Emotional Leadership in an Intergroup Conflict Game Experiment

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Abstract

This article introduces leadership in a Contest group contest game. More specifically, it studies the effects of leading-by-example and emotional leadership in a behavioral experiment, but also theoretically. In this experiment leaders lead-by-example by contributing publicly to the contest before followers and can show emotional leadership by selecting basic emotions that are subsequently evoked in their followers. Emotions are evoked in this study by showing specially selected and validated movie clips.

Overall, we find that leaders contribute more than followers and that leading-by-example as well as emotional leadership have a significant effect on the behavior of followers. Although, leaders do not always use these mechanisms wisely. This behavior contrasts strikingly with the Nash equilibrium predictions. Furthermore, we find that both leaders and followers contribute more then predicted by a standard Nash equilibrium. These results are shown to be in line with the affective tie model of van Dijk and van Winden (1997), the imitation model of Cartwright and Patel (2010), and a psychological costs model of Dufwenberg et al. (2011).

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1 Introduction

The ability of leaders to make others follow their lead is of utmost importance to them. Whether it concerns the ability of politicians leading their citizens into, or away from, war or that of managers leading their teams into competition, it often requires not just a compelling rationale but also an emotional address as well as an example of direction by the leader. For example, many politicians combined these latter two responses in their speeches after the recent tragic shootings in Paris and San Bernadino. They evoke emotions of anger towards the enemy or other party, while they (try to) convey a message of personal commitment, restraint, and hope. Perhaps the best example of a leader leading-by-example as well as using emotional leadership might be Dr. Martin Luther King, Jr. who not only inspired and advanced the U.S. civil rights movement with his speeches but also led activists in marches, demonstrations and sit-ins. These two forms of leadership, leading-by-example and emotional leadership are investigated in this experimental study.

Hermalin (1998) shows that leading-by-example might be a useful signaling tool if the leader knows more about the environment than his or her followers. For sequential public good games Potters et al. (2007), Gächter et al. (2010) and Arbak and Villeval (2013) find experimental evidence that leading-by-example indeed leads to more cooperative outcomes. This effect is less strong however if the leader does not possesses more information than the follower(s). To the best of our knowledge, as yet no experimental work has been done on the effect of leadership in the game that we will study in this paper, a conflict game (related to Hirshleifer (1988) and Skaperdas (1992); for surveys, see: Garfinkel and Skaperdas (2007) and Abbink (2012)).[1] This is somewhat surprising given the natural link between group conflict and leadership.

Humphrey (2002) describes the importance of emotional leadership and states that "a key leadership function is to manage the emotions of group members"(Humphrey, 2002, p.498). Furthermore, this meta-study finds that the emotional display of leaders has a significant influence on the behavior of followers. This research concers a work environment,

[1] Conflict games are related to rent-seeking games based on Tullock (1980), where typically a fixed prize is contested and the winner (only) loses the resources that s/he spent on the contest (for surveys, see: Konrad (2009); Sheremeta (2015) (on group contests), and Dechenaux et al. (2015) (on experiments). The main difference is that in a conflict game all the endowments are at stake (no private account is available as a safe haven) as the winner can take all net of conflict expenditures. This makes the prize endogenous, because both the winner's and the loser's resources spent on conflict are wasted.

showing the importance of these mechanisms in that environment, but leaves open questions regarding causality. It makes clear, though, that if we want to get a better understanding of real leader-follower relationships, it is important to know how leadership is obtained. As Humphrey notes, leaders have (or are perceived to have) different characteristics than followers. As Hermalin does, he stresses the importance of leadership being a voluntary activity that is often costly to obtain. To mimic such a situation, we will use the auction design of Concina and Centorrino (2013). In their design the position of a leader is auctioned off, using a second-price sealed-bid auction, so that the one who wants to be the leader most will be the leader during the experiment.

In our experiment subjects play a repeated conflict game as member of a fixed group. We allow leaders to have some emotional control over their followers by having them evoke a basic (or neutral) emotion in their followers. These emotions are evoked with the use of specially selected and validated video clips that are displayed in between the repetitions of the game. Besides this emotional control, leaders can also lead by example as they move first in every period of the conflict game. To get some better insights in the experimental results we develop and analyze different behavioral models and compare their predictions with the data.

Overall, we do not find a significant treatment effect as groups with a leader who can use this emotion evoking mechanism do not contribue more (or less) than groups without this emotional control. Besides this, our main findings are that emotional leadership, but especially leading-by-example is an effective instrument for a leader to influence the behavior of group members, and, furthermore, that the behavioral data can be best explained by models including either imitation (Cartwright and Patel, 2010), psychological costs (Dufwenberg et al., 2011) or affective ties (van Dijk and van Winden, 1997).

The organisation of the paper is as follows. In section 2 the game will be introduced and the main theory is developed and analyzed. Section 3 presents the experimental design, while section 4 goes into the results. Section 5 closes with a concluding discussion.

2 The Game

In comparison to extant conflict games (see, e.g., Abbink, 2012), our game is novel in that it introduces groups (of four) with leaders. All players are endowed with Y and have to decide on their contribution to their group's conflict (where we will focus on the contribution of a generic member i of one of the groups: C_i). One player – the leader – first makes a contribution that is observed by the other group members – the followers – who subsequently and simultaneously make their contribution decisions. The winner of the conflict is determined by a lottery, where the odds that the group of i wins, $P(Win_i)$, is determined by the relative investment of resources into the conflict: $P(Win_i) = \frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j}$. The group that wins the conflict gets all the remaining resources. More specifically, player i of the winning group keeps: $Y - C_i$ and gets, in addition, one-fourth of the remaining resources of the other group: $Y - \frac{1}{4}\sum_{j=1}^{4} C_j$. Members of the losing group are left with nothing. If both groups contribute zero to the conflict ($C = 0$ for all players), however, there is no conflict and every player keeps his or her endowment Y. This outcome is Pareto efficient, but not a best response as every player would gaurantee its group to win by making a minimal contribution. The expected payoff of player i ($E\pi_i$) thus equals (if $C \neq 0$ for at least one of the players):

$$E\pi_i = \frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j}(Y - \frac{1}{4}\sum_{j=1}^{4} C_j + Y - C_i) \tag{1}$$

Appendix A.1 shows that the standard Nash equilibrium, assuming risk neutrality, entails that a leader's contribution (C_L) equals: $C_L = 0$, while a follower's contribution (C_F) equals: $C_F = \frac{8}{31}Y$. As a consequence, the expected payoff of a leader is: $\frac{28}{31}Y$, while that of a follower equals: $\frac{24}{31}Y$. It might seem counterintuitive that the leader contributes less than the followers, let alone zero. By contributing first, however, the leader is able to free-ride on the contributions of the others, who will have an incentive to contribute more due to the low (zero) contribution made by the leader. This is an interesting finding in itself, as leaders are typically seen as giving the good example. These predicted contributions (labeled *Nash* below) are notably different from the ones predicted for a completely simultaneous game with no leader (labeled *Nash Simultaneous*), where all players contribute $C = \frac{1}{5}Y$ and player's expected payoffs are $\frac{4}{5}Y$.[2]

In the rest of this section we further discuss the role of leaders and derive predictions

[2] Appendix A.2 presents an equilibrium analysis for risk-averse players. We do so for the more tractable case ot the simultaneous game, as the intuition is the same for both the sequential as well as the simultaneous game, namely, that agents will contribute more when they dislike risk, to decrease the chance of losing everything.

for different behavioral models.

2.1 Leaders, ties, and psychological preferences

Typical findings of group contest experiments are that players contribute more to the contest than the Nash equilibrium prediction and, in a repeated game, players start to contribute more after a loss. Both of these findings, are confirmed in our experiment. Interestingly, also the effect of leadership in a contest game has been studied before. Eisenkopf (2014) finds that the advise of managers that have only an advisory role, as a third party, in a two person contest game has a significant effect on contributions to the contest. This might be an indication that also in our experiment followers may not contribute less when they observe a higher contribution by their leader, as is derived from the best response function above, but more.

The fact that in this study the leader contributes before the others and that this contribution is observable for followers (own group members) allows the leader not only to free-ride at the expense of the followers, as predicted by the standard Nash equilibrium, but might also allow him or her to *lead-by-example*. By leading-by-example we mean that higher contributions from the leader could potentially influence the contributions made by their followers in a positive way as is, for instance, observed by Güth et al. (2007), Potters et al. (2007), Gächter et al. (2012), and Concina and Centorrino (2013) in public good game experiments, who find that if leaders contribute more to a public good so do the followers. In these settings the leader typically contributes more than his or her followers, in contrast to the Nash prediction for these games. This may be due to followers believing that the leader has more or better information about the situation, due to a social norm induced by the leader, or because the followers feel emotionally attached to their leader (Hermalin, 1998; Popper, 2000).

Not only do followers bond with their leader there is also evidence that leaders care for the outcomes of their group and feel pride, when their group performs well, or guilt, when their group performs poorly (Arbak and Villeval, 2013; Concina and Centorrino, 2013). To understand why following the leader might be profitable for the followers and why the leader has an incentive to not just free ride on the contributions of the followers by letting them compensate for his or her lack of contributions, it is important to note that the game, when observed from within the group, is like a public good game with an interior Nash equilibrium. Beyond a certain point, further contributing is good for the other members of the group but not a best-response for an individual. In the rest of this subsection we will analyze different behavioral models that could be relevant for the game described above and indicate what behavior they predict. The exact predictions as well as the derivation of these predictions can be found in appendix A.

In sequential games, like ours, reciprocity can be an important element; see, for instance, Cox (2004) and Fehr and Gächter (2000). Dufwenberg and Kirchsteiger (2004), elaborating on the work of Rabin (1993), developed a model for sequential games where players reciprocate kind actions. In this model whether or not an action is seen as kind depends on a player's belief of what the other player(s) will do, and a reference point or action (that can be seen as a neutral action). Given the large number of potential choices by all the players it is unclear to us, though, what exactly the predictions of this model would be for our game.

Another model that allows for the dynamics described above is a simplified version of the ties model by van Dijk and van Winden (1997). This model is especially relevant in the emotional context of our experiment as the reciprocity (or lack thereof) is caused by a mechanism of affective impulses. These impulses are generated by the behavior of the other player(s). If their behavior is better than what is taken as a reference point, this player will start to weigh the utility of the respective player more when taking a decision. This weight is typically represented by a value α. This fits in nicely with the followers in our game, who might not only care about their own payoff but may also (start to) care about the payoffs of the rest of the group, through a tie with a caring leader. How much they would care depends on the contribution of the leader.

A model that can, in principle, generate similar behavioral predictions as the affective ties model would be a model with psychological preferences as in Dufwenberg et al. (2011) and McCannon (2015). In these models players are assumed to suffer from guilt aversion or psychological costs from deviating from a certain norm. The leader faces costs that are a (linear) function of the distance between his or her contribution and an exogenous reference point. The followers face similar cost but their reference point is the contribution of the leader. Social preference models like the inequality aversion models of Fehr and Schmidt

(1999) and Bolton and Ockenfels (2000), could potentially also lead to higher contributions by the leader but would draw the equilibrium towards the equilibrium of the simultaneous game as leaders would like to contribute more (to diminish inequality), while followers would like to contribute less.

What makes both the social ties model and the psychological preferences model distinct from these fixed social preference models in this context is that the contribution of the leader could positively affect the contribution of the followers as it creates a bonding (in the ties model) or sets a reference point (in the psychological preferences models). This could potentially overcome the 'substitution effect' of followers contributing more if the leader contributes less, and result in leaders contributing more instead of less. Another finding that would support these models over the other models of social preferences would thus be a positive relationship between the change in the contribution of the leader and that of the followers (when controlling for history), as a larger impulse generated or a higher reference point set by the leader should lead to higher contributions by the followers.

Another potentially relevant model is by Cartwright and Patel (2010). Their model distinguishes three types of players: strategists, imitators and independents, in a sequential public good game, but the model translates to our game as well. In their model first movers are assumed to have an incentive to contribute if there are enough imitators in the subject pool. Strategists will use this and would want to contribute early to set a high standard. This can be translated to our game assuming that the strategists are the leaders who contribute relatively much. Some of the followers (the imitators) will then follow suit, while independents always do the same regardless of the contribution of the leader. This could generate high contributions by leaders and a positive relationship between the contribution of the leader and that of the followers.

2.2 Emotional leadership

Salovey and Mayer (1990) state that managing the emotions of followers is an important task of managers. One reason they mention for this is that followers look at leaders for a sense of direction in uncertain times. As participants in the conflict game may find it difficult to define an optimal strategy, this may hold for our setting as well. Law et al. (2004) find that positive emotions appear to correlate with better job satisfaction. Furthermore, it is interesting to note that more empathetic team members seem more likely to become a leader. Together with the observation by Myers (2015) that prosocials are more likely to participate in collective action, this is suggestive of leaders caring more for the group, and in line with a higher α-value in the affective social ties model. For a review on (strategic) emotional leadership, see Humphrey (2002).

3 Experimental Design

Participants played 12 periods of the conflict game in fixed groups, of 4 participants. In every period they started with an endowment of 20 tokens. The exchange rate for tokens was 10 tokens = 1 euro. Before the first, fourth, seventh and tenth period a short video clip, taking less than 4 minutes, was shown. The content of those clips varied per treatment. After the instructions (reproduced in appendix B) but before the twelve periods, an auction determined who would be the leader of the group. This was a second-price sealed-bid auction, as in Concina and Centorrino (2013), with all participants getting 20 tokens to bid. If a bid was successful 20 tokens minus the number of tokens bid by the second highest bidder were added to the earnings of this participant, otherwise 20 tokens were added. Players were paid for every round they played.

The experiment took place in April and May 2015 at the CREED laboratory of the University of Amsterdam. In total, 240 participants took part in 16 sessions.[3] These sessions typically lasted for about one hour. Average earnings amounted to 14.90 euros.

3.1 Treatments

In the Baseline treatment (Baseline) the video clips shown to all subjects were neutral. Leaders and followers saw the same clips in the same period and leaders had no other task then to contribute first. This allowed them to (only) lead by example in a neutral environment. As in all other treatments, players were informed after every round about the contributions of their individual team members, the total contribution of the other group as well as their own earnings. All treatments had 80 participants.

Besides contributing first, leaders in the Strategic Emotion (SE) treatment could also decide what emotion to induce in their followers. They could choose a basic emotion or the

[3] Another session had to be ended early because of software problems and is therefore neglected here.

neutral state, but could not see or choose the actual video clip used to induce this emotion, before the first, fourth, seventh, and tenth period. The leader always saw neutral movie clips, regardless of the choice he or she made. This allowed the leader to not only lead by example but to also strategically induce emotions in an attempt to 'steer' followers.[4]

To see if the effects found in SE, as compared to Baseline, were due to the fact that followers were emotionally aroused or because the leader indeed manipulated the behavior of the followers by selecting specific emotions, we used a Random Emotion (RE) treatment as control. In this treatment the role of the leader was exactly the same as in Baseline, the only difference being that the followers would see emotion inducing movie clips, which followed the same sequences as were chosen by leaders in the SE treatment. This way we could disentangle the effect of a more emotional environment from the effects of emotions strategically used by leaders. It is important to keep in mind that subjects in all treatments were informed about their roles and the kind of videos they could get to see or choose.

3.2 Emotion evocation

According to Gross and Levenson (1995), the two main criteria for a good emotion evoking movie are *intensity* and *discreteness.* The former indicates how well the targeted emotion is induced, while the latter informs us about the difference in strength between the inducement of the targeted emotion and that of the second strongest (basic) emotion induced. The idea is that it is not so bad if next to happiness also similar emotions as joy and amusement are evoked, but that things become messy when together with anger also sadness and disgust are induced, as these are also basic emotions. Most of our tested clips reached the criteria of both *intensity* and *discreteness.* There were problems, however, with anger as well as the neutral state. Most anger clips did either not evoke enough anger or induced a wide variety of negative emotions, while neutral movies evoked too much happiness in 2 out of 4 instances.[5] The exact criteria for *intensity* and *discreteness* as well as the full list of clips

[4] In the instructions of the experiment all participants got to see a trailer that included short samples (samples took about 10 to 12 seconds per sample, with one sample for every emotion and one for the neutral state) of some of the clips used in the experiment in order to give the participants an idea about the nature of the clips used.

[5] In the end we used only two videos for both anger (although the second anger video *'Cry Freedom'* did technically not fulfill the *discreteness* criterion) as well as the neutral state. This meant that leaders saw the same (very short) video twice and that if a leader would have chosen 'Anger' three times, which never happened in our experiment, his or her followers would have seen the first movie again after the third 'Anger' choice.

and the instructions for the validation experiment can be found in appendix C.5.

As mentioned before, video clips were shown that intended to evoke a certain basic emotion in both the Strategic Emotion (SE) treatment as well as the Random Emotion (RE) treatment. In order to test what videos indeed evoked the targeted basic emotion a test protocol was developed. Our fully computerized protocol (see Appendix C) was based on the procedures described by Ray (2007) and Gross and Levenson (1995), from whom we also used many of their recommendations for video clips. Other video clips were suggested by Bartolini (2011). This testing procedure took place in April 2015 at the CREED laboratory. In total 87 participants saw 12 movies each. This lasted for around 45 to 50 minutes for which they were compensated with 10 euros.

3.3 Hypotheses

Hypotheses are presented first, followed by a rationale. Our first hypothesis concerns the difference in behavior between the different treatments.

Hypothesis 1. *Contributions in SE will be larger than contributions in RE, which in turn will be larger than contributions in Baseline.*

This hypothesis is driven by the assumption that the goal of most leaders will be to increase the contributions of the followers. SE gives the leader the most opportunities to influence the followers. In the more emotional environment of RE the contributions of the leader may again have a larger (positive) effect than in Baseline.

Hypothesis 2. *Bids in SE will be higher than bids in RE, which in turn will be higher than bids in Baseline.*

Because the amount of control the leader has is greatest in SE, our hypothesis is that bids for the leadership position will be highest in SE. Furthermore we hypothesize that participants value the role of leader more in the more emotional RE treatment, when compared with Baseline.

Hypothesis 3. *Leaders will contribute more than followers.*

In subsection 2.1 we presented three different behavioral models that predict that leaders may contribute more: the affective ties model of van Dijk and van Winden (1997), the imitation model of Cartwright and Patel (2010), and a psychological games model of Dufwenberg and Kirchsteiger (2004). There is also empirical evidence suggesting that in our conflict game leaders will contribute more than followers. For example, as Arbak and Villeval (2013) and Reuben et al. (2015) show that leaders are more competitive than followers, this would make them to contribute more in our game in order to win the conflict. Furthermore, the findings by Potters et al. (2007) and Gächter et al. (2012), that leaders contribute more to public good games than their followers when given a first-mover advantage, indicate that players contribute more when given the leadership position. Another finding that supports this hypothesis comes from Myers (2015), who shows that self-selected leaders care more about the welfare of others. This should lead to higher contributions by leaders as their contributions positively affect the payoff of their followers.

Our last hypothesis focuses on the effect of the different emotions.

Hypothesis 4. *Positive emotions have a positive influence on contributions.*

Telle and Pfister (2015) present an overview of the evidence for a positive influence of positive affect on prosocial behavior. In our game this would translate to positive emotions improving the relationship between the leader and followers, and making followers act more prosocial towards the leader. This should increase contributions. Negative emotions, on the other hand, would detoriorate the relationship between the leader and the followers, decreasing the contributions. A similar process is described by Humphrey (2002), who shows that positive emotions signaled by leaders correlate with better job satisfaction as well as positive emotions in followers.

4 Results

In this section we first look if there are differences in the average contribution between the treatments. We then turn our attention to the behavior in the auction, before we look at the potential differences between the contributions of leaders and followers. Next, we study the choices of emotions by leaders and its direct/isolated effect on the contribution behavior of the followers. Finally, we investigate what exactly drives the (change in) contribution by leaders and followers. Regarding the latter, three key determinants will be focused on: the recent history, the (change in) contribution of the leader and the choice of emotion by the leader.

Turning now to the contribution levels in the three treatments, table 1 shows that they are very similar and not significantly different.

Table 1: Average contribution per treatment

Treatment	Contribution	Observations
Baseline	8.26 (0.61)	20
SE	8.68 (0.52)	20
RE	8.38 (0.51)	20

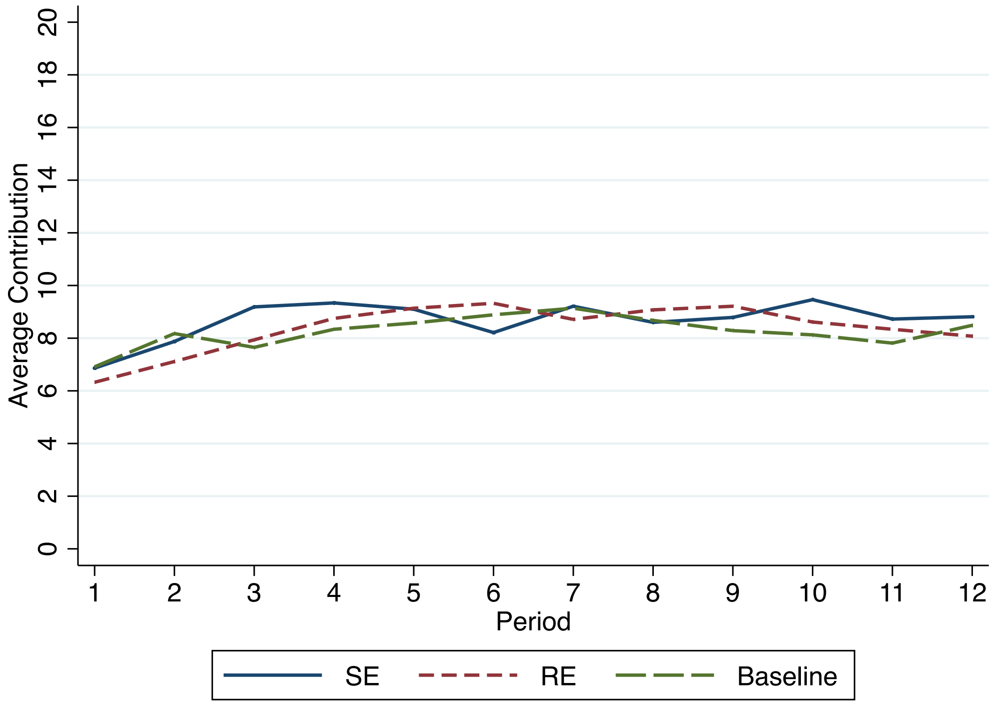
Note: Robust standard errors clustered on the group level in parentheses.
No significant differences between treatments at the 5% level, using a Mann-Whitney-Wilcoxon (MWW) test.

If we compare the actual contributions it is clear that players do not contribute according to the Nash predictions. Contributions range between 40% and 45% of the endowments, which is more than twice the predicted 20% (3 followers contributing 26% and the leader zero). Instead, these results seem to be more in line with Perfect Imitation or the Ties model.

It is interesting to note that the difference in emotional environment as well as a different role for the leader of a group does not lead to a significant change in the overall contribution level. This does not imply however that the environment does not matter. Positive and negative emotional stimuli might offset each other, and the extent to which leaders are followed and the way they behave could potentially differ between the different treatments. Another potential explanation for the limited effect of the emotional stimuli, is the fact that these stimuli are presented completely out of context, in stark contrast to the use of the stimuli outside of the lab.[6] Overall, though, as there is no significant difference in average contribution between the treatments, using Mann-Whitney-Wilcoxon (MWW) tests, we do not find much support for our first hypothesis (H1). Also in the development of contributions over time there is little difference observable, as can be seen from figure 1.

[6]We thank an anonymous referee for this observation. We wanted to start our first approach to emotional leadership with a defendable but simple design, however, focusing on a small set of generally agreed upon basic emotions, using a standard technique of inducing emotions and only one choice of emotion for leaders.

Figure 1: Average contribution per period



4.1 Auction

If subjects have a different valuation for the leadership position in the different treatments, we would expect that the leadership position would be more valuable in the SE treatment as it gives leaders not only the opportunity to be the first mover but also allows them to select the emotion to be induced in followers. When we test, using MMW-tests, for differences in the bids between the treatments (see tables 2 and 3) we find no significant differences, however. If anything, subjects were offering more for the leadership position in Baseline, although leaders have seemingly more control in SE. This could be due to the fact that many subjects are uncomfortable with such 'emotional control' over others, or because subjects might dislike not being the leader less in SE. Based on these results we have to reject our second hypothesis (H2).

Table 2: Average bid per treatment

Treatment	Bid	Observations
Baseline	6.39 (0.65)	80
SE	4.96 (0.62)	80
RE	5.39 (0.65)	80

Note: Robust standard errors clustered on the group level in parentheses. No significant differences between treatments at the 5% level, using a Mann-Whitney-Wilcoxon (MWW) test.

Table 3: Average winning bid per treatment

Treatment	Winning Bid	Observations
Baseline	12.45 (1.08)	20
SE	11.20 (1.23)	20
RE	12.45 (1.34)	20

Note: Robust standard errors clustered on the group level in parentheses. No significant differences between treatments at the 5% level, using a Mann-Whitney-Wilcoxon (MWW) test.

4.2 Contributions of leaders and followers

To investigate whether leaders and followers contribute differently it is important to see if leaders either lead-by-example or try to exploit the fact that followers might want to make up for his or her lack of contributions. Table 4 shows that overall leaders seem to contribute (between 11% and 17%) more than followers. Moreover, for all treatments the differences between the contrtibutions of leaders and followers are significant at the 5% level when we take the average total group contribution (excluding leaders) as one observation using a MWW-test[7]. There is, however, no apparent difference between the treatments, as none of the differences is significantly different from zero at the 5% level. The fact that leaders

[7] The difference between leaders and followers is also significant in all treatments when using a parametric t-test (if we pool the data for all treatments, $p<0.01$).

contribute more than followers might be a sign that leaders indeed try to lead by example. In any case, it confirms our third hypothesis (H3). Furthermore, it provides evidence that the results found when looking at the group level are not due to perfect imitation, but could be more in line with the Ties model, models with psychological preferences or the imitation model of Cartwright and Patel, as discussed in section 2.1.

Table 4: Average contribution per role per treatment

Treatment	Leaders	Followers
Baseline	9.15 (0.80)	8.00 (0.45)
SE	9.77 (0.61)	8.32 (0.39)
RE	9 (0.59)	8.18 (0.40)

Note: Robust standard errors in parentheses.

Differences between roles are significant at the 5% level, using a Mann-Whitney-Wilcoxon (MWW) test.

4.3 Emotions

Now that we have established that leaders contribute more than their followers we turn our attention to the choice of emotion in the SE treatment. Figure 2 shows a histogram with the choice frequencies of all different emotions. We find that happiness is chosen most often. Some leaders indicated in the questionnaire that they selected happiness to keep their followers in a good mood, which would lead to higher contributions, while others chose happiness to express their own happy emotional state. Given that we have 20 leaders of which only 6 made a remark about happiness it is hard to draw strong conclusions from this, though.

N=80

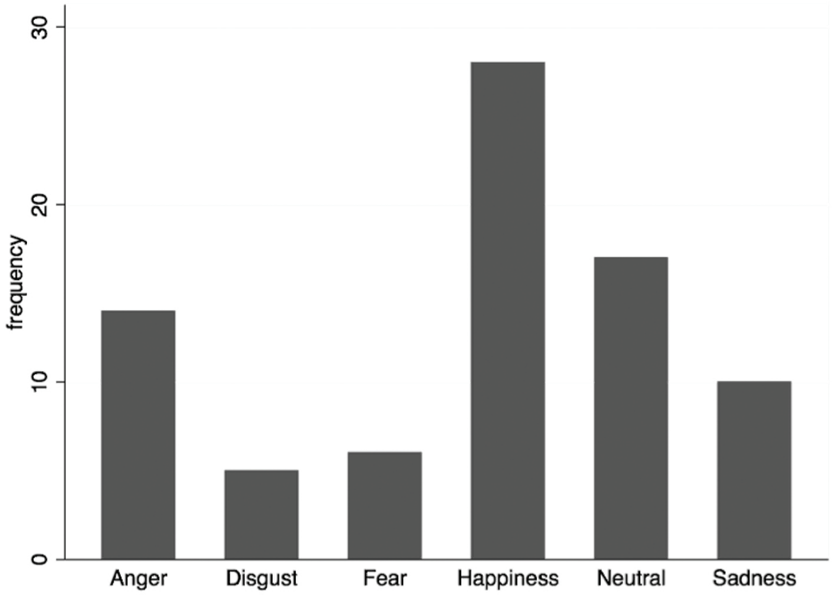


Figure 2: Frequencies of the emotion choices

To see if the choice of emotion has an effect on followers and can, thus, be used by leaders as a form of strategic emotional leadership, we first investigate the effect of emotion on the change in contribution of followers. We use first differences to correct for the fact that some individuals or groups start out with higher contribution levels than others. Let: ΔContribution = Contribution$_{it}$-Contribution$_{it-1}$, where Contribution$_{it}$ represents the contribution of participant i at time t and Contribution$_{it-1}$ the contribution of participant i at time $t-1$. In this estimation are used as dummy variables, where the neutral state is omitted. For the results, see table 5.

Table 5: Effect of emotions on the change in contribution of followers

	SE	RE
	Δ Contribution	Δ Contribution
	SE	RE
Anger	-0.353	-0.0263
	(0.397)	(0.617)
Disgust	0.647	-1.328
	(0.694)	(0.777)
Fear	0.478	-1.016
	(0.450)	(0.639)
Happiness	0.430	-0.237
	(0.280)	(0.316)
Sadness	-0.524	-0.714
	(0.413)	(0.734)
Constant	0.0909	0.447
	(0.261)	(0.315)
Observations	660	660
R-squared	0.009	0.007

Note: OLS estimation, robust standard errors in parentheses.

None of the coefficients is significant at the 5% level.

In SE the coefficients are jointly significant at the 5% level.

When studied in isolation it seems as if emotions do not affect the change in contribution much (jointly they do have a significant effect in SE). Because some of the negative emotions were not picked that often and because the clips inducing a specific negative emotion typically also evoked other negative emotions[8] we continue to work with the *valence* of an emotion from now on, which is constructed as follows: It takes the value of 1 if a positive emotion (happiness) has been selected, a value of 0 if it concerns the neutral state, and -1 in case of a negative emotion. Valence turns out to have a significant positive effect on

[8]in the case of *Cry Freedom* even so much so that it violated the *Discreetness* criterion, see Appendix C.5.

the change in contribution in SE (0.65, p≈0.04), but not in RE(0.4, p>0.1), using OLS regression. This supports our fourth hypothesis (H4). We have to be careful, however, as this relationship might not be causal. A confounding factor that comes to mind (only in the SE treatment) is that the result of the previous game might influence both the contributions in the next period as well as the choice of emotion. If we look at the SE treatment in periods 4, 7 and 10 we find a correlation of only -0.19 between valence and loss (a variable that indicates if a loss occurred in the previous period). Loss, however, does not seem to be a significant predictor of valence, as loss is not significant if we use a ordered logit regression (p>0.1).

4.4 Behavior of followers

Leaders can try to influence their followers in two different ways. They can try to change the behavior of the followers by the choice of emotion and by making a contribution, that is observable for the followers before they make their decision. These publicly observable contributions can be seen as a form of leading by example, as the leader might be trying to set a norm or show his or her affection towards the followers. As discussed in subsection 2.1, leading-by-example is often found to be important in settings involving public goods. In our game a contribution generates a public good within the group, but across groups it provides a public bad. So it is not immediately clear what leading-by-example should imply. Before we saw that leaders contribute more than followers, but do their contributions influence the followers? When regressing the change in contribution of the leader on the change in contributions of followers we find an effect size of around 0.2 for all treatments, and this effect is always significant at the 5% level, and in Baseline even at the 1% level. Once again we have to be careful with drawing conclusions as the shared history (winning or losing) might influence both decisions.

To come to firmer results we need to add variables to control for the shared history. Based on Lacomba et al. (2014), who analyzed a 2-person version of this game, we assume that it is not necessarily only the fact that one won or lost the previous period that might play a role, but also the difference in contribution levels between the two groups (or two individuals in their case).

Furthermore, we will control for valence, and the change in contribution of the leader.

Using ordinary least squares (OLS) regression, we first estimate the effect of (recent) history on the change in contribution of followers (model 1) and subsequently add other variables in new models. Model 2 adds the change in contribution of the leader, models 3 adds valence, while both valence as well as the change in contribution of the leader are added in model 4. Tables 6, 7, and 8 show the estimates of these four models for the different treatments.

Table 6: The change of contribution of followers in Baseline

	Models	
Baseline	(1)	(2)
	ΔContribution	ΔContribution
Loss	1.409**	1.250**
	(0.406)	(0.419)
$\frac{\lvert\sum Ci - \sum Cj\rvert}{4}$	-0.0284	0.000551
if $\sum Ci - \sum Cj > 0$	(0.153)	(0.152)
$\frac{\lvert\sum Ci - \sum Cj\rvert}{4}$	0.309	0.405*
if $\sum Cj - \sum Ci > 0$	(0.218)	(0.198)
ΔLeader		0.207**
		(0.0717)
Constant	-0.399	-0.692
	(0.392)	(0.352)
Observations	660	660
R-squared	0.042	0.083

Note: OLS estimation, robust standard errors clustered on the individual level in parentheses.

** p<0.01, * p<0.05

Table 7: The change of contribution of followers in SE

	Models			
SE	(1)	(2)	(3)	(4)
	ΔContribution	ΔContribution	ΔContribution	ΔContribution
Loss	0.771**	0.541	0.780**	0.550
	(0.331)	(0.33)	(0.33)	(0.333)
$\frac{\mid\sum Ci - \sum Cj\mid}{4}$	0.199*	0.189*	0.168	0.157
if $\sum Ci - \sum Cj > 0$	(0.110)	(0.106)	(0.112)	(0.109)
$\frac{\mid\sum Ci - \sum Cj\mid}{4}$	0.493***	0.425***	0.480***	0.411***
if $\sum Cj - \sum Ci > 0$	(0.122)	(0.124)	(0.123)	(0.125)
Valence			0.265**	0.272**
			(0.122)	(0.117)
ΔLeader		0.211***		0.212***
		(0.0755)		(0.0755)
Constant	-0.844***	-0.698**	-0.772***	-0.624**
	(0.269)	(0.279)	(0.269)	(0.280)
Observations	660	660	660	660
R-squared	0.027	0.071	0.031	0.079

Note: OLS estimation, robust standard errors clustered on the individual level in parentheses.

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

Table 8: The change of contribution of followers in RE

	Models			
RE	(1)	(2)	(3)	(4)
	ΔContribution	ΔContribution	ΔContribution	ΔContribution
Loss	1.001**	0.804*	0.993**	0.801*
	(0.362)	(0.370)	(0.369)	(0.375)
$\frac{\lvert \sum Ci - \sum Cj \rvert}{4}$	-0.0877	-0.0984	-0.0862	-0.0975
if $\sum Ci - \sum Cj > 0$	(0.198)	(0.193)	(0.197)	(0.193)
$\frac{\lvert \sum Ci - \sum Cj \rvert}{4}$	0.194	0.128	0.183	0.122
if $\sum Cj - \sum Ci > 0$	(0.216)	(0.208)	(0.218)	(0.208)
Valence			0.103	0.0575
			(0.191)	(0.191)
ΔLeader		0.172**		0.172**
		(0.0603)		(0.0608)
Constant	-0.491	-0.344	-0.464	-0.329
	(0.416)	(0.415)	(0.424)	(0.422)
Observations	660	660	660	660
R-squared	0.025	0.076	0.026	0.076

Note: OLS estimation, robust standard errors clustered on the individual level in parentheses.

** p<0.01, * p<0.05

First we notice that the (recent) history does play an important role in the behavior of followers. This can be seen from the fact that either losing in the previous round or the difference in contribution between groups (if this difference is negative) is higly significant in all model specifications of all treatments. As a result, groups that lose, in a certain period, typically increase their contribution the next period. Only in the SE treatment, though, it seems more important whether or not the group contributed more than their opponents, as was also found by Lacomba et al. (2014) in a two-player setting. These two events, contributing less and losing, are obviously positively correlated.

Furthermore it becomes clear, from tables 6, 7, and 8, that the contribution of the leader is of significant importance in all three treatments. The effect of ΔLeader on ΔContribution is quite constant over the treatments, as the effect size is between 0.17 in RE and 0.21 in SE. This means that for every additional token contributed by the leader every one of his or her followers will contribute around 0.2 additional tokens. So, if the leader contributes 5 tokens more, his or her followers will contribute one additional token. From the leader's perspective contributing (more) is thus more attractive, as additional contributions are basically matched with 60%. These results – that a contribution of the leader has a positive effect on the contributions of followers, and that leaders contribute more than followers (see section 4.2) – can be explained by the tie model, as well as the imitation model and a model of psychological preferences, which are all discussed in section 2.1. We also note that ΔLeader seems to mediate[9] the effect of loss, as the effect of loss becomes smaller in all model specifications when ΔLeader is introduced and both the effect of loss on ΔLeader as well as the effect of ΔLeader on ΔContribution is significant. This represents the fact that followers and leaders are affected in a similar way by a loss, as we will see in the next subsection.

When controlling for (recent) history, one can observe from table 7 and 8 that a leader has the ability to both lead by example as well as lead by emotional influence. Regarding the latter s/he needs control over these emotions (of others), though. The showing of emotional video clips as such does not help a leader, as we can see from the absence of a significant effect of valence and the smaller effect of ΔLeader in the RE treatment.[10] In an emotional environment that is caused by outside events these emotions do not seem to effect behavior of followers nor does this effect enhances the ability of a leader to lead by example. This means that our fourth hypothesis (H4), that positive emotions have a positive effect on contributions, is only true under the condition where these emotions are evoked by the leader of the group. Whether this is due to a timing issue – with some leaders knowing when it is useful to induce these emotions – or due to followers caring about the source of the emotions, is still unclear. Future research could help us find out the relative importance of these two channels.

[9]For more on the mechanism of mediation, see Baron and Kenny (1986).

[10]It is interesting to note that the correlation between ΔLeader and valence is -.01 in this treatment.

4.5 Behavior of Leaders

The finding that leaders have a big influence on followers with their contribution raises the question what drives the changes in he contribution of leaders. We use the same recent history variables as before in model 1 for the change in contributions. Furthermore, we pool the results for all leaders as they all see the same clips.

Table 9: Contribution of leaders

	Baseline	SE	RE	Pooled
	Δ Leader	Δ Leader	Δ Leader	Δ Leader
Loss	1.734**	1.084**	1.607**	1.482***
	(0.808)	(0.516)	(0.651)	(0.381)
$\frac{\lvert\sum Ci-\sum Cj\rvert}{4}$	-0.0365	0.0460	0.0761	0.0162
if $\sum Ci - \sum Cj > 0$	(0.299)	(0.255)	(0.299)	(0.161)
$\frac{\lvert\sum Ci-\sum Cj\rvert}{4}$	0.376	0.325	0.363	0.349**
if $\sum Cj - \sum Ci > 0$	(0.297)	(0.255)	(0.300)	(0.160)
Constant	-1.111	-0.690	-1.095*	-0.955***
	(0.720)	(0.535)	(0.619)	(0.358)
Observations	220	220	220	660
R-squared	0.036	0.031	0.037	0.034

Note: OLS estimation, robust standard errors clustered on the individual level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 9 shows that leaders are clearly driven by the results in the previous period. Their strategy seems to be rather simple: if the group won (and contributed more than the other group) the leader typically contributes less to increase potential profit; after a loss, though, the leader contributes more in order to increase the chance of winning. Moreover, their contributions are also increased when their group contributed less than the other group.

5 Concluding discussion

We introduce leadership in a conflict environment by using a sequential group conflict game. In this game there are two ways to lead for leaders: leading-by-example and leading by the strategic use of emotions. The former is possible by giving leaders the opportunity to contribute before their followers. Evoking basic emotions in followers relates to the latter form of leadership. To that purpose, specially selected video clips are available to leaders. Every three periods leaders choose an emotion (not a clip) that is then induced in followers by the use of one of these video clips. Although no significant treatment effect on the level of contribution has been found, potentially due to the very minimal setting and the use of emotional movie clips without any context, we do find evidence that leading-by-example is an important channel for leaders in our environment(s). Emotional leadership is found to have a significant effect as well, but seems less potent in this environment, as leaders do not appear to be effective in using it strategically. Note, however, that our design only allows for minimal emotional interaction between leaders and followers, as leaders are only able to evoke a basic emotion and have no other means of verbal communication. Therefor this research is by no means evidence that (strategic) emotional leadership is more generally of less importance.

In a theoretical analysis of the game we find (very) different behavioral predictions. In sharp contrast to the Nash equilibrium predictions, in which leaders should not contribute at all and followers contribute about a quarter of their endowment, we find that leaders contribute more than followers and both leaders and followers contribute much more than predicted. The Ties model of van Dijk and van Winden (1997), the Imitation model of Cartwright and Patel (2010) and the psychological preferences model of Dufwenberg et al. (2011) can in principal explain our findings. All these models share one important characteristic, namely that they can explain the positive relationship between the contribution of the leader and that of the followers. In the Ties model this positive relation is created by affective bonds created by the contribution of the leader, in the psychological preferences model the contribution of the leader creates a norm that (through guilt aversion) followers prefer to follow, while in the imitation model this relationship is driven by the existence of imitators that simply follow the leader. We leave for future research the question what the precise motives are for this leading by example. Are leaders motivated by higher payoffs for themselves (as the strategists in the imitation model), or initially (at least) partly driven by an intrinsic prosocial motivation related to social value orientation or norms?

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Appendices

A Theory

In this section we elaborate on the intergroup conflict game discussed in section 2. More specifically, we start by giving an overview of the equilibrium predictions for different behavioral models and in the subsequent subsections derive these predictions.

We start our analysis with the Ties model. For the rest of this analysis we normalize the endowment, putting Y equal to one, which is equivalent to interpreting C as the fraction of Y that is contributed. We start by modeling the payoff function of the follower. Assuming that the followers initially do not care about the other group members, according to the social ties model, the weight attached to the payoff of the others will then be determined by the impulse. As behavioral reference point we take the contribution predicted by the standard Nash equilibrium (0), based on experimental evidence (Loerakker et al., 2016).

Then, the weight attached to the utility of the leader – perceived as made up by the well-being of the group – is determined by the contribution of the leader C_{Li} (which determines the impulse) multiplied by an impulse parameter δ. As a result, the expected payoff of a follower (eq.1) is now assumed to include δC_{Li} times the total payoff of the other group members:

$$E\pi_F = \frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j} \left(2 - \frac{1}{4}\sum_{j=1}^{4} C_j - C_F + \delta C_{Li}(6 - \frac{3}{4}\sum_{j=1}^{4} C_j - 2C_F - C_{Li}) \right) \tag{A.1}$$

We further assume that a leader anticipates this when making a contribution and may care for the outcomes of the followers from the onset. Many experimental studies have shown, using social value orientation measures, that there are prosocial individuals who care for the outcomes of others (McClintock and Liebrand, 1988; van Lange, 1999). This might be especially relevant for self-selected leaders, because prosocials are also found to participate more in voter participation games (Myers, 2015). This is captured in eq. A.2, representing the expected payoff of the leader ($E\pi_{Li}$), by the parameter α_i that represents the weight the leader attaches to the payoffs of the followers.

$$E\pi_{Li} = \frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j} \left(2 - \frac{1}{4}\sum_{j=1}^{4} C_j - C_L + 3\alpha_i(2 - \frac{1}{4}\sum_{j=1}^{4} C_j - \frac{1}{3}\sum_{i=1}^{3} C_F) \right) \tag{A.2}$$

Table A.1 shows the predicted contributions of leaders and followers for different values of α and δ (for a more in-depth analysis of this model, see appendix A.4):

Table A.1: Predicted contributions for the social ties model, using different parameter values

	$\delta = 0$	$\delta = \frac{1}{2}$	$\delta = 1$
$\alpha = 0$	0, 0.26	0.09, 0.26	$0.22, 0.32$
$\alpha = 0.1$	0, 0.26	0.20, 0.26	$0.31, 0.33$
$\alpha = 0.2$	0, 0.26	0.28, 0.26	$0.37, 0.34$
$\alpha = 0.3$	0, 0.26	0.39, 0.25	$0.43, 0.34$

Note: The first number is the predicted contribution for the leader, while the second number is the prediction for a follower.

From the figures in this table we learn that total contributions rise when α and δ go up. Furthermore, it is interesting to see that if both α and δ are substantially positive we have a situation were a leader contributes more than his followers and that this does not happen when only one of them is positive.

Furthermore, note that if both leaders anticipate to be perfectly followed (*Perfect Imitation*) the game becomes identical to a game between 2 players. The equilibrium for that game was already derived by Lacomba et al. (2014). They show that in a Nash equilibrium both players (the leaders in our game) will contribute $C = 1/2$, earning in expectation $1/2$. If only one of the leaders is followed while the other leader does not have any influence on the contributions of his or her followers (*Perfect Imitation vs. No Influence*) it can be shown that in equilibrium the group that follows their leader contributes $C = 4/9$, while the group that does not contributes $C = 2/9$ (see appendix A.3). As a consequence, the 'following' group also has expected earnings that are twice as high in equilibrium, $\frac{8}{9}$ versus $\frac{4}{9}$.

Table A.2, below, summarizes the predictions of the beforementioned behavioral models regarding our game. The table starts by displaying the Nash equilibria of our sequential conflict game (Nash) and its simultaneous version (Nash Simultaneous). Then, the contributions predicted by a model wherein both groups perfectly follow their leader (Perfect Imitation) are shown, followed by the prediction for a group that perfectly follows their leader while the other group completely neglects its leader (Perfect Imitation vs. No Influence). Predictions for a group that neglects its leader while playing against a group that does not do so (No Influence vs Perfect Imitation) are shown next. Lastly, the contributions predicted by the social ties model (Ties) for two different parameter combinations are presented. Finally, it is noted that models that include psychological costs or the imitation model developed by Cartwright and Patel could in principle give roughly the same predictions as the Ties model in this table; the latter, for instance, depending on the distribution of strategists, imitators and independents in the population.

Table A.2: Predicted contributions for different models

Models	Leaders	Followers
Nash	0	0.26
Nash Simultaneous	0.2	0.2
Perfect Imitation	0.5	0.5
Perfect Imitation vs. No Influence	0.44	0.44
No Influence vs. Perfect Imitation	0.22	0.22
Ties ($\alpha = 0.1$, $\delta = \frac{1}{2}$)	0.20	0.26
Ties ($\alpha = 0.3$, $\delta = 1$)	0.43	0.34

A.1 Equilibrium analysis

We start our formal analysis by deriving the equilibria for risk neutral as well as for different types of risk averse players. The game has 8 players that are divided into 2 groups. Each player is endowed with Y and has to decide how much to contribute (C_i) to their group's conflict. The group that wins the conflict gets all that is not invested in the conflict, while members of the losing group get nothing. More specifically, each member of the winning group keeps its own remaining resources ($Y - C_i$) and get, in addition, one-fourth of the remaining resources of the other group ($\sum_{j=1}^{4} Y - C_j$). The winner of the conflict is determined by a lottery, where the odds that the group of i wins are determined by $P(Win_i) = \frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j}$. The expected payoff of i, thus, is:

$$E\pi_i = \frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j} \left(Y - 1/4 \sum_{j=1}^{4} C_j + Y - C_i \right) \tag{A.3}$$

For expositional reasons we start here with the simultaneous game (Nash Simultaneous) followed by the sequential game of our intergroup conflict (Nash).

A.1.1 Simultaneous game

We take the first derivative of the expected payoff described by eq. (A.3) to determine a Nash equilibrium:

$$\frac{dE\pi_i}{dC_i} = -\frac{\sum_{i=1}^4 C_i}{\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j} + \left((2Y - 1/4\sum_{j=1}^4 C_j - C_i)\frac{\sum_{j=1}^4 C_j}{(\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j)^2} \right) \tag{A.4}$$

A Nash equilibrium requires $dE\pi_i/dEC_i$, for all i, and thus:

$$\frac{\sum_{i=1}^4 C_i}{\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j} = \left((2Y - 1/4\sum_{j=1}^4 C_j - C_i)\frac{\sum_{j=1}^4 C_j}{(\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j)^2} \right) \tag{A.5}$$

The term left of the equality sign is the same for all members of the same group. The term right of the equality sign, however, is only equal for all group members if the contributions of all group members are identical (Symmetry). We simplify with $X_1 \equiv \sum_{i=1}^4 C_i$ and $X_2 \equiv \sum_{j=1}^4 C_j$, rendering:

$$\frac{X_1}{X_1 + X_2} = \frac{2YX_2 - 1/4X_2^2 - 1/4X_1X_2}{(X_1 + X_2)^2} \tag{A.6}$$

A similar condition holds for the other group:

$$\frac{X_2}{X_1 + X_2} = \frac{2YX_1 - 1/4X_1^2 - 1/4X_1X_2}{(X_1 + X_2)^2} \tag{A.7}$$

Combining and elaborating gives:

$$\begin{aligned} \frac{X_1}{X_2} &= \frac{2YX_2 - 1/4X_2^2 - 1/4X_1X_2}{2YX_1 - 1/4X_1^2 - 1/4X_1X_2} => \\ 2YX_1^2 - 1/4X_1^3 - 1/4X_1^2X_2 &= 2YX_2^2 - 1/4X_2^3 - 1/4X_2^2X_1 => \\ X_1^2(2Y - 1/4X_1 - 1/4X_2) &= X_2^2(2Y - 1/4X_1 - 1/4X_2) => \\ X_1^2 &= X_2^2 => X_1 = X_2 \end{aligned} \tag{A.8}$$

Having established that all contributions must be equal, using eq. (A.5), this leads to the following symmetric equilibrium contribution for Nash Simultaneous:

$$\begin{aligned}\frac{1}{2} &= ((2Y-2C_i)\frac{4C_i}{64C_{i^2}}) => \\ \frac{1}{2} &= ((Y-C_i)\frac{C_i}{8C_{i^2}}) => \\ 8C_i^2 &= 2YC_i - 2C_i^2 => \\ 10C_i^2 &= 2YC_i => C_i = 1/5Y\end{aligned} \tag{A.9}$$

A.1.2 Sequential game (Nash)

To analyze the sequential game of our intergroup conflict we start from eq. (A.5). First using the same arguments as for the simultaneous game, we conclude that all followers will contribute the same amount. Next, note that $\sum_{i=1}^{4} C_i = \sum_{j=1}^{4} C_j$ should hold, since the reward is the same for both groups and if $\sum_{i=1}^{4} C_i \neq \sum_{j=1}^{4} C_j$ the chance of winning is different for the two groups. If this would be the case it cannot be that $\frac{dE\pi_i}{dC_i} = 0$, $\frac{dE\pi_i}{dC_{Fi}} = 0$, $\frac{dE\pi_{Li}}{dC_{Fj}} = 0$ and $\frac{dE\pi_i}{dC_{Lj}} = 0$. We continue by finding the best response of the followers from eq. (A.5) and filling this in directly in eq. (A.3) for the leaders. With C_F and C_L, respectively, denoting the contribution of a follower and a leader eq. (A.5) can now be rewritten in the following way:

$$\begin{aligned}\frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j} &= \left((2Y - 1/4\sum_{j=1}^{4} C_j - C_i)\frac{\sum_{j=1}^{4} C_j}{(\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j)^2}\right) => \\ \sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j &= 2Y - 1/4(\sum_{j=1}^{4} C_j) - C_i => \\ 2C_L + 6C_F &= 2Y - 7/4C_F - 1/4C_L => \\ C_F &= 8/31Y - 9/31C_L \ if \ C_L \leq \frac{8}{9}Y \ else \ C_F = 0\end{aligned} \tag{A.10}$$

Inserting this condition in eq. (A.3), the expected payoff for a leader can now be written as:

$$E\pi_i = \frac{4/31C_L + 24/31Y}{4/31C_L + 24/31Y + \sum_{j=1}^{4} C_j}(2Y - 1/4\sum_{j=1}^{4} C_j - C_L) \tag{A.11}$$

Taking the first derivative with respect to C_L and setting it equal to zero, gives:

$$\frac{4/31C_L + 24/31Y}{4/31C_L + 24/31Y + \sum_{j=1}^{4} C_j} = \frac{4}{31} \frac{\sum_{j=1}^{4} C_j}{(4/31C_L + 24/31Y + \sum_{j=1}^{4} C_j)^2} (2Y - 1/4 \sum_{j=1}^{4} C_j - C_L) \tag{A.12}$$

Using $\sum_{i=1}^{4} C_i = \sum_{j=1}^{4} C_j$ we obtain:

$$\begin{aligned} 1 &= \frac{4}{31} \frac{2Y - (1/31C_L + 6/31Y) - C_L}{2(4/31C_L + 24/31Y)} => \\ 2(4/31C_L + 24/31Y) &= \frac{4}{31}[2Y - (1/31C_L + 6/31Y) - C_L] => \\ C_L &= \frac{-316}{94} Y \end{aligned} \tag{A.13}$$

As this is outside of the range of feasible contributions, we continue by investigating whether $C_{Li} = 0$ is a best respons. Given that leader j contributes zero:

$$\begin{aligned} E\pi_i &= \frac{4/31C_L + 24/31Y}{4/31C_L + 48/31Y} (56/31Y - C_L) => \\ E\pi_i &= \frac{-4/31C_L^2 - 520/961C_L Y + 1344/961Y^2}{4/31C_L + 48/31Y} \end{aligned} \tag{A.14}$$

As the leader's expected payoff is clearly decreasing in C_L in the positive domain, we conclude that there is a pure Nash equilibrium where both leaders contribute 0 and all followers contribute 8/31Y.

A.2 Risk aversion

This section provides an equilibrium analysis for risk averse, instead of risk neutral players. For convenience we will focus here on symmetric equilibria in the simultaneous game (see A.1.), with all players having known and identical utility functions. Two often used utility functions will be evaluated, one that assumes *constant absolute risk aversion* (CARA) and one that assumes *constant relative risk aversion* (CRRA).

A.2.1 CARA

We begin by looking at a situation where all players have the following CARA utility function:

$$u_i = 1 - e^{-\alpha \Pi_i} \tag{A.15}$$

with Π_i denoting the monetary payoff. In that case, the expected payoffs equals:

$$Eu_i = \frac{X_1}{X_1 + X_2}(1 - e^{-\alpha(2Y - 1/4\sum_{j=1}^{4} C_j - C_i)}) \tag{A.16}$$

Using the first-order condition: $\frac{dEu_i}{dC_i} = 0$, we get:

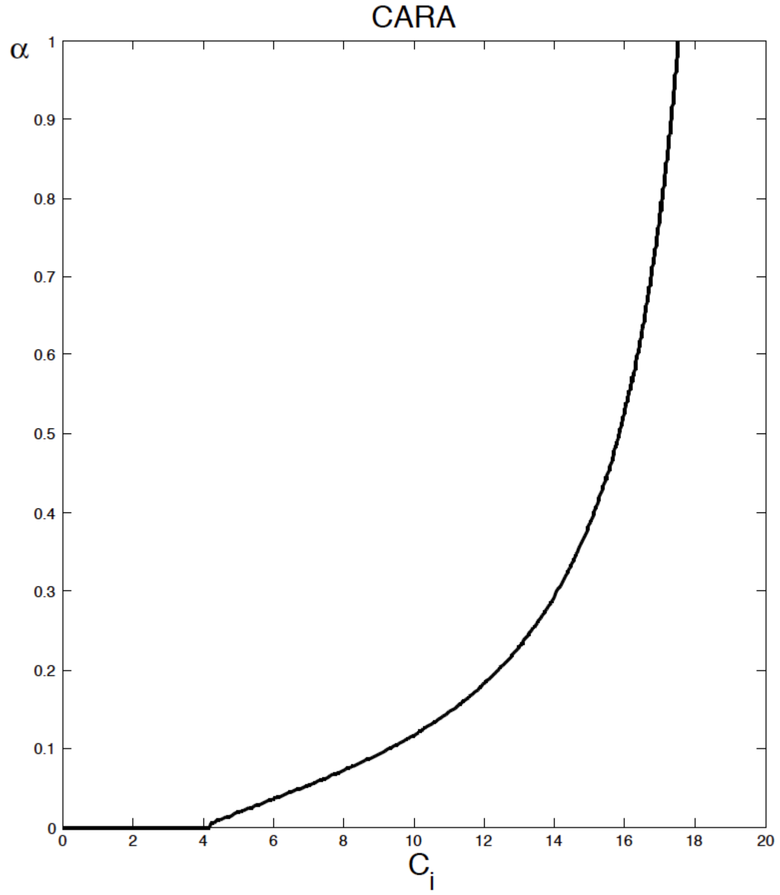
$$\begin{aligned}
\frac{X_2}{(X_1 + X_2)^2}(1 - e^{-\alpha(2Y - 1/4\sum_{j=1}^{4} C_j - C_i)}) &= \frac{X_1}{X_1 + X_2}\alpha e^{-\alpha(2Y - 1/4\sum_{j=1}^{4} C_j - C_i)} \\
\frac{1}{2}(1 - e^{-\alpha((2Y - 2C_i))}) &= 4C_i \alpha e^{-\alpha((2Y - 2C_i))} \\
ln(1 + 8\alpha C_i) &= 2\alpha(Y - C_i)
\end{aligned} \tag{A.17}$$

As there is no nice expression that relates C_i to Y, we first look at what happens if α approaches zero. As this leads to zeros on both sides we need to use L'Hôpital's rule to get:

$$\begin{aligned}
\frac{d}{d\alpha} ln(1 + 8\alpha C_i) &= \frac{d}{d\alpha} 2\alpha(Y - C_i) => \\
\frac{8C_i}{1 + 8\alpha C_i} &= 2(Y - C_i) \\
8C_i &= 2(Y - C_i) \\
C_i &= \frac{1}{5}Y
\end{aligned} \tag{A.18}$$

This confirms our analysis above that without risk aversion the equilibrium is $C_i = \frac{1}{5}Y$. Figure A.1 shows how the symmetric equilibrium contribution changes as the level of risk aversion (α) changes, using $Y = 20$ as in the experiment.

Figure A.1: Equilibrium contributions for different values of *constant absolute risk aversion*



A.2.2 CRRA

For the analysis of CRRA utility functions we take the following widely used specification:

$$u_i = \frac{\pi_i^{1-\beta}}{1-\beta} \tag{A.19}$$

This leads to the following expected utility function:

$$Eu_i = \frac{X_1}{X_1 + X_2} \frac{(2Y - 1/4\sum_{j=1}^{4} C_j - C_i)^{1-\beta}}{1-\beta} \tag{A.20}$$

We continue analogously to the CARA case above:

$$\frac{dEu_i}{dC_i} = 0 =>$$

$$\frac{X_2}{(X_1+X_2)^2}\frac{(2Y - 1/4\sum_{j=1}^{4} C_j - C_i)^{1-\beta}}{1-\beta} = \frac{X_1}{X_1+X_2}(2Y-2C_i)^{-\beta}$$

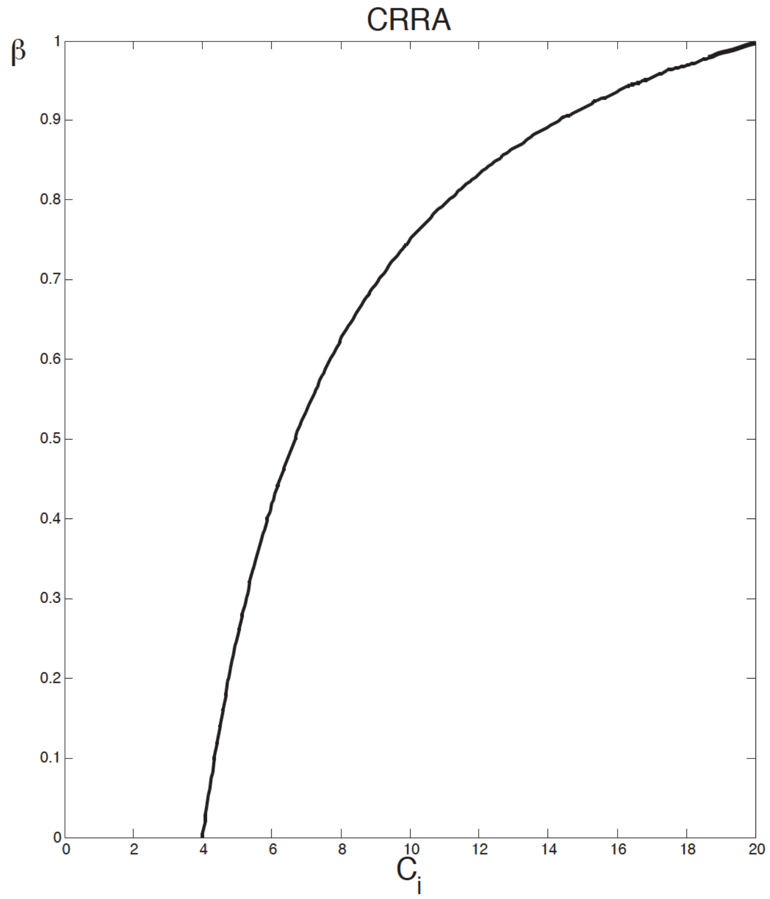
$$\frac{1}{2}\frac{(2Y-2C_i)^{1-\beta}}{1-\beta} = 4C_i(2Y-2C_i)^{-\beta} \tag{A.21}$$

$$8C_i = \frac{1}{1-\beta}2(Y-C_i)$$

$$C_i = \frac{2}{(1-\beta)(8+\frac{2}{1-\beta})}Y$$

Here it is immediately clear that if β approaches zero the symmetric best response moves to $C_i^{br} = \frac{1}{5}Y$. Figure A.2 depicts the equilibrium contribution for different levels of risk aversion, using again $Y = 20$.

Figure A.2: Equilibrium contributions for different values of *constant relative risk aversion*



A.3 On (a)symmetric perfect following of leaders

If the leader is not followed (we use Nash Simultaneous to model this situation) this does not affect the Nash equilibrium, but what if they do follow him or her? If both leaders are perfectly followed (Perfect Imitation) they basically play as if they are in a two-player version of the game. Lacomba et al. (2014) showed that in this game both players contribute half of their endowment in the Nash equilibrium.

Let us now consider a situation where only one of the groups perfectly imitates their leader, while the other group neglects its leader (No Influence vs. Perfect Imitation). For the group neglecting the leader we start with eq. (1) :

$$E\pi_i = \frac{\sum_{i=1}^4 C_i}{\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j}(2Y - \frac{1}{4}\sum_{j=1}^4 C_j - C_i) \tag{A.22}$$

And again as in eq. A.5 a Nash equilibrium requires:

$$\frac{\sum_{i=1}^4 C_i}{\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j} = \left((2Y - \frac{1}{4}\sum_{j=1}^4 C_j - C_i)\frac{\sum_{j=1}^4 C_j}{(\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j)^2} \right) \tag{A.23}$$

Simplifying with $X_1 \equiv \sum_{i=1}^4 C_i$ and $X_2 \equiv \sum_{j=1}^4 C_j$, one obtains:

$$\frac{X_1}{X_1 + X_2} = \frac{2YX_2 - \frac{1}{4}X_2^2 - \frac{1}{4}X_1X_2}{(X_1 + X_2)^2} \tag{A.24}$$

For the group perfectly following its leader, a different condition holds. First of all, this leader's expected payoff will be (with $\mathbf{C_j} \equiv 4C_{Lj}$):

$$E\pi_{Lj} = \frac{1}{4}\frac{C_j}{\sum_{i=1}^4 C_i + \mathbf{C_j}}(8Y - \sum_{j=1}^4 C_i - \mathbf{C_j}) \tag{A.25}$$

Using the first-order condition for a maximum,$dE\pi_j/dE\mathbf{C_j} = 0$, the following condition for an equilibrium is arrived at:

$$\frac{\mathbf{C_j}}{\sum_{i=1}^4 C_i + \mathbf{C_j}} = (8Y - \sum_{j=1}^4 C_i - \mathbf{C_j})\frac{\sum_{j=1}^4 C_i}{(\sum_{i=1}^4 C_i + \mathbf{C_j})^2} \tag{A.26}$$

We now follow the same procedure as described above (after noting that the behavior of the members of the first group must be the same in equilibrium and setting $X_1 \equiv \sum_{i=1}^4 C_i$

and $X_2 \equiv \mathbf{C_j}$). For an individual in the group where the leader has no influence condition eq. (A.24) holds:

$$\frac{X_1}{X_1+X_2} = \frac{2YX_2 - \frac{1}{4}X_2^2 - \frac{1}{4}X_1X_2}{(X_1+X_2)^2} \tag{A.27}$$

,while for the leader who is perfectly imitated eq. (A.26) can be rewritten as:

$$\frac{X_2}{X_1+X_2} = \frac{8YX_1 - X_1^2 - X_1X_2}{(X_1+X_2)^2} \tag{A.28}$$

Combining eq. (A.27) and eq. (A.28) gives:

$$\begin{aligned}
\frac{X_1}{X_2} &= \frac{2YX_2 - \frac{1}{4}X_2^2 - \frac{1}{4}X_1X_2}{8YX_1 - X_1^2 - X_1X_2} => \\
8XY_1^2 - X_1^3 - X_1^2X_2 &= 2YX_2^2 - \frac{1}{4}X_2^3 - \frac{1}{4}X_2^2X_1 => \\
X_1^2(8Y - X_1 - X_2) &= X_2^2(2Y - \frac{1}{4}X_1 - \frac{1}{4}X_2) => \\
4X_1^2(8Y - X_1 - X_2) &= X_2^2(8Y - X_1 - X_2) => \\
4X_1^2 = X_2^2 &=> 2X_1 = X_2
\end{aligned} \tag{A.29}$$

We use eq. (A.29) to obtain an explicit expression for $\mathbf{C_j}$:

$$\begin{aligned}
\frac{2}{3} &= (8Y - \frac{3}{2}\mathbf{C_j})\frac{\frac{1}{2}}{\frac{9}{4}\mathbf{C_j}} => \\
\mathbf{C_j} = \frac{16}{9}Y &=> C_j = C_L = \frac{4}{9}Y
\end{aligned} \tag{A.30}$$

For an individual in the no influence group we thus have:

$$\sum_{i=1}^{4} C_i = \frac{8}{9}Y => C_i = \frac{2}{9}Y \tag{A.31}$$

We, thus, find that the group where the leader has no influence slighty increases it's contribution, as compared to Nash Simultaneous, when playing against a group that perfectly imitates its leader. On the other hand, the perfect imitation group slightly decreases its contribution (when compared to playing against a group that has a similar structure).

As (expected) payoffs we find for the imitating group members:

$$E\pi_{PerfectImitation} = \frac{2}{3}(2Y - \frac{4}{9}Y - \frac{2}{9}Y) = \frac{2}{3}(2Y - \frac{2}{3}Y) = \frac{8}{9}Y \quad (A.32)$$

and for members of the non-imitation group:

$$E\pi_{NoInfluence} = \frac{1}{3}(2Y - \frac{2}{3}Y) = \frac{4}{9}Y \quad (A.33)$$

So in terms of expected payoff the group that follows their leader perfectly is much better of than the group that neglects their leader. The intuition here is that in a perfect imitation group the players (implicitely) take the positive externalities towards their team members into account (but not the negative externalities towards the members of the other group), this leads to higher contributions and more profit. However, free-riding on the following of others is still profitable.

A.4 Ties model

As in the main text we start by analyzing modeling the payoff function of the follower. In this model, the distance between the contribution of the leader and a reference point (here the contribution in the Nash equilibrium, zero, is taken as the reference point) generates an affective impulse that is multiplied by a impulse parameter. This impulse results in an interpersonal emotional tie (here expressed as δC_L), that makes a follower care about its leader. Expected payoff of a follower, thus, looks like:

$$E\pi_F = \frac{\sum_{i=1}^4 C_i}{\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j} \left(2Y - \frac{1}{4}\sum_{j=1}^4 C_j - C_F + \delta C_L(6Y - \frac{3}{4}\sum_{j=1}^4 C_j - 2C_F - C_L) \right) \quad (A.34)$$

It is assumed that a leader anticipates the effect its contribution has on its followers and cares for the outcomes of the followers from the onset. The latter is captured by a parameter α that represents the weight the leader attaches to the payoffs of follower.

$$E\pi_L = \frac{\sum_{i=1}^4 C_i}{\sum_{i=1}^4 C_i + \sum_{j=1}^4 C_j} \left(2Y - \frac{1}{4}\sum_{j=1}^4 C_j - C_L + 3\alpha(2Y - \frac{1}{4}\sum_{j=1}^4 C_j - C_F) \right) \quad (A.35)$$

Now that we have established the expected payoff functions we can use backward induction to solve for the equilibrium. We start by analyzing the followers best response function. We can find it as we did for the sequential game in eq. (A.10) using the first-oder condition, $dE\pi_F/dEC_F = 0$ (from here on we set $Y = 1$ for tractability):

$$\begin{aligned}
&\frac{\sum_{i=1}^{4} C_i}{\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j} = \\
&\left(\frac{(2 - \frac{1}{4}\sum_{j=1}^{4} C_j - C_F + \delta C_L(6 - \frac{3}{4}\sum_{j=1}^{4} C_j - 2C_F - C_L)\sum_{j=1}^{4} C_j}{(\sum_{i=1}^{4} C_i + \sum_{j=1}^{4} C_j)^2} \right) => \\
&2C_L + 6C_F = 2 - \frac{7}{4}C_F - \frac{1}{4}C_L + 6\delta C_L - \frac{17}{4}\delta C_F C_L - \frac{7}{4}\delta C_L^2 => \\
&C_F = \frac{2 - 2\frac{1}{4}C_L + 6\delta C_L - 1\frac{3}{4}\delta C_L^2}{7\frac{3}{4} + 4\frac{1}{4}\delta C_L} \; if \; 2 - 2\frac{1}{4}C_L + 6\delta C_L - 1\frac{3}{4}\delta C_L^2 \geq 0 \; else \; C_F = 0
\end{aligned} \tag{A.36}$$

For the leader we repeat this procedure, but have to keep in mind that its contribution will affect that of its followers:

$$\begin{aligned}
&(1 + 3\alpha\frac{\Delta C_F}{\Delta C_L})\frac{C_L + 3C_F}{C_L + 3C_F + \sum_{j=1}^{4} C_j} = \\
&(1 + 3\frac{\Delta C_F}{\Delta C_L})\frac{\sum_{j=1}^{4} C_j(2 - \frac{1}{4}\sum_{j=1}^{4} C_j - C_L + 3\alpha_i(2 - \frac{1}{4}\sum_{j=1}^{4} C_j - \frac{1}{3}\sum_{i=1}^{3} C_F)}{(C_L + 3C_F + \sum_{j=1}^{4} C_j)^2}
\end{aligned} \tag{A.37}$$

Now we need to find the effect of the contribution of the leader on that of the followers ($\frac{\Delta C_F}{\Delta C_L}$), this effect is obtained by taking the derivative of eq. (A.36) to the contribution of the leader (C_L):

$$\frac{\Delta C_F}{\Delta C_L} = \frac{\delta(608 - 434C_L) - 279 - 119\delta^2 C_L^2}{(31 + 17\delta C_L)^2} \tag{A.38}$$

To find solutions we plug in eq. (A.38), as well as values for α and δ into eq. (A.37) and solve numerically.

B Instructions

Below the instructions of the experiment are shown. This example comes from the SE treatment.

Instructions

Welcome to this experiment on decision-making. In this experiment your decisions will influence the money you will earn as well as the earningsn of others. All your decisions will be recorded anonymously and you will be paid confidentially. During this experiment you can earn tokens. You will start with 20 tokens as a starting fee. At the end of this experiment your tokens are substituted for Euros at an exchange rate of 10 tokens=1Euro.

During this experiment you will be part of a four-person group. Your group will have one leader and will participate in 12 rounds of a decision-making task involving a similar group of four participants. The task will be repeated 12 times. In each of these 12 rounds, your group and leader as well as the other group remains the same. At the start of every round each participant will receive an endowment of 20 tokens.

Task

In every round you have to decide how much of your endowment you want to contribute to a group account and how much to leave for your own private account. The number of tokens in your group account compared with the number of tokens contributed to the group account of the other group determines the chance that your group wins a lottery.If no one contributes to the group account in both groups, there will be no lottery. If your group wins the lottery your group members equally divide the tokens in the private accounts of the other group. These tokens will be added to the tokens in your own private account. If your group loses the lottery, you will earn nothing in that round.

More specifically, your earnings in a round will be determined as follows:

Payoffs

Contribution= Number of tokens allocated to the group account.

Your chance of winning the lottery = (Your group's contributions)/(Your group's contributions+The other group's contributions)

And your winnings look like:
Payoff[if you win the auction]= 20-Your contribution + 1/4 x (80-Total contrbutions other group)

If no one in your as well as the other group contributes to the group account however, all participants earn the 20 tokens they put into their private accounts.

Your total earnings (in tokens) for this experiment will be the 20 tokens you earn at the beginning of the experiment plus the sum of the tokens you earn in the 12 rounds of the decision-making task.

In the quiz after the instructions you will see some examples of how this works in practice.

Feedback

During the game the leader of the group first makes his contribution. Then after his or her group members observe this contribution they simultaneously make theirs. After every round, participants get to see whether or not their group won the lottery, the individual contributions of their group members and the total contribution of the other group. Below you can see a screenshot of a feedback screen:

Results period 1:
Your decision was 3, your group contributed in total 11
The other group also contributed 18 You lost the lottery so your payoffs are 0

Feedback period 2:
Member 1 contributed: 3
Member 2 contributed: 7
Member 3 contributed: 1
Member 4 contributed: 0
Your leader is: Member1

To the next period

Video Clips

Next to being the first one to contribute in the decision making task the leader has another task in this experiment. Before every block of 3 rounds, so before the first round and before the fourth, seventh and tenth round the leader can choose a basic emotion (anger, disgust, fear, happiness and sadness) or neutral emotional state that will be evoked on his or her group members. Tests indicate that showing a video clip that is specially selected to evoke the selected emotion will do this. The leader gets to see neutral videos. The shortest video is about 30 seconds long, while the longest video lasts for about 4 minutes. During the showing of the video clips we need you to carefully watch these clips. If you do watch these clips when the are shown we will warn you first, if it happens a second time though you will not be able to take part in the rest of the experiment and we will not pay you for it. Below you can find a screenshot of the emotion selection menu.

Your choice of emotion

- ◉ Anger
- ○ Disgust
- ○ Fear
- ○ Happiness
- ○ Neutral
- ○ Sadness [OK]

Trailer

In the trailer below you can watch short segments of some (not all!) video clips that can be shown during this experiment to evoke emotions. The trailer shows clips that bring up the five basic emotions and the neutral state in alphabetical order of these emotions. So the first segment is from a video that evokes anger, the second one from one that targets disgust and the following segments are from videos that respectively target fear, happiness, the neutral state and sadness. Remember though that these short segments not necessarily also evoke these emotions but are shown just so you will have an idea of how these clips look and how they could bring up basic emotions.

Leadership Auction

As mentioned before every group has a leader during this experiment. The leader makes the first contribution in all rounds of the decision-making task and chooses the target emotions of the clips shown to the other group members. To determine who will be the leader of your group there will be an auction. The auction works as follows: Every group member can use the twenty tokens received as a starting fee and can bid zero to twenty tokens. The member that sends in the highest bid wins the auction and pays the second highest bid. So, suppose you bid 3 and the other members respectively bid 5, 11 and 0. Then the one bidding 11 will win the auction and will pay 5 for it, while the others pay nothing. The tokens the leader pays are taken from his or her starting fee.

To the Quiz

C Rating the videos

The rating of the different movie clips took place in 4 sessions held in the CREED laboratory of the University of Amsterdam in April 2015. In total 87 participants saw 12 movies each, this lasted for around 45 to 50 minutes for which they were compensated with 10 euros. In total 24 movies were rated. All movies were rated either 43 or 44 times.

The procedure followed was based on the procedures described by Gross and Levenson (1995). After the subjects were welcomed in the reception room they were told that they would see emotion evocating movie clips. Furthermore they were asked to rate in a direct manner and not to 'overthink' the level of emotion experienced. The subjects were then assigned to a computer. There they all simultaneously watched the clips and rated them immediately thereafter on a 0-8 Likert scale.

We used the *intensity* and *discreteness* criteria (Gross and Levenson, 1995) in the following manner: In order to fulfill the *intensity* criterium a clip had to score at least a 4 on the target emotion (neatral clips should not score higher than 2 on any emotion). To also fulfill the *discreteness* criterium the score om the target emotion had to be at least 1 point higher for the target emotion than for the next highest emotion recorded. To order the clips we first looked at the intesity score. When these score were within a half point we sometimes changed the order to prevent clips with a very similar motive to be (potentially) played just after each other. If less than four movies satisfied these criteria for a certain basic emotion we used the best performing clip again (as we did for anger and the neutral state). Since only neutral and happiness were chosen more than twice by some leaders (and all leaders saw only neutral clips), only neutral movies were actually seen twice in some occasions. The overall order of clips was:

Table C.1: The order of movies per emotion

Anger	Disgust	Fear
My Bodyguard	Pink Flamingos	The Silence of the Lambs
Cry Freedom	The Fly	The Shining
Crash	Van Wilder	Psycho
My Bodyguard	Slumdog Millionaire	Mulholland Drive
Happiness	Neutral	Sadness
WALL-E	Alaska's Wild Denali	The Champ
Remember The Titans	Searching for Bobby Fisher	The Shawshank Redemption
Love Actually	Alaska's Wild Denali	My Girl
When Harry met Sally	Searching for Bobby Fisher	Saving Private Ryan

The results of all movie clips tested are shown below:

Table C.2: Emotion scores per movie

Movie	Anger	Disgust	Fear	Happiness	Sadness
Alaska's Wild Denali	.093	.023	.093	3	.326
(S.E.)	.366	.152	.426	2.08	.778
BBC Planeth Earth	0	.931	.614	3.57	.545
	0	1.72	1.22	2.43	1.13
Crash	4.01	3.46	1.81	.326	3.58
	2.86	2.84	1.94	.969	2.80
Cry Freedom	6.32	4.61	3.27	.727	5.91
	2.21	3.05	2.69	1.78	2.30
Love Actually	.326	.488	.163	4.88	.419
	1.02	1.32	.688	2.81	1.24
Mulholland Drive	.25	.636	4.55	.636	1.70
	.576	1.28	2.38	1.42	2.22
My Bodyguard	4.47	2.91	1.86	.116	2.40
	2.28	2.43	2.24	.544	2.18
My Girl	.727	.455	.75	.318	6.18
	1.65	1.53	1.64	.740	2.17
Pink Flamingos	3.07	6.70	2.16	.744	2.12
	3.20	2.36	2.67	1.63	3.14
Pride and Prejudice	.232	.163	0	4.23	.442
	1.07	.652	0	2.61	1.18
Psycho	1.28	2	3.86	1.35	1.14
	2.33	2.55	2.48	2.11	1.85
Remember the Titans	.477	.272	.341	4.68	.205
	1.13	.727	.776	2.33	.553
Saving Private Ryan	1.05	.372	1.28	.837	4.63
	2.03	1.16	2.10	1.66	2.69
Searching for Bobby Fisher	.25	.227	.114	2.48	1.05
	.943	.743	.443	2.41	1.82
Slumdog Millionaire	1.36	4.80	.568	3.20	1.43
	2.21	2.87	1.37	2.87	2.19
The Champ	1.49	1.34	1.65	.326	5.93
	2.09	2.01	1.92	.969	2.32
The Fly	2.09	6.84	4.35	.163	1.95
	2.64	2.02	2.91	.574	2.59
The Shawshank Redemption	1.07	.545	1.52	.568	6.45
	1.85	1.21	2.14	1.62	1.44
The Shining	.364	.409	4.64	.545	.545
	.838	1.13	2.36	1.21	1.11
The Silence of the Lambs	1.26	2.77	4.81	.233	2.05
	2.27	2.70	2.84	.751	2.58
Van Wilder	.955	6.66	.477	2.55	.886
	1.87	2.18	.976	2.55	1.71
WALL-E	.023	.209	.674	5.77	.488
	.152	1.01	1.61	1.91	1.14
When Harry met Sally	.409	.795	.295	4.795	.114
	.996	1.47	.904	2.72	.493

C.1 Instructions rating experiment

Instructions

Welcome to this rating experiment. During this experiment you will rate the emotions you experience while watching video clips. This will earn you in total 10 euros.

You will get to see a total of 12 video clips, all with a duration between 20 seconds and 5 minutes. After every video you will be asked how strong you felt certain emotions. Where an 8 represents the strongest emotions you can imagine while a zero means you didn't feel this emotion at all. Please report the greatest amount of each emotion you felt during the preceding film. When answering please do not deliberate too much on your choices but answer inuitively.

Before every new video the experimenter will give a signal that indicates that you can now start watching the new video. After this signal please click on the "To the movie" link. Please do so immediately after the signal is given. Make sure though that you wear your headphones as you click on this link, as the video starts immediately after.

During the experiment we would like you to stay attentive, keep your headphones on druring the movies and remain focussed on the screen while the videos play. Please also take your time to fill in the questionnaires after carefully.

To the Movie