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ECONOMISTS FREE RIDE, DOES ANYONE ELSE?

Experiments on the provision of public goods, IV

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Eleven closely related experiments testing the free rider hypothesis under different conditions, and sampling various subpopulations, are reported. Results question the empirical validity and generality of a strong version of the hypothesis. Some reasons for its failure are discussed.

1. Introduction

The free rider hypothesis [Hardin (1968), Olson (1968)] has been one of the most widely accepted propositions in the literature on the provision of public goods by groups. This acceptance, however, has been based primarily on the strength of the theoretical argument, and the citation of commonplace example, rather than rigorous empirical test. In this paper we report on a series of experiments expressly designed to test the hypothesis and related aspects of the theory. Some of these experiments have been extensively reported in the sociological literature [Marwell and Ames (1979, 1980) contain experiments 1, 2, 5, 6; Alfano and Marwell (1980) reports on experiment 11]. Others will be reported here for the first time. Our objective is to review and consider the sum of our findings.

The experiments reported here add substantially to a small, but quickly growing experimental literature whose general trend has been to question the power of the free rider hypothesis for predicting behavior in collective action situations. A large portion of this work has been done by psychologists and has recently been reviewed by Dawes (1980) and Edney (1980). Almost all of this work, however, has dealt with free riding in small groups. Similarly, the few articles by economists and sociologists which have appeared in the literature also tend to deal with relatively small numbers of subjects in

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relatively small groups [Bohm (1972), Brubaker (1975), Sweeney (1973), Smith (1978), Schneider and Pommerehne (1979)]. These latter works also tend to use very complex experimental designs, running individual subjects through multiple trials, each of which involves a somewhat different experimental condition.

In the research reported below standard social psychological experimental procedures are employed. Care is taken to have subjects understand the task and the situation. Subjects are not used in more than one condition so that there is no contamination from order effects, etc. Equally important, the number of experiments and subjects involved serves to replicate and give weight to our conclusions.

In our experiments 'free riding' refers to the absence of contribution towards the provision of a public good by an individual, even though he or she will not be excluded from benefiting from that good. The free rider hypothesis is based on the assertion that under such conditions it is irrational for an individual to voluntarily contribute. Following Brubaker (1975), however, we will consider two versions of the group-level implication of this assertion: the 'weak' version of the free-rider hypothesis, which states that the voluntary provision of public goods by groups will be sub-optimal; and the 'strong' version, which argues that (virtually) no public goods at all will be provided through voluntary means.

2. The research paradigm

To test the free rider hypothesis, and related aspects of the theory, we created a highly controlled, very abstract, experimental situation. The original experiments were designed to maximize the probability of free riding by minimizing the possible effects of normative and other pressures for contributing towards the public good. Although aspects of the paradigm changed for different experiments, it is useful to begin by describing the simplest version that we used. All experiments in the program may be seen as variants of this situation.

2.1. Dependent variable: Investment in the public good

The central ingredient in the research paradigm was the operationalization of our dependent variable — investment in a public good. For this purpose, subjects were provided with a given amount of resources, in the form of tokens, which they had to invest in one of two 'exchanges': The 'group exchange' or the 'individual exchange'. The group exchange was our operationalization of a public good, while the individual exchange was a private good. Tokens invested in the individual exchange earned a set amount, regardless of the behaviour of other group members or anything

else. In a typical experiment this might be one cent per token. The individual exchange was thus like a bank in assuring a specific return on investment. The return was 'excludable' in neither affecting, nor being affected by, returns to other group members.

The group exchange, on the other hand, paid its cash earnings to *all* members of the group by a pre-set formula, regardless of who invested. The subject received a *share* of the return on his own investment in the group exchange (if any), and also the same share of the return on the investment of each of the other group members. Thus, the group exchange provided a joint, nonrival, nonexcludable, or *public* form of payoff. What made the group exchange a public *good* when compared with the individual exchange, was that it was possible to have the group exchange return substantially *more* than the fixed amount set for the individual exchange. For example, in several experiments reported below the group exchange returned 2.2 cents to the group for every token invested by any group member. Under these circumstances, all members of the group would be better off if all the group's resources were invested in the group exchange than if all were invested in the individual exchange. On the other hand, each individual would be best off if s/he invested in the individual exchange while everyone else invested in the group exchange. This is the incentive to 'free ride' on the investments of others in the public good.

Subjects were allowed to divide their investment between the two exchanges in any way they wished. The investment decision they made comprised the measure of the dependent variable.

2.2. *Procedures*

In general, all contact with the subjects of these experiments was by telephone and mail. The subjects were first reached by telephone and asked if they were interested in participating in an experiment concerning investment decisions. If they wished to participate they were sent a packet of instructions. The instructions gave a complete, and (in all but one particular) honest description of the nature of the study, the investment decision to be made, and all other factors that might be relevant to that decision. Our intention was to have the subject act with 'full information'. The instructions were carefully designed, with cartoons and tables, and were repetitive, so that we might make as clear as possible a mildly complex situation.

A few days after the mailing an experimenter called the subject and went over each point in the instructions, testing and reviewing until the subject fully understood the situation and the decision to be made. The subject was then given one or two days to decide on an investment, and was again called by the experimenter. At this point the subject reported the investment decision, answered several questions checking for understanding of the situation, and verbally explained the reasons for his or her behavior. Finally,

subjects responded to a mailed questionnaire regarding certain background and personality characteristics and their reactions to the experiment.

3. Consensual validation of the operationalization

Largely because neither of us is a trained economist, we felt somewhat insecure in defending our operationalization of economic theory, and in asserting the predictions of theory for behavior in our experimental situation. In response to these problems we decided to validate our approach by consulting with acknowledged experts in this area. Some of our consultation, of course, was of the usual kind, and helped us in refining our hypotheses, methods and procedures. In addition, however, we pursued a more systematic method of validation which can be usefully summarized.

Using our own knowledge of the literature, advice from our consulting economists, and excluding all those experts with whom we had previously discussed this project, we selected six economists and one sociologist prominent in this area.[1] Each expert was sent a version of our experimental situation (see experiment 3, below) along with a questionnaire. He was asked to indicate what he thought relevant *theory* would predict about our subjects' investment behavior, and also whether he personally agreed with the prediction from theory. If he did not agree with the theory (as he saw it), he was asked to indicate the bases on which he disagreed.

One economist declined to answer our questions, arguing that economic theory made no relevant predictions. A second economist had major qualms about making predictions, since he felt the situation was too 'rich' for a pure test of relevant theories. Nevertheless, he did make predictions, and we will include them below. The six panel members who did make predictions all felt that either 'economic theory' or 'game theory', or both, were relevant to this situation.

Five of the six respondents agreed that theory clearly supported the *strong* free rider hypothesis. Four stated that theory predicted that group members would invest no tokens at all, while the fifth estimated investments of less than 5% of the tokens in the group exchange. The sixth respondent said the typical individual would invest 30% of his or her tokens, but added that this prediction came from a combination of theory *and* his reading of previous, vaguely related, empirical research. In general, then, we consider our description of the theoretical predictions for our operations to be strongly supported.

We should add, however, that four of the experts felt that the subjects would actually invest *more* than the theory predicted, and suggested 25%, 25%, '5 to 15%' and '10 to 20%' of available tokens as typical investments. In all, the average prediction by our experts was approximately 20% of

[1]Names available on request, but we'd prefer you didn't ask.

resources, with a range from 0 to 30%. The major reasons given for these 'non-theory' predictions were that people either liked taking risks and were willing to pay for them, or were altruistic (equated to some extent with being 'silly' or 'irrational'). It should be remembered, however, that even these somewhat higher predictions envision behavior that is primarily free riding, with only small amounts of investment resulting from 'irrationality'.

4. Experiment 1: The basic experiment

In the simplest version of our experiments all subjects were presented with a single set of conditions, and their behavior compared with predictions from theory. Subjects were sixteen male and sixteen female high school juniors and seniors selected from a list of such students for Madison, Wisconsin. In this study, as in the other studies reported below, about 40% of all students asked to participate in the research declined. Nevertheless, differences on a series of background factors among those who participated and those who did not were negligible, and the sample is much less of a 'convenience' sample than is usually found in experimental work. For an extended discussion of sampling and other methodological issues, see Marwell and Ames (1979).

Subjects were told that they belonged to a group of eighty high school students 'like themselves', all of whom were making a similar economic decision. Each was provided with 225 tokens which he or she could invest in either the group or the individual exchange. The individual exchange returned one cent for each token invested. The group exchange paid in accordance with the schedule contained in table 1. This table was actually mailed to every subject. Returns were given in a table, and were not continuous, because pretesting indicated that subjects were better able to understand the structure of payoffs under these conditions. In addition, pretests indicated that subjects did not make the fine predictions of others' investments that would be required for them to calculate whether an additional investment on their part would 'put the group over' the border of specific intervals. Payoffs for the group exchange averaged 2.2 cents per token.

Results

Investment in the public good by members of the group certainly did not fit a strong version of the free rider problem. The mean investment was 93.8 tokens or 42% of available resources. Although this is clearly sub-optimal, it is just as clearly not zero, or insignificant. Considering the explicitly depersonalized, profit-oriented, full information nature of the experiment, the strong free rider proposition did not appear to predict behavior accurately.

Table 1

Payoffs from group exchange, study 1 and comparable condition in study 3.

If the total tokens invested in the group exchange by *all* group members is between	Study 1		Study 3	
	Total money earned by the group is	How much money you get (1.25 cent of each group dollar)	Total money earned by the group is	How much money you get (1.25 cent of each group dollar)
0 and 1999 tokens	$000.00	$0.00	$000.00	$0.00
2000 and 3999	044.00	0.55	014.00	0.18
4000 and 5999	088.00	1.10	032.00	0.40
6000 and 7999	132.00	1.65	054.00	0.68
8000 and 9999	176.00	2.20	320.00	4.00
10000 and 11999	220.00	2.75	350.00	4.38
12000 and 13999	264.00	3.30	390.00	4.88
14000 and 15999	308.00	3.85	420.00	5.25
16000 and 17999	352.00	4.40	440.00	5.50
18000	396.00	4.95	450.00	5.63

The weak version, of course, fared better. However, its requirements are not very stringent.

5. Experiment 2: Skewed resources and interest

At the same time as we ran experiment 1, ninety-six subjects were examined under somewhat different, more complex conditions. Since variations in these conditions did *not* produce significant variations in investment we will not describe them in detail. It should be sufficient to indicate that the key independent variables were the perceived distribution of resources within the group, and the perceived distribution of interest. In some conditions a number of subjects were given 165 tokens to invest, while others received 405 tokens each. The subjects were aware of this skewed distribution of resources. Under other conditions some subjects received 2.25% of returns to the group from the group exchange, while other subjects received 0.92%. Again, subjects were aware of this skewed distribution of interest. Finally, under some conditions both interest and resources were skewed.

Along with the conditions reported above as experiment 1, these conditions constituted a multifactor, fully crossed experimental design, whose independent variables had little consistent effect on investment. What is important to report, however, is that for these 96 additional subjects mean investment in the public good was even *higher* than for the subjects reported on under experiment 1. For the 96 additional subjects mean investment was 119.8 tokens, or 53% of available resources. If all 128 subjects (including those from experiment 1) are considered as participating in a single experiment, the mean investment was 113 tokens, or 50% of the possible maximum.

In all, these results certainly reinforce our earlier conclusions.

6. Experiment 3: Provision point

One characteristic of some public goods that was not considered in the experiments reported above, but which many sociologists, at least, consider crucial, is the fact that they are 'lumpy'. Small amounts of the good are worth little or nothing. Only when some specified provision point is passed is the good valuable. For example, 49% of the workforce joining a union might just as well be 4.9% — in neither case does the union get bargaining power, recognition, or a contract.

Experiment 3 was identical to experiments 1 and 2 (combined) in design, with one fundamental exception — the payoff schedule for the group exchange was altered. The right-hand side of table 1 presents the new schedule, as given to the participants. The key difference here was the

presence of a 'provision point'. For the first 8000 tokens invested *by the group* in the group exchange (i.e. up to 44% of the group's available resources) returns to investment were near zero. If more than 8000 tokens were invested however, the group exchange returned approximately 3.8 cents for *every* token invested, including the first 8000.

Results

Again, the results strongly support the previous findings. Over all treatments, an average of 112.8 tokens were invested in the public good by individuals as compared with 113 in experiments 1 and 2. This again comprised 51% of the available resources. Differences among treatments were not significant. Consistency with the previous studies was remarkable.

7. Experiment 4: Small groups

Experiment 4 was identical to experiment 3 in every way except one — subjects were informed that their groups contained four rather than 80 persons. Under these conditions some subjects perceive that they are in a position to profit even if they provide the public good all by themselves. They have sufficient interest that they should not free ride.[2] Of course, it was partly to see if these subjects would provide the good that these conditions were examined in the first place.

Results

As expected, subjects with sufficient interest in the public good to profit from any investment they made in the group exchange invested at particularly high levels — an average of 87% of their available resources. More important for this paper, the remaining subjects invested an average of 124 tokens, approximately 60% of their available resources. For this group the strong free rider hypothesis was once again not supported. Subjects invested at high levels. Only the weak free rider hypothesis received any support.

8. Experiment 5: Experienced subjects

One threat to the generalizability of the above experiments is the fact that each subject confronted his or her investment decision only once. Since subjects were in a highly abstract, 'unrealistic' situation, their initial decisions might have reflected a lack of understanding — or lack of full information.

[2]Because of the provision point, and the fact that many of the subjects did not have sufficient resources to reach that point, investment was *not* always their dominant strategy.

Experiment 5 therefore replicated the procedures of experiment 1, with the key exception that all 32 subjects were experienced. Each had previously participated in either experiment 1 or experiment 2. In addition, all payoffs were doubled, partly to meet some of the effects of inflation on the value of the decision, and generally to increase the importance of the decision. Thus, for example, returns from the individual exchange were now 2 cents per token.

Results

The most important result from this experiment is the full replication of findings from experiment 1. Subjects invested an average of 106 tokens in the group exchange, or 47% of their available resources. Comparing these subjects with those in experiment 1 reveals no significant difference in mean investment. In general, subjects tended to invest in much the same way they invested the first time, the correlation between first and second investment being 0.42.

9. Experiment 6: High stakes

The departure from theoretical expectations found in the previous experiments might also arise from the fact that subjects were deciding about relatively small amounts of money. With such 'low' stakes they might have been willing to gamble, or be altruistic. Thus, experiment 6 was designed to completely replicate experiment 1, except that the stakes were raised substantially — by a factor of five. Every token invested in the individual exchange returned five cents. Group returns were similarly affected, and it appeared to subjects that up to $1,980 could now be earned by the group. This meant that the maximum any of the subjects under these conditions could earn was $33.25 — if he or she free rode while everyone else invested in the public good. This was certainly a meaningful amount for the typical high school student.

Results

Results from this study are somewhat complex because of a problem that developed with new experimenters. For the only time in the research program, results systematically differed (although not extremely) depending on which individual experimenter conducted the interviews. For a full analysis of the results the reader is referred to the original report [Marwell and Ames (1980)].

Taken generally, however, the results indicate that there *might* be some reduction in contribution to the group exchange when stakes are raised. Depending on which analytic strategy is pursued, the mean level of

investment is between 63 and 78 tokens, or 28% and 35% of available resources. The latter, higher estimate, is probably more accurate, as it reflects the responses of subjects interviewed by more experienced interviewers. In either case, however, subjects under high stakes conditions clearly invest in the group exchange at a level much higher than would be predicted from a strong version of the free rider hypothesis. A subject who invests even 70 tokens in the group exchange is giving up a certain $3.50 to help the other members of his or her group, without knowing whether any of them will reciprocate. We should understand that at some level of stakes it becomes improbable that people would invest in a public good of our kind — who would risk a certain $100,000 to earn a possible but not very probable, $220,000? But the free-rider proposition is supposed to apply whenever people are making 'rational' choices about amounts of money they find meaningul, not only when the stakes are enormous.[3]

10. Experiments 7, 8 and 9: Feedback

One of our long-held expectations was that the free rider problem might be more severe under conditions where individuals get little or no information about the intentions of other group members than where some information was available. In particular, we realized that in the real world people rarely make all-or-nothing decisions at a single point of time. For example, potential contributors to the United Fund are constantly informed of the Fund's progress so that they can evaluate whether others are contributing or not. If others are contributing we might be more willing to contribute our share as well. If not, we might be more inclined to join them in free riding.

In experiments 7, 8 and 9 we gave our subjects a chance to gather information on each other's behavior. The experiments were identical to experiment 1, except that there were two opportunities to invest. In experiment 7, subjects could make an initial investment of some, none, or all of their tokens in the group or the individual exchange, thus to some extent informing each other of their 'intentions'. After information about the group's response to this initial phase was broadcast, each subject could distribute the tokens he or she hadn't yet invested. In experiments 8 and 9 tokens invested in the group exchange at time 1 remained in the group exchange at time 2, but additional tokens could be moved from the individual to the group exchange after feedback. In all three experiments subjects were arbitrarily assigned to groups of 4, whose behavior determined the feedback those subjects would get about other group members' behavior. Of course, subjects

[3]It is interesting to note that despite the greater range of possible investment with higher stakes, subjects in experiments 1 and 6 had comparable variances in investment. The respective standard deviations were 67 and 72 tokens.

were still told that the whole group determined the payoffs, and had no reason to think otherwise. However, feedback varied over subjects. Experiments 7 and 8 each used 32 high school aged students as subjects, while experiment 9 studied 32 college volunteers.

Results

No significant differences from previous studies were found in these studies. Subjects in experiment 7 invested 46% of their available tokens in the group exchange, while subjects in experiments 8 and 9 invested 50% and 49% of their tokens, respectively. The previous results were replicated once again.

11. Experiment 10: Manipulated feedback

Our last experiment with feedback involved manipulating what the subjects were told prior to the second stage of investment. Sixteen randomly selected college subjects were told that their group of eighty (including themselves) had invested 7% of its total resources in the group exchange at time 1. Another sixteen were given a more moderate level of investment, 48% of the group's tokens. A third group was given the high figure of 88%. Procedures were otherwise identical to experiment 7.

Results

Once again, the treatment made little difference. The low, medium, and high feedback groups invested 43%, 50% and 44% of their tokens, respectively. None of these figures is much different from those previously reported.

12. Experiment 11: Non-divisibility

The next-to-last experiment to be reported in this series required a somewhat different methodology. Our objective was to see whether subjects dealing with a non-divisible public good would behave similarly to those in our previous experiments. We defined a non-divisible good as one which must be consumed collectively. It cannot be divided up, taken home, and consumed privately [Head (1962)]. A park or a bridge is of this nature. Our previous experiments involved a good — the higher payoff from the group exchange — that was divisible, like an increase in wages won by a union, or a cartel's forced increase in prices.

Making this comparison, however, required that we study *real* groups with members who might reasonably conceive of themselves as consuming something collectively. At the same time, our procedures require that our

subjects neither know one another nor interact. To deal with these contradictory demands we studied a sample of incoming freshman in the summer before they arrived at the University of Wisconsin. The subjects were told that they had been assigned to a specific dormitory floor and that they and the other prospective floor residents were the group being studied. The group that was offered a divisible good was then given the standard instructions used in experiment 1. The subjects in the non-divisible treatment were given identical instructions, with one exception: they were told that all earnings from the group exchange had to be spent on a *group* project. They could choose anything they wanted on which to spend the money, such as a party, or a hi-fi for their floor, so long as there was something purchased collectively.

Since the payoff structures for the two groups were formally identical, we expected that the non-divisible group would be less inclined to invest in the group exchange. We reasoned that demanding collective consumption meant that individuals could not maximize the use of their individual shares according to their individual tastes, thus reducing the utility of the returns from the group exchange.

Results

Results were exactly the opposite of our expectations. Members of the non-divisible group invested almost twice the amount invested by subjects given our standard experimental treatment. This is particularly noteworthy because the control group once again replicated our basic finding — they invested 43% of their resources in the public good. Therefore the investment of 84% of all tokens in the group exchange by the subjects in the non-divisible condition is remarkable.

13. Experiment 12: Economics graduate students

The last experiment we report is identical to our first with two exceptions: most importantly, the subjects were thirty-two first-semester graduate students in economics at the University of Wisconsin; in addition, the value of all tokens was doubled (as in study 5). Interestingly, when questioned later, only two of the graduate students could specifically identify the theory on which this study was based. As first-year students they had yet to reap the full benefits of the remarkable education assuredly to be theirs.

Results

At last, a result that is really different. Economics graduate students contributed only an average of 20% of their resources to the group exchange. They were much more likely to free ride than any of our other

groups of subjects. The differences between them and the subjects in experiment 1 is significant at the 0.05 level, (F-test). The previous results do not replicate. One could argue that for this group the strong free rider hypothesis receives some support.

14. Summary and conclusions

For ease of reference, table 2 presents the mean investment behavior of subjects in all twelve experiments.

Table 2

Summary of results: Experiments 1 11.

Experiment	Mean % of resources invested
1. Basic experiment	42%
2. Skewed resources and/or interest	53%
Experiments 1 and 2, combined	51%
3. Provision point	51%
4. Small groups with provision point (except those with sufficient interest to provide the good themselves)	60%
5. Experienced subjects	47%
6. High stakes	
Experienced interviewers	35%
All interviews	28%
7. Feedback, no changing initial investment	46%
8. Feedback, could change investment in individual account	50%
9. Feedback, could change investment in individual account — college students	49%
10. Manipulated feedback	
Low	43%
Medium	50%
High	44%
11. Non-divisibility	
Divisible (control)	43%
Non-divisible	84%
12. Economics graduate students	20%

Summarizing most of the results seems ridiculously easy: over and over again, in replication after replication, regardless of changes in a score of situational variables or subject characteristics, the strong version of the free rider hypothesis is contradicted by the evidence. People voluntarily contribute substantial portions of their resources - usually an average of between 40 and 60 percent — to the provision of a public good. This despite the fact that the conditions of the experiment are expressly designed to maximize the probability of individualized, self-interested behavior. Free riding does exist — subjects do not provide the optimum amount of the

public good, and tend to reserve a meaningful fraction of their resources. The 'weak' free rider hypothesis is supported. Nevertheless, the amount of contribution to the public good is not easily understood in terms of current theory. As the analyses of our expert economists demonstrate, the basic thrust of individual decision theory argues for the strong version of the free rider hypothesis.

Of course, any set of experimental results must be treated with some skepticism. Problems about generalizing from a single, unrealistic situation, and a rather restricted sample, are intrinsic to the method. A variety of questions might be asked about specific decisions regarding how much money was involved, where different control conditions were set, etc. For economists, the key problem may be the non-iterative nature of the situation. Subjects do not engage in this decision over and over again, learning the risks and payoffs through experience, and eventually settling on an experientially informed stable pattern of behavior. Regardless of how well the instructions are understood the subjects are relatively naive, even in experiments 7, 8 and 9 where they are making the decision for the second time. It is still only the second time. Despite all of these caveats, however, our findings are real, unusually well replicated, and constitute a challenge to the generality and utility of the strong free rider hypothesis.

We do not have a clear basis on which to suggest some alternative theoretical approach that might account for these results. In doing these experiments, however, we collected a wide range of additional information regarding the backgrounds, perceptions, expectations and explanations for behavior of our subjects. With a single exception, perusal of this information failed to suggest any systematic differences among those who did and those who did not invest substantially in the public good. The exception, however, may be instructive.

Two questions we asked of subjects concerned 'fairness' in this investment situation. One asked what they thought a fair investment in the group exchange would be. The other asked whether they were 'concerned with fairness' in making their own investment decision. There was surprising unanimity of thought regarding what was considered fair. Using all subjects except the economics graduate students and those subjects in study 4 with sufficient interest in the group exchange to provide the good by themselves, we found that more than three out of four thought that 'about half' or more of a person's resources should be contributed, and more than one out of four thought people who were fair would contribute *all* of their tokens. These constitute major investments, and also relate to the levels of investment actually found. The correlation between investment and definitions of fairness, however, is not very high — only 0.23. Much higher is the correlation between investment and whether or not the individual indicated he or she was 'concerned with fairness' when investing — 0.47. However, as

shown in table 3, both of these significant zero-order relationships are reduced to near zero in a regression which also contains an interaction term. It is the interaction term which remains substantial and significant, indicating that those who *both* considered fairness when deciding how to behave, *and* defined higher levels of contribution as fair, were the ones who contributed the most.

Comparisons with the economics graduate students is very difficult. More than one-third of the economists either refused to answer the question regarding what is fair, or gave very complex, uncodable responses. It seems

Table 3

'Fairness' and percent of resources invested in the group exchange.

	Regression coefficients (standard errors in parentheses)	
Independent variables	Additive model	Interactive model
Constant	−17.67	16.56
	(5.69)	(11.72)
What's fair?	6.43[a]	−3.14
	(1.18)	(3.10)
Concerned with fairness?	17.78[a]	2.45
	(1.54)	(4.85)
Interaction	—	4.27[a]
		(1.28)
R^2	0.516	0.532
F	83.11	60.53
N	462	462

[a]Significant at 0.001 level.

that the meaning of 'fairness' in this context was somewhat alien for this group. Those who did respond were much more likely to say that little or no contribution was 'fair'. In addition, the economics graduate students were about half as likely as other subjects to indicate that they were 'concerned with fairness' in making their investment decision.

Perhaps these results make sense. Economists may be selected for their work by virtue of their preoccupation with the 'rational' allocation of money and goods. Or they may start behaving according to the general tenets of the theories they study. Confronted with a situation where others may not behave rationally, they nevertheless behave the way good economic theory predicts. Note as well the very similar responses of our 'famous' economists.

Of course, we might also turn the causal order around and gain insight into the deficiencies of the theory of collective action. We may do well to pay more attention to questions of fairness and equity, as they affect behavior in collective action situations. Such variables are difficult to include in formal

theories, as they are often perceived quite differently by different actors. Nevertheless, their empirical power may be more important than their heuristic drawbacks.

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