Exploring Group Decision Making in a Power-to-Take Experiment*

Ronald Bosman[a], Heike Hennig-Schmidt[b], and Frans van Winden[c]

Published in Experimental Economics (2006) 9: 35–51

DOI 10.1007/s10683-006-4310-9

Abstract

Most studies that compare individual and group behavior neglect the in-group decision making process. This paper explores the decision making process within groups in a strategic setting: a two player power-to-take experiment. Discussions preceding group decisions are video taped and analyzed. We find the following: (1) no impact of the group setting as such on individual behavior; (2) heterogeneity of individual types; (3) perceptions of fairness are hardly discussed and are prone to the self-serving bias; (4) groups ignore the decision rule of other groups and typically view them as if they were single agents. (5) We also show that to explain group outcomes two factors have to be taken into account that are often neglected: the distribution of individual types over groups and the decision rules that groups use to arrive at their decision.

Key words: groups, decision rule, fairness, experiment, video.

JEL-classification: A12, C72, C91, C92.

[a] Monetary and Economic Policy Department
De Nederlandsche Bank
Postbus 98
1000 AB Amsterdam
Tel. +31(0)205245772
Fax. +31(0)205242506
E-mail: r.a.j.bosman@dnb.nl

[b] Department of Economics
Laboratorium für experimentelle
Wirtschaftsforschung
Bonn University
Adenauerallee 24-42
D - 53113 Bonn
Germany
E-mail: hschmidt@uni-bonn.de

[c] CREED/Department of Economics

* At the time of running the experiment Ronald Bosman was affiliated with CREED. He further worked on the project as a visiting fellow at Bonn University. Comments of Jens Grosser in an early phase of this project are gratefully acknowledged. We thank Daniel Friedrich and Eva Synowsky for transcribing the group discussions. Furthermore, we thank two anonymous referees as well as participants of the 2000 ENDEAR Workshop in Barcelona, the 2000 ESA European Meeting in Amsterdam, the 2002 and 2003 Symposia on Group Decision Making in Amsterdam and the 2002 ESA Meeting in Strasburg for their useful comments and suggestions. Financial support by Deutsche Forschungsgemeinschaft (Sonderforschungsbereich 303) and EU-TMR Research Network Endear (FMRX-CT98-0238) is gratefully acknowledged. The present paper is a completely revised version of Bosman, Hennig-Schmidt and van Winden (2000): "The influence of emotions on group decision making in a power-to-take game: A video experiment".

University of Amsterdam
Roetersstraat 11
1018 WB Amsterdam
The Netherlands
E-mail: f.a.a.m.vanwinden@uva.nl

1. Introduction

In many economic situations, decisions are not taken by individuals but by groups, like committees, management teams or families. In contrast, in economic theory groups are often modeled as a single agent. Group decision making, however, can be fundamentally different from individual decision making. For example, groups typically have to deal with conflicting interests to arrive at a group decision.

Experimental economics shows a growing interest in this issue. However, almost all studies compare individual decisions with group decisions neglecting the way in which groups arrive at their decision, that is, the in-group decision making process.[1] The objective of our study is to open the black box of in-group decision making by means of a controlled laboratory experiment. A new feature of our experiment is that groups are being videotaped while making their group decision.[2] The videotapes are used to make transcripts of the group discussions.[3] While this method is generally applied in psychology it is rather new in economics.[4]

As our work horse we use the two-player power-to-take game developed by Bosman and van Winden (2002) – referred to as BvW below. Before this game is played, each participant first earns an income in an individual effort task. The game itself consists of two stages. First, one player – the take authority – can claim any part of the other player's income. Then, the latter – the responder – can react by destroying part or all of its income. The power-to-take game is interesting from an economic point of view because it captures important aspects of taxation, principal-agent relationships, and monopoly pricing (see BvW for illustrations). BvW found that take authorities choose considerable take rates (the mean rate is almost 60%) and that responders typically destroy nothing or everything. Note that these take rates concern the income of the *other* player only.

An important issue is whether groups as players behave different from individuals in strategic settings such as the power-to-take game, and, if so, why?

---

[1] Exceptions are Kocher and Sutter (2002), Cooper and Kagel (2005), Rockenbach et al. (2005).

[2] According to Loomes (1999), the use of audio or video records makes up one of the real challenges of experimental economics in the future. See also Camerer (2003, p.35). For a more elaborate discussion on this research method, see Hennig-Schmidt (1999).

[3] The reason why we videotaped group discussions, instead of audio tape, is that speakers can be identified more easily (Orbell et al., 1988). Moreover, non-verbal expressions, such as gestures and facial expressions, are also recorded and may facilitate identifying speakers and understanding their speech.

[4] See Bakeman (2000), Ratcliff (2003), Rockenbach et al. (2005), and Hennig-Schmidt (1999, 2002).

Existing evidence is inconclusive[5]. Some studies find that group outcomes are more in accordance with standard game theory. This holds for: Robert and Carnevale (1997) and Bornstein and Yaniv (1998), focusing on an ultimatum game; Bornstein et al. (2002), using the centipede game; Bornstein et al. (2005), analyzing a Bertrand duopoly; and Cooper and Kagel (2005) studying a signalling game. Other studies, however, suggest that groups behave less like gamesmen. For example, Cason and Mui (1997) find that groups are more generous in a dictator game, while Cox and Hayne (2002), analyzing common value auctions, and Kocher and Sutter (2002), focusing on gift exchange, report some mixed evidence. Finally, there are also studies finding no difference like Raab and Schipper (2004), examining Cournot competition, and Kocher and Sutter (2005), analyzing beauty contests.[6]

The reason why these studies find very different results may be due to the fact that they differ in many ways that seem potentially important in explaining group decision making in a strategic context. From the economic and psychological literature it appears that the following factors should be taken into account:[7] (i) the decision problem (e.g. whether groups have to decide in an ultimatum game or a public good game); (ii) the decision structure (e.g. do individuals decide privately within a group setting or do they sit together and make a joint decision?); (iii) the nature of the other player(s) (does the group play against an individual, a group or nature?); (iv) the size of the group; (v) the communication medium (e.g. computer messages versus face-to-face); (vi) types of group members (e.g. similar or dissimilar preferences or beliefs); (vii) allocation of types of individuals over groups; (viii) the decision rule used by the group (e.g. majority rule or unanimity).

In economic experiments factors (i)-(v) are usually taken into account only. In this paper we will argue that factors vi-viii need to be considered as well for understanding the outcomes of group decision making. One of our major findings is that it is important to control for the distribution of individual types over groups and the decision rules that groups use to arrive at their decision.

[5] In non-interactive experimental settings, the evidence is inconclusive as well; see Bone et al. (1999), Guarnaschelli et al. (2000), Bottom et al. (2002), Rockenbach et al. (2005).
[6] However, in Kocher and Sutter (2005) groups learn faster and reason with more depth.
[7] With regard to (iii), see also the taxonomy of Bornstein (2003); for (iv), c.f. Stasser (1999); for (v), c.f. Brosig et al. (2003); concerning (vi) to (viii), see also Kerr et al. (1996, 1999).

The remainder of the paper is organized as follows. In the next section we discuss our research questions and present the experimental design. In section 3, the results are given. Section 4 concludes with a discussion of the results.

2. Research questions and experimental design

2.1 Research questions

Our first research question is whether the group setting influences individual behavior. More specifically, we want to investigate whether individuals in the group experiment want to take decisions that are different from the decisions taken in the individual experiment of BvW. An important finding by social psychologists is the 'discontinuity effect' which suggests that individuals behave more competitively or less cooperatively in groups (see Wildshut et al. 2003). Applied to the power-to-take game, this finding would predict that take authority groups take more than individuals do, while responder groups destroy more easily than individuals.

Our second research question is concerned with player types. We investigate whether individuals in groups have similar or dissimilar preferences and beliefs, and how this affects group decision making. Can a classification of players help us to understand differences in group decisions, like it has helped to explain behavior in other game settings (see e.g. Fischbacher et al., 2001).

Our third research question is concerned with players' perception of fairness. In the recent experimental literature, much emphasis is put on fairness when explaining observed deviations in behavior from standard game theoretic predictions (e.g. Fehr and Schmidt, 1999). It has also been shown that perceptions of fairness are prone to the 'self-serving bias', which occurs "when individuals subconsciously alter their fundamental views about what is fair or right in a way that benefits their interests" (Dahl and Ransom, 1999, p.703). We conjecture that fairness plays an important role in the group discussions, given the nature of the power-to-take game, where only the income of the responder is at stake. Moreover, an interesting question is whether possible individual biases will be corrected in the group discussion.

Our fourth research question deals with how groups view other groups. In particular, do groups take in-group processes of opponents into account when making their decision? There is evidence that groups tend to underestimate the importance of the decision rule. As a consequence, the group decision can deviate

from the one that would have maximized the group payoff (Messick et al. 1997). In light of this study, we wonder to what extent participants in our experiment will take into account the way in which groups arrive at their group decision.

Our last research question is concerned with how individuals reach a group decision. The information provided by the group discussion will be of particular interest here. In that context we will also analyze how different decision rules and allocations of types of individuals over groups affect the group outcome. To our knowledge, this has not been studied for an economic environment before (for related psychological studies, see Davis, 1973, Levine, 1999).

2.2 Experimental design

Design

As our vehicle of research we use the two-player power-to-take game discussed in the Introduction, with in this case groups (of three participants) as players. One player group can be considered as the 'take authority' who is paired to another player group, the 'responder'. Before the game is played, each participant in the experiment has to earn an income E_i by doing an individual real effort task.[8] The game has two stages. At the first stage, the randomly chosen take authority decides on the so-called take rate $t \in [0,1]$, which is the part of the responder's income E_{resp} (the sum of the group members' incomes) that will be transferred to the take authority after the second stage. At the second stage, the only action that the responder can take is to decide on $d \in [0,1]$, the part of E_{resp} that will be destroyed. For the take authority the payoff of the game is thus equal to the transfer $t(1-d)E_{resp}$, generating total earnings from the experiment of $E_{take} + t(1-d)E_{resp}$ (where E_{take} equals the total income earned by the take authority members before the game). For the responder, the payoff equals $(1-t)(1-d)E_{resp}$, which also determines this player's total earnings.[9] Note that the responder group can only destroy their own prior-to-the-take income (E_{resp}) and not that of the take authority (E_{take})[10]. Furthermore, it follows that only if t=d=0, experimental earnings for both player groups will be

[8] The task is a computerized two-variable optimization problem that lasts for 30 minutes. For more details on the computer task, see van Dijk et al. (2001).

[9] Group payoffs were equally divided among the group members, or proportional to E_i in the few cases where these individually earned incomes differed.

[10] In this respect, and apart from the use of groups as players, the power-to-take game differs from the convex ultimatum game recently investigated by Andreoni et al. (2003).

equal to the income earned by the group members before the game; otherwise, the responder group will always get less than E_{resp}, whereas the take authority gets at least E_{take}.

The main features of our observation method are the following. Groups in each dyad were given 10 minutes to reach a joint decision (see below). Note that a decision rule was not imposed. Intra-group discussions were video taped. After the experiment, the video-taped discussions were transcribed word for word into text protocols by graduate students who had been especially trained to do this task. These transcripts are the basis for our analysis.[11] A potential weakness of the video technique is that it may influence the behavior of participants (observation effect).[12] In our experiment, this could mean that groups behave more cooperatively, that is, choose lower take rates and destruction rates. Our results indicate that this effect is probably not very important. [13]

Evidence in the literature whether the observation effect matters is mixed. Endres et al. (1999) and Bornstein et al. (2005) find no difference between the behaviour of participants that were audio/videotaped and those who were not. In the context of an ultimatum game, Hoffman et al. (1996) find offers to be lower when anonymity is increased, whereas Bolton and Zwick (1995) find that anonymity explains a small part of non-equilibrium play only.[14]

[11] Transcripts (in German) are available from the authors upon request.

[12] The observation effect cannot be easily tested even if we run a control treatment without video taping. The reason is that group outcomes crucially depend on the distribution of individual types over groups and the decision rules groups use to arrive at their decision (see section 4). Without observation, group composition and decision rules are not observable. Consequently, a difference in outcomes could be due to observation but could also be the result of different within-group decision processes. Controlling for group composition and decision rules is in our view an important area for future research.

[13] If observation makes groups behave more cooperatively, then one would expect responder groups to destroy less than individuals. In fact, we do not observe this in the experiment (see section 3). Furthermore, our video tapes convey the impression that participants are not affected by the video technology (see also Potter 1996). When participants had finished making a decision, they started talking about very private matters or, in some cases, gave negative comments on their university teachers.

[14] Brosig et al. (2003) find in the context of a public good experiment that that there is more cooperation when social distance is reduced. Social distance is manipulated by letting participants use different communication media in the pre-play communication phase, corresponding to different levels of observations. The authors, however, do not relate their findings to observation but to better coordination possibilities in the communication phase. They stress the content of communication to be remarkably similar across treatments, which goes against an observation effect.

Procedures

The video experiment was run in the Laboratory of Experimental Economics at the University of Bonn. In total, 70 participants, almost all undergraduate students from the University of Bonn, participated in 6 experimental sessions, each session providing two independent observations.[15] The show-up fee was 20 DM (approximately 10 euros), independent of participants' earnings in the experiment. In addition, participants could earn up to 20 DM in the individual real effort task. 68 participants earned this maximal amount, two subjects earned 18 DM. Their earnings from the experiment could be higher or lower depending on whether participants belonged to take authority or responder groups. On average, participants were paid out approximately 38 DM (19 euros, including the show-up fee). The whole experiment took about 2 hours. We framed the take game as neutral as possible, avoiding any suggestive terms like take authority (a summary of the instructions is provided in the Appendix[16].

In each experimental session, the following procedure was used. After participants had completed the individual effort task, they were randomly divided into take authorities (referred to as participants A) and responders (referred to as participants B). Then the instructions for the take game were read, followed by two individual exercises to check participants' understanding of the procedures. After these exercises, two responder and two take authority groups were randomly formed by letting take authorities draw a coded envelope from a box. Each group consisted of three members.[17] The envelope contained a form on which the total income of the members of the matched responder group from the real effort task was stated (see Appendix). The take authorities then had to leave the room and each group was brought to a separate room. The procedure chosen guaranteed full anonymity between groups. Neither could participants identify which participants belonged to any of the other groups, nor did they know which group they were playing against.

[15] The 12 independent observations are in line with many other studies on group decision making. For example, there are 10 independent observations in Bornstein & Yaniv (1998), who study an ultimatum game, as well as in Goren & Bornstein (2000), focusing on a prisoners' dilemma game.

[16] Full instructions as well as the script of the experimental protocol are available at www.bonneconlab.uni-bonn.de/bonneconlab/.

[17] There were 12 take authority and 12 responder groups. Due to no show-ups, in one case both the take authority and responder group consisted of two members.

The responders were now asked to fill out a short questionnaire with questions concerning expectations and social back ground. Thereafter, each responder learned about the take rate chosen by the take authority group they were matched to. After having filled out a second short questionnaire[18], responders were put in their group and each group was brought to a separate room.

Each take authority group had 10 minutes to make a decision on the take rate, which was video taped. After these 10 minutes, they had to fill in their own total earnings from the effort task as well as the take rate, and put the form back in the envelope again. Subsequently, the envelopes were brought to the matched responder groups who had 10 minutes time to decide on the part of their earnings to be destroyed, which was video taped as well. The envelopes containing the forms were then returned to the take authority groups for their information. Before the take authority group received this envelope they had to fill out a short debriefing questionnaire, including a questionnaire about expectations. The responders were also asked to fill out a short debriefing questionnaire. After having completed these questionnaires, participants were paid out in their groups.

3. Results

A summary of behavior in the group and individual experiment is given in Table 1. This table suggests that group outcomes are similar to individual outcomes. On average groups take 60% and destroy 20.8%, while the mean take rate (destruction rate) for individuals is 58.5% (18.7).

OBSERVATION 1: *Group outcomes do not differ from individual outcomes.*

Support. Using a Mann-Whitney test, the hypothesis that the take rates in the group and individual experiment are drawn from the same distribution cannot be rejected (p=0.77). Using a Fisher exact test, the hypothesis that the proportions of responders who destroyed are the same in the group and individual experiment cannot be rejected (p=0.71).

[18] This questionnaire contained some questions about experienced emotions.

Table 1. Summary of data in the group and individual experiment

Group experiment			Individual experiment					
Case (#)	*T* (%)	*D* (%)	Case (#)	*t* (%)	*d* (%)	Case (#)	*t* (%)	*d* (%)
1	40	0	1	0	0	21	70	0
2	45	0	2	0	0	22	70	0
3	50	0	3	0	0	23	70	0
4	50	0	4	25	0	24	70	30
5	50	0	5	30	0	25	70	0
6	60	100	6	30	0	26	70	0
7	60	0	7	30	0	27	70	0
8	60	0	8	35	0	28	70	100
9	72	0	9	40	0	29	70	100
10	73	0	10	50	0	30	70	0
11	75	50	11	50	0	31	70	0
12	85	100	12	50	0	32	75	100
			13	50	0	33	75	0
			14	60	0	34	80	0
			15	65	0	35	80	99
			16	65	0	36	80	100
			17	65	0	37	90	100
			18	65	0	38	90	0
			19	66	0	39	100	100
			20	66.7	0			
mean	60.0	20.8					58.5.	18.7
	(13.8)	(39.6)					(24.3)	(38.8)

Note: Upper case letters denote the group experiment, lower case letters denote the individual experiment; data of the individual experiment are taken from Bosman and van Winden (2002).
T: group take rate in the group experiment; *D*: part of the group income that is destroyed by the group; *t*: take rate in the individual experiment; *d*: part of the individual income that is destroyed in the individual experiment; cases are ordered by the take rate. Numbers in brackets are standard deviations.

Our first observation is in line with Raab and Schipper (2004) who find no difference between individual and group behavior. To explore how groups decide we need information on the in-group decision process which we discuss below.

3.1 Impact of group setting on individual behavior

Our first research goal is to analyze whether the group setting influences individual behavior. To answer this question, we need a transcript-based measure of an individual's willingness to take or to destroy. We therefore define two new variables called the 'individual take input' and the 'individual destruction input', respectively. These decision inputs can be seen as a measure of the individual take authority's willingness to claim income of the responder group, and the individual

responder's willingness to destroy, respectively. More specifically, these inputs are defined as either (1) the first take rate (destruction rate) that is mentioned and can be identified as an intention or proposal, or (2) the first approval or confirmation of some take rate (destruction rate) mentioned by another individual.

It turns out that for one individual take authority and one individual responder it was not possible to determine their individual inputs.[19] Individual decision inputs are presented in table 2.

Table 2. Individual take and destruction inputs in the group experiment

Case (#)	Group		*Individual take input* (%) take authority			*Individual destruction input* (%) responder		
	T (%)	*D* (%)	1	2	3	1	2	3
1	40	0	30	20	20	0	0	0
2	45	0	100	50	–	0	0	–
3	50	0	50	60	75	0	0	100
4	50	0	49	60	45	0	0	100
5	50	0	50	100	0	0	0	>0
6	60	100	50	50	55	100	100	100
7	60	0	75	60	60	0	0	0
8	60	0	100	50	70	0	0	0
9	72	0	70	70	75	40	0	*m*
10	73	0	73	50	75	0	0	0
11	75	50	90	75	90	0	100	0
12	85	100	100	75	*m*	100	100	100
mean	60.0	20.8		62.4			28.5	
	(13.8)	(39.6)		(23.7)			(45.0)	

Note: *T*: group take rate; *D*: part of the group income that is destroyed; *individual take input*: take input of each individual take authority i=1, 2, 3 in each take authority group; *individual destruction input*: destruction input of each individual responder i = 1, 2, 3 in each responder group; – : in case 2, i = 1, 2; *m*: missing observation; > 0: exact amount not identifiable; cases are ordered by the take rate. Numbers in brackets are standard deviations.

Our first result shows that inputs of individual take authorities and responders in the group experiment do not differ significantly from the take and destruction rates selected by players in the individual experiment.

RESULT 1: *Individual decision inputs are in line with behavior in the individual experiment.*

[19] To score the individual inputs, two raters went through the transcripts independently. In only 10% of the cases, there was a discrepancy in scores. Subsequently, these cases were again considered by two other raters, followed by a final discussion with all raters. Ultimately, the discrepancies were solved and supported by all raters.

Support. For take authorities, using a Mann-Whitney test, the hypothesis that the individual take inputs are the same as the take rates selected by players in the individual experiment cannot be rejected (p=0.66, two-tailed; a Kolmogorov-Smirnov test also shows no significance, p=0.53). The average take input is 62.4% (st. dev.=23.7) while in the individual experiment the average take rate is 58.5% (st. dev.=24.3) (cf. tables 1 and 2). For responders we cannot reject the hypothesis that the individual destruction inputs are drawn from the same distribution as the destruction rates in the individual experiment (Mann-Whitney test, two-sided, p=0.30; a Kolmogorov-Smirnov test also shows no significance, p=0.92). The average destruction input is 28.5% (st. dev.=45.0) while the average destruction rate in the individual experiment it is 18.7% (st. dev.=38.8) (cf. tables 1 and 2).

Average individual take rates and destruction rates turn out not to be significantly different in the group and in the individual experiment. Result 1 suggests that the group setting as such does not influence behavior of individual group members compared to the individual experiment

3.2 Types of individuals

Our second research question concerns player types. We deliberately designed our experiment such that participants earned the same amount of money before they played the power-to-take game. Since take authorities and responders have an equal income one may expect zero take rates from a fairness point of view. We find, however, clear evidence for heterogeneity in individual take authorities' behavior (table 2). The mean take input is 62.4, the median is 60.00 and the mode is 50.00. Only 6 of the 34 group members (17 %) show a take input lower than 50%. When the earned income of take authorities and responders is considered as one pie (E_{resp} + E_{take}) – to make a comparison with the ultimatum game possible – individual take authorities ask on average 81% of the whole pie. This amount is considerably higher than the 60-70% which senders on average demand in the ultimatum game (Camerer 2003, p. 49). We will come back to this finding when we discuss fairness and the self-serving bias in section 3.3.

We now turn to responder behavior. Different from take authorities, individual responders reveal a clear behavioral dichotomy (see table 2).

RESULT 2: *Individual responders typically want to destroy either 0 or 100% of the earned group income.*

Support. In total, 32 out of the 35 participants showed a preference for a destruction rate of either 0 or 100%, while two wanted to destroy an intermediate amount, and one member did not reveal a preference.

Note that result 2 is in line with the individual experiment where 37 of 39 individuals either destroy everything or nothing, and only 2 individuals destroy an intermediate amount (cf. table 1). Our finding is supported by the transcripts. In one group, an individual said: "OK, I believe there are only two extremes since the rest is foolish", while in another group a member said: "So, in my view the question can only be, do we destroy everything or do we destroy nothing (...) in between is playing". Moreover, responders typically stuck to their intended decisions in the group discussion, even in case of conflicting preferences. Those who wanted to destroy neither seemed to cool off nor got persuaded by more 'rational', i.e. self-interested, members during the 10 minutes discussion.

The second classification of responders concerns the impact of beliefs on individual destruction inputs and is based on the relation between expected and actual take rates. We distinguish between *optimists*, *pessimists*, and *realists* according to whether the difference between the expected take rate and the actual take rate turned out to be negative, positive or zero, respectively. It appears that optimists typically provide an input for destruction in the group discussion.

RESULT 3: *Individual responders whose expectation regarding the take rate turned out to be optimistic typically provide an input for destruction in the group discussion.*

Support. 15 out of 29 responders who reported an expectation and revealed their input were optimistic. 8 out of these 15 optimists provided an input for destruction, while of the 14 pessimists/realists only 3 provided an input for destruction. Using a Fisher exact test, the hypothesis that the proportion of optimistic responders who provided an input for destruction is the same as the proportion of pessimistic/realistic responders who provided an input for destruction is rejected at

the 10% level (p=0.08, one-sided). A binary logit model, with the individual input as dependent variable (equal to 1 if the individual input is greater than zero, and 0 otherwise) and as explanatory variable the expected take rate, gives further support that an expectations-based classification is an important explanatory variable for the individual destruction input (the estimated model, with a coefficient of –0.037, is significant at the 5% level, n=29). The logit model that includes the take rate as well is marginally significantly better (likelihood ratio test, p=0.07; coefficient for the take rate is 0.07 and for the expected take rate -0.04).

3.3 Fairness notions and self-serving bias

Our third research question is concerned with players' perception of fairness. To investigate whether individual take authorities and responders are concerned with fairness, we need some measure of a player's notion of fairness based on the group discussion. We define a fair take rate (destruction rate) in a similar way as was done for the individual take and destruction inputs, namely as (1) the first take rate (destruction rate) that is referred to as being fair or (2) the first approval or confirmation of the perception of fairness revealed by another take authority (responder).[20]

RESULT 4: *Only a (small) minority of the players refers to fairness when making the group decision. Most take authorities who do discuss fairness perceive a take rate of 50% as being fair. When responders discuss fairness, they all perceive a take rate of 0% as being fair.*

Support. Out of the 35 take authorities only 9 referred to fairness during the group discussion, with 8 (1) of them believing that a take rate greater than (equal to) 0% is fair (7 believed that a rate of 50% is fair).[21] Out of the 35 responders only 5 referred

[20] With regard to scoring fairness, in about 10% of the cases there was a discrepancy among the raters. After a short discussion, these discrepancies could be solved.

[21] In addition to the word 'fair', other expressions were used that could be related to fairness. These expressions include: 'a take rate of 50% is honest', ' a take rate of 60% is also social', and 'taking everything is terribly mean'. Raters did not always agree whether expressions such as these refer to fairness. Therefore, we have reported results for the explicit use of the word 'fair' only.

to fairness during the group discussion; all of them shared the opinion that a take rate of 0% is fair.[22]

Given the attention fairness receives in the literature, one would have expected more emphasis on this issue in the group discussions, in particular since take authorities take high percentages from responders' income, even though the members of both player groups had earned the same income before the game. Although only a small subset of individuals refers to fairness, we find a large discrepancy between the fairness notion of take authorities (a take rate (much) greater than 0%) and the fairness notion of responders (a take rate of 0%). The discussions illustrate this finding. For example, take authorities point out that "…we only play with regard to their earned money" and "50% after all is a fair deal", while responders note that "...everybody invested the same amount of time. Therefore it would be fair that all receive 40 DM", "Group A gets 40 DM for sure (…) so it would have been fair, when they had taken 0%".

The way in which take authorities choose a take rate supports the existence of a self-serving bias and shows that maximizing own income is the predominant strategy for them. Ten groups first discuss very high take rates of 90 to 100%. They then move on discussing a 50% take rate. The majority of individual take authorities (83%) mention numbers that take away at least half of the responders' earnings. It seems that 50% is the minimum take rate for most individual take authorities. They believe that responders will always accept this rate and destroy nothing: "We won't go below 50%". "If we take 50% they will not destroy anything, and we will receive the highest amount of money".

Our results show that the self-serving bias, which has been well established for individuals (Babcock and Loewenstein 1997, Dahl and Ransom 1999, Rutström and Williams 2000), also shows up in our group setting (see also Hennig-Schmidt, 2002). It appears that these individual biases are not corrected in the group discussion.

[22] Also with responders, other expressions are used that could be related to fairness. For example, one responder refers to destruction as 'a moral case' because the take authorities have taken something that the responders have earned themselves. Furthermore, this responder points out that the take authorities and the responders have done the same amount of effort to obtain their

3.4 View of the other group

Our next result is concerned with how groups view their 'opponent' groups.

RESULT 5: *Take authorities as well as responders perceive the other group as a single agent and ignore intra-group processes.*

Support. In the group discussions of take authorities as well as of responders, there was never any reference to the group decision-making process of the other group. When they refer to the other group, they refer to it as if it were a single agent.

Result 5 is in line with Messick et al. (1997) who find that groups tend to underestimate the importance of the decision rule in an ultimatum game. Our result is surprising because the reaction of a responder group to a particular take rate may depend on the decision rule that responders use. For example, if in each responder group at most one group member would want to destroy and the simple majority rule is used, then take authorities could claim whatever they like. If, however, responders make a compromise, then a lower take rate may be optimal for the take authorities. In other words, if take authorities want to maximize payoffs – which appears to be the case – it seems sensible to take the decision rule of the responder group into account. In the last section we come back to this issue.

3.5 Decision rules applied in the group experiment

Our last research question is concerned with how participants arrive at their group decision.

OBSERVATION 2*: The group decision of take authorities is consistent with both the use of a simple majority rule and a group compromise approximated by the average individual take input.*

Support. It turns out that in 4 out of 10 cases with three take inputs the median take input lies closer to the group decision than the average take input. In 5 out of these 10 cases, the average take input lies closer to the group decision than the median

---

endowment. As was the case for the take authorities, we have reported results for the explicit use of

input. In one case, the group decision, median and average take input coincide. However, if we look at the correlation between, on the one hand, the group decision and, on the other hand, the median or the average take input per group, it turns out that both correlations are significant (coefficient for correlation is 0.90 and 0.86, respectively; both $p<0.01$). This correlation suggests that either decision rule could generate the observed outcomes, and we cannot say for sure which one is predominant. Note that the average take input per group is 59.9% and the median input 59.2%, which explains why it may be hard to discriminate between these two decision rules.

OBSERVATION 3*: In responder groups, most group decisions are consistent with a simple majority rule in case of conflict.*

Support. In seven groups all individual responders had the same destruction input, which also turned out to be the group destruction rate. In four groups there was a conflict in terms of destruction inputs: two out of three responders in each group showed a preference for no destruction, while the others preferred to destroy either something or everything. In three out of those four groups, the destruction rate was equal to the destruction rate preferred by the majority, while in one group a compromise was made at 50%. Note that in all these four groups responders explicitly discussed the group decision rule. In those three groups where the group decision is consistent with majority rule, there was also an explicit reference to majority rule in the group discussion. Finally, note that in one group we cannot conclude whether the group decision is consistent with majority rule because the individual destruction input of one responder could not be determined.

4. Discussion

In the growing literature on group decision-making in economics, a key question is whether group behavior is different form individual behavior. To answer this question, virtually all studies compare group outcomes with individual outcomes. From that perspective, our results indicate that group behavior is in line with individual behavior. This conclusion, however, would be premature because it

---

the word ‘fair’ only.

neglects some important factors of group decision making. In a group setting, potentially conflicting interests have to be aggregated to a group outcome. Consequently, it is the combination of the decision rule used and the distribution of types of individuals over groups that determines whether group behavior is different from that of individuals.

To illustrate the importance of the above two factors we do two simple simulations for the responder groups. The data on individual destruction inputs in table 2 are the starting point. In the first simulation, we use the actual distribution of individual inputs. In the second simulation, we manipulate the distribution of individual inputs such that they are distributed more evenly. In both simulations we look at the impact of three different decision rules:[23] (i) *simple majority rule*, (ii) *compromise* (the average destruction input is the group decision), and (iii) *minority rule* (the destruction rate favored by the minority is the group decision). The idea behind minority rule is that responders who are a minority may be able to dominate the group discussion when they are passionate. These responders may feel urged to destroy and, consequently, may not be very receptive to arguments in the discussion.

The results of the two simulations are given in table 3. If the actual distribution of inputs is used, then the percentage of groups that destroy ranges from almost 22% (majority rule) to almost 56% (minority rule, compromise). The average destruction rate ranges from 22% (majority rule) to almost 56% (minority rule). Compared to the individual experiment, it is possible that groups destroy more and behave more aggressively than individuals, provided that group members make a compromise or that they use the minority rule.[24] So, if groups behave more aggressively than individuals, it need not be the result of the group setting per se.

In the second simulation, we manipulate the distribution of individual inputs. Note that responders' inputs were not distributed randomly over the groups (see table 2). In two (five) groups, all responders provided a destruction input of 100% (0%). We now assume that the inputs are distributed more evenly, with only one responder providing an input for destruction in each three-person group. We

[23] These rules are either discussed in the literature (Kerr et al. 1996, Laughlin 1999) or are used by participants in our experiment.

[24] Applying minority rule and compromise increases group destruction rates significantly as compared to the individual experiment (Mann-Whitney test, two-sided, p=0.02 and p=0.065,

refer to this distribution as the *simulated inputs* distribution. It turns out that the percentage of groups that destroy now ranges from 0% (majority rule) to 100% (minority rule, compromise). The average destruction rate ranges from 0% (majority rule) to 100% (minority rule).

Table 3. Group destruction under three different decision rules for responders

Decision rule	Percentage of groups that destroy		Average destruction rate	
	Actual inputs	*Simulated inputs*	*Actual inputs*	*Simulated inputs*
Actual behavior	25.0		20.8	
Majority rule	22.2	0.0	22.2	0.0
Minority rule	55.6	100.0	55.6	100.0
Compromise	55.6	100.0	33.3	33.3

Note: based on three persons groups where information for each responder is available

The simulations show that the decision rule can be very important for the group outcome. Given that in the experiment a decision rule was not imposed, it is surprising that groups do not at all discuss the way in which other groups reach a decision. Groups clearly have a tendency to perceive other groups as if they were single agents. It would be interesting to establish whether this phenomenon also shows up in different environments (e.g. other experimental games), whether it occurs when participants are given explicit information about the decision rule, and whether participants can learn to take the decision rule of their 'opponents' into account (e.g. repetition of the game).

We conjectured that fairness norms would play an important role in the group discussions. Although only a small fraction of the participants discusses fairness explicitly, responders clearly have a different view on what is fair in the power-to-take game compared to take authorities. Responders typically view a take rate of 0% as fair, whereas the majority of take authorities who discuss fairness believe that a take rate of 50% is fair. Thus, perceptions of fairness seem to be prone to the self-serving bias. Apparently, individual biases concerning perceptions of fairness need not be corrected by group discussions.

respectively) whereas applying majority rule has no significant influence on group destruction rates ($p=0.85$).

We find it somewhat surprising that only a small fraction of the participants discusses fairness explicitly, in view of the emphasis put on fairness in the recent experimental literature. Does this mean that only few participants are concerned with fairness? For the take authorities this seems plausible since most of them seem focused on maximizing own payoffs. For the responders, on the other hand, it is possible that fairness norms do play a role, since most of them are treated unfairly according to the fairness views that were discussed (albeit by a small fraction) but perhaps at a more subconscious level. In this environment, it is likely that other motivations, in particular emotional urges, play an important role as well. For responders, BvW find evidence that negative emotions such as irritation and contempt are important for the decision to destroy. An important feature of emotional urges is that they "clamor for attention and for execution" (Frijda, 1986, p.78). Therefore, emotions may easily overrule other considerations in the decision-making process, such as expressing one's view on fairness.

Our study has shown that a number of factors need to be considered to explain the outcomes of group decision making. There is probably no general answer to questions like "Are groups more rational than individuals?" As Kerr et al. (1999) point out the correct answer to such a question must be "it depends". Our results show that it is particularly important to take the decision rule and distribution of individual inputs into account. Apart from controlling for the impact of the decision rule, a key issue for future research is to develop a better understanding of the determining factors and role of the individual inputs in the decision making process. Why, for instance, are there such large differences between individuals? To clarify these issues further research is needed.

References

Andreoni, J., Castillo, M., and Petrie, R. (2003). “What Do Bargainers’ Preferences Look Like? Experiments with a Convex Ultimatum Game”. *American Economic Review*. 93. 672-685.

Babcock, L., and Loewenstein, G. (1997). Explaining Bargaining Impasse. The Role of Self-Serving Bias. *Journal of Economic Perspectives*. 11. 109-126.

Bakeman, R. (2000). Behavioral Observation and Coding. In Reis, H.T. and Judd, Ch. M (eds.), *Handbook of Research Methods in Social and Personality Psychology*. Cambridge: Cambridge University Press. UK.. 138-159.

Bolton, G. E., and Zwick, R. (1995). Anonymity versus Punishment in Ultimatum Bargaining. *Games and Economic Behavior*. 10. 95-121.

Bone, J., Hey, J., and Suckling, J. (1999). ”Are Groups More (or Less) Consistent than Individuals?”. *Journal of Risk and Uncertainty*. 8. 63-81.

Bornstein, G. (2003). "Intergroup Conflict. Individual, Group, and Collective Interests”. Discussion Paper #297. Center for the Study of Rationality and Interactive Decision Theory. The Hebrew University.

Bornstein, G., and Yaniv, I. (1998). ”Individual and Group Behavior in the Ultimatum Game. Are Groups More Rational Players?” *Experimental Economics*. 1. 101-108.

Bornstein, G., Kugler, T. and Ziegelmeyer, A. (2004) Individual and Group Decisions in the Centipede Game: Are Groups More Rational Players? *Journal of Experimental Social Psychology*. 40. 599-605.

Bornstein, G., Budescu, D.V., Kugler, T., and Selten, R. (2005). “Repeated Price Competition between Individuals and between Teams”. Working paper. The Hebrew University. Jerusalem.

Bosman, R., and van Winden, F. (2002). ”Emotional Hazard in a Power-to-Take Experiment”, *The Economic Journal*. 112. 146-69.

Bottom, W.P., Krishna L., and Miller, G.J. (2002). “Propagation of Individual Bias through Group Judgment. Error in the Treatment of Asymmetrically Informative Signals". *Journal of Risk and Uncertainty*. 25. 147–163.

Brosig, J., Ockenfels, A., and Weimann, J. (2003). “The Effect of Communication Media on Cooperation”. *German Economic Review* 4. 217-241.

Camerer, C.F. (2003). *Behavioral Game Theory*. Princeton: Princeton University Press.

Cason, T.N., and Mui, V.-L., (1997). “A Laboratory Study of Group Polarization in the Team Dictator Game”. *Economic Journal*. 107. 1465-83.

Cooper, D.J., and Kagel, J. H. (2005). “Are Two Heads Better than One? Team versus Individual Play in Signaling Games”. *The American Economic Review*. 95. 477-509.

Corden, R. (2001). “Group Discussion and the Importance of a Shared Perspective. Learning from Collaborative Research”, *Qualitative-Research*, 1, 347-367

Cox, J. C., and Hayne, S. C (2002). “Barking up the Wrong Tree. Are Small Groups Rational Agents?” Working Paper. University of Arizona.

Dahl, G.B., and Ransom, M.R. (1999) "Does Where You Stand Depend on Where You Sit? Tithing Donations and Self-Serving Bias". *American Economic Review*. 89.703 – 727.

Davis, J.H. (1973). “Group Decision and Social Interaction. Theory of Social Decision Schemes”. *Psychological Review*. 80. 97-125.

van Dijk, F., Sonnemans, J., and van Winden, F. (2001). “Incentive Systems in a Real Effort Experiment”. *European Economic Review*. 45. 187-214.

Endres, J., Poggenpohl, C. and Erben, C. (1999). “Repetitions, Warnings and Video. Cognitive and Motivational Components in Preschool Children’s Suggestibility”. *Legal and Criminological Psychology*. 4. 129-146.

Fehr, E. and Schmidt, K.M. (1999). “A Theory of Fairness, Competition, and Cooperation”. *Quarterly Journal of Economics*. 114. 817-68.

Fischbacher, U., Gächter, S., and Fehr, E. (2001). “Are people conditionally cooperative? Evidence from a public goods experiment”. *Economics Letters* 71. 397–404

Frijda, N.H. (1986). *The Emotions*. Cambridge: Cambridge University Press.

Goren, H., and Bornstein, G. (2000). "The Effects of Intragroup Communication on Intergroup Cooperation in the Repeated Intergroup Prisoner's Dilemma (IPD) Game". *Journal of Conflict Resolution*. 44(5). 700-719.

Guarnaschelli, S., McKelvey, R. D., and Palfrey, Th. R.. (2000). “An Experimental Study of Jury Decision Rules.” *American Political Science Review* 94. 407–423.

Hennig-Schmidt, H. (1999). *Bargaining in a Video Experiment. Determinants of Boundedly Rational Behavior*. New York: Springer. 1999.

Hennig-Schmidt, H. (2002). "The Impact of Fairness on Decision Making – An Analysis of Different Video Experiments". In F. Andersson, and H. Holm (eds.), *Experimental Economics. Financial Markets. Auctions. and Decision Making.* Dordrecht: Kluwer Academic Publishers.185-210.

Hoffman, E., McCabe, K., and Smith, V. (1996). “Social Distance and Other-regarding Behavior”. *American Economic Review*. 86. 653-60.

Kerr, N.L., Kramer, G.P., and MacCoun, R.J. (1996). "Bias in Judgment. Comparing Individuals and Groups", *Psychological Review*. 103. 687-719.

Kerr, N.L., Niedermeier, K.E., and Kaplan, M.F. (1999). "Bias in Jurors vs. Bias in Juries. New Evidence from the SDS Perspective". *Organizational Behavior and Human Decision Processes*. 80. 70-86.

Kocher, M.G., and Sutter, M. (2002). ”Individual versus Group Behavior and the Role of the Decision Making Process in Gift-exchange Experiments”. *Papers on Strategic Interaction* 27/2002. Max-Planck-Institute for Research into Economic Systems

Kocher, M.G., and Sutter, M. (2005). ”The ‘Decision Maker’ Matters. Individual versus Team Behavior in Experimental ‘Beauty-Contest’ Games”. *Economic Journal*. 115. 200-223

Laughlin, P.R. (1999). "Collective Induction. Twelve Postulates." *Organizational Behavior and Human Decision Processes*. 80. 50-69.

Levine, J.M. (1999). "Transforming Individuals into Groups. Some Hallmarks of the SDS Approach to Small Group Research." *Organizational Behavior and Human Decision Processes*. 80. 21-27.

Loomes, G. (1999). “Some Lessons from Past Experiments and Some Challenges for the Future”. *The Economic Journal*. 109. F35-F45.

Messick, D.M., Moore, D.A., and Bazerman, M.H. (1997). "Ultimatum Bargaining with a Group. Underestimating the Importance of the Decision Rule". *Organizational Behavior and Human Decision Processes*. 69. 87-101.

Orbell, J.M., Dawes, R.M., and van der Kragt, A.J.C., (1988). "Explaining Discussion-Induced Cooperation". *Journal of Personality and Social Psychology*. 5. 811-819.

Potter, J. (1996). "Discourse Analysis. Theoretical Background". In J.T.E. Richardson (ed.), *Handbook of Qualitative Research Methods for Psychology and the Social Sciences*. Leicester :The British Psychological Society, 125- 140

Raab, Ph. and B. C. Schipper (2004). "Cournot Competition between Teams. An Experimental Study". *Bonn Graduate School of Economics. University of Bonn. Discussion Paper No. 13/2004*

Ratcliff, D. (2003). "Video Methods in Qualitative Research". In P. M. Camic, J.E. Rhodes, and L. Yardley (eds.), *Qualitative Research in Psychology. Expanding perspectives in methodology and design*. Washington. DC: American Psychological Association. 113-129.

Robert, C., and Carnevale, P.J. (1997). "Group Choice in Ultimatum Bargaining". *Organizational Behavior and Human Decision Processes*. 72. 256-279.

Rockenbach, B., A. Sadrieh and B. Mathauschek (2005). "Teams Take the Better Risk". Working paper. University of Erfurt.

Rutström, E.E.L., and M.B. Williams (2000). Entitlements and Fairness. An Experimental Study of Distributive Preferences. *Journal of Economic Behavior and Organization*. 43. 75-89.

Stasser, G. (1999). "A Primer of Social Decision Scheme Theory. Models of Group Influence, Competitive Model Testing, and Prospective Modeling." *Organizational Behavior and Human Decision Processes*. 80. 3-20.

Wildshut, T., Pinter, B., Vevea, J. L., Insko, Ch. A. and Schopler, J. (2003). "Beyond the Group Mind. A Quantitative Review of the Interindividual–Intergroup Discontinuity Effect". *Psychological Bulletin*. 129. 5. 698–722.

Appendix

Summary of the instructions of the power-to-take game

(translated from German; full instructions and script of experimental protocol available at www.bonneconlab.uni-bonn.de/bonneconlab/)

Show-up fee

This is 20 DM for all participants in the experiment. You keep the show-up fee, independent of the decisions taken in the experiment. The show-up fee is included in the calculation of your individual earnings at the end of the experiment.

Division in groups

The 6 participants A and B will in the course of the experiment be divided into two groups, A and B, such that in each group 3 persons decide together. The group decisions take place in different rooms and will be video taped. The allocation of individuals to groups will be described below.

Two phases
The experiment consists of two phases. In phase 1 only group A must make a decision whereas in phase 2 only group B must make a decision. Every participant, be it in group A or B, must make one decision. There are no other decisions that will follow.

Phase 1: group A chooses percentage
In this phase, each group A will be paired with a group B. This will be done by letting each participant A draw a coded envelope. With the help of the different codes, the 6 participants A and B will be divided into two groups, with three participants in each group. Every group A will be paired to a group B. Because of this procedure, both group A and B remain anonymous.

In the envelope, there is a form with a black box, which must be filled in by group A, and a grey box which must be filled in by group B (see specimen). In the black box of group A, we have filled in the total earnings of group B from the previous part of the experiment. Group A must fill in its own total earnings. Group A must then choose a percentage and fill this in on the form. This percentage determines how much of group B's total earnings after phase 2 will be transferred to group A. The percentage chosen by participant A must be an integer in the interval [0, 100]. The decision must be taken jointly and then filled in on the form. All group members must agree by signing a separate form.

When the participants of group A have completed the form, it must be put in the envelope again. After this we will collect the envelopes and bring them to group B paired with group A by means of the code.

Phase 2: group B chooses percentage
In this phase group B has to fill in on the form which percentage of its total earnings will be destroyed. The percentage chosen by group B must be an integer in the interval [0, 100]. The decision must be taken jointly and then filled in on the form. All group members must agree by signing a separate form. The transfer from group B to group A will be based on the rest earnings of group B that are left after destruction. Group B must transfer the percentage of their rest earnings chosen by group A.

When group B has completed the form, it must be put in the envelope again. After this we will collect the envelopes and bring them to group A, that is paired to group B, for their information.

Determination of individual earnings in part 2
Every member of group A always receives one third of its group earnings. For members of group B earnings are determined as follows. If all members of group B have the same earnings from part 1 of the experiment, then group earnings will be divided by 3. Every member gets one third of the group earnings. If the members of group B do not have the same earnings from part 1 of the experiment, then the group earnings from part 2 are divided proportionally. For example: two members have earned 20 DM and one member 10 DM in part 1. Assume that that the group earnings from part 2 are equal to 25DM. This means that two members receive 10 DM and one member 5DM.

Decision Form

Code: …….

<u>GroupA</u> fills in this block:

Earnings group A: ..... DM.

Earnings group B: ..... DM.

We (Group A) decide that ……. % of the earnings of group B will be transferred to us.

<u>Group B</u> fills in this block:

We (Group B) destroy ……. % of our earnings.