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Leadership and incentives

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This series consists of papers with limited circulation, intended to stimulate discussion.

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NORWEGIAN SCHOOL OF ECONOMICS

Leadership and incentives*

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Bertil Tungodden

April 12, 2013

Abstract

We study whether compensating people who volunteer to be leaders in a public goods game creates a social crowding-out effect of moral motivation among the others in the group. We report from an experiment with four treatments, where the base treatment is a standard public goods game with simultaneous contribution decisions, while the three other treatments allowed participants to volunteer to be an “early contributor” in their group. In the three leader treatments, we manipulate the level of compensation given to the leader. Our main finding is that a moderate compensation to the leader is highly beneficial, it increases the average contribution by almost 80%. A high compensation, however, is detrimental to public good provision. We show that paying a moderate compensation to the leaders strikes the right balance between the need for recruiting leaders and avoiding a large social crowding-out effect. We argue that the main findings of the paper are important in many real life settings where we would like to use economic incentives to encourage people to lead by example.

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1 Introduction

The possibility to lead by example is potentially important in many public goods settings. In the household, at the workplace, in the local community, in business and politics, it is often possible for agents to take the lead and announce their contribution to the public good before others do. Since many people are conditional contributors in public goods contexts (Fischbacher and Gächter, 2010), first movers can potentially inspire others to contribute. But how can people be motivated to take the lead and when is the strategy of leading by example likely to be effective?

Evidence from economic experiments with the public goods games suggest that leading by example has the potential to increase the contributions by the followers (Moxnes and van der Heijden, 2003; Arbak and Villeval, 2007; Haigner and Wakolbinger, 2010; Rivas and Sutter, 2011).¹ The same studies, however, also find that leaders typically end up worse off than their followers, since followers tend to contribute less than the leader. Thus, in contexts where it is a voluntary decision to become a leader, one may face the challenge that no one steps up and makes the first move.

This problem is familiar in many real life settings. At the work place, everyone may hesitate accepting to take the leading role in organizing valuable social activities, fearing that their co-workers will not contribute to the same extent. Similarly, parents may avoid taking the lead in organizing a school activity for the children, being afraid that the other parents will not follow up. More generally, whenever there is the possibility for taking the lead in a public good setting, people may hesitate to step up and take the costs of making the first move.

The classical solution in economics to the problem of undersupply is to strengthen economic incentives. It is by now, however, well recognised that the introduction of economic incentives may undermine the intrinsic motivation of individuals, and the net effect may be a reduction of the overall motivation and a reduction of the activity itself (Frey and Oberholzer-Gee, 1997; Gneezy and Rustichini, 2000; Fehr and Falk, 2002; Bénabou and Tirole, 2003). Thus, it is not obvious that offering leader compensation would strengthen people's willingness to volunteer as leaders, the economic incentive may crowd out any intrinsic motivation to step forward. In the public goods context, however, there is a further concern regarding the introduction of economic incentives for the leader, it may crowd out the intrinsic motivation of the other members of the group. We coin this the social crowding-out effect.

To study the effect of leader compensation we designed an experiment with a sequence of one-shot public goods games with random rematching. In addition to a treatment without a leader, we had three treatments where the participants could vol-

¹Leadership has many important aspects that are not investigated in the present paper, including granting the leader the authority to reward or punish (Gürek, Irlenbusch, and Rokenbach (2009), Güth, Levati, Sutter, and van der Heijden (2007)), asymmetric payoff structures (Gächter, Herrmann, and Thoeni (2010), Glöckner, Irlenbusch, Kube, Nicklisch, and Normann (2011), Levati, Sutter, and van der Heijden (2007), van der Heijden and Moxnes (2013)) and asymmetric information (Potters, Sefton, and Vesterlund (2007)).

unteer to be the leader whose contribution was announced before the other members of the group decided on their contribution. The three treatments differed only in the compensation given to the leader (zero, moderate and high). This design allows us to study whether leader compensation represents a promising approach to public goods provision in settings where it is possible for an agent to move before others, and allows us to shed light on whether leader compensation creates a social crowding-out effect.

The paper offers three main findings. First, we show that leader compensation indeed improves public good provision. Second, we find that the optimal strategy is to pay leaders a moderate compensation. In this case, the average contribution increases by almost 80% compared to the base treatment without a leader. A further increase in the leader compensation causes a considerable drop in contributions, and turns out to be the worst arrangement if the participants themselves have to cover the costs of the leader compensation. Third, we show that a moderate compensation to the leaders strikes the right balance between the need for recruiting leaders and avoiding a large social crowding-out effect. Paying no compensation to the leaders appears to make the followers even more responsive to the leader's contribution, but fails to attract a sufficient number of leaders. Paying a high compensation to the leaders, on the other hand, appears to make it attractive to become the leader, but weakens the leader's ability to lead by example. In sum, the paper shows that leader compensation may be a viable strategy for increasing public good provision, but also that it may initiate a social crowding-out effect that makes it optimal to keep the compensation at a moderate level.

The structure of the paper is as follows: Section 2 presents the experimental design, Section 3 reports treatment effects, Section 4 investigates potential mechanisms through which leader compensation affects cooperation, and Section 5 provides some concluding remarks.

2 The experiment

The experiment consisted of four treatments of a repeated public goods game with random rematching. The base treatment was a standard public goods game with simultaneous contribution decisions, while the three other treatments allowed participants to volunteer to be an "early contributor" in their group. Being an early contributor meant that one's contribution would be announced to the other group members before they made their contribution decision. We shall in the following refer to the "early contributor" as the "leader", though the word "leader" was never used in the experiment.

2.1 The participants and procedures

We recruited participants among students at the NHH Norwegian School of Economics. A total of 272 subjects participated in ten sessions. Each session lasted approximately 90 minutes and the average payment was 464 NOK (about 80 USD)

including a show up fee of 100 NOK. The experiment was conducted in a computer lab using a web-based interface and was double blind.

Upon arrival the participants were informed about the rules of conduct, given an overview of how the experiment would proceed and introduced to the general public goods game. The participants were also informed that they would remain anonymous throughout the experiment.² Written copies of the instructions were available at the participants' desks. After the introduction, the participants were given a set of control questions in order to ensure that they had understood the nature of the public goods problem. All ten control questions had to be answered correctly before a participant could proceed to the actual experiment.

All payments were made in cash immediately after the experiment. Special care was taken so that the payment procedure ensured anonymity. The computer assigned a payment code to each of the participants, and a group of assistants who were not present in the lab during the experiment prepared envelopes containing the payments corresponding to each payment code. After bringing the envelopes to the lab, the assistants immediately left and the envelopes were handed out in accordance with the payment codes. This procedure was explained to all participants at the start of the experiment.

2.2 The treatments

All four treatments consisted of ten rounds of a public goods game with random re-matching of groups after each period. The participants were randomly assigned to groups of four and in each round they received 20 points (1 point = 1 NOK) that they either could keep to themselves or invest in a public good. Each participant's return from the public good was 0.4 times the group's total investment in the public good. After each round the participants were informed about their payoff in this round and their group's total/average contribution.

Our base treatment (B-treatment) was a standard public goods game where all group members simultaneously chose their contribution to the public good. This treatment was a replication of the experiment presented in Fischbacher and Gächter (2010). In the three leadership treatments the participants could volunteer to be the leader. If more than one group member volunteered, the leader was randomly chosen among the volunteers and asked to state his contribution. The leader contribution was announced to the three other group members before they decided on their contribution. If no one volunteered to be the leader, the round was played with simultaneous contribution decisions. The only difference between the three leadership treatments was the level of compensation given to the leader. In the "no compensation" treatment (NC-treatment) the leader received no compensation.³ In the "medium compensation" treatment (M-treatment) and the "high compensation" treatment (H-treatment), the leader

²The instructions and screenshots are provided in Appendix 2.

³The NC-treatment is related to the design in Rivas and Sutter (2011), who also study voluntary leadership without compensation. There are two important differences between their study and our NC-

received 4 and 12 points respectively to her private account as compensation for being the leader. Importantly, the compensation given to the leader in the M-treatment and the H-treatment did not change the pay off structure in the public goods game.

To summarize, a participant's payoff in each round can be represented in the following way,

$$\pi_i = 20 - c_i + 0.4 \sum_{j=1}^4 c_j + d_i \cdot f_i, \quad (1)$$

where c_i is the contribution to the public good, d_i is a binary variable indicating whether the participant was a leader and f_i indicates the compensation paid to the leader (which depended on the treatment).⁴

2.3 A conditional contribution experiment

After playing ten rounds of the public goods game, all participants took part in a second experiment similar to the the P-experiment in Fischbacher and Gächter (2010). In this P-experiment, the participants first decided on how much they wanted to contribute in a one-shot public goods game. The public goods game was the same as in the base-treatment except that 1 point = 5 NOK. After deciding on the contribution in the one-shot game, all participants were asked to fill out a conditional contribution table. For each possible average contribution level of the three other participants (rounded to whole integers), they were asked to specify how much they would want to contribute. When all participants had made their decision, three of the four participants in a group contributed according to their decision in the one-shot unconditional game, while the contribution of the fourth participant (randomly drawn) was determined by his or her conditional contribution table and the average of the three other participants. This experiment provides us with an independent measure of the social preferences. In the

treatment; first, they consider a repeated game with partner matching, and second they let subjects go ahead as leaders if they are quicker in entering a contribution than others. These differences may explain why they find a stronger effect of voluntary leadership without compensation than what we observe in the present study.

⁴Before making their contribution decision participants were also asked what they believed the other participants would do. Leaders were asked what they believed the average contribution of the followers would be given their own contribution. Followers were asked what they believed the average contribution of the two other followers would be given the leader's contribution. Participants in situations without a leader were asked what they believed the average contribution of the three other participants would be. The questions were incentivized and the participants received three points for a correct answer, two points if their answer deviated with one point from the correct answer, and one point if the answer deviated with two points. The beliefs data confirm almost exactly the analysis in Fischbacher and Gächter (2010), where it is shown that declining cooperation in a public goods game is driven by people being imperfect conditional cooperators. We also find that the beliefs of followers about others contribution are strongly correlated with the leader's contribution. It is, however, not possible to identify whether the underlying mechanism in this case is that the follower is inspired by the leader's contribution and is prone to a false consensus effect, or that the follower is not himself inspired but believes that others are so.

following, we classify a participant as a freerider if he did not contribute at all in the conditional contribution game, and as prosocial if he did contribute for some positive contribution levels of the others in the group.

3 Results

We first present treatment effects on the contributions to the public good, before we provide a brief discussion of whether it would pay off for the participants to compensate leaders, if the group itself would have to cover the costs of compensation.

3.1 Treatment effects on contributions

Figure 1 presents how the contributions to the public good evolved in the experiment. We observe that in all treatments, there is a declining trend in contributions in later rounds. In the B-treatment, we replicate almost exactly the findings of Fischbacher and Gächter (2010), the average contribution is 37.3% of the endowment in the first round, but falls to 12.5% of the endowment in the last round. The introduction of the possibility of volunteering to be the leader without any compensation (NC-treatment) increases slightly average contributions in the initial rounds, but this treatment falls short of the B-treatment in almost all of the later rounds. In contrast, offering a leader compensation increases average contributions relative to the B-treatment in all rounds (with the exception of the last round for the H-compensation treatment). Finally, we observe that the average contribution in the M-treatment is above the average contribution in the H-treatment in all rounds (with the exception of the ninth round).

[Figure 1 about here]

Figure 2 presents the treatment effects on the average contribution to the public good across rounds.⁵ We observe that the introduction of a moderate compensation to the leader substantially increases contributions, the average contribution in the M-treatment is almost 80% higher than in the NC-treatment ($p < 0.001$).⁶ A further increase in compensation is, however, detrimental for the public goods provision, the average contribution in the H-treatment is significantly lower than in the M-treatment ($p = 0.048$), but still higher than in the NC-treatment ($p < 0.001$). Finally, we observe that the average contribution in the NC-treatment is slightly below the average contribution in the B-treatment, but this difference is not statistically significant ($p = 0.721$).

⁵More detailed statistics are provided in Table A1 in Appendix 1. In the appendix, we also show OLS-regressions on the treatment effects in Table A2 and disaggregated treatment effects for rounds 1-5 and 6-10 in Table A3. We observe the same pattern of treatment effects in the first and second part of the experiment.

⁶Throughout the paper, reported p -values are from t -tests, where standard errors have been corrected for clustering on individuals where appropriate.

[Figure 2 about here]

In sum, Figure 1 and Figure 2 provide three important insights. First, the introduction of leader compensation substantially increases contributions to the public good; second, a too high leader compensation can be counterproductive; third, the reliance on participants volunteering as leaders without receiving any compensation is not a good strategy for securing public good provision.⁷

3.2 Does it pay off?

We end this section by briefly considering whether it pays off to compensate the leaders. In the present experiment, the leaders were paid by the experimenter, but let us consider whether it would have been profitable for the participants themselves if they had to share the costs of paying the leader. Figure 3 shows the net value created for the participants in each of the four treatments, where the net value is defined as the difference between the income of the participant minus the endowment and the payment to leaders. We observe that the introduction of moderate compensation is highly beneficial, it increases the net value by 38.3% compared to NC-treatment ($p = 0.044$). In contrast, the net value generated in the H-treatment is very small and much lower than in all the other treatments ($p < 0.001$).

[Figure 3 about here]

4 Mechanisms

In this section, we investigate potential mechanisms through which leader compensation affects cooperation. We first look at how the level of leader compensation affects the recruitment of leaders, before we discuss how it affects leader and follower behavior.

4.1 Recruitment of leaders

As shown in the left panel in Figure 4, the level of compensation has a significant positive effect on the participants' willingness to be leaders.⁸ Only 22.1% of the participants volunteer to be leaders in the NC-treatment, whereas 64.6% and 93.3% would like to be the leader in the M-treatment and the H-treatment, respectively.⁹ As shown

⁷It should be noted, however, that voluntary leadership without compensation has been shown to work in other settings, see Güth et al. (2007); Rivas and Sutter (2011)

⁸In Figure A1 in Appendix 1, we report data disaggregated by round.

⁹Thus, in the present experiment, the economic incentive appears to be sufficiently strong to create a positive net effect on the supply of leaders. This is consistent with the crowding-out literature (Gneezy and Rustichini, 2000), which typically finds that a sufficiently strong economic incentive dominates a crowding-out effect of intrinsic motivation.

in the right panel, this implies that in the treatments with leader compensation, there is almost always a leader in the group (94.6% of the groups in M-treatment, 99.5% of the groups in the H-treatment), whereas we only have leaders in 62.1% of the groups in the NC-treatment.

[Figure 4 about here]

The absence of a leader can clearly be detrimental for the group, since it may be seen as a signal of no one being willing to contribute much to the public good. It is, however, not straightforward to identify this effect, since followers in groups with a leader may differ from followers in groups without a leader. However, if we focus on the participants who never volunteered to be the leader, we have random assignment into groups with and without leaders in any particular round and thus a clean identification of the effect of having a leader. Regressing the follower's contribution on an indicator for the presence of a leader and controlling for round effects, we indeed find that the presence of a leader has a statistically significant positive effect: the average contribution to the public good is about 20% higher in groups with a leader ($p = 0.055$). We do not know whether this leader effect applies to the other participants in the sample, but at least it provides suggestive evidence of the importance of ensuring that someone volunteers to be a leader in the group.

4.2 Leader behavior

We now turn to a discussion of how leader compensation affects leader behavior. As shown in Figure 5, the average leader contribution is slightly lower in the H-treatment than in the NC-treatment and, in fact, slightly higher in the M-treatment, but none of these differences are statistically significant. What can explain the absence of a treatment effect on leader contribution?

[Figure 5 about here]

The level of the leader compensation may affect both who volunteers to be leaders and leader behavior.¹⁰ Importantly, a high compensation may attract more freeriders to volunteer, as we indeed observe in Figure 6.¹¹ But it may also generate a reciprocal motive in the leader or change his beliefs about the extent to which the followers will respond to his contribution. Overall, we observe from Figure 5 that the net effect on leader behavior of manipulating the level of compensation is negligible in the present experiment, we do not observe statistically significant differences in leader behavior across treatments.

[Figure 6 about here]

¹⁰See also ? and Arbak and Villeva (2007).

¹¹We observe the same pattern if we consider the relative shares of freeriders and prosocial patterns volunteering to be leaders, see Figure A3 in Appendix 1.

4.3 Follower behavior

How do the followers respond to the leader's contribution? Figure 7 reports the correlation between the leader contribution and the followers contribution, and we observe that it is very rare that the follower contributes with more than the leader (only in 7.2% of the cases). The leader's contribution appears to serve as an upper ceiling for the followers. We also observe a positive relationship between the leaders and followers contributions in all treatments; a higher contribution by the leader is, on average, followed by a higher contribution by the followers.

[Figure 7 about here]

Table 1 investigates the relationship between the leaders and followers contributions in more detail. The main coefficient of interest when comparing across treatments is the linear combination of the leader contribution variable and the interaction variable between the leader contribution variable and a dummy for whether the follower has not experienced a situation without a leader.¹² This coefficient captures the effect of the leader's contribution on the followers in the cases where the follower has not experienced a situation without a leader. We observe that in these cases, the leader's ability to lead by example is strongest in the NC-treatment and weakest in the H-treatment; an additional unit of contribution by the leader is met with 0.45 units increase in the follower's contribution in the NC-treatment, whereas it only generates an increase in the follower's contribution of 0.33 units in the H-treatment. Thus, the follower's marginal response to the leader is 36% higher in the NC-treatment than in the H-treatment, even though the difference is not statistically significant ($p = 0.161$).¹³ The effect in the M-treatment is between that of the NC-treatment and the H-treatment, and thus we observe a pattern across treatments suggesting that increased compensation creates a social crowding-out effect among the followers.

[Table 1 about here]

The analysis of mechanisms suggests that the success of the M-treatment in generating high contributions is that a moderate compensation of the leaders strikes the right balance between the need for recruiting leaders and avoiding a large social crowding-out effect. Paying no compensation to the leaders appears to make the followers even

¹²We introduce this interaction term to allow for the possibility that having experienced no one volunteering to be a leader may affect the willingness of the followers to respond to a leader's contribution in the future. We observe that this variable is positive and statistically significant ($p = 0.024$) in the NC-treatment, which means that the leader's contribution is more effective if the follower not yet has experienced a situation without a leader. The interaction effect is also positive in the two other treatments but not statistically significant (which is not surprising, given that we have very few groups without a leader in the M-treatment and H-treatment).

¹³A related interesting result has been shown in van der Heijden and Moxnes (2013), who find that followers follow the leaders more closely and make higher contributions when leading by example is costly.

more responsive to the leader's contribution at the margin, but fails to attract a sufficient number of leaders. Paying a high compensation to the leaders, on the other hand, makes it even more attractive to become the leader, but weakens the leader's ability to lead by example.

5 Concluding remarks

We have shown that monetary compensation of leaders can be used to increase public goods provision, but also that it may create a social crowding-out effect of moral motivation. We believe that these insights may be of great importance in a wide range of real life situations.

It has been estimated that nearly a billion people are involved in voluntary work throughout the world, and the voluntary sector has increasingly been recognised to play a fundamental role in society, and particularly in the provision of public goods (Salamon, Sokolowski, and Haddock, 2011). A crucial question in the organization of voluntary work is how to motivate people to take the lead and inspire others to follow. An example from daily life is the question of how to organize a youth soccer team, which typically requires inputs from many parents. How shall we make sure that someone is willing to take the responsibility of being the first mover in getting the team established? The present paper has investigated one possibility, namely to provide a monetary compensation to the leader of the team. Our experiment suggests that such a compensation may be beneficial for the effort put into the organization of the soccer team. It may make it more likely that someone steps up, and the presence of a leader will most likely generate more effort from the other parents. But this strategy must be implemented with care. A too high compensation to the leader of the team may backfire, both by weakening the power of the example and by attracting the wrong leaders.

Similar examples abound in the public and the private sector. For example, how should we think of monetary compensation to the department head at a university? A high level of compensation will probably attract many candidates for the job (including candidates with the wrong qualities), but it may also undermine the willingness of the rest of the members in the department to contribute to the provision of public goods in the department. The fact that the head of department works very hard to create a well-functioning department may not inspire a similar effort from others, if they know that he or she is highly compensated for taking the lead.

We find that compensating leaders involved in public goods provision may have both positive and negative effects, and the relative importance of these effects may depend on the level of compensation offered the leader. In particular, we have shown that a high compensation to leaders may generate a large social crowding-out effect of moral motivation that may be detrimental for public good provision. This finding may also shed light on the present debate on CEO compensation, where we have seen a surge in executive pay in the past 30 years. A main focus in this literature has been

on whether CEO compensation motivates managers to make sound business decisions (Frydman and Jenter, 2010), whereas the present paper points to the possibility that a too high CEO compensation may crowd out the intrinsic motivation of other workers in the firm. Further research, however, is needed to understand how these effects work in different types of settings, where potentially also other aspects of leadership are involved.

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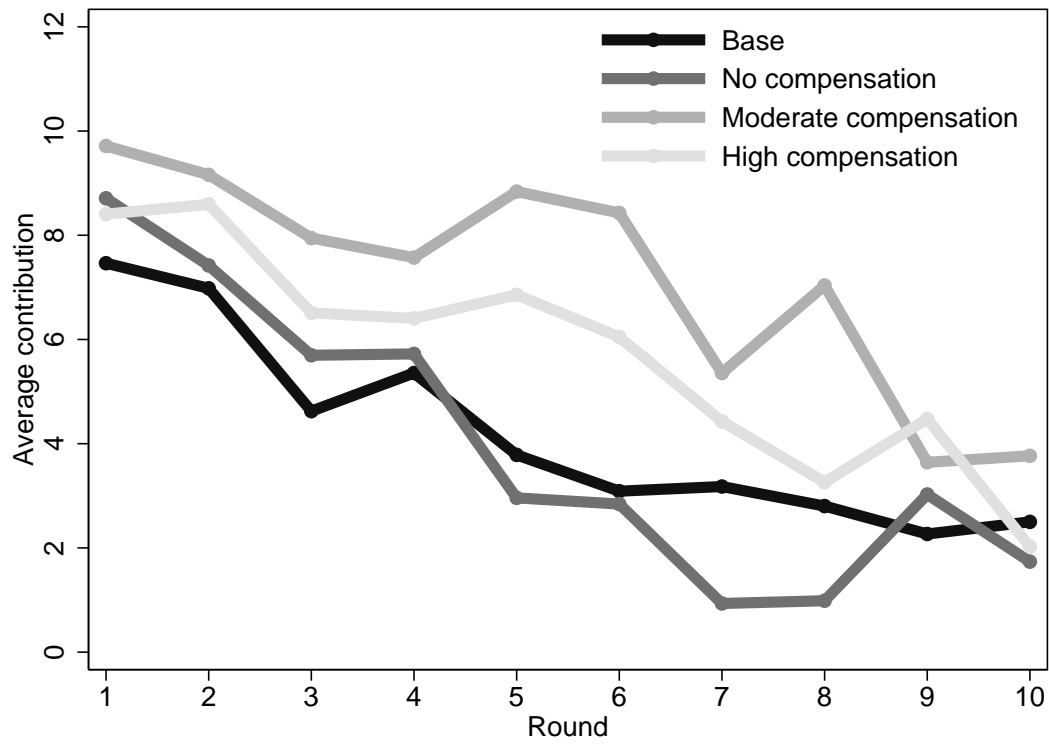


Figure 1: Contributions

Note: The figure shows contributions over the 10 rounds for all the different treatments. Both leaders and followers are included.

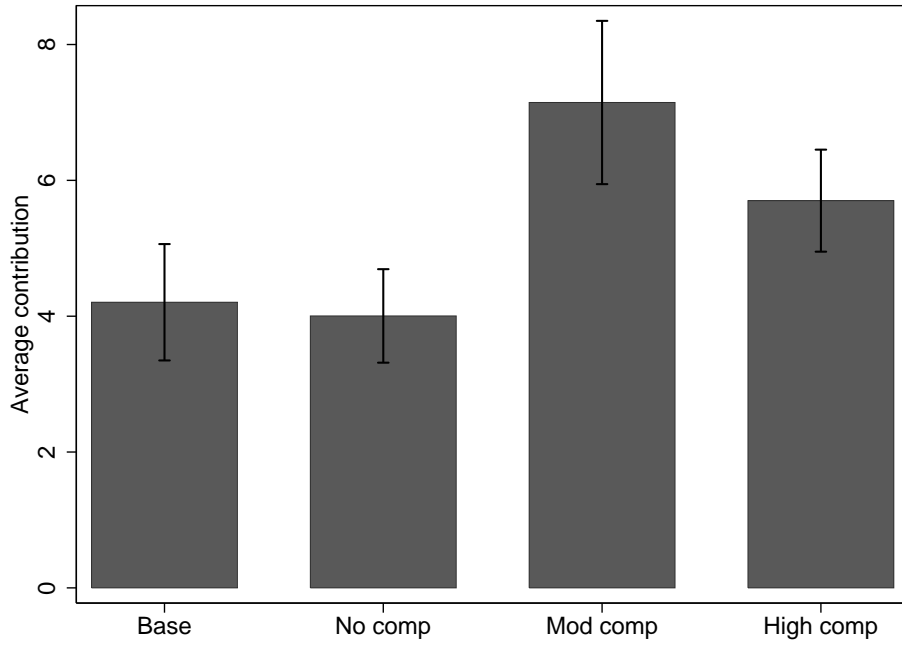


Figure 2: Average contributions

Note: The bars show average contributions for the leadership treatments. The 95 percent confidence intervals are also indicated. Note that all participants are included (also leaders). The p-value when comparing moderate and high compensation is 0.047, hence the difference is significant on a 5 percent level.

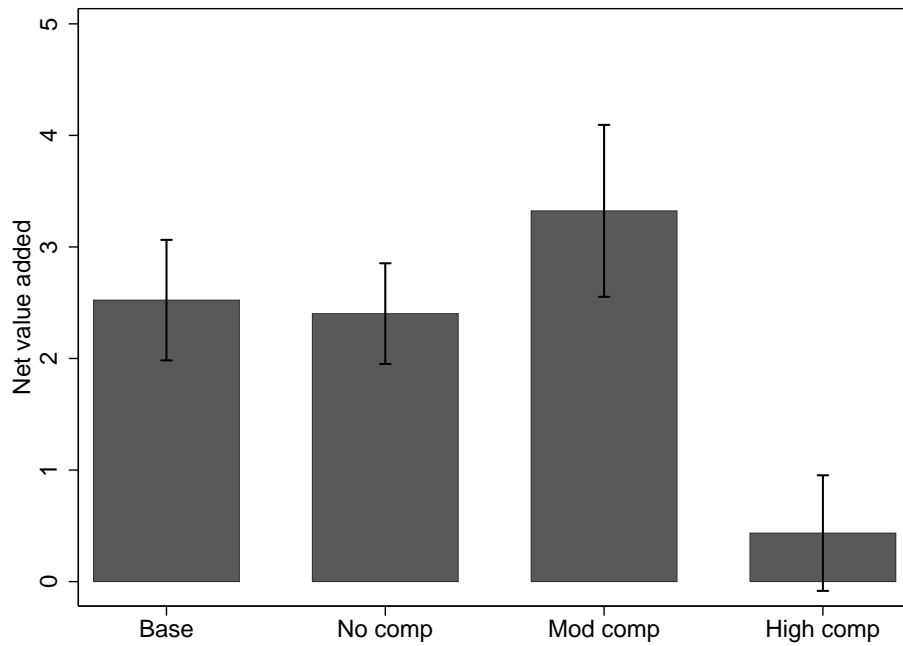
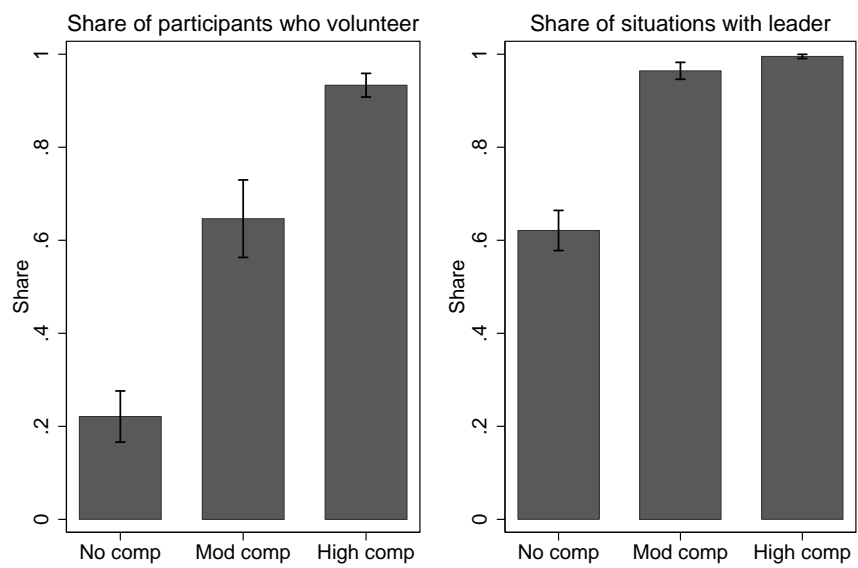


Figure 3: Net value added

Note: The bars show the return on investment for the leadership treatments. The 95 percent confidence intervals are also indicated. Note that all participants are included (also leaders). The net value added has been calculated as: Net value added = average income - endowment - average leadership payment. The p-value when comparing moderate compensation and base is 0.097. The p-value when comparing moderate compensation and no compensation is 0.044.



Graphs by volunteer

Figure 4: Recruitment

Note: The bars to the left show the share of participants volunteering for leadership in the different treatments. The figure to the right shows the share of groups that had a leader in the different treatments.

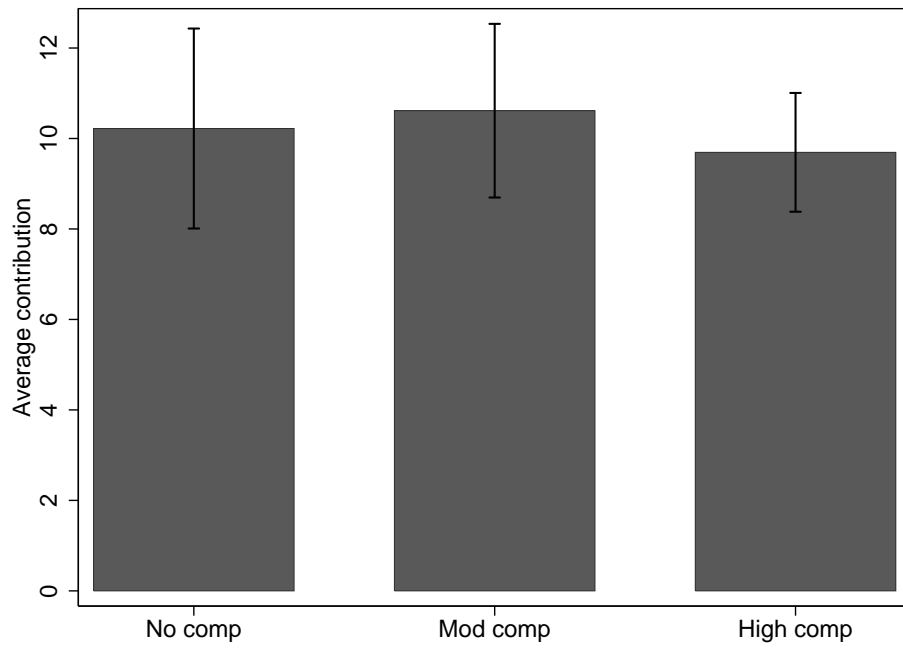


Figure 5: Leader contributions

Note: The figure shows the contributions of leaders in the different treatments. The 95 percent confidence intervals are also indicated.

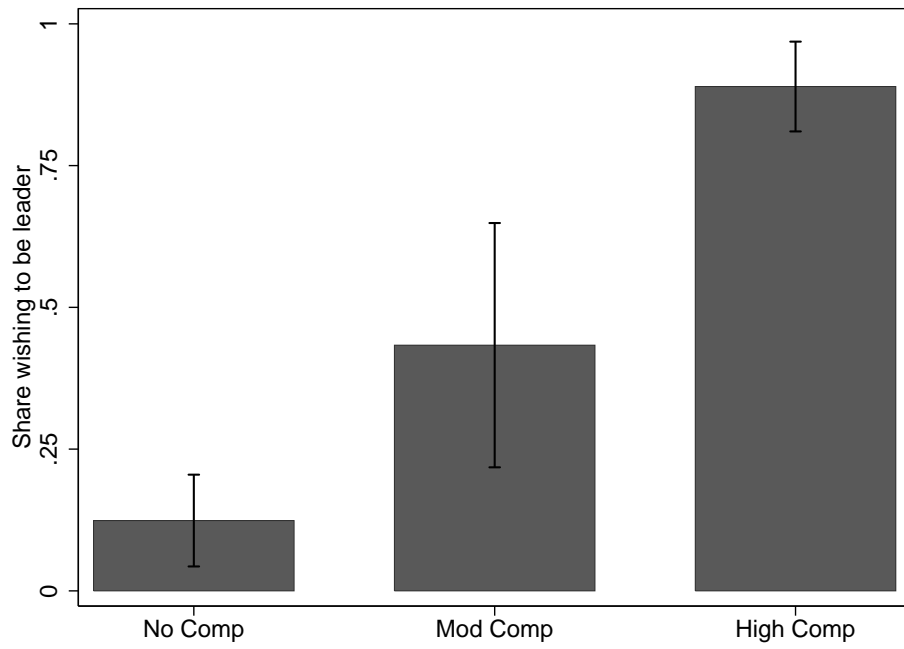


Figure 6: Leader composition across treatments

Note: The figure shows the share of freeriders (classified by the P-experiment) that volunteered for leadership in the different treatments.

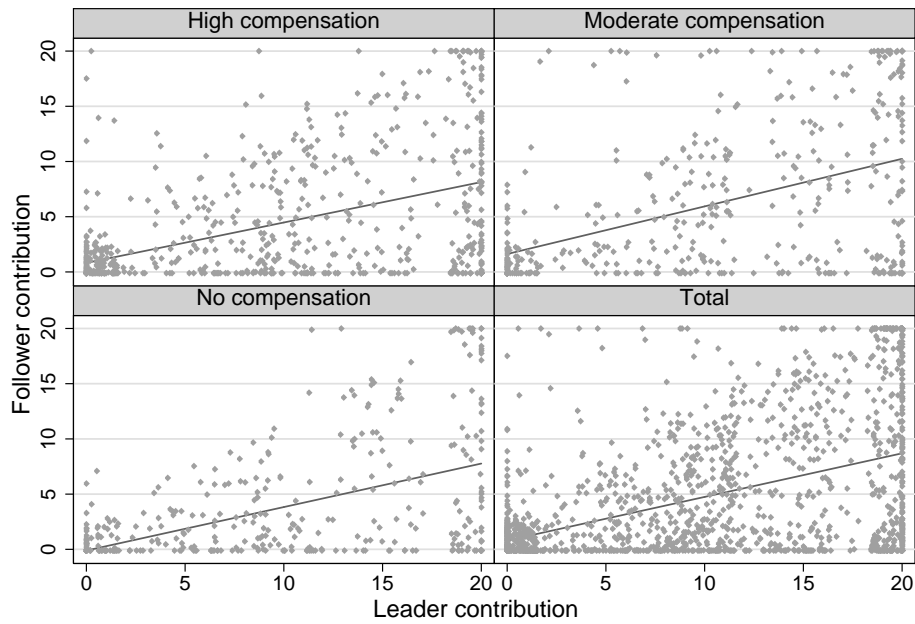


Figure 7: Follower contribution as a function of leader contribution

Note: The figure shows a scatter of follower contribution plotted against the leader's contribution for all leadership treatments separately and pooled. The line shows the linear fit.

Table 1: Follower motivation

	Followers' contribution		
	No comp	Mod comp	High comp
Leader contribution	0.253*** (0.0603)	0.296*** (0.110)	0.298* (0.163)
Always_leader	-1.485** (0.666)	-0.579 (1.047)	0.431 (0.904)
Leader_always_int	0.200** (0.0868)	0.104 (0.122)	0.0356 (0.168)
Freerider	-3.312*** (0.755)	-5.050*** (1.168)	-2.446*** (0.907)
Period	-0.269*** (0.0984)	-0.452*** (0.0990)	-0.415*** (0.0726)
Constant	3.412*** (0.869)	5.931*** (1.180)	3.629*** (1.055)
Leader_lincom	0.453*** (0.073)	0.399*** (0.060)	0.333*** (0.043)
<i>N</i>	354	405	627
<i>R</i> ²	0.347	0.322	0.297

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Standard errors in parentheses (robust and clustered on participant level). The model shows a regression of follower contribution on several explanatory variables across the leadership treatments. “Leader contribution” is the contribution of the leader in the participant’s group in this round. “Always_leader” is a dummy taking the value one if the participant in all previous rounds has been in a group with a leader. “Leader_always_int” is an interaction between “Always_leader” and “Leader contribution.” “Freerider” = 1 if the participant gave all zeros in the conditional table. “Leader_lincom” is the linear combination of leader contribution and the interaction term. Hence, “Leader_lincom” should be read as the average marginal effect on a follower’s contribution from an increase in leader contribution in situations where the followers always had encountered a leader.

Appendix 1: Leadership and incentives

Alexander W. Cappelen Bjørn Atle Reme
 Erik Ø. Sørensen Bertil Tungodden

April 12, 2013

Table A1: Descriptive statistics

	Average Contributions				
	All	No leader	Leader groups	Leader	Followers
Base treatment	4.21 (0.437)				
<i>N</i>	560				
No comp	4.00 (0.351)	1.56 (0.216)	5.49 (0.481)	10.22 (1.128)	3.92 (0.435)
<i>N</i>	760	288	472	118	354
Mod comp	7.15 (0.613)	2.90 (1.215)	7.30 (0.616)	10.61 (0.979)	6.2 (0.653)
<i>N</i>	560	20	540	135	405
High comp	5.70 (0.383)	6.25 (3.259)	5.70 (0.381)	9.69 (0.670)	4.37 (0.370)
<i>N</i>	840	4	836	209	627

Note: Standard errors in parentheses (robust and clustered on participant level).

Table A2: Treatment effects - all rounds

	Average contribution
No compensation	-0.201 (0.561)
Moderate compensation	2.941*** (0.754)
High compensation	1.496** (0.582)
Constant	4.205*** (0.437)
N	2720
R^2	0.035

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Standard errors in parentheses (robust and clustered on participant level). The model shows a regression of a participant's contribution on dummies for each treatment with the base treatment as a reference.

Table A3: Treatment effects - periods 1-5 and 6-10

	Average contribution	
	Period 1-5	Period 6-10
No compensation	0.460 (0.743)	-0.863* (0.485)
Moderate compensation	3.004*** (0.835)	2.879*** (0.791)
High compensation	1.712** (0.736)	1.280** (0.556)
Constant	5.643*** (0.525)	2.768*** (0.421)
N	1360	1360
R^2	0.026	0.059

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Standard errors in parentheses (robust and clustered on participant level). The model shows a regression of a participant's contribution on dummies for each treatment for periods 1-5 and 6-10 separately with the base treatment as a reference.

Table A4: Effect of leader

Average contribution	
Round	-0.681*** (0.0779)
Leader	1.237** (0.482)
Constant	5.339*** (0.632)
N	406
R^2	0.198

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Standard errors in parentheses (robust and clustered on participant level). The model uses a subsample of followers: those who previously never has volunteered for leadership in the experiment. The "Leader"-variable is a dummy which is equal to one if the group has a leader, and zero if not.

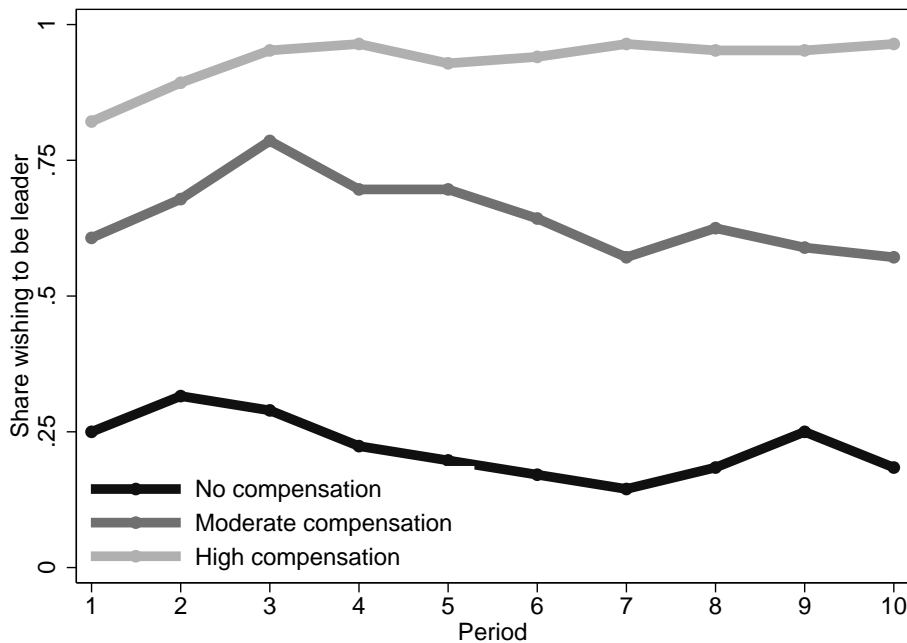


Figure A1: Recruitment

Note: The figure shows the share of participants volunteering for leadership in the different periods for each treatment.

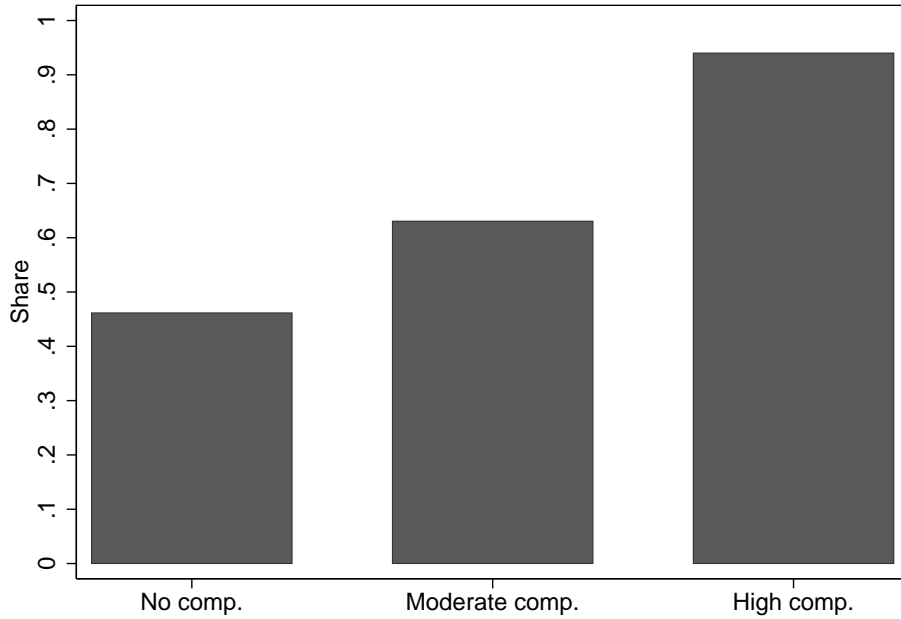


Figure A1: Leader composition across treatments

Note: The figure shows the share of freeriders that volunteered for leadership in the different treatments. Participants were classified as freeriders if they in the P-experiment chose never to contribute in the conditional contribution game. Let n_f and n_o be the number of freeriders and other regarding participants in each treatment, respectively. Also let n_f^l and n_o^l be the number of freeriders and other regarding participants volunteering to lead. The bars show $\frac{n_f^l/n_f}{n_o^l/n_o}$ for each treatment.

Appendix 2 - for online publication: Leadership and incentives

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April 12, 2013

In this web-appendix we present the instructions that were read, instructions on screen and the control questions used in the experiment. Please note that text in brackets indicates comments to the procedure that were not read by the session leaders.

Contents

1	General introduction (all treatments)	42
1.1	Screenshot - control questions	44
2	C-experiment	45
2.1	Base treatment - C-experiment	45
2.1.1	Instructions on screen for base treatment	46
2.2	No compensation treatment - C-experiment	48
2.2.1	Instructions on screen for no compensation treatment	49
2.3	Moderate compensation treatment - C-experiment	51
2.3.1	Instructions on screen for moderate compensation treatment	52
2.4	High compensation treatment - C-experiment	54
2.4.1	Instructions on screen for high compensation treatment	55
3	P-experiment	56
3.1	Instructions on screen to P-experiment	57
4	Closing remarks (all treatments)	59

1 General introduction (all treatments)

Welcome. My name is ... and I will lead this session. The instructions will be in English, since this is part of an international research project financed by the Norwegian Research Council. Please please listen carefully to the instructions.

In this experiment you can, depending on the decisions you and others make, earn more money in addition to the 100 NOK that you receive in show-up fee. Your earnings will be added to your show-up fee and paid to you in cash at the end of the session.

You are not allowed to communicate during the session. If you have questions, please ask us. Violation of this rule will lead to the exclusion from the session and all payments. If you have questions, please raise your hand. A member of the research team will come to you and answer them in private.

You will be **completely anonymous** throughout the session, which means that it will not be possible for the other participants - or us - to identify which decisions you make. At the end of the session you will get a payment code on your screen. You will be asked to write this code down on the sheet that is in the folder next to you. You will show this sheet when you leave the session, and you will then be handed over an envelope with the corresponding code, which contains the money you have earned in the session. The research assistants who have prepared the envelope will not be in the room when the envelopes are distributed, which ensures that no one can identify how much each of you have earned in the session.

We will not speak of Norwegian kroner (NOK), but rather of points. Your income will first be calculated in points. At the end of the session, the total amount of points you earned will be converted to NOK, and you will be paid accordingly.

An example:

We will now introduce you to an example, and we want to make sure that you understand this example before we proceed. You will therefore be given some control questions after the description of the example, and we will not proceed before everyone has answered correctly all these questions. A copy of this example is provided by the sheet named "explanation sheet" , and you should now take out this copy and follow carefully my description of the example.

[LEADER WAITS UNTIL EVERYONE HAS TAKEN OUT THE COPY]

Assume that you are a member of a group consisting of 4 people. Each group member has to decide on the allocation of 20 points. You can put these 20 points

into your private account or you can invest them fully or partially into a project. Each point you do not invest into the project, remains in your private account.

Your income from the private account:

You earn one point for each point you put into your private account. For example, if you put 20 points into your private account (and therefore do not invest into the project) your income amounts to exactly 20 points out of your private account. If you put 6 points into your private account, your income from this account is 6 points. **No one except you earns something from your private account.**

Your income from the project:

Each group member will profit equally from the amount you invest into the project. On the other hand, you also get a payoff from the other group members' investments. The income from the project for each group member in this example is determined as follows:

$$\text{Income from the project} = \text{sum of all contributions} \times 0.4$$

If, for example, the sum of all contributions to the project is 60 points, then you and the other members of your group **each** earn $60 \times 0.4 = 24$ points out of the project. If four members of the group contribute a total of 10 points to the project, you and the other members of your group **each** earn $10 \times 0.4 = 4$ points.

Total income:

Your total income is the sum of your income from your private account and your income from the project:

$$\begin{aligned} & \text{Income from your private account } (= 20 - \text{contribution to the project}) \\ & + \text{Income from the project } (= 0.4 \times \text{sum of all contributions to the project}) \\ & = \text{Total income in points} \end{aligned}$$

You should now move to the next screen to answer some control questions to the example.

1.1 Screenshot - control questions

<http://192.168.10.51/mmin/understandingquestions/>

Control questions:

Please answer the following control questions on the introductory example. They will help you understand the situations that you will face later in the experiment. *Please answer all the questions and submit your answers.*

1. Each group member has 20 points. Assume that none of the four group members (including you) contributes anything to the project.
 1. **What is your total income?**
 2. **What is the total income of each of the *other* group members?**
2. Each group member has 20 points. You invest 20 points in the project. Each of the other three members of the group also contributes 20 points to the project.
 1. **What is your total income?**
 2. **What is the total income of the *other* group members?**
3. Each group member has 20 points. The other 3 members contribute a total of 30 points to the project.
 1. **What is your total income, if you - in addition to the 30 points - invest 0 points into the project?**
 2. **What is your total income, if you - in addition to the 30 points - invest 10 points into the project?**
 3. **What is your total income, if you - in addition to the 30 points - invest 15 points into the project?**
4. Each group member has 20 points at his or her disposal. Assume that you invest 8 points to the project.
 1. **What is your total income if the other group members - in addition to your 8 points - contribute 7 points in total to the project?**
 2. **What is your total income if the other group members - in addition to your 8 points - contribute 12 points in total to the project?**
 3. **What is your income if the other group members - in addition to your 8 points - contribute 22 points in total to the project?**

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2 C-experiment

2.1 Base treatment - C-experiment

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED ALL THE QUESTIONS]

Everyone has now answered correctly all the control questions. You will now get a set of new instructions on the screen, please read them carefully.

[THE FOLLOWING SHOULD NOT BE READ BY LEADER, ONLY ON SCREEN. A COPY OF THE SCREENSHOT IS PROVIDED ON THE NEXT PAGE]

2.1.1 Instructions on screen for base treatment

Instructions

<http://192.168.10.51/mmin/instructionsC/>

Instructions

You will now take part in an experiment that lasts 10 rounds.

In each round, you will be part of a group consisting of **4 participants**. The group changes at **random** after every round. **So your group consists of different people in all 10 rounds.** Each member of the group has to decide how to use 20 points. You can put these 20 points into your private account or you can invest them fully or partially into a project. Each point you do not invest into the project is automatically placed into your private account. The conversion rate is:

1 point = 1.00 NOK.

Your total income in a round is the sum of your income from your private account and your income from the project:

Income from your private account (= 20 - your contribution to the project)
+ Income from the project (=0.4 x sum of all contributions to the project)
= Total income in points

In each round, you will be asked you to make two inputs.

1. First you have to **decide on your contribution to the project** in this round, that is, you have to decide how many of the 20 points you want to contribute to the project and how many points you want to put into your private account.
2. Afterwards you have to **estimate the average contribution to the project** (rounded to an integer) of other group members in this round (you will get more details later). You will be paid for the accuracy of your estimate:
 - o If your estimate is exactly right, you earn 3 points in addition to your other income from the experiment.
 - o If your estimate deviates by 1 point from the correct result, you earn 2 additional points.
 - o If your estimate deviates by 2 points from the correct result, you earn 1 additional point.
 - o If your estimate deviates by 3 or more points from the correct result, you do not earn any additional points.

You will have 90 seconds to fill in the decision screen in each round. If the time runs out you will be given 90 more seconds, but 10 points will be subtracted from your account at the end of the experiment.

After each round you will be informed about the contributions and earnings in your group in this round. We will then **randomly** select a new group for you for the next round. When you have completed all 10 rounds, you will be asked to wait until you get further instructions on the screen.

When you have completed reading these instructions, please move to the next screen. You will here be asked to wait until everyone is ready to move to the first decision screen.

I have read the instructions

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[LEADER MOVES ON WHEN EVERYONE HAS READ THE INSTRUCTIONS]

Everyone has now read the instructions, and we will therefore move to the first decision screen. Keep in mind that your group consists of different people in all 10 rounds. The instructions you have already read is also provided to you by the sheet you have next to you named "Instructions". Please follow carefully your screen.

2.2 No compensation treatment - C-experiment

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED ALL THE QUESTIONS]

Everyone has now answered correctly all the control questions. You will now get a set of new instructions on the screen, please read them carefully.

[THE FOLLOWING SHOULD NOT BE READ BY LEADER, ONLY ON SCREEN. A COPY OF THE SCREENSHOT IS PROVIDED ON THE NEXT PAGE]

2.2.1 Instructions on screen for no compensation treatment

Instructions

<http://192.168.10.51/mmin/instructionsC/>

Instructions

You will now take part in an experiment that lasts 10 rounds.

In each round, you will be part of a group consisting of **4 participants**. The group changes at **random** after every round. **So your group consists of *different* people in all 10 rounds.** Each member of the group has to decide how to use 20 points. You can put these 20 points into your private account or you can invest them fully or partially into a project. Each point you do not invest into the project is automatically placed into your private account. The conversion rate is:

1 point = 1.00 NOK.

At the beginning of each round, all members of the group will be asked whether they want to be the **early contributor** of their group **in this round**. The early contributor makes his or her choice of contribution before the others, **and the choice of the early contributor is announced to the three other members of the group before they make their decision of how much to contribute**. In all other ways, the situation is identical to the example presented in the introduction.

You have 60 seconds to answer whether you want to be the early contributor of your group. If the time runs out you will be given 60 more seconds, but 10 points will be subtracted from your account at the end of the experiment. If more than one person wants to be the early contributor in the group, the computer selects one of them randomly. If no one wants to be an early contributor, then there is no early contributor in the group. In this case, all four members of the group will make their decision at the same time.

Your total income in a round is the sum of your income from your private account and your income from the project:

Income from your private account (= 20 - your contribution to the project)
+ Income from the project (= 0.4 x sum of all contributions to the project)
= Total income in points

In each round, you will be asked to make two inputs.

1. First you have to **decide on your contribution to the project** in this round, that is, you have to decide how many of the 20 points you want to contribute to the project and how many points you want to put into your private account.
2. Afterwards you have to **estimate the average contribution to the project** (rounded to an integer) of other group members in this round (you will get more details later). You will be paid for the accuracy of your estimate:
 - o If your estimate is exactly right, you earn 3 points in addition to your other income from the experiment.
 - o If your estimate deviates by 1 point from the correct result, you earn 2 additional points.
 - o If your estimate deviates by 2 points from the correct result, you earn 1 additional point.
 - o If your estimate deviates by 3 or more points from the correct result, you do not earn any additional points.

You will have 90 seconds to fill in the decision screen in each round. If the time runs out you will be given 90 more seconds, but 10 points will be subtracted from your account at the end of the experiment. **If someone else is an early contributor in your group, then we will post his or her contribution on your contribution decision screen. Hence, you will know his or her contribution before you make your own decision.**

1 of 2

[LEADER MOVES ON WHEN EVERYONE HAS READ THE INSTRUCTIONS]

Everyone has now read the instructions, and we will therefore move to the first decision screen. Keep in mind that your group consists of different people in all 10 rounds. The instructions you have already read is also provided to you by the sheet you have next to you named "Instructions". Please follow carefully your screen.

2.3 Moderate compensation treatment - C-experiment

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED ALL THE QUESTIONS]

Everyone has now answered correctly all the control questions. You will now get a set of new instructions on the screen, please read them carefully.

[THE FOLLOWING SHOULD NOT BE READ BY LEADER, ONLY ON SCREEN. A COPY OF THE SCREENSHOT IS PROVIDED ON THE NEXT PAGE]

2.3.1 Instructions on screen for moderate compensation treatment

Instructions

<http://192.168.10.51/mmin/instructionsC/>

Instructions

You will now take part in an experiment that lasts 10 rounds.

In each round, you will be part of a group consisting of **4 participants**. The group changes at **random** after every round. **So your group consists of *different* people in all 10 rounds.** Each member of the group has to decide how to use 20 points. You can put these 20 points into your private account or you can invest them fully or partially into a project. Each point you do not invest into the project is automatically placed into your private account. The conversion rate is:

1 point = 1.00 NOK.

At the beginning of each round, all members of the group will be asked whether they want to be the **early contributor** of their group **in this round**. The early contributor makes his or her choice of contribution before the others, **and the choice of the early contributor is announced to the three other members of the group before they make their decision of how much to contribute**. The early contributor will be paid **4** points in addition to what he or she earns from the private and public account. In all other ways, the situation is identical to the example presented in the introduction.

You have 60 seconds to answer whether you want to be the early contributor of your group. If the time runs out you will be given 60 more seconds, but 10 points will be subtracted from your account at the end of the experiment. If more than one person wants to be the early contributor in the group, the computer selects one of them randomly. If no one wants to be an early contributor, then there will be no early contributor in the group. In this case, all four members of the group will make their decision at the same time.

If you are a **late contributor** your total income in a round is the sum of your income from your private account and your income from the project:

Income from your private account (= 20 - your contribution to the project)
+ Income from the project (=0.4 x sum of all contributions to the project)
= Total income in points

If you are an **early contributor** your total income in a round is the sum of your income from your private account, your income from the project and the additional payment given to the early contributor:

Income from your private account (= 20 - your contribution to the project)
+ Income from the project (=0.4 x sum of all contributions to the project)
+ Payment for being an early contributor (=4)
= Total income in points

In each round, you will be asked to make two inputs.

1. First you have to **decide on your contribution to the project** in this round, that is, you have to decide how many of the 20 points you want to contribute to the project and how many points you want to put into your private account.
2. Afterwards you have to **estimate the average contribution to the project** (rounded to an integer) of other group members in this round (you will get more details later). You will be paid for the accuracy of your estimate:
 - o If your estimate is exactly right, you earn 3 points in addition to your other income from the experiment.
 - o If your estimate deviates by 1 point from the correct result, you earn 2 additional points.

1 of 2

[LEADER MOVES ON WHEN EVERYONE HAS READ THE INSTRUCTIONS]

Everyone has now read the instructions, and we will therefore move to the first decision screen. Keep in mind that your group consists of different people in all 10 rounds. The instructions you have already read is also provided to you by the sheet you have next to you named "Instructions". Please follow carefully your screen.

2.4 High compensation treatment - C-experiment

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED ALL THE QUESTIONS]

Everyone has now answered correctly all the control questions. You will now get a set of new instructions on the screen, please read them carefully.

[THE FOLLOWING SHOULD NOT BE READ BY LEADER, ONLY ON SCREEN. A COPY OF THE SCREENSHOT IS PROVIDED ON THE NEXT PAGE]

2.4.1 Instructions on screen for high compensation treatment

Instructions

<http://192.168.10.51/mmin/instructionsC/>

Instructions

You will now take part in an experiment that lasts 10 rounds.

In each round, you will be part of a group consisting of **4 participants**. The group changes at **random** after every round. **So your group consists of *different* people in all 10 rounds.** Each member of the group has to decide how to use 20 points. You can put these 20 points into your private account or you can invest them fully or partially into a project. Each point you do not invest into the project is automatically placed into your private account. The conversion rate is:

1 point = 1.00 NOK.

At the beginning of each round, all members of the group will be asked whether they want to be the **early contributor** of their group **in this round**. The early contributor makes his or her choice of contribution before the others, **and the choice of the early contributor is announced to the three other members of the group before they make their decision of how much to contribute**. The early contributor will be paid **12** points in addition to what he or she earns from the private and public account. In all other ways, the situation is identical to the example presented in the introduction.

You have 60 seconds to answer whether you want to be the early contributor of your group. If the time runs out you will be given 60 more seconds, but 10 points will be subtracted from your account at the end of the experiment. If more than one person wants to be the early contributor in the group, the computer selects one of them randomly. If no one wants to be an early contributor, then there will be no early contributor in the group. In this case, all four members of the group will make their decision at the same time.

If you are a **late contributor** your total income in a round is the sum of your income from your private account and your income from the project:

Income from your private account (= 20 - your contribution to the project)
+ Income from the project (=0.4 x sum of all contributions to the project)
= Total income in points

If you are an **early contributor** your total income in a round is the sum of your income from your private account, your income from the project and the additional payment given to the early contributor:

Income from your private account (= 20 - your contribution to the project)
+ Income from the project (=0.4 x sum of all contributions to the project)
+ Payment for being an early contributor (=12)
= Total income in points

In each round, you will be asked to make two inputs.

1. First you have to **decide on your contribution to the project** in this round, that is, you have to decide how many of the 20 points you want to contribute to the project and how many points you want to put into your private account.
2. Afterwards you have to **estimate the average contribution to the project** (rounded to an integer) of other group members in this round (you will get more details later). You will be paid for the accuracy of your estimate:
 - o If your estimate is exactly right, you earn 3 points in addition to your other income from the experiment.
 - o If your estimate deviates by 1 point from the correct result, you earn 2 additional points.

1 of 2

[LEADER MOVES ON WHEN EVERYONE HAS READ THE INSTRUCTIONS]

Everyone has now read the instructions, and we will therefore move to the first decision screen. Keep in mind that your group consists of different people in all 10 rounds. The instructions you have already read is also provided to you by the sheet you have next to you named "Instructions". Please follow carefully your screen.

3 P-experiment

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED THE C-EXPERIMENT]

We will now conduct another experiment, please follow carefully the instructions on the screen.

[THE FOLLOWING SHOULD NOT BE READ BY LEADER, ONLY ON SCREEN. A COPY OF THE SCREENSHOT IS PROVIDED ON THE NEXT PAGE]

3.1 Instructions on screen to P-experiment

Instructions

<http://192.168.10.51/mmin/level50/>

Instructions

This experiment will only be conducted **once** and is the last experiment in the session.

You will be asked to make a decision in a situation identical to the example presented in the introduction. Your group consists of **4 participants**, and the formation of groups is random. Each member of the group has to decide how to use 20 points. Each point you do not invest into the project is automatically placed in your private account. The conversion rate is:

The conversion rate in this experiment:

1 point = 5.00 NOK.

Your total income in this experiment is the sum of your income from your private account and that from the project:

$$\begin{aligned} & \text{Income from your private account (= 20 - contribution to the project)} \\ & + \text{Income from the project (=0.4 x sum of all contributions to the project)} \\ & = \text{Total income in points} \end{aligned}$$

Each subject has to make two types of decisions in this experiment, which we refer to below as the "**unconditional contribution**" and the "**contribution table**".

- Unconditional contribution:** Your first task will be to decide how many of the 20 points you want to invest into the project when you have no information about the contributions of the other group members.
- Contribution table:** Your second task is to fill in a "contribution table" where you indicate how many points **you** want to contribute to the project **for each possible average contribution of the other group members** (rounded to the nearest integer). To illustrate, consider the table below, which will be presented to you in the experiment.

Your conditional contribution to the project (Contribution schedule)

0:	<input style="width: 60px;" type="text"/>	7:	<input style="width: 60px;" type="text"/>	14:	<input style="width: 60px;" type="text"/>
1:	<input style="width: 60px;" type="text"/>	8:	<input style="width: 60px;" type="text"/>	15:	<input style="width: 60px;" type="text"/>
2:	<input style="width: 60px;" type="text"/>	9:	<input style="width: 60px;" type="text"/>	16:	<input style="width: 60px;" type="text"/>
3:	<input style="width: 60px;" type="text"/>	10:	<input style="width: 60px;" type="text"/>	17:	<input style="width: 60px;" type="text"/>
4:	<input style="width: 60px;" type="text"/>	11:	<input style="width: 60px;" type="text"/>	18:	<input style="width: 60px;" type="text"/>
5:	<input style="width: 60px;" type="text"/>	12:	<input style="width: 60px;" type="text"/>	19:	<input style="width: 60px;" type="text"/>
6:	<input style="width: 60px;" type="text"/>	13:	<input style="width: 60px;" type="text"/>	20:	<input style="width: 60px;" type="text"/>

The numbers in the table are the possible (rounded) average contributions of the other group members to the project. You simply have to insert how many points you will contribute to the project into each input box. You have to make an entry into each input box. For example, you will have to indicate how much you contribute to the project if the others contribute 0 points to the project, how much you contribute if the others contribute 1, 2, or 3 points, etc. You can insert any integer numbers from 0 to 20 in each input box. Once you have made an entry in each input box, click "OK".

After all participants of the experiment have made an unconditional contribution and have filled in their contribution table, the computer randomly selects one of the group members. The contribution table will be the payoff-relevant decision for the randomly selected member, the unconditional contribution will be the payoff-relevant decision for the other three group members. You obviously do not know whether the random mechanism will select you when you

1 of 2

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED READING THE INSTRUCTIONS]

Everyone has now read the instructions, and we will therefore move to the decision screen. The instructions you have already read is also provided to you by the sheet you have next to you named "Instructions". Please follow carefully your screen. When you have made your decisions, please wait for further instructions.

4 Closing remarks (all treatments)

[LEADER MOVES ON WHEN EVERYONE HAS COMPLETED THE P-EXPERIMENT]

Everyone has now completed the second experiment. We should now like to ask you a few questions before we present the payment screen that shows how much you have earned in the experiment.

The earnings consist of: your income from the first experiment (including your income from your correct estimates) + your income from the second experiment = total income from both experiments + 100 NOK show up fee.

There will also be a payment code on the payment screen. As soon as the envelopes with payment have been brought into the lab, we will start the payment process. On request, show the payment code to my colleague and he will hand you the envelope with this code. This envelope contains your earnings. Please remain seated until we read your payment code.

Since we will conduct further sessions today, please do not talk to anyone about the experiment before tomorrow.

You can now start answering the questions and then move to the payment screen. This part ends the session. On behalf of the research group, I should like to thank you for your participation.

Issued in the series Discussion Papers 2012

2012

- 01/12 February, **Ola Honningdal Grytten**, "The Protestant Ethic and the Spirit of Capitalism the Haugian Way".
- 02/12 February, **Alexander W. Cappelen**, Rune Jansen Hagen, **Erik Ø. Sørensen**, and **Bertil Tungodden**, «Do non-enforceable contracts matter? Evidence from an international lab experiment".
- 03/12 February, **Alexander W. Cappelen** and **Bertil Tungodden**, "Tax policy and fair inequality".
- 04/12 March, Mette Ejrnæs and **Astrid Kunze**, «Work and Wage Dynamics around Childbirth".
- 05/12 March, **Lars Mathiesen**, "Price patterns resulting from different producer behavior in spatial equilibrium".
- 06/12 March, **Kurt R. Brekke**, Luigi Siciliani, and Odd Rune Straume, "Hospital competition with soft budgets".
- 07/12 March, **Alexander W. Cappelen** and **Bertil Tungodden**, "Heterogeneity in fairness views - a challenge to the mutualistic approach?"
- 08/12 March, Tore Ellingsen and **Eirik Gaard Kristiansen**, "Paying for Staying: Managerial Contracts and the Retention Motive".
- 09/12 March, **Kurt R. Brekke**, Luigi Siciliani, and Odd Rune Straume, "Can competition reduce quality?"
- 10/12 April, Espen Bratberg, **Øivind Anti Nilsen**, and Kjell Vaage, "Is Reciprocity of Disability Pension Hereditary?"
- 11/12 May, **Lars Mathiesen**, **Øivind Anti Nilsen**, and **Lars Sjørgard**, "A Note on Upward Pricing Pressure: The possibility of false positives".
- 12/12 May, **Bjørn L. Basberg**, "Amateur or professional? A new look at 19th century patentees in Norway".
- 13/12 May, Sandra E. Black, Paul J. Devereux, Katrine V. Løken, and **Kjell G. Salvanes**, "Care or Cash? The Effect of Child Care Subsidies on Student Performance".

- 14/12** July, **Alexander W. Cappelen**, Ulrik H. Nielsen, **Erik Ø. Sørensen**, **Bertil Tungodden**, and Jean-Robert Tyran, “Give and Take in Dictator Games”.
- 15/12** August, **Kai Liu**, “Explaining the Gender Wage Gap: Estimates from a Dynamic Model of Job Changes and Hours Changes”.
- 16/12** August, **Kai Liu**, **Kjell G. Salvanes**, and **Erik Ø. Sørensen**, «Good Skills in Bad Times: Cyclical Skill Mismatch and the Long-term Effects of Graduating in a Recession”.
- 17/12** August, **Alexander W. Cappelen**, **Erik Ø. Sørensen**, and **Bertil Tungodden**, «When do we lie?».
- 18/12** September, **Kjetil Bjorvatn** and Tina Søreide, «Corruption and competition for resources”.
- 19/12** September, **Alexander W. Cappelen** and Runa Urheim, “Pension Funds, Sovereign-wealth Funds and Intergenerational Justice”
- 20/12** October, **Ingvild Almås** and **Erik Ø. Sørensen**, “Global Income Inequality and Cost-of-Living Adjustment: The Geary–Allen World Accounts”.
- 21/12** November, **Ingvild Almås** and Åshild Auglænd Johnsen, “The cost of living in China: Implications for inequality and poverty”.
- 22/12** December, **Alexander W. Cappelen**, **Tom Eichele**, **Kenneth Hugdahl**, **Karsten Specht**, **Erik Ø. Sørensen**, and **Bertil Tungodden**, “Fair inequality: a neureconomic study”.
- 23/12** December, **Ingvild Almås**, **Alexander W. Cappelen**, **Kjell G. Salvanes**, **Erik Ø. Sørensen**, and **Bertil Tungodden**, «Willingness to compete: family matters».
- 24/12** December, **Ingvild Almås**, **Alexander W. Cappelen**, **Kjell G. Salvanes**, **Erik Ø. Sørensen**, and **Bertil Tungodden**, «Willingness to compete in a gender equal society».
- 25/12** December, Ari Hyytinen, **Frode Steen**, and Otto Toivanen, “Anatomy of Cartel Contracts”.
- 26/12** December, **Sandra E. Black**, Paul J. Devereux, and **Kjell G. Salvanes**, “Losing Heart? The Effect of Job Displacement on Health”.
- 27/12** December, **Frode Steen** and **Lars Sörgard**, “Disadvantageous Semicollusion: Price competition in the Norwegian airline industry”

2013

- 01/13 January, **Lukáš Lafférs**, "Identification in Models with Discrete Variables".
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- 03/13 February, **Ragnhild Balsvik** and Line Tøndel Skaldebø, "Guided through the 'Red tape'? Information sharing and foreign direct investment".
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- 09/13 **Liam Brunt** and Edmund Cannon, "The truth, the whole truth, and nothing but the truth: the English Corn Returns as a data source in economic history, 1770-1914".
- 10/13 **Alexander W. Cappelen**, **Bjørn-Atle Reme**, **Erik Ø. Sørensen**, and **Bertil Tungodden**, "Leadership and incentives".



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