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Article

Representing Others in a Public Good Game

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Abstract: In many important public good situations the decision-making power and authority is delegated to representatives who make binding decisions on behalf of a larger group. The purpose of this study is to compare contribution decisions made by individuals with contribution decisions made by group representatives. We present the results from a laboratory experiment that compares decisions made by individuals in inter-individual public good games with decisions made by representatives on behalf of their group in inter-group public good games. Our main finding is that contribution behavior differs between individuals and group representatives, but only for women. While men's choices are equally self-interested as individuals and group representatives, women make less self-interested choices as group representatives.

Keywords: public good game; lab experiment; group representative; gender

1. Introduction

In many important decisions, the decision-making power and authority is delegated to representatives who make binding decisions on behalf of a larger group. In wage negotiations, for instance, representatives for the different parties meet and negotiate on behalf of their respective groups. Similarly, contracts are negotiated by representatives of each of the contract partners, international agreements on climate change or other issues are negotiated by representatives of each of the participating nations, and within firms, departments might send representatives to decide on the future strategy.

While both theoretical and empirical work within economics have focused mainly on individual decision makers and decisions made as individuals, insight from economics is commonly applied to contexts where decisions are made by individuals representing groups. If decisions made as group representatives differ systematically from decisions made as individuals, then this calls into question the external validity of research based on individual decisions to contexts where people act as group representatives. The same concern has previously been expressed by others. See for instance Cooper and Kagel [1].

Decision making by representatives is closely related to group decision making, but less studied. Group decision making refers to inter-group settings where the members of each team make decisions together. Recent research on decisions made by groups indicates that group decisions differ systematically from those of individuals. Reviews of the literature on group decision making indicate that groups behave more in line with standard economic models than individuals: Groups are cognitively more sophisticated, have better self-control and behave in a more self-interested manner, see Charness and Sutter [2] and Kugler, *et al.* [3] for comprehensive reviews of this literature. Not all studies, however, find support for groups behaving more in line with economic models than individuals [4–13].

Studies comparing decisions made by individuals and group representatives have found that in dictator games, men (but not women) allocate less to recipients when acting as representatives compared to as individuals [14], in trust games representatives trust less and reciprocate less than individuals [15], and in the stag-hunt game representatives behave in a less risk-averse manner than individuals [16]. Song [15] argues, based on her review of this literature, that group representatives—like groups—behave in a more self-interested manner.

The above-mentioned reviews of group decisions and studies of decisions by group representatives do not include studies of behavior in public good games. The pattern from earlier studies would suggest that groups and group representatives should contribute less to public goods than individuals do in inter-individual settings. Few have studied group decisions and decisions made by group representatives in public good games[1]. Thum, Auerswald, Schmidt and Torsvik [13] study group decision making in a public good game, and find that in joint groups decisions, contributions to the public good are higher, not lower, than contributions made by individuals. In a public good game where a second person outside the lab receives the same payoff as the decision maker, however, Humphrey and Renner [20] find that contributions decrease when the second person is a friend the decision makers has brought to the lab, while contributions are not affected when the second person is an anonymous stranger. A closely related literature on delegation has examined how representatives make contribution decisions in public good games on behalf of all participating players [21–24]. In this literature, decision power is delegated to a representative (either designated [23] or elected [25]) who decides the contribution decisions of the entire group and thus determines the final outcome. The representatives are found to contribute higher amounts to the public good, giving a final outcome closer to social optimum compared to when individuals make their own contribution decisions.

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[1] A different, but also somewhat related literature studies leading-by-example in public good games, where one person makes his contribution decision before the other group members [17–19].

Two factors that seem to matter for decisions made by group representatives, is gender and whether decisions are anonymous or made in public. As mentioned above, men and women have been found to respond differently to behaving as representatives, compared to as individuals, in dictator games. Song, Cadsby and Morris [4] compare dictator behavior in an inter-individual dictator game and an inter-group dictator game. They found that women gave away slightly, but not significantly, more in the role as representatives compared to as individuals, while men give away significantly less as representatives. Men and women may also respond differently to having their decisions being observed by in-group and out-group members: women have been found to cooperate more when observed by their in-group, while men cooperated less [26].

In this paper, we compare contribution decisions made by individuals in inter-individual public good games with contribution decisions made by individuals on behalf of a three-person group in inter-group public good games. The study has a within-subject comparison of decisions made as individuals and as representatives. In addition, the study has a between-subject comparison of the impact of gender and anonymity. We chose the public good game for our study because important decisions in public good situations are made by group representatives, and because decisions by group representatives in public good games have not yet been studied much.

Our results show firstly that decisions made as individuals and representatives in a public good game settings differ. Secondly, we find that this difference is primarily driven by how women respond to the change in role from individual to representative for the group. Finally, we do not find support for representatives being more self-interested than individuals. To the contrary we find that men behave in an *equally* self-interested manner in the role as representatives and individuals, while women behave in a *less* self-interested manner as representatives compared to as individuals.

Our paper makes the following contributions: (1) it contributes to the literature on group decisions and decisions made by group representatives by providing a study of behavior in a public good situation; and (2) it refines the notion that group representatives are more self-interested than individuals by providing an example where this notion does not hold true.

The remainder of the paper is organized as follows: Section 2 presents the experimental design, Section 3 presents the results and Section 4 presents a concluding discussion.

2. Experimental Section

The experiment is designed to compare the choices of individuals in inter-individual public goods with the choices of the same individuals acting as group representatives who decide on behalf of their group in inter-group public good games. The experiment has a within-subject comparison of decisions made by individuals and representatives, and a between-subject comparison of the impact of gender and anonymity.

An example can illustrate the decision environments in inter-individual public goods and inter-group public goods. In the inter-individual public good setting, three persons collaborate on a group project and must each decide how much effort they themselves will put into the project. In the inter-group public good setting, the three individuals are replaced by three groups with three persons in each group. The three groups collaborate on a common group project, and a representative from each of the three groups meet and decides how much effort his or her team will put into the group project.

Before we present the procedures of the experiment, we will present the details of these two public good settings.

2.1. Decisions as Individuals

The inter-individual public good game was a standard linear three-person public good game [27]. Participants were given an endowment of 60 Norwegian kroner (NOK) (~$10). The game was explained using the concept of a "doubling bucket". The three members of a group shared a doubling bucket, and each subject could decide how much of his or her endowment to put in the doubling bucket and how much to keep. All money placed in the bucket was doubled and divided equally between the group members, giving the monetary payoff function provided in Equation (1) below. Subjects made simultaneous-move contributions to the doubling bucket, stated as shares of the endowment in 10% increments.

$$\pi_i^I = e(1-c_i) + \frac{2}{3}\sum_{i=1}^{3} ec_i \quad (1)$$

where $c_i =$ is individual *i*'s contribution as share of the endowment e.

Since contributions give a return of 2/3, the Nash equilibrium in the absence of social preferences consists of no contributions and each participant getting a payoff of e.

2.2. Decisions as Group Representatives

The inter-group public good game consists of three groups of three individuals who shared a doubling bucket. Each group member made a contribution decision on behalf of his or her three-person group. This decision was made in private, the identity of other group members was unknown, and there was no communication between group members. One of these three decisions was chosen at random and implemented as the group's contribution decision. Each group member had an endowment of 60 NOK, giving the group representative 3 × 60 = 180 NOK at his or her disposal. Thus the group representative could contribute an amount between 0 and 180 to the doubling bucket on behalf of his or her group. The group representative was asked to make the following decision:

> Your task is to answer the following question: How much of your group's money do you want to put in the bucket on behalf of yourself and the two others in your group?

The contributions were stated as shares of the group's total endowment in 10% increments. By design, therefore, all three members of each group contributed the same amount.

All money placed in the bucket was doubled, and split equally between the total of nine members in the three groups sharing the bucket. The payoff function for group representative *i* is presented in Equation (2) below.

$$\pi_i^G = \frac{1}{3}\left[3e(1-c_g) + \frac{2}{3}\sum_{g=1}^{3} 3ec_g\right] = e(1-c_g) + \frac{2}{3}\sum_{g=1}^{3} ec_g \quad (2)$$

where $c_g \in [0,1]$ is the contribution share decision on behalf of group *g* stated as percentage of the group's total endowment $3e$.

The inter-group public good game is a scaled up version of the inter-individual public good game. The per-capita return to the public good is by construction identical between that of the inter-individual and the inter-group public good, so is the Nash Equilibrium in the absence of social preferences.

2.3. Experimental Procedures

The experiment consisted of four sessions and was conducted at the University of Oslo. Each session included 27 subjects, adding up to a total of 108 subjects and 324 contribution decisions. Each subject participated only once. The subjects were recruited from lectures attended by first-year students from a number of faculties of science at the University of Oslo, Norway. Fifty (46.3%) of the subjects were female. The distribution of subjects across sessions is presented in Table 1. The experiment was programmed in z-tree [28].

Table 1. Descriptive statistics of subjects by session: number of subjects, female share and mean age.

Session	Number of Subjects	Female Share	Mean Age
1	27	0.56	21.9
2	27	0.56	20.4
3	27	0.41	21.7
4	27	0.33	21.4
Total	108	0.46	21.4

The experiment consisted of a training phase, a decision phase, a feedback phase and a post-experimental questionnaire. When subjects arrived at the lab, a random draw decided the seating in the lab. The *training phase* started after the general instructions[2] were read out load and before subjects started making their decisions. In the training phase subjects could test out various hypothetical contribution decisions of three fantasy players and observe how this affected payoffs.

The *decision phase* consisted of three one-shot public good games. As we are interested in measuring the difference in contributions by individuals and group representatives, we employed a "within-subject" design, such that all subjects in the experiment made decisions both as individuals and as representatives. For half of the subjects, the first public good game was an inter-individual public good game where they made their contribution decision as an individual, the second public good game was an inter-group public good game where they made a contribution decision as a group representative, and the third and last public good game was again an inter-individual public good game where they decided as an individual. For the other half of the subjects, the order was reversed, such that the first public good game was an inter-group public good game, the second an inter-individual public good game, and the third an inter-group public good game. This crossover design with an A-B-A (individual-representative-individual) *versus* a B-A-B (representative-individual-representative) pattern makes it possible to correct for potential order effects. The experiment had a perfect stranger design [29], such that subjects were not re-matched with the same individuals twice.

[2] See the on-line Supplementary file, section 3 for a translated copy of the experimental instructions and Supplementary file, section 4 for the screen-shots from the experiment.

After the three public good games were completed, there was a *feedback phase*. Before this, subjects received no feedback on outcomes from the games played. Postponing all feedback to after all public good games were completed ensured that outcomes from earlier games did not affect choices in later games. In the feedback phase subjects were reminded about their own individual contribution decisions and informed about their payoffs from each of the three public good games. In addition, they were informed about what their group's contribution was in inter-group public good games, and whether their decision was the one drawn to be the group representative.

The experiment had a between-subject comparison of anonymous and public decisions. Half of the subjects from each of the decision orders explained above (ABA and BAB) were in anonymous treatments and the other half in public treatments. In anonymous treatments the subjects did not know the identity nor the decisions made by the other subjects. In public treatments the subjects knew there was a positive probability that they would have to write their group number and contribution decision on a flip-over chart at the end of the experiment in front of all the other subjects in the same session.

At the end of the feedback phase in public treatments, for each of the three public good games, three[3] of the 27 subjects who participated in the session were randomly selected and called forth to write down their contribution decision on a flip-over chart in front of the other subjects. For the inter-group public good games, the three subjects which were randomly chosen were chosen among the actual group representatives. Since "forcing" people to go public could be experienced as unpleasant and unexpected, participants in public sessions were notified of this possibility during the introduction and given the opportunity to leave with a show-up fee. No one did.

At the very end of the experiment, all subjects answered a post-experimental questionnaire covering background information such as gender, age and which faculty of science they attended at the university.

3. Results

In this section we present the behavior observed in the experiment and examine whether subjects behaved differently as individuals compared to as representatives. In particular we examine whether the difference in behavior as individuals and representatives differs between men and women.

As with any experiment with a within-subject design, there is a possibility of order effects. The design of the experiment, where choice 1 and 3 were identical treatments (see Figure 1 for the design of the experiment), allows us to test for and if necessary correct for potential order effects. A paired *t*-test found signs of systematic differences: the third contribution choice averaged 6 percentage points lower than the first choice, a difference that was significant at the 10% level ($p = 0.095$). For this reason, controls for the choice number (choice 1, 2 or 3) within a session are used in the regression results reported below.

[3] Only a subsample (1/9) of subjects were asked to reveal their contribution decision in front of the other subjects. This was in order to make decisions public within a reasonable time-constraint.

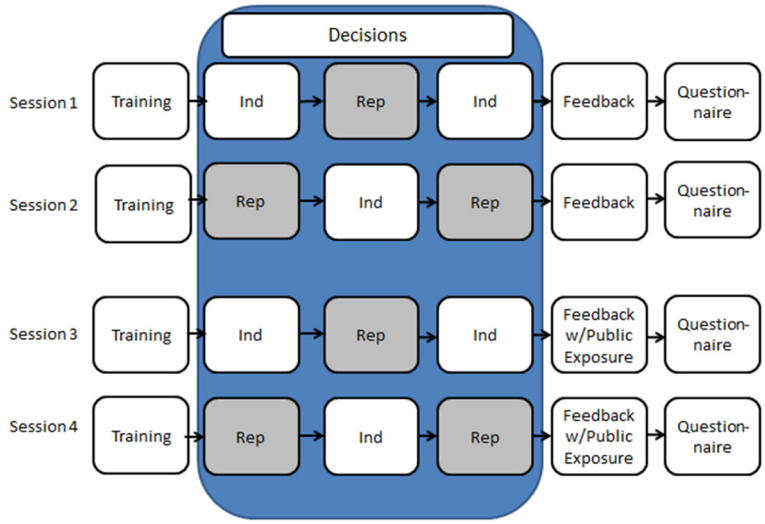

Figure 1. Outline of the experimental design. Decisions as Individuals (Ind) and Decisions as Group Representatives (Rep).

Figure 2 averages an individual's contribution under identical treatments (choice 1 and 3), and illustrates average contributions by treatment and gender. This suggests an interesting pattern of gender difference: while men contribute quite similar amounts as individuals and representatives, both in anonymous and public decisions, women contribute more as representatives than they do as individuals both in anonymous and public decisions. The largest raw difference between contributions as individuals and representatives is observed in the anonymous decisions of women.

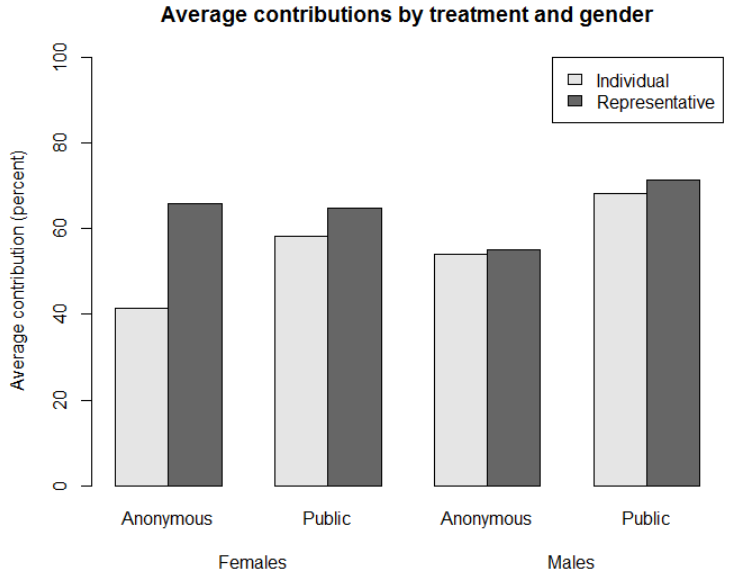

Figure 2. Average contributions (in percent of endowment) by treatment and gender.

The differences between contributions made as individuals and group representatives can be compared using non-parametric tests. Since feedback was given only after the completion of all games, a subject's choices could not be affected by the choices of the other subjects within the session. As each subject made three contribution choices, however, these choices are not independent of each other. If we nevertheless treat individual contribution decisions as independent observations, including

all choices observed in one comparison, Wilcoxon rank-sum tests report a significant difference between contributions made as individuals and group representatives (p = 0.039). Doing the same comparison separately for men and women, Wilcoxon rank-sum tests report a significant difference between contributions made as individuals compared to group representatives for women (p = 0.002), but not for men (p = 0.862).

As in Figure 2, we can calculate the difference at the individual level between contributions made as representatives and as individuals. This gives us one (independent) observation for each participant. Comparing men and women, the Wilcoxon rank-sum test reports a significant difference between men and women (p = 0.014).

To further investigate the robustness of the interesting gender difference in behavior illustrated in Figure 2, Table 2 reports OLS regressions of contributions to the public good as a percentage of the endowment, with standard errors clustered at the individual level and gender specific parameters.

Table 2. Regression results for outcome "Share of endowment contributed to public good". Clustering on the individual. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

	(1)	(2)	(3)	(4)
VARIABLES	**Percent**	**Percent**	**Percent**	**Percent**
Female representative	17.30 ***	17.57 ***	22.83 ***	32.90 ***
	(5.954)	(6.046)	(5.914)	(7.916)
Male representative	2.180	1.945	6.091	9.290
	(5.230)	(5.050)	(4.848)	(7.456)
Female × Public	7.601	7.596	−1.273	8.923
	(7.252)	(7.279)	(9.566)	(11.65)
Male × Public	15.24 *	15.24 *	6.104	6.649
	(8.208)	(8.234)	(9.773)	(11.68)
Female × Public × Representative				−24.80 **
				(11.29)
Male × Public × Representative				−5.671
				(9.794)
Controls for period within session		YES	YES	YES
Controls for session			YES	YES
Female intercept	45.13 ***	45.55 ***	54.42 ***	50.63 ***
	(5.552)	(6.092)	(7.259)	(7.711)
Male intercept	53.49 ***	54.16 ***	63.60 ***	63.24 ***
	(7.171)	(7.653)	(7.979)	(8.731)
Observations	324	324	324	324
R-squared	0.741	0.745	0.757	0.761

Gender specific parameters ease the comparison between how men and women react to behaving as group representatives *versus* as individuals. The regression equation of interest is:

$$Y_i = \sum_{s\in\{M,F\}} (\alpha^s + \beta_R^s D_R^s + \beta_P^s D_P^s + \beta_{R\times P}^s D_{R\times P}^s) + \beta_C D_C + \text{ò} \tag{3}$$

here, Y_i is the public good contribution of individual *i*, while the D's are dummies that indicate treatment: s indicates gender, R refers to decisions made as a representative and P refers to public sessions. Interaction terms have these acronyms separated with "×". In addition, there are dummies (here referred to by index C) that act as controls for the session and choice order in some of the regressions. The results are given in Table 2[4].

The regressions in Table 2 include dummy variables for decisions as representatives and public decisions. The reference decision reflected in the intercept is thus an anonymous decision made as an individual in an inter-individual public good game. As can be seen from the male intercept, men contribute on average 53%–63% as individuals in anonymous decisions, depending on the model specification. Acting as representatives does not affect the contributions of men significantly in any of the specifications. When acting as individuals, the public decisions of men are 15 percentage points higher than the anonymous decisions (seen by the coefficient "Male public"), which is significant at the 10% level. When acting as representatives, the point estimates suggest that this difference between anonymous and public decisions is largely erased (see the coefficient "Male × Representative × Public").

The patterns in female decisions are strikingly different. Average female contributions in anonymous decisions as individuals lie between 45 and 51% of the endowment depending on the model specification; which is somewhat lower than for men, but not significantly[5] so. When acting as representatives women increase their contributions substantially, and in all model specifications the increase is statistically significant at the one percent level. The estimates of the increase in female contributions as representatives from our models lie between 17 and 33 percentage points. While Model 1 only includes the treatment dimensions, Model 2 adds controls for order effects (choice 1, 2 or 3), Model 3 adds in controls for session and Model 4 allows for gender-specific interactions between the two treatment dimensions. The controls added in Models 2–4 only strengthen the estimate of increased contributions by female representatives. However, we can see from Model 4 that when decisions are revealed to others (including the members of the subgroup), women still contribute more as representatives compared to as individuals, but this difference is less than under anonymous decisions (seen in the coefficient for "Female × Representative × Public"). Further robustness checks of the gender differences are reported in the on-line Supplementary file, section 2.

Summing up, we find that men behave similarly as individuals in the inter-individual public good game and as representatives in the inter-group public good game, while we find a quite substantial and robust difference in such decisions made by women. Women contribute substantially higher levels when acting as representatives in the inter-group public good game in comparison to acting as individuals in the inter-individual public good.

4. Conclusions

In this study we have compared the behavior of individuals in inter-individual public good games with the behavior of group representatives in inter-group public good games. Our main finding is that contribution decisions made as individuals differ from those made when acting as representatives for

[4] See the on-line Supplementary file, section 1 for an equivalent model with gender neutral parameters.

[5] See the on-line Supplementary file, section 1, Table S1.

a group, but only for women. While previous research on group decision making suggests that group decisions are more self-interested than individual decisions[6] [2,3], and while it has been suggested that this is also true for decisions made by group representatives [15], our results do not fit this pattern. To the contrary, we find that men behaved in an *equally* self-interested manner, and women behaved in a *less* self-interested manner in the role as group representatives.

A handful of other papers have also found results that do not fit the "groups and representatives of groups are more self-interested" hypothesis. Some papers have failed to find a difference between the behavior of individuals and groups in terms of self-interested or other-regarding behavior [6,10], some find that groups behave in a more other-regarding manner than individuals [4,5,9]. The study closest to ours is a study comparing the behavior of individuals in three-person public good games with the behavior of elected representatives in a nine-person public good game [30]. Their main finding, in line with our result for women, is that the elected representatives contribute higher amounts than individuals.

At first glance, our result appears inconsistent with the gender effects presented in Song, Cadsby and Morris [14]. As mentioned in the introduction, Song, Cadsby and Morris [14] compare decisions made as individuals and as group representatives in a dictator game. They found that women gave away slightly, but not significantly, more in the role as representatives compared to as individuals, while men gave away significantly less as representatives. This differs from our results where it is women—not men—that alter their behavior. The relative change in male and female choices when moving from the individual to the representative context, however, is in the same direction: Song, Cadsby and Morris found that men behave in a more self-interested manner as representatives, while we found that women behave in a less self-interested manner as representatives.

Although our results do not support the notion that group representatives behave in a more self-interested manner than individuals, the design of our experiment suggests that the self-interest effect might be related to group dynamics. Differences in individual and group decisions can be due to the decision maker's consideration for the final outcome, other group members or be due to group dynamics within the group. By design, there were no group dynamics in our experiment: There was no group-building exercise, no communication between the group members, and the identity (and gender) was unknown to participants. If the results of our experiment should prove representative of how representatives act in public good games, it would be interesting to repeat it with interaction between group members to see if this is what drives group decisions towards self-interest.

We found that the gender of the representative is of importance for decisions made on behalf of others in a public good game. By design, we did not give participants any information about the gender of interacting partners. The gender of others may also have an effect of decisions, according to a study that found that women—but not men—were influenced by the gender of the opposing players in a public good game [31]. However, a study comparing individual and group decision making in a trust game found no effect of gender composition on group decisions [6]. An interesting avenue for future research is whether and how the gender composition of interacting partners influences behavior.

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[6] Although there are several exceptions to this, as referred to in the introduction.

In the introduction we expressed concern for using insight based on decisions made by individuals to contexts where decisions are made by representatives on behalf of others. Our results give reason to take this concern seriously.

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Authors Contribution

Both authors contributed equally to this article.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Cooper, D.J.; Kagel, J.H. Are two heads better than one? Team *versus* individual play in signaling games. *Am. Econ. Rev.* **2005**, *95*, 477–509.
2. Charness, G.; Sutter, M. Groups make better self-interested decisions. *J. Econ. Perspect.* **2012**, *26*, 157–176.
3. Kugler, T.; Kausel, E.E.; Kocher, M.G. Are groups more rational than individuals? A review of interactive decision making in groups. *Wiley Interdiscip. Rev.: Cogn. Sci.* **2012**, *3*, 471–482.
4. Balafoutas, L.; Kerschbamer, R.; Kocher, M.; Sutter, M. Revealed distributional preferences: Individuals *vs.* Teams. *J. Econ. Behav. Organ.* **2014**, *108*, 319–330.
5. Cason, T.N.; Mui, V.-L. A laboratory study of group polarisation in the team dictator game. *Econ. J.* **1997**, *107*, 1465–1483.
6. Chaudhuri, A.; Paichayontvijit, T.; Shen, L. Gender differences in trust and trustworthiness: Individuals, single sex and mixed sex groups. *J. Econ. Psychol.* **2013**, *34*, 181–194.
7. Cox, J.; Hayne, S. Barking up the right tree: Are small groups rational agents? *Exp. Econ.* **2006**, *9*, 209–222.
8. Gillet, J.; Schram, A.; Sonnemans, J. The tragedy of the commons revisited: The importance of group decision-making. *J. Public Econ.* **2009**, *93*, 785–797.
9. Gong, M.; Baron, J.; Kunreuther, H. Group cooperation under uncertainty. *J. Risk Uncertain.* **2009**, *39*, 251–270.
10. Kocher, M.; Sutter, M. Individual *versus* group behavior and the role of the decision making procedure in gift-exchange experiments. *Empirica* **2007**, *34*, 63–88.
11. Kocher, M.G.; Sutter, M. The decision maker matters: Individual *versus* group behaviour in experimental beauty-contest games. *Econ. J.* **2005**, *115*, 200–223.

12. Müller, W.; Tan, F. Who acts more like a game theorist? Group and individual play in a sequential market game and the effect of the time horizon. *Games Econ. Behav.* **2013**, *82*, 658–674.
13. Thum, M.; Auerswald, H.; Schmidt, C.; Torsvik, G. Teams Contribute More and Punish Less. Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik—Session: Experimental Economics II, No.B09-V3. Available online: https://www.econstor.eu/dspace/bitstream/10419/100537/1/VfS_2014_pid_105.pdf (accessed on 17 September 2015).
14. Song, F.; Cadsby, B.C.; Morris, T. Other-regarding behavior and behavioral forecasts: Females *versus* males as individuals and as group representatives. *Int. J. Confl. Manag.* **2004**, *15*, 340–363.
15. Song, F. Trust and reciprocity behavior and behavioral forecasts: Individuals *versus* group-representatives. *Games Econ. Behav.* **2008**, *62*, 675–696.
16. Charness, G.; Jackson, M.O. The role of responsibility in strategic risk-taking. *J. Econ. Behav. Organ.* **2009**, *69*, 241–247.
17. Guth, W.; Levati, M.V.; Sutter, M.; van der Heijden, E. Leading by example with and without exclusion power in voluntary contribution experiments. *J. Public Econ.* **2007**, *91*, 1023–1042.
18. Levati, M.V.; Sutter, M.; van der Heijden, E. Leading by example in a public goods experiment with heterogeneity and incomplete information. *J. Confl. Resolut.* **2007**, *51*, 793–818.
19. Moxnes, E.; van der Heijden, E. The effect of leadership in a public bad experiment. *J. Confl. Resolut.* **2003**, *47*, 773–795.
20. Humphrey, S.J.; Renner, E. *The Social Costs of Responsibility*; CeDEx discussion paper series; School of Economics, University of Nottingham: Nottingham, UK, 2011.
21. Andreoni, J.; Gee, L.K. Gun for hire: Delegated enforcement and peer punishment in public goods provision. *J. Public Econ.* **2012**, *96*, 1036–1046.
22. Bernard, M.; Dreber, A.; Strimling, P.; Eriksson, K. The subgroup problem: When can binding voting on extractions from a common pool resource overcome the tragedy of the commons? *J. Econ. Behav. Organ.* **2013**, *91*, 122–130.
23. Bolle, F.; Vogel, C. Power comes with responsibility—Or does it? *Public Choice* **2011**, *148*, 459–470.
24. Hamman, J.R.; Weber, R.A.; Woon, J. An experimental investigation of electoral delegation and the provision of public goods. *Am. J. Political Sci.* **2011**, *55*, 738–752.
25. Hamman, J.R.; Loewenstein, G.; Weber, R.A. Self-interest through delegation: An additional rationale for the principal-agent relationship. *Am Econ. Rev.* **2010**, *100*, 1826–1846.
26. Charness, G.; Rustichini, A. Gender differences in cooperation with group membership. *Games Econ. Behav.* **2011**, *72*, 77–85.
27. Ledyard, J.O. Public goods: A survey of experimental research. In *The Handbook of Experimental Economics*; Kagel, J.H., Roth, A.E., Eds.; Princeton University Press: Princeton, NJ, USA, 1995; pp. 111–194.
28. Fischbacher, U. Z-tree: Zurich toolbox for ready-made economic experiments *Exp. Econ.* **2007**, *10*, 171–178.
29. Fehr, E.; Gächter, S. Fairness and retaliation: The economics of reciprocity. *J. Econ. Perspect.* **2000**, *14*, 159–181.

30. Kocher, M.G.; Tan, F.; Yu, J. *Providing Global Public Goods: Electoral Delegation and Cooperation*; Working Paper of the Max Planck Institute for Tax Law and Public Finance; Max Planck Institute for Tax Law and Public Finance: Munich, Germany, 2014.
31. Greig, F.; Bohnet, I. Exploring gendered behavior in the field with experiments: Why public goods are provided by women in a nairobi slum. *J. Econ. Behav. Organ.* **2009**, *70*, 1–9.