Individual or team decision-making – Causes and consequences of self-selection[#]

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Abstract

Even though decision-making in small teams is pervasive in business and in private life, little is known about subjects' preferences with respect to individual and team decision-making and about the consequences of respecting these preferences. We report the results from an experimental beauty-contest game, where subjects could endogenously choose their preferred way of decision-making. About 60% of subjects prefer to act in a team, and teams win the game significantly more often than individuals. Nevertheless, both individuals and team members are highly satisfied with their chosen role, but for different reasons.

JEL classification: C72, C91, C92, J21, M54

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1 Introduction

More and more companies rely on team decision-making to manage and coordinate organizational tasks (Milliken and Martins, 1996). A survey of Osterman (1995) established that work teams exist in 54.5% of US-American firms, and the main reason for the frequent and increasing use of teams is that they simply have proven to be beneficial for their companies (Che and Yoo, 2001). Teams are generally expected to make better decisions than individuals, and decisions made by teams are often accepted to a larger extent by those affected by these decisions. Furthermore, decision-making teams allow for the possibility to decentralize authority, encourage gains from knowledge transfers and may help to introduce optimal incentive schemes that can be supervised by peer pressure rather than by more costly shirking detection technologies. Thus, teams have become important vehicles for identifying high-quality solutions to emerging organizational problems (Jehn et al., 1999).

Despite of the importance of decision-making in teams, surprisingly little is known about subjects' preferences to decide either alone or in a team.[1] In this paper, we explore the causes and consequences of self-selection into individual or team decision-making. We use an experimental beauty-contest game (first studied by Nagel, 1995; for surveys see Nagel, 1999, or Camerer, 2003) where subjects can endogenously choose their preferred way of decision-making – either individually or in a team. Our design allows us to address the following three research questions, which are key in this paper: (1) Which percentage of subjects wants to decide individually, respectively in a team? This first question is of explorative nature, and we will provide an answer for the interactive environment of the beauty-contest game. (2) What are the main reasons for the choice of decision-making types and how are they related to an individual's task-specific characteristics? This second question addresses the possible causes for one's choice of decision-making type – whether they are predominantly motivated by payoff considerations or driven by aspects of the decision-making process. Identifying a relation between a subject's task-specific performance and its choice of decision-making type promises to shed light on whether there is some adverse selection of less able subjects into teams and whether highly capable subjects have a preference for individual decision-making.

[1] The emerging (experimental) literature on team decision-making versus individual decision-making (see, e.g. Bornstein and Yaniv, 1998, Bone et al., 1999, Rockenbach et al., 2001, Laughlin et al., 2002, Cooper and Kagel, 2003, Blinder and Morgan, 2004, Kocher and Sutter, 2005) has relied exclusively on the exogenous assignment of subjects to individual and team decision-making and can, therefore, provide no insights into subjects' actual preferences for deciding individually or in a team. A recent field study by Hamilton et al. (2003) is a rare exception as it addresses the self-selection of workers into teams (rather than working alone). We will relate our study to the one of Hamilton et al. (2003) in more detail below.

(3) Is there a relation between the decision-making type and the performance in the task, i.e. the quality of decision-making? This third question may be considered important for the organization of institutions such as companies, because it examines the consequences of the endogenous choice of the decision-making type on the performance of different types.

We are only aware of one study that analyzes self-selection of workers in a similar spirit like ours. Hamilton et al. (2003) examine the endogenous choice of workers on a garment plant to either work in a team or individually. They are particularly interested in the relationship between a worker's ability and her decision whether or not to work in a team. They do not find any indication for an adverse selection of low-ability workers into teams. Rather, high-ability workers are, in fact, the ones to join a team first, despite of a loss in earnings in many cases. The authors conclude that – besides monetary incentives, which are frequently not substantiated – there are several other important reasons for joining a team, such as work being more variable and less repetitive within teams, or the appreciation and social status that can be gained within a team. Actually, workers joining a team report higher job satisfaction.

Whereas field studies like the one of Hamilton et al. (2003) have the obvious advantage of creating a more natural environment, experiments allow obtaining more control over the decision-making situation. In Hamilton et al. (2003), for instance, self-selection is not totally voluntary, because the organization they studied intended to change to module production with work teams gradually, and, hence, workers refusing to join a work team had to leave the firm in the medium run. Furthermore, monetary incentives were not identical for individual and team workers, which constitutes a confounding factor, since the choice of individual or team work might not have been made according to one's preferences for working in a team or individually, but simply due to the different payment schemes. More generally, employees in real-world organizations cannot always choose to work individually or in a team and they are frequently acting both as individuals and within teams. As a consequence, it is difficult to disentangle performance of individuals and teams. Field studies may also be biased or contaminated by other human resource measures that are implemented at the same time as team formation. Moreover, teams in the real world often face an intra-team conflict in terms of earnings, promotion or similar monetary and non-monetary incentives.

While field studies suffer from the above-mentioned difficulties, experiments are conducted under control of most of these possibly confounding factors. We, therefore, regard our experimental approach as a means to obtain important evidence on the causes and consequences of individual, respectively team, decision-making that cannot be collected

straightforwardly in the field. Hence, it should be viewed as a complementary approach, rather than as a substitute for field studies.

Of course, we are aware of the fact that there are quite a few situations in which an endogenous choice of the decision-making type is not possible, because companies usually dictate the organization of decision-making. In many important instances, however, it is possible for an individual to deliberately choose whether she wants to decide alone or consult several people, form an ad-hoc team for the decision-making task or let an existing team decide. Companies may also implicitly or explicitly allow employees to choose their preferred way of decision-making. A straightforward real-world application of our experimental setting would be financial decision-making. Not only that the beauty-contest game is very much akin to financial markets (see already Keynes, 1936), trading on financial markets is also a very good example for a situation where decision-making constitutes an important part of the work task and where both individual decision-makers and small teams are actually represented, e.g., among mutual fund managers (Prather and Middleton, 2002).

Our results show that about 60% of experimental participants want to act as a member of a team and the remaining participants choose to decide individually. The most important motivation for participants to opt for team membership is the expectation of better decisions and, thus, higher profits. On the contrary, most of the participants opting for individual decision-making stress the importance of being able to decide alone, without any need for discussion or compromise. Although teams perform significantly better than individuals and earn almost twice as much, both types of decision-makers – individuals and team members – report high satisfaction with their chosen role after the experiment. Thus, it seems that individual decision-makers are, on average, willing to pay a price for the possibility to decide alone.

The remainder of this paper is structured as follows. In the next section we describe the beauty-contest game and introduce our experimental design. In Section 3 we present our results. Section 4 concludes.

2 Experimental design and procedure

2.1 The beauty-contest game

In the beauty-contest game, N decision-makers simultaneously choose a real number from the interval $I \equiv [0, 100]$. The winner is the decision-maker whose number is closest to p times the mean of all chosen numbers, where $p \in (0, 1)$ is a predetermined and commonly known number. In the tournament setting, the winner receives a prize; all other N-1 decision-makers earn nothing. In case of a tie, the prize is split equally among those who have tied.

The game is dominance solvable with a Nash equilibrium in which all decision-makers choose zero. The process is as follows: A rational player will not choose any number higher than $100p$, because such a number would be weakly dominated by $100p$. If the decision-maker assumes all other players to be rational as well, i.e. they exclude numbers from [$100p$, 100], she will exclude numbers higher than $100p^2$ and so on. Thus, after an infinite number of iteration steps of excluding weakly dominated choices the only number left is zero.

The game-theoretic structure of the beauty-contest game allows analyzing how many steps of iteration decision-makers actually apply (Camerer, 2003; Camerer et al., 2004). Previous studies have found that the depth of reasoning, i.e. the number of iteration steps a decision-maker applies, is rather limited across a wide range of different subject pools, sample sizes or parameters p (see Bosch-Domenech et al., 2002; Camerer, 2003; Camerer et al., 2003; Duffy and Nagel, 1997; Güth et al., 2002; Ho et al., 1998; Kocher and Sutter, 2005; Nagel, 1995, 1999; Sutter, 2004, Weber, 2003)[2]. Usually first round guesses are far from the equilibrium, with averages around 20 to 40. When the game is repeated chosen numbers decline significantly, but the equilibrium is typically not reached.[3]

The beauty-contest game is an almost perfect tool to study reasoning processes, rationality and learning of different types of decision-makers (individuals or teams), without confounding rationality with social preferences or risk and loss aversion. It is an interactive game that is very simple to explain and which has a clear economic interpretation, since it has already been likened to stock market investments by Keynes (1936).

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[2] Kocher and Sutter (2005) is the paper which is most closely related to ours. They were the first to compare individuals and teams. However, assignment to individual or team decision-making was exogenous in their study, thereby making it impossible to infer anything about subjects' preferences for individual or team decision-making and possible causes and consequences.

[3] Ho et al. (1998) find that the larger the number of decision-makers N the higher is the speed of convergence to the equilibrium. Note that $N = 2$ is an exception, because the lower number always wins (see Costa-Gomes and Crawford, 2004; Grosskopf and Nagel 2001).

2.2 Experimental setup

Our experiment consisted of two parts.[4] In Part One all subjects played one single round of the beauty-contest game (with $p = 2/3$) as individuals. Participants were told that they would be randomly assigned to units of 3 subjects and that the winner would get a prize of 7€. Subjects received, however, *no* feedback about the outcome of Part One until *after* the end of Part Two in order to avoid that learning from Part One confounded preferences for individual or team decision-making. Likewise, subjects were informed about Part Two only after the end of Part One in order not to distort decisions in Part One by possible deliberations about Part Two.

At the beginning of Part Two we asked subjects to indicate on a decision sheet whether they wanted to play the same beauty-contest game as a member of a team with three subjects or individually and for which reasons they did so. When making their decision on individual or team play, subjects knew that the same beauty-contest game as in Part One would be played for 4 more rounds in fixed units of 3 interacting decision-makers, of which two were individuals and the third one a team with three members. The prize of winning in a given round was again 7€, which was either paid to a winning individual or to *each* member of a winning team (in order to keep the per-capita payoff constant).

Assignment to a specific unit and team within a unit was known to be random[5], subject to the restriction that the preferences of as many subjects as possible were respected. We have opted for units of two individuals and one team with three members after having asked a completely different set of subjects during a large lecture (with about 200 students) in which role they would prefer to play a beauty-contest game. Although we played only one round of the game in this lecture for the sake of demonstrating the concept of iterated elimination of weakly dominated strategies, it turned out that about 40% of the students would have preferred to play the game individually, whereas about 60% indicated a preference for playing the game in a team of three subjects each. We would like to mention briefly already at this point that by using the data from the lecture for our experiment, we have been able to assign 97% (!) of subjects to their preferred role of either individual or team decision-making.

After the random assignment to the decision-making units, participants were seated on predetermined places in a large auditorium. Teams were seated at a joint table in order to

[4] The experimental instructions for both parts and the post-experimental questionnaire are given in the Appendix.
[5] Random assignment to teams is a crucial feature to study the pure preferences for individual or team decision-making, because with random assignment the choice of decision-making type can not be contingent on the advance knowledge of other team members' characteristics (like their level of cooperation in the case of endogenous group formation in public good games; see Ehrhart and Keser, 1999, or Coricelli et al., 2004).

enable them to discuss face-to-face, but they were separated from the two individual members of the same unit. The three decision-makers in each unit could not identify each other and remained anonymous throughout the experiment. The space between all decision-makers was chosen in a way that it was impossible to communicate or to disturb the deliberation process of other individuals and teams. Teams were requested to come up with a single decision after five minutes of discussion which turned out to be a sufficient time span to make a decision.

At the end of each round, decision-makers were asked to write down the reason(s) for their choice. Then each decision-maker received feedback information on all numbers in her unit, on the average chosen number in her unit, the target number (i.e. two thirds of the average), and whether she had won or not in that round. It was not revealed whether a particular number had been chosen by an individual or a team. After completion of round 4 we asked each participant to fill in a short post-experimental questionnaire individually (team members were seated separately for that purpose). Finally, the results of Part One were revealed.

The experiment was run as a paper-and-pen experiment at the University of Innsbruck in November 2003. A total of 90 subjects, mainly studying business adminstration, economics, political science, medicine and psychology took part in the experiment. Participants were recruited from introductory courses, making it very unlikely that subjects had any prior knowledge of game theory or the beauty-contest game. We had 3 sessions á 30 subjects, yielding 18 independent units of two individuals and one team of three subjects. Sessions lasted about one hour each, yielding an average payoff of 13.7€ (including a 2€ show-up fee).

3 Results

3.1 Preferences for acting individually or in a team

Table 1 presents the relative frequencies of participants' choice of decision-making role. 33 out of 90 subjects (37%) indicated that they wanted to play as an individual; the remaining 57 participants (63%) preferred to decide in a team. Overall, we could assign 87 out of 90 participants (97%) to their preferred role. Only 3 participants (luckily exactly one in each session) had to act individually rather than in their preferred role as a team member. Despite of the 3 mismatches (3% of all participants), the actual assignment of roles corresponded

almost perfectly with participants' preferences, therefore guaranteeing a truly endogenous self-selection into the most preferred type of decision-maker.[6]

Table 1 about here

In addition to indicating their preferred role at the beginning of Part Two of the experiment, we asked participants for the main reason for their decision by picking one out of the following two statements: *"I want to act as an individual, because I want to decide alone / I want to act in a team, because I do not want to decide alone."* or *"I want to act as an individual / team member, because this way I will earn more money."* By restricting subjects to pick only *one* of both statements, we wanted to pin down the relative importance of the two possibly most prominent aspects shaping one's choice, i.e. profits versus the (utility from the) decision-making process.

Figure 1 about here

Figure 1 displays the relative frequency of subjects picking any of the two statements. 24 out of 32 participants[7] (75%) who wanted to play as individuals chose this role primarily because they wanted to decide alone. Only 8 participants (25%) indicated that they wanted to act alone because they expected higher profits this way. Judging by a binomial test, participants preferring to act alone do not choose the two statements equally likely ($p < 0.01$).

34 out of 57 participants (59.6%) with a preference for team decision-making indicated as their prime reason that they did not want to decide alone, whereas 23 participants (40.4%) preferred to act in a team, because they expected higher profits in teams. According to a binomial test, we cannot reject the hypothesis that both reasons are chosen equally likely.

Comparing the frequency of choosing a certain statement across both types of participants (those preferring to act individually and those with a preference for being a team member), we find a weakly significant difference in the frequencies ($p = 0.1$; χ^2-test). The expectation of earning higher profits is relatively more important for those participants choosing to act in a

[6] Note that there is no significant difference between the choices of men and women, as 13 out of 40 women, respectively 20 out of 50 men, indicated a preference for acting individually.
[7] One participant indicating that she or he wanted to play as an individual failed to provide a reason.

team, whereas the opportunity to decide alone is relatively more important for subjects opting to act individually.

In addition to selecting one of the two statements above, participants were encouraged to write down any additional reasons that were important for their decision. 12 out of 33 participants who wanted to play individually, and 23 out of 57 participants who opted into teams, listed one additional reason each. Since many arguments were almost identical in phrasing or meaning, we summarized the additional arguments in nine different categories, as indicated in Figure 2. Note that percentages are derived from the total number of subjects stating an additional reason.

Figure 2 about here

Concerning those participants who want to act individually, the two most frequently cited arguments are *"I do not want to discuss"* (42%) and *"Only I am responsible for my decisions"* (25%). Interestingly enough, no participant preferring to act alone referred to profits or the quality of decision-making, but all arguments were related to the process of decision-making.

In stark contrast, 87% of participants who wished to act in a team indicated that *"More players have more experience, therefore results will be better"*, thus stressing the payoff prospect. In total, the picture emerging from the list of additional reasons confirms the impression arising from the dichotomous choice of statements discussed above: Team members mainly focus on profits and the quality of decision-making, whereas individual decision-makers' center of attention is at the decision-making process itself.

3.2 Decisions of individuals and teams

Figure 3 shows the average number chosen by individuals (N = 36) and teams with three subjects (N = 18). Recall that all numbers in Part One were submitted by individuals. However, we can link these numbers to the self-selected type of decision-maker in Part Two. Hence, we have two different averages in Part One, one for those acting individually in Part

Two, and one for those deciding in a team. As it is typical for the beauty-contest game, Figure 3 reveals a downward trend of numbers in the course of the experiment.[8]

Figure 3 about here

In Part One of the game, the overall average chosen number is 37.1, with subjects deciding later on to play in a team choosing significantly higher numbers (on average 40.1) than those subjects who later on opted for playing individually (with an average of 32.6; $p < 0.05$, Mann-Whitney U-test).

Even though one should be careful in interpreting individually chosen numbers in Part One as a proxy for individual abilities (because it is hard to distinguish whether the first number chosen is a consequence of sophistication or random choice), it is clear that, on average, more sophisticated players will choose lower numbers. We can therefore tentatively conclude from the behavior in Part One that the set of higher-ability decision-makers is the set of subjects opting for individual decision-making in Part Two. The reverse side of the coin is the fact that those subjects choosing in the aggregate significantly higher numbers are the ones self-selecting into teams (in order to gain higher profits in Part Two, as our previous analysis has shown).[9]

The effects of team decision-making can be immediately recognized from round 1 in Part Two. Recall that subjects got no feedback on the outcome of Part One before making decisions in Part Two. Nevertheless, chosen numbers of team members decline significantly from Part One to the first round in Part Two (40.1 vs. 25.8; $p < 0.05$; Wilcoxon signed ranks test; $N = 18$).[10] On the contrary, the numbers of subjects acting individually in Part Two do practically not change from Part One to round 1 of Part Two (32.6 vs. 31.7; $p > 0.6$).

In all rounds of Part Two, numbers chosen by teams are smaller than those chosen by individuals, with the difference being significant for all rounds except the first one ($p < 0.01$ in any of rounds 2 to 4; Wilcoxon signed ranks test; $N = 18$).[11] Lower numbers of teams

[8] The increase from round 3 to round 4 in Part Two for individuals is due to three individuals choosing 100, 100, and 90 in the last round.

[9] Supportive evidence for this statement is provided by running a probit regression with the preference for individual (= 0) or team decision-making (= 1) as dependent variable and the chosen number in Part One as independent variable. The latter turns out to be weakly significant and positive ($p = 0.108$), indicating that subjects with higher numbers tend to opt for team decision-making.

[10] This 'learning' without feedback is similar to what Weber (2003) has found in a beauty-contest game with individuals who got no feedback until the very end of a repeated beauty-contest game.

[11] The test was done by comparing the number chosen by the team with the average number chosen by the two individuals *within* a given unit. Hence, we have 18 independent observations. Comparing chosen numbers *across* units would blur the picture since numbers within a unit are path-dependent. One can pin down the different

substantiate into higher profits of teams, as can be seen from Figure 4.[12] In fact, teams earn significantly more than individuals in rounds 1, 3 and 4 as well as for all rounds together ($p < 0.01$ overall; $p < 0.05$ in round 3; $p < 0.1$ in rounds 1 and 4; χ^2-tests). In sum, team members win on average 13.2 euro, but individuals only 7.4 euro.

Figure 4 about here

After having submitted their decisions, we asked subjects to write down their main reason for choosing a particular number. The motivation for this request was that we wanted to get some additional insight into the decision-making process of individuals, respectively teams. From Figure 5, where we summarize the reasons submitted after round 1 of Part Two[13], there emerge three main differences between individuals and teams. First, 20% of individuals stated that they had chosen a number randomly without any further deliberation. None of the teams submitted such an explanation ($p < 0.1$, χ^2-test). Second, half of the teams chose their number contingent on their expectation of the overall average in their unit; i.e. they formed an expectation of the overall average and chose two thirds of that expected number. The same reasoning was applied by only 25% of individual decision-makers. Third, 20% of the individuals decided to choose a particular number because they expected other decision-makers in their unit to choose similar numbers. Only 7% of teams committed to the same kind of logic, which is, of course, wrong since expecting the others to choose similar numbers should result in oneself choosing about two thirds of the expected average. Concerning other stated reasons, there is hardly any difference between individuals and teams.[14]

Figure 5 about here

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decisions of individuals and teams in rounds 2 to 4 also by calculating the ratio of a decision-maker's chosen number in round t to the average number within the unit in round t-1. We find that teams choose significantly lower fractions than individuals ($p < 0.05$ in any round; Mann-Whitney U-test), which shows that teams converge much faster towards the equilibrium than individuals do.

[12] Note that in a beauty-contest game with 3 decision-makers, it is possible that the median (and not the minimum) number is the winning number. The relatively small – and insignificant – advantage of teams over individuals in round 2 of Part Two is mainly due to many teams choosing too low numbers to win (see the strong decline of team numbers from round 1 to round 2 of Part Two in Figure 3).

[13] Note that not every decision-maker actually submitted a reason for her chosen number. 20 out of 36 individuals and 14 out of 18 teams gave an explanation for their choice.

[14] It is noteworthy that about the same percentage of individuals and teams (two individuals and one team) explicitly stated that they knew zero to be the equilibrium of the game, but that it would be unwise to choose zero, because others would most probably deviate from the equilibrium.

From round 2 onwards, there are no longer any noteworthy differences between teams and individuals with respect to the reasons for choosing a certain number. Most decision-makers (about 75% of individuals and teams alike) mention that they expect a further downward trend in numbers. Some of them, mainly teams, try to extrapolate the trend by dividing the average in round t by the average in round t-1 in order to estimate the relation between the prospective average in round t+1 to the average in the current round t.

3.3 Subjects' post-experimental assessment of their role

At the end of the experiment, subjects were asked to answer a short post-experimental questionnaire. Team members were requested to fill in the questionnaire individually and were seated separately for that purpose. Table 2 reports on some selected questions and the average answers of individuals and team members.

Table 2 about here

First, we asked subjects about their satisfaction with their (self-selected) role in the game. The scale ranged from 1 (very satisfied) to 7 (not at all satisfied). 79% of individuals and 72% of team members reported to be very satisfied (scale 1). However, 21% of individuals also reported to be not satisfied at all (scale 7), whereas those team members who were not very satisfied indicated their satisfaction in the range from 2 to 4. On average, therefore, team members show a higher degree of satisfaction with their chosen role, but the difference is not significant.

Second, we asked subjects whether they would stick to their chosen role in case the experiment was to be repeated. All but one of the 54 team members indicated that they would like to proceed as team members, whereas only 25 out of 33 individuals would have preferred to act as an individual again ($p < 0.01$; χ^2-test).[15]

Third, subjects had to report their expectation about which type of decision-maker had – in the aggregate – won the game relatively more often. Both types of decision-makers expected teams to be more successful in terms of profits. However, team members expected

[15] Out of the three subjects who had to play individually despite their wish to be a team member (and which were excluded from the data in Table 2), two would have switched to team decision-making (these two also indicated not to be satisfied at all), whereas one would have opted for individual decision-making (this person indicated to be very satisfied with his or her role).

teams to win the game significantly more often than individual decision-makers did (85% vs. 62%, $p < 0.01$; χ^2-test).

In sum, our post-experimental questionnaire shows that self-selection into deciding individually or as a team member created a very high degree of satisfaction with the particular role. This was true for both individuals and team members. Interestingly, even though the majority of individuals expected – correctly – teams to win the game more often, these individuals were nevertheless satisfied with their decision to act individually. Hence, individuals were obviously willing to pay a price for the freedom to make their decision alone.

4 Conclusion

This paper has addressed the causes and consequences of self-selection into individual, respectively team decision-making. Our main findings provide the following answers to our research questions put forward in the introduction: (1) About 60% of subjects prefer team decision-making over individual decision-making in our experimental beauty-contest game. (2) The most important reason for participants to opt for team membership is the expectation of better decisions and, thus, higher profits. This induces in particular low-ability subjects (with relatively higher numbers in Part One of the experiment) to self-select into team decision-making. Most of the subjects choosing individual decision-making stress the importance of being able to decide alone, without any need for discussion or compromise. (3) Our endogenously formed teams perform significantly better than individuals by earning almost twice as much as individuals. Yet, *both* types of decision-makers – individuals and team members – are highly satisfied with their chosen role. This is also true for those individual decision-makers who expect teams to win more often on average. Obviously, individual decision-makers are willing to pay a price for the possibility to decide alone.

Our paper has partly produced different results than the field study of Hamilton et al. (2003) on self-selection into work teams. Whereas they have found that higher-ability workers chose team decision-making more often and sooner, our results suggest that subjects with higher numbers in Part One select more frequently into teams, indicating tentatively that teams consist – in the aggregate – of lower-ability players. Yet, given that the company studied by Hamilton et al. (2003) had announced to shift to work team production in any case, self-selecting in teams might actually have been predominantly motivated by strategic

considerations in the sense that those opting for teamwork would have higher chances of keeping their job than those continuing individual work. In fact, higher-ability workers might have been those realizing this connection earlier and, therefore, opted sooner for teamwork.

It is also no surprise that Hamilton et al. (2003) report higher job satisfaction for subjects working in teams than working alone, whereas we do not find any significant difference in our experiment with respect to individuals' and team members' satisfaction with their decision-making role. After all, subjects working alone in the garment plant faced the prospect of either being dismissed or being forced to join a work team, which can easily explain the lower job satisfaction of individual workers.

Our results prove that more research on this issue is required to be able to draw more general conclusions. Both experiments and field studies ought to be used as complementary approaches to address further questions related to the endogenous choice of the decision-making type, such as whether preferences for team decision-making or teamwork are task-dependent, whether there is a systematic relation between subjects' abilities and their preference for individual or team decision-making or whether disregarding subjects' preferences bears the cost of worse performance. Knowing more about the causes of self-selection into individual or team decision-making and its consequences may certainly prove helpful for the management of organizations, for example in developing strategies on decision-making in organization and in detecting areas where endogenous team formation dominates the typical exogenous approach in terms of decision-makers' performance.

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Tables and figures

Table 1: Preferences and assignment

		Relative frequency in % (N = 90)
I wish to play as …	individual	37
	team member	63
Preferred role has been …	assigned	97
	not assigned	3

Table 2. Post-experimental questionnaire

	Individuals[#] (N = 33)	Team members (N = 54)
How would you rate your satisfaction with having played the game as an individual/as a team member on a scale ranging from 1 (= very satisfied) to 7 (= not at all satisfied)?	2.27	1.41
Would you repeat your choice of playing as individual/as a team member if the experiment were to be repeated? Yes (= 1) or No (= 0)	0.75	0.98
Who do you think has won (on aggregate) the game more often in relative frequencies? Individuals (= 0) or Teams (= 1)	0.62	0.85

[#] We exclude those three subjects who wanted to decide in a team, but which we had to assign to individual decision-making.

Figure 1: Reasons for self-selection

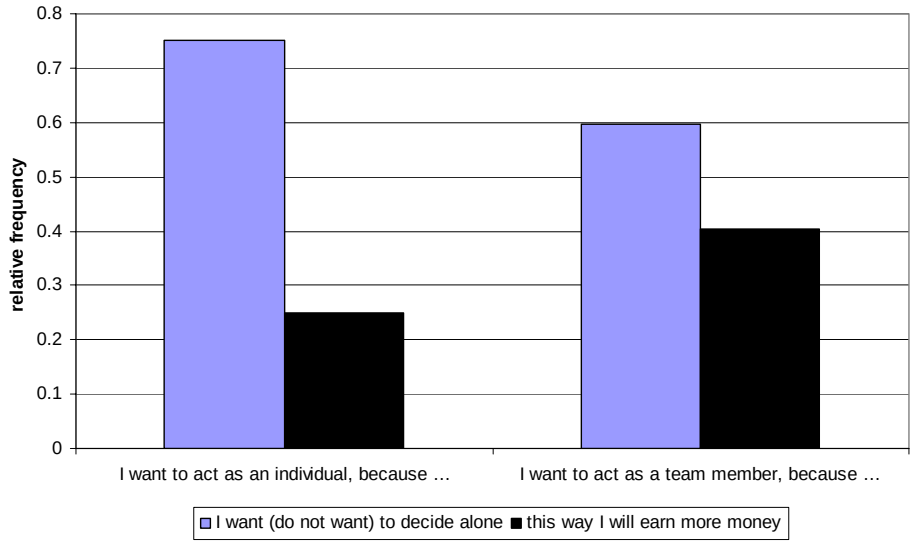
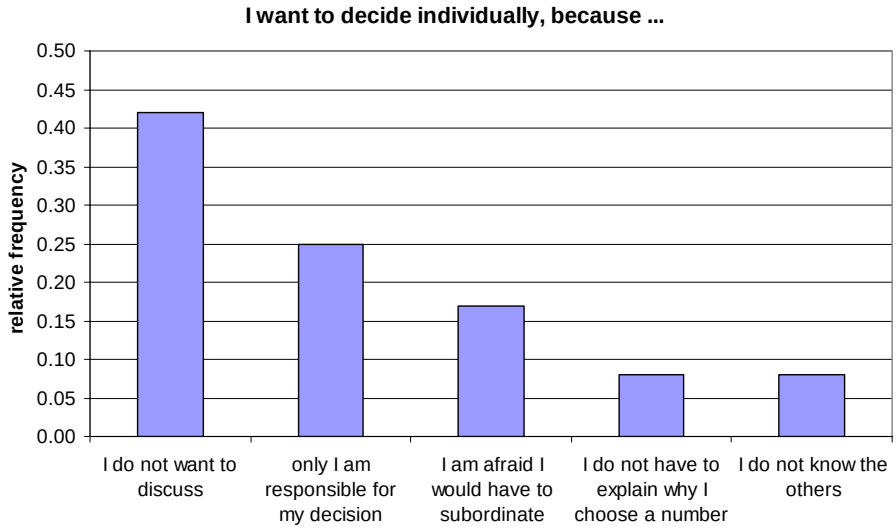


Figure 2: Additional reasons for self-selection

A. Individuals



B. Team members

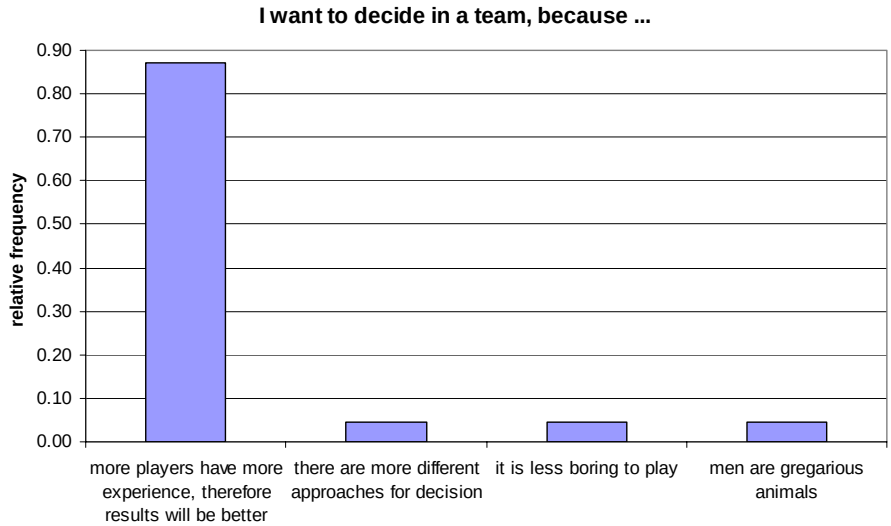


Figure 3: Average numbers in Part One and Part Two (Rounds 1 – 4)

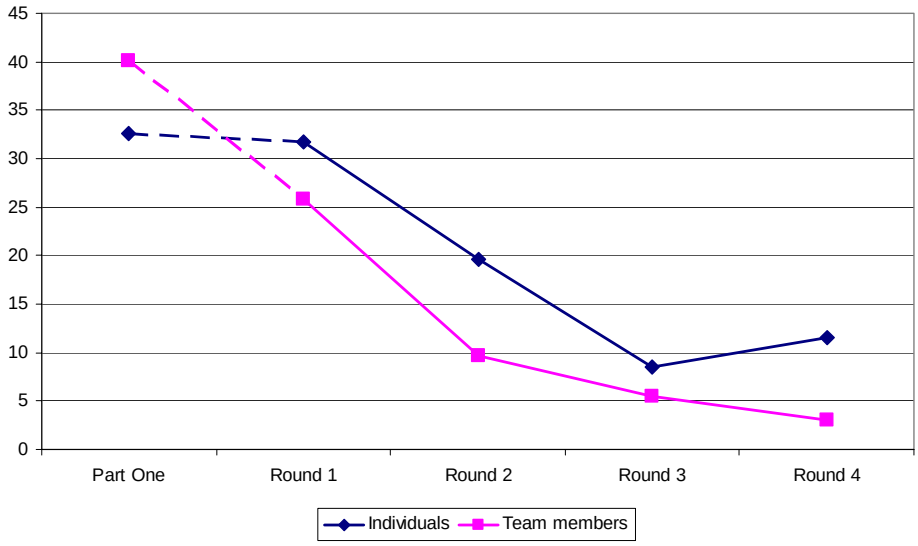


Figure 4: Average profits

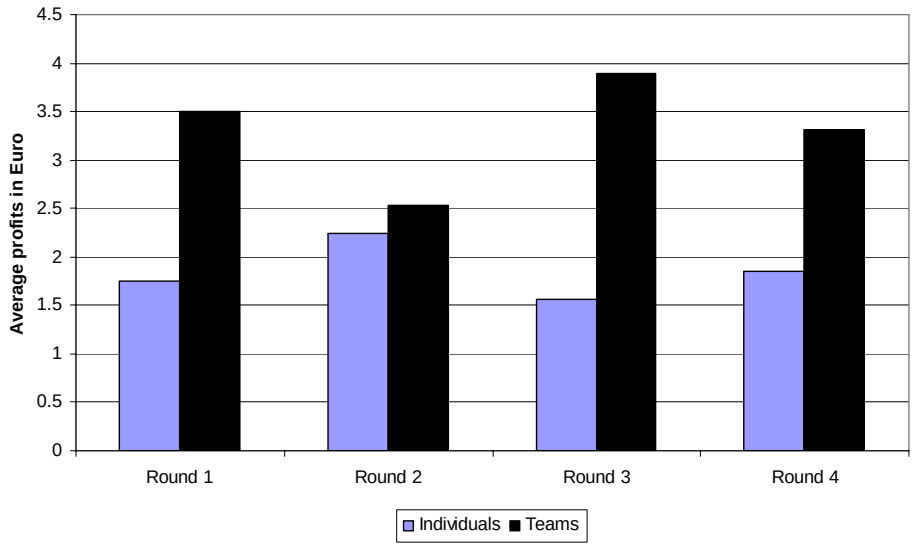
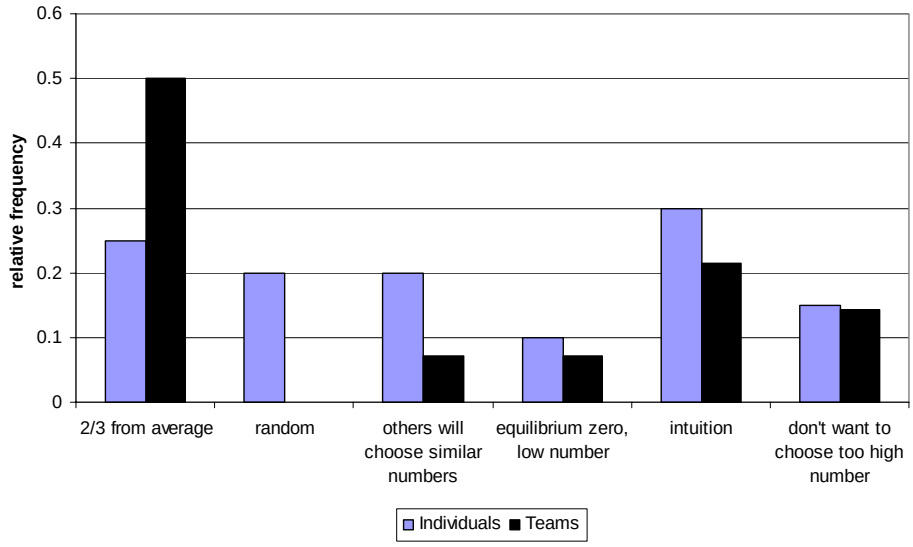


Figure 5: Reasons for choosing a particular number in the first round of Part Two



Appendix: Instructions [originally in German]

Welcome to the experiment and thank you for your participation!
Please do not talk to other participants of the experiment from now on.

Part One

This is an experiment to analyze economic decision-making behavior. During the experiment you will be asked to make decisions. How much you will earn depends on your own decisions and on the decisions of other participants. At the end of the experiment your earnings will be paid to you privately and in cash. The experiment will take about 1 hour. You will receive € 2 as a show-up fee. If you have questions after reading the instructions please raise your hand. One of the experimenters will come to you and answer your questions privately.

Each participant writes down a number x_i from the interval [0, 100] on her response card. It is also possible to choose zero or 100. There is an ID-number on your response card. This number is valid for the whole experiment. The winner is the participant whose number is closest to $\bar{x}$ that is calculated as follows:

$$\bar{x} = \frac{2}{3}\frac{\sum_{i=1}^{n} x_i}{n}$$

That means that the number which is closest to two thirds of the average of all chosen numbers will be the winning number. The number of decision-makers n is 3, i.e. 3 players form a unit and $\bar{x}$ is calculated from the numbers that these 3 players choose.
The winner receives € 7. If there is more than one winner, the amount is split equally among them.

After all participants have written down their numbers we collect the response cards (response cards with more than one number are invalid!) and calculate the sum of all numbers, the average and $\bar{x}$, i.e. 2/3 of the average. The winning number will be marked on the decision-making form. You will receive feedback on the results of Part One only after Part Two, and you will not know who the other two members of your decision-making unit are.
After the end of Part One you receive the instructions for the second part.

Part Two [handed out after completion of Part One]

Four rounds of the same game as in Part One will be played in this part, i.e. each player makes four independent decisions about x_i. After each round you will be informed about the decisions of the other players in your decision-making unit, about the winning number and whether you have won. The next round only starts after you received feedback about the preceding round.

Response cards with more than one number are invalid. Together with your response card you get an empty sheet for writing down explanations for your decision. We would be grateful if you could give a reason for choosing a specific number.

Before the beginning of the game you have to decide whether you want to make your decisions alone or as a member of a three-person group. Each decision-making unit with n = 3 decision-makers consists of 2 individual players and one three-person group. For the decision whether to play alone or in a group you get a separate decision form on which you are also asked to tick off reasons for your decision.

The assignment of roles will be according to the whishes on the decision-forms for as many participants as possible. Because we need two individual players and one group for each decision-making unit, it is possible that not all wishes can be fulfilled. We will determine randomly whose whishes will be fulfilled and whose cannot. Assignment to specific groups will also be random.

If a group is the winner the profit will be tripled and distributed equally among the group members. Therefore, each group member receives an amount of € 7. If more than one member of a unit wins, the profit will be split equally among the winners.

The composition of the group remains constant over the whole experiment. That means, if you have decided to act as group member / individual you will be in your chosen role for all four rounds. Thus, there is no possibility to change your role.

In each round groups have a maximum of 5 minutes to discuss and agree on a single number. We ask you to discuss as quiet as possible! Talking to members of other groups or other units is strictly forbidden and results in exclusion from the experiment!

If you have a question, please raise your hand. One of the experimenters will come to you and answer you questions privately.

Post-experimental questionnaire

[*Participants had to fill in the questionnaire below at the end of the experiment. This is the specimen for groups; we do not print the questionnaire for individuals separately because it is similar to the one for groups except for the questions concerning the group decision-making process.*]

ID _____

We would ask you to complete a short questionnaire before you receive your payoff.

Age: _____ Gender: ☐ m ☐ f

Faculty: _____

How many participants in this room do you know personally (approximately)? _____

1. Do you think that groups or individuals have won more often?

☐ Individuals ☐ Groups

Why do you think this is the case? _____

_____

2. Are you satisfied with your decision to decide as member of a group?

very satisfied ☐ ☐ ☐ ☐ ☐ ☐ ☐ no at all satisfied

Why? _____

3. How do you rate cooperation in your group?

very good ☐ ☐ ☐ ☐ ☐ ☐ ☐ very bad

4. How much have you been involved in achieving a group decision?

☐ not at all ☐ rarely ☐ a little ☐ quite much ☐ much

5. How has the decision for a certain number been made within your group?

☐ There was a unanimous decision.

☐ There was a majority decision.

☐ We used another decision rule (please indicate which one)

_____

6. How often have you made proposals for x_i in one round, on average?

☐ never ☐ 1-2 times ☐ 3-4 times ☐ 5 times or more often

7. Have the members in your group had an equal say? ☐ yes ☐ no

8. Have arguments come up in the group discussion that were new to you? ☐ yes ☐ no

9. Would you again choose to decide in a group if the experiment were repeated now? ☐ yes ☐ no