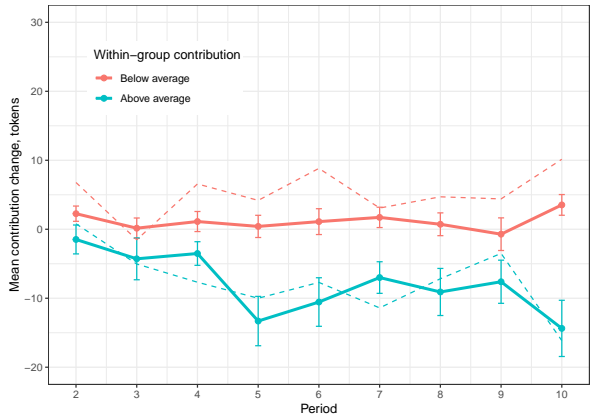
(a) Individual feedback: Below average



(b) Individual feedback: Above average



(c) Group-level feedback: Below average



(d) Group-level feedback: Above average

relative to those observed in the individual feedback treatments.

Corresponding regression results for changes in contributions ($a_{it} - a_{it-1}$), using OLS random effect panel models, are reported in Tables 4 and 5 for individual and group-level feedback respectively (see Huck et al., 1999; Bigoni and Suetens, 2012, for similar approaches). In both tables, the first two columns focus on exogenous social feedback conditions, while the latter two columns focus on endogenous feedback conditions. Within these, we run separate regressions for cases where contribution in the previous period was below own-group average (reported in odd columns) or above own-group average (reported in even columns). All regressions include

Table 4: Conditional cooperation and individual feedback

Δ contributions ($a_{it} - a_{it-1}$)	Control and INDIVIDUAL FEEDBACK conditions		Control and INDIVIDUAL CHOOSE conditions	
	Below own-group average (1)	Above own-group average (2)	Below own-group average (3)	Above own-group average (4)
Intercept (control group)	8.19*** (1.92)	-8.80*** (1.07)	7.82*** (1.80)	-8.97*** (1.07)
Individual feedback: Below average	-1.03 (2.48)	13.29*** (2.12)	3.28 (2.39)	12.69*** (3.16)
x Ignore	-	-	-6.58** (2.83)	-15.77*** (5.74)
Individual feedback: Above average	-11.31*** (2.23)	-4.65** (2.36)	-11.98*** (3.15)	-1.57 (2.30)
x Ignore	-	-	5.96 (8.56)	3.42 (2.46)
Observations	506	459	502	660
R ²	0.0291	0.0573	0.0480	0.0524

Notes: OLS random effect panel regressions reported. Column 1 and 2 consider only choices by participants in control and INDIVIDUAL FEEDBACK conditions, with own contribution in previous period respectively below (column 1) and above (column 2) own-group average. Columns 3 and 4 consider only participants in control and INDIVIDUAL CHOOSE conditions, with own contribution in previous period respectively below (column 3) and above (column 4) own-group average. Standard errors are clustered at the group level and reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively.

Table 5: Conditional cooperation and group-level feedback

Δ contributions ($a_{it} - a_{it-1}$)	Control and GROUP FEEDBACK conditions		Control and GROUP CHOOSE conditions	
	Below own-group average (1)	Above own-group average (2)	Below own-group average (3)	Above own-group average (4)
Intercept (control group)	8.11*** (1.89)	-8.59*** (1.07)	8.00*** (1.86)	-9.04*** (1.08)
Group-level feedback: Below average	-0.70 (2.67)	4.24* (2.36)	-1.24 (2.31)	3.12 (2.67)
x Ignore	-	-	-3.72*** (1.21)	4.55 (7.56)
Group-level feedback: Above average	-5.13** (2.39)	-1.57 (1.72)	-5.82*** (2.01)	-0.24 (2.19)
x Ignore	-	-	-0.40 (1.71)	-0.44 (5.00)
Observations	490	470	520	477
R ²	0.0170	0.00573	0.0195	0.00168

Notes: OLS random effect panel regressions reported. Column 1 and 2 consider only choices by participants in control and GROUP FEEDBACK conditions, with own contribution in previous period respectively below (column 1) and above (column 2) own-group average. Columns 3 and 4 consider only participants in control and GROUP CHOOSE conditions, with own contribution in previous period respectively below (column 3) and above (column 4) own-group average. Standard errors are clustered at the group level and reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively.

treatment dummies, and in conditions with endogenous feedback we include an interaction term to identify instances where participants chose to ignore social feedback information. Consistent with Figure 6, all regressions include corresponding observations from the control group, so that the intercept represents conditional cooperation in the baseline. Standard-errors are clustered at the group-level.

Starting with conditional cooperation in the control group, estimates for the constant in all odd columns are positive, confirming that individuals who contribute below their own-group average increase contribution by around 8 tokens on average in the next period. Conversely,

intercepts in the even columns are all negative, suggesting that participants in the control group who are above their own-group average reduce their contributions by almost 9 tokens on average.

In relation to this pattern, results in Table 4 largely consolidate the above discussion. For individuals below own-group average (columns 1 and 3) estimates associated with positive (above average) individual feedback are negative and highly statistically significant. This negative effect of feedback information on conditional cooperation is also present for participants who contribute above own-group average, as positive feedback leads to a sharper decline in contributions relative to control (see column 2). For individuals who contribute above their own-group average (columns 2 and 4), negative (below average) individual feedback is associated with a positive and highly statistically significant coefficient.

The possibility to ignore feedback also produces interesting findings. On the one hand, coefficients for respondents in INDIVIDUAL CHOOSE who consult feedback information are strikingly similar to those in INDIVIDUAL FEEDBACK regressions. On the other hand, those who ignore negative (below average) individual feedback display a more pronounced tendency to reduce contributions. These respondents therefore hasten the breakdown of cooperation, especially if they contribute above own-group average (column 4). By contrast, respondents who ignore positive (above average) individual feedback do not significantly differ from those who considered the feedback.

Regression results in Table 5 confirm that group-level feedback also tends to offset both positive and negative effects of conditional cooperation, although the magnitude of estimates is lower relative to individual feedback treatments. One striking difference is that those who contribute above their own-group average and ignore negative feedback do not reduce reduce their contributions faster (Table 5, column 4).

Taken together, two conclusions can be made in reference to Hypothesis 4. First, social comparison feedback affects conditional cooperation through two channels: (i) negative feedback mitigates the breakdown of cooperation on the above-the-average contributors, and (ii) positive feedback increases the breakdown of cooperation on the below-the-average contributors. Both effects are stronger with individual feedback, but are also present for group-level feedback. Second, subjects who ignore negative feedback cooperate less than those choosing to ignore a positive feedback.

5 Discussion and conclusion

In this paper, we have investigated the effect of social comparison feedback in a standard public good game setting. The main focus of our work has been to endogenize the possibility for subjects to receive payoff-irrelevant information about their out-group relative standing, and document how self-image concerns may induce a significant share of subjects to avoid this information. Our design further extend the idea of social comparison to group-level comparison, with the purpose of mitigating self-image concerns and thereby increase feedback exposure.

Our results show that information avoidance is indeed sensitive to individual vs. group level social comparison. Moving from individual-level feedback to group-level feedback enhances information acquisition, without significantly affecting contribution behavior. We further show that low-contributors are most likely to avoid individual feedback information, a finding that is directly related to moral wiggle room experiments, where deliberate ignorance is typically associated with more selfish choices. From a practical perspective, low-contributors is the group typically targeted by field interventions leveraging social comparison as a way to incentivize pro-social behavior. These findings therefore suggest that group-level feedback interventions might perform better in terms of getting individuals exposed to social norms.

Our results also show that social comparison information alone is not effective to induce cooperation in a public good game setting, either based on individual feedback or group-level feedback. We have shown that feedback information both promotes and deteriorates cooperation among group members, and that these effects working through conditional cooperation cancel each other out on aggregate. On a more positive note, group-level comparison was found to be less prone to a boomerang effect (decline of contributions by individuals above the norm) documented in individual comparison treatments and elsewhere in the literature. Anecdotal evidence from debriefing questions further suggest that subjects in group-level feedback treatments indeed consider group-level information and associated norms as relevant for their decisions.¹⁴ Following social identity theory, our simple exercise therefore suggests that cohesive social groups can be created to leverage preferences to conform with norms in inducing prosocial behavior.

¹⁴ The following sentences are examples of textual responses translated from French: “I noticed that we were always below average of the other groups and I decided to always put to the common account...”, “Since the average (of the group) was lower, I wanted to increase it...”, “I was generally trying to contribute more... to the common account when I saw that the standing of our group was lower than the other groups...”.

We close by emphasizing the complementarity between social feedback information and injunctive norms or moral suasion. Following our results, the effect of *merely descriptive* social comparison feedback on the contributions is likely to be limited, and this holds for both individual and group-level feedback. Information has a highly heterogeneous effect on high and low contributors, which calls for different exposure strategies for these two groups of people. For example, a successful strategy might consist in increasing exposure for free-riders and reducing adverse effect on contributions for high cooperators. One possibility to achieve this would be to use group-level feedback coupled with additional informational design features such as an explicit recommendation to adopt a more pro-social behavior.

Appendix A Experimental script

These instructions were printed and handed out to participants. The text is the same for all treatments, except for the part that discusses information feedback after all participants have made their contribution decision.

Instructions

Welcome and thank you for participating in this experiment. Please switch off your mobile phones and do not talk to other participants. If you have a question, raise your hand, and the experimenter will answer you privately.

In this experiment you can earn money. Your earnings depend on your own decisions, the decisions of other participants as well as on chance.

During the experiment your earnings will be expressed in Tokens which will be converted at the end of the experiment in CHF at the following conversion rate:

$$1 \text{ Token} = 0.25 \text{ CHF.}$$

During the whole experiment your anonymity is warranted.

Experimental procedure

The experiment consists of two parts. The following instructions explain the first part of the experiment. The instructions for the second part of the experiment will be presented to you after you have finished the first part.

After the second part of the experiment is over, the computer will randomly select either first or the second part of the experiment to define your final payment.

It means that you will either receive the payment from part 1 or from part 2 of the experiment. Since both parts can be selected with equal probability, please take all the decisions carefully in both parts of the experiment.

Part 1

At the beginning of this part of the experiment, the participants will be matched in the groups of four. The participants remain in the same groups throughout all the 10 rounds in this part of the experiment.

At the beginning of every round, each participant receives an endowment of **60 Tokens**. Next, the participants will be asked to make a decision regarding this endowment.

In each group every participant has its own **account A**, and the group has a common **account B**. It means, in every group there are four private accounts A, one for each participant, and a single common account B.

The participants decide how they would like to allocate their endowment of 60 tokens between accounts A and B.

For each token the participants put on their private account A, they receive exactly one token. The tokens the participants in a group put on the group account B are summed up and **multiplied by 1.6**. The resulting total amount of tokens on the account B is then divided equally among the four members of the group.

The payment of each participant is thus defined as follows:

$$\text{tokens on account A} + 0.4 * \text{sum of contributions to group account B}$$

It means that your earnings from account A are independent from the decisions of other participants. You simply keep the money that you put on account A.

Your payment from the account B, however, depends on the decisions of all group members.

It holds that you always receive 0.4 of the sum of the contributions to the group account B, regardless of how many tokens you contribute to this account; the more tokens are contributed to the group account B, the higher are the total earnings of the group (since the value of each contribution is increased by 60%).

Consider the following example:

Group member	1	2	3	4
Endowment	60	60	60	60
Contribution to group account B	0	20	40	60
Sum of contributions	120			
Profit from group account	$120 * 1.6 / 4 = 48$			
Tokens kept on private account A	60	40	20	0
Profit for round	108	88	68	48

After all the group members have made their decisions, you will be informed about your payment in that round.

Individual feedback:

Every round once all the participants have made their decisions, the computer will compare your contribution to the group account B with the average contribution of all the other participants

(your group-members are not included in this comparison). Your relative standing is then defined as below, above or equal to the average. After the comparison is made, your relative standing will be shown to you on the screen. The information about your relative standing does not affect your payment.

Individual choose:

Every round once all the participants have made their decisions, you will have the opportunity to compare your contribution to the group account B with the average contribution of all the other participants (your group-members are not included in this comparison). Your relative standing is then defined as below, above or equal to the average. If you choose to make a comparison, your relative standing will be shown to you on the screen. It means that you decide individually whether to know your relative standing. Your decision to display or not to display your relative standing will not be disclosed to other participants. The information about your relative standing does not affect your payment.

Group feedback:

Every round once all the participants have made their decisions, the computer will make a comparison of the total contribution of your group to the group account B with the average total contributions to the account B of the other groups. The relative standing of your group is then defined as below, above or equal to the average. After the comparison is made, the relative standing of your group will be shown to you on the screen. The information about the relative standing of your group does not affect your payment.

Group choose:

Every round once all the participants have made their decisions, you will have the opportunity to compare the total contribution to a group account B of your group to the average total contribution to account B of the other groups. The relative position of your group is then defined as below, above or equal to the average. If you choose to make a comparison, the relative standing of your group will be shown to you on the screen. It means that you decide individually whether to know the relative standing of your group. Your decision to display or not to display it will not be disclosed to other participants. The information about the relative standing of your group does not affect your payment.

You will then be informed about your payment in that round.

Once the 10 rounds are over, the computer will randomly select one round to define your payment for this part of the experiment. It means that your payment in this part of the exper-

iment will be determined according to the decisions made in that particular round based on the aforementioned procedure. Since every round can be selected with equal probability, please take all the decisions carefully.

The experiment will then proceed to the second part. The experiment will end with the questionnaire which does not affect your payment. Should you read the instructions carefully, please click on “continue”. Before the experiment begins, you will be asked a few control questions to test your understanding of the experimental procedure.

Good Luck.

Appendix B Decision screens

Figure B1: Contribution stage

Contribution Stage (All treatments)

Your endowment: **60 tokens**.

1 token = 0.25 CHF

How many tokens you would like to contribute to the group account B?

(You can choose any amount X between 0 and 60.
The remaining amount 60-X will be automatically put to your private account A)

OK

Figure B2: Individual choose: choice to ignore the feedback

INDIVIDUAL CHOOSE

Do you want to compare your contribution to the group account B with the average contribution of all the other participants in the room (excluding your group)?

Show comparison Do not show comparison

OK

Figure B3: Individual feedback

INDIVIDUAL FEEDBACK

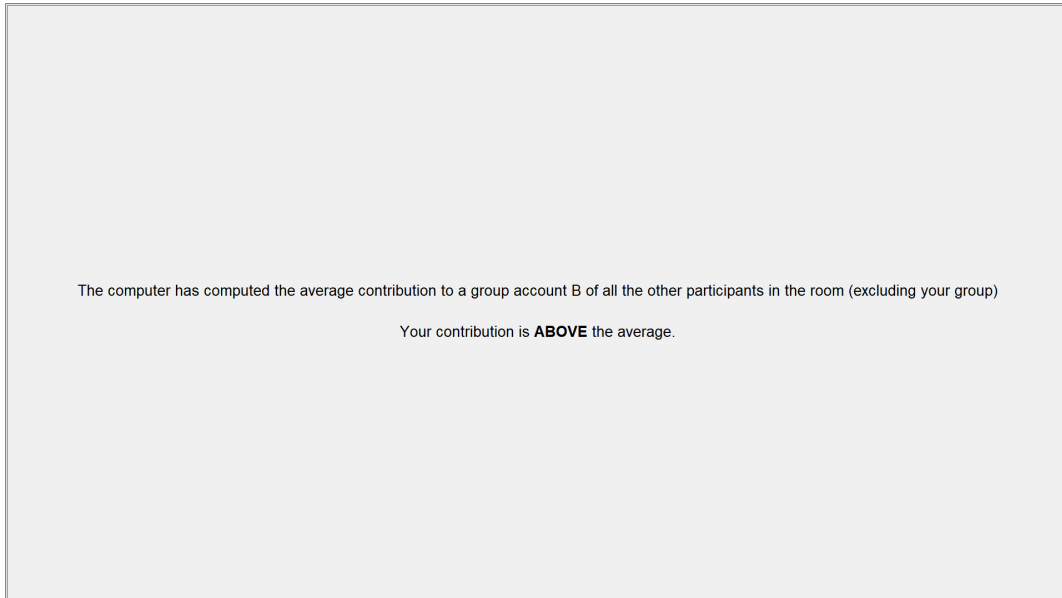


Figure B4: Group choose: choice to ignore group-level feedback

GROUP CHOOSE

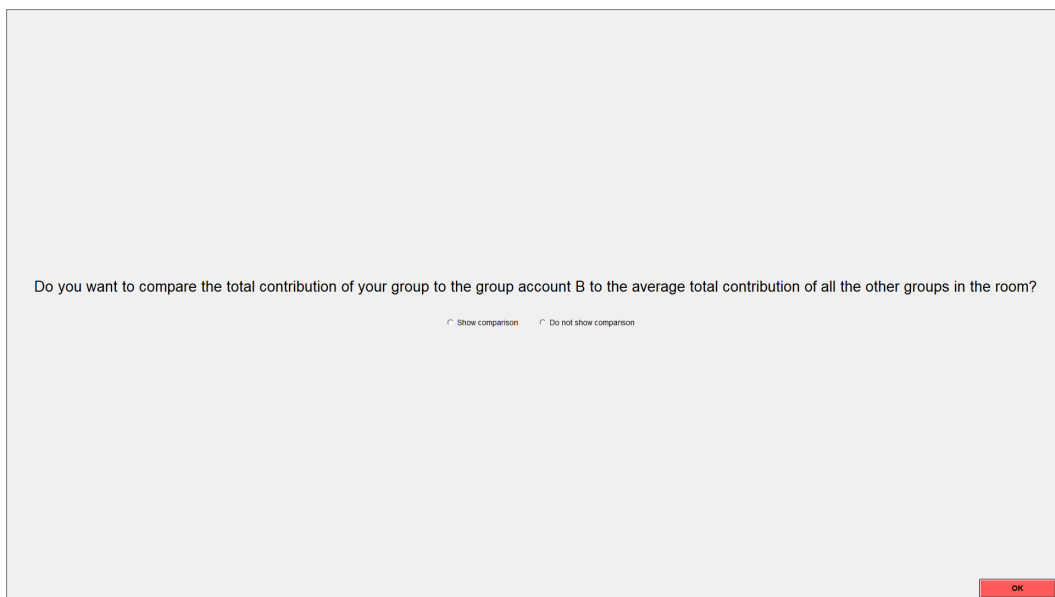


Figure B5: Group feedback:

GROUP FEEDBACK

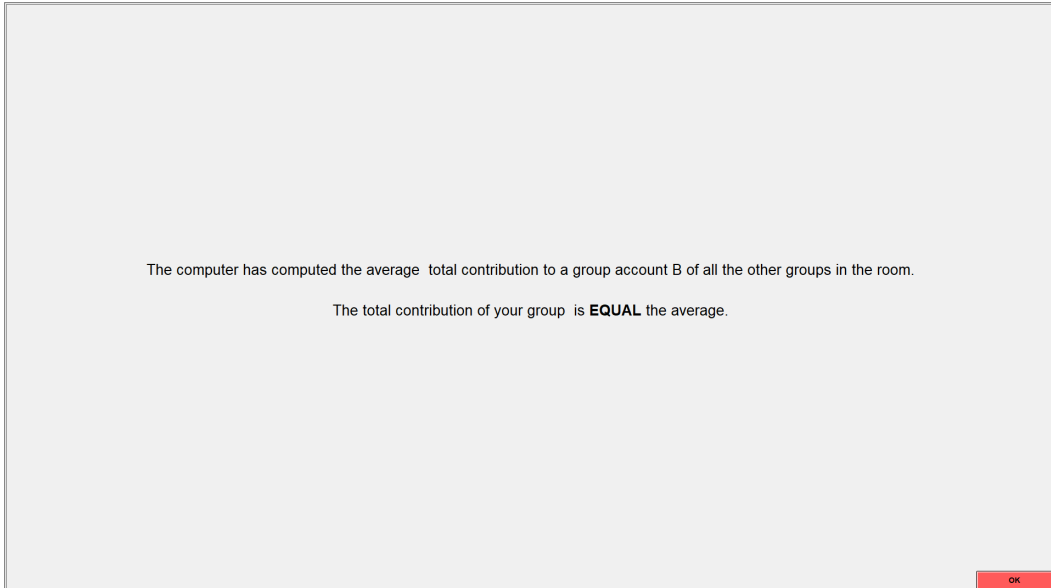
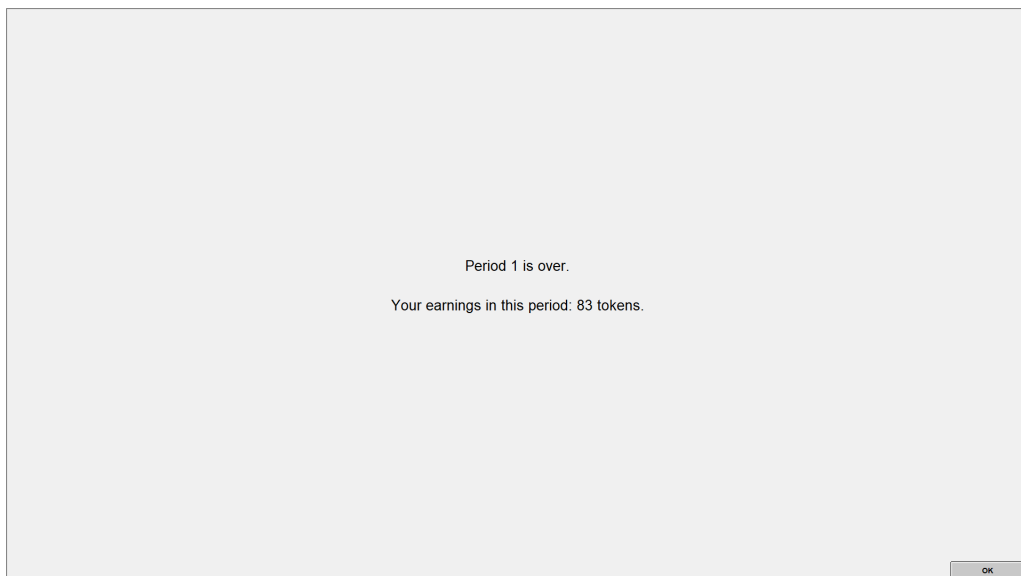


Figure B6: Payoff feedback: all treatments, no choice.

PAYOFF FEEDBACK (ALL TREATMENTS)



References

- Allcott, H. (2011) "Social norms and energy conservation," *Journal of Public Economics*, 95, 9, pp. 1082 – 1095.
- Allcott, H. and J. Kessler (2015) "The welfare effect of nudges: A case study of energy use social comparisons." NBER Working Paper Series.
- Allcott, H. and T. Rogers (2014) "The short-run and long-run effects of behavioral interventions: Experimental evidence from energy conservation," *American Economic Review*, 104, 10, pp. 3003–37, October.
- Andreoni, J. and R. Petrie (2004) "Public goods experiments without confidentiality: A glimpse into fund-raising," *Journal of Public Economics*, 88, 7, pp. 1605 – 1623.
- Ayers, U., S. Raseman, and A. Shih (2013) "Evidence from two large field experiments that peer comparison feedback can reduce residential energy usage," *Journal of Law, Economics and Organization*, 29, pp. 992–1022.
- Babcock, P., K. Bedard, G. Charness, J. Hartman, and R. Heather (2015) "Letting down the team? Social effects of team incentives," *Journal of the European Economic Association*, 13, 5, pp. 841–870.
- Bandiera, O., I. Barankay, and I. Rasul (2012) "Team incentives: Evidence from a firm level experiment," *Journal of the European Economic Association*, 11, 01.
- Bigoni, M. and S. Suetens (2012) "Feedback and dynamics in public good experiments," *Journal of Economic Behavior & Organization*, 82, 1, pp. 86 – 95.
- Boehm, R. and B. Rockenbach (2013) "The inter-group comparison - intra-group cooperation hypothesis: Comparisons between groups increase efficiency in public goods provision," *PLOS ONE*, 8, pp. 1–7, 02.
- Chaudhuri, A. (2011) "Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature," *Experimental Economics*, 14, 1, pp. 47–83, Mar.
- Clee, M. and R. Wicklund (1980) "Consumer behavior and psychological reactance," *Journal of Consumer Research*, 6, pp. 389–405.
- Costa, D. L. and M. E. Kahn (2013) "Energy conservation "nudges" and environmentalist ideology: Evidence from a randomized residential electricity field experiment," *Journal of the European Economic Association*, 11, 3, pp. 680–702.
- Dana, J., R. Weber, and J. Kuang (2007) "Exploiting moral wiggle room: Experiments demonstrating an illusory preference for fairness," *Economic Theory*, 33, 1, pp. 67–80, October.
- Eckel, C. C., E. Fatas, S. Godoy, and R. K. Wilson (2016) "Group level selection increases cooperation in the public good game," *PLOS ONE*, 11, pp. 1–13, 08.
- Elster, J. (1989) "Social norms and economic theory," *Journal of Economic Perspectives*, 3, 4, pp. 99–117, December.
- Erkut, H., D. Nosenzo, and M. Sefton (2015) "Identifying social norms using coordination games: Spectators vs. stakeholders," *Economics Letters*, 130, Supplement C, pp. 28 – 31.
- Ferraro, P. J., J. J. Miranda, and M. K. Price (2011) "The persistence of treatment effects with norm-based policy instruments: Evidence from a randomized environmental policy experiment," *American Economic Review*, 101, 3, pp. 318–22, May.

- Fischbacher, U. (2007) “z-tree: Zurich toolbox for ready-made economic experiments,” *Experimental Economics*, 10, 2, pp. 171–178, Jun.
- Fischbacher, U., S. Gaechter, and E. Fehr (2001) “Are people conditionally cooperative? Evidence from a public goods experiment,” *Economics Letters*, 71, 3, pp. 397 – 404.
- Fischbacher, U. and S. Gaechter (2010) “Social preferences, beliefs, and the dynamics of free riding in public goods experiments,” *American Economic Review*, 100, 1, pp. 541–56, March.
- Gaechter, S., D. Nosenzo, and M. Sefton (2013) “Peer effects in pro-social behavior: Social norms or social preferences?” *Journal of the European Economic Association*, 11, 3, pp. 548–573.
- Gaechter, S., L. Gerhards, and D. Nosenzo (2017) “The importance of peers for compliance with norms of fair sharing,” *European Economic Review*, 97, pp. 72 – 86.
- Grossman, Z. (2014) “Strategic ignorance and the robustness of social preferences,” *Management Science*, 60, 11, pp. 2659–2665.
- Grossman, Z. and J. J. van der Weele (2017) “Self-image and willful ignorance in social decisions,” *Journal of the European Economic Association*, 15, pp. 173–217, April.
- Hallsworth, M., J. A. List, R. D. Metcalfe, and I. Vlaev (2017) “The behavioralist as tax collector: Using natural field experiments to enhance tax compliance,” *Journal of Public Economics*, 148, pp. 14 – 31.
- Harding, M. and D. Rapson (2017) “Do voluntary carbon offsets induce energy rebound? A conservationist’s dilemma.” Working paper.
- Hertwig, R. and C. Engel (2016) “Homo ignorans: Deliberately choosing not to know,” *Perspectives on Psychological Science*, 11, 3, pp. 359–372.
- Ho, B., J. Taber, G. Poe, and A. Bento (2016) “The effects of moral licensing and moral cleansing in contingent valuation and laboratory experiments on the demand to reduce externalities,” *Environmental & Resource Economics*, 64, 2, pp. 317–340.
- Huck, S., H. Normann, and J. Oechssler (1999) “Learning in cournot oligopoly: An experiment,” *The Economic Journal*, 109 (454), pp. C80–C95.
- Irlenbusch, B. and J. Ter Meer (2013) “Fooling the nice guys: Explaining receiver credulity in a public good game with lying and punishment,” *Journal of Economic Behavior & Organization*, 93, C, pp. 321–327.
- Ito, K., T. Ida, and M. Tanaka (2018) “Moral suasion and economic incentives: Field experimental evidence from energy demand,” *American Economic Journal: Economic Policy*, 10, 1, pp. 240–67, February.
- Jacobsen, G. D., M. J. Kotchen, and M. P. Vandenbergh (2012) “The Behavioral Response to Voluntary Provision of an Environmental Public Good: Evidence from Residential Electricity Demand,” *European Economic Review*, 56, pp. 946–960.
- Karlin, B., J. F. Zinger, and R. Ford (2015) “The effects of feedback on energy conservation: A meta-analysis,” *Psychological Bulletin*, 144, pp. 1205–1227.
- Kluger, A. N. and A. DeNisi (1996) “The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory,” *Psychological Bulletin*, 119, pp. 254–284.

- Krupka, E. and R. Weber (2009) "The focusing and informational effects of norms on pro-social behavior," *Journal of Economic Psychology*, 30 (3), pp. 307–320.
- Ladley, D., I. Wilkinson, and L. Young (2015) "The impact of individual versus group rewards on work group performance and cooperation: A computational social science approach," *Journal of Business Research*, 68, 11, pp. 2412 – 2425.
- Ledyard, J. O. (1995) "Public Goods: A Survey of Experimental Research," in J. Kagel and A. Roth eds. *Handbook of experimental economics*: Princeton University Press, Chap. 2.
- Lickel, B., T. Schmader, M. Curtis, M. Scarnier, and D. R. Ames (2005) "Vicarious shame and guilt," *Group Processes & Intergroup Relations*, 8, 2, pp. 145–157.
- Matthey, A. and T. Regner (2011) "Do I Really Want to Know? A Cognitive Dissonance-Based Explanation of Other-Regarding Behavior," *Games*, 2, 1, pp. 114–135, February.
- Mazar, N., O. Amir, and D. Ariely (2008) "The dishonesty of honest people: A theory of self-concept maintenance," *Journal of Marketing Research*, 45, 6, pp. 633–644.
- Nikiforakis, N. (2010) "Feedback, punishment and cooperation in public good experiments," *Games and Economic Behavior*, 68, 2, pp. 689 – 702.
- de Oliveira, A., R. Croson, and C. Eckel (2015) "One bad apple? Heterogeneity and information in public good provision," *Experimental Economics*, 18, 1, pp. 116–135, Mar.
- Robinson, E., J. Thomas, P. Aveyard, and S. Higgs (2014) "What everyone else is eating: A systematic review and meta-analysis of the effect of informational eating norms on eating behavior," *Journal of the Academy of Nutrition and Dietetics*, 114, 3, pp. 414 – 429.
- Schultz, P. W., J. M. Nolan, R. B. Cialdini, N. J. Goldstein, and V. Griskevicius (2007) "The constructive, destructive, and reconstructive power of social norms," *Psychological Science*, 18, 5, pp. 429–434.
- Sutter, M., S. Czermak, and F. Feri (2013) "Strategic sophistication of individuals and teams. experimental evidence," *European Economic Review*, 64, pp. 395 – 410.
- Tajfel, H. and J. C. Turner (1986) "The social identity theory of intergroup behaviour," in S. Worchel and W. G. Austin eds. *Psychology of Intergroup Relations*, Chicago: Nelson-Hall Publishers, 2nd edition, pp. 7–24.
- Tiefenbeck, V., T. Staake, K. Ross, and O. Sachs (2013) "For Better or for Worse? Empirical Evidence of Moral Licensing in a Behavioral Energy Conservation Campaign," *Energy Policy*, 57, pp. 160–171.
- Welten, S. C. M., M. Zeelenberg, and S. M. Breugelmans (2012) "Vicarious shame," *Cognition and Emotion*, 26, 5, pp. 836–846.