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Does Studying Economics Inhibit Cooperation?

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From the perspective of many economists, motives other than self-interest are peripheral to the main thrust of human endeavor, and we indulge them at our peril. In Gordon Tullock's (1976) words (as quoted by Mansbridge, 1990, p. 12), "the average human being is about 95 percent selfish in the narrow sense of the term."

In this paper we investigate whether exposure to the self-interest model commonly used in economics alters the extent to which people behave in self-interested ways. The paper is organized into two parts. In the first, we report the results of several empirical studies—some our own, some by others—that suggest economists behave in more self-interested ways. By itself, this evidence does not demonstrate that exposure to the self-interest model *causes* more self-interested behavior, since it may be that economists were simply more self-interested to begin with, and this difference was one reason they chose to study economics. In the second part of the paper, we present preliminary evidence that exposure to the self-interest model does in fact encourage self-interested behavior.

Do Economists Behave Differently?

Free-Rider Experiments

A study by Gerald Marwell and Ruth Ames (1981) found that first-year graduate students in economics are much more likely than others to free-ride

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in experiments that called for private contributions to public goods. In their experiments, groups of subjects were given initial endowments of money, which they were to allocate between two accounts, one "public," the other "private." Money deposited in the subject's private account was returned dollar-for-dollar to the subject at the end of the experiment. Money deposited in the public account was pooled, multiplied by some factor greater than one, and then distributed equally among all subjects. Under these circumstances, the socially optimal behavior is for all subjects to put their entire endowment in the public account. But from an individual perspective, the most advantageous strategy is to put everything in the private account. Marwell and Ames found that economics students contributed an average of only 20 percent of their endowments to the public account, significantly less than the 49 percent average for all other subjects.

To explore the reasons for this difference, the authors asked their subjects two follow-up questions. First, what is a "fair" investment in the public good? Of the noneconomists, 75 percent answered "half or more" of the endowment, and 25 percent answered "all." Second, are you concerned about "fairness" in making your investment decision? Almost all noneconomists answered "yes." The corresponding responses of the economics graduate students were more difficult to summarize. As Marwell and Ames wrote,

> 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 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 decisions.

The Marwell and Ames study can be criticized on the grounds that their noneconomist control groups consisted of high school students and college undergraduates, who differ in a variety of ways from first-year graduate students in any discipline. Perhaps the most obvious difference is age. As we will see, however, criticism based on the age difference is blunted by our own evidence that older students generally give greater weight to social concerns like the ones that arise in free-rider experiments. It remains possible, however, that more mature students might have had a more sophisticated understanding of the nuances and ambiguities inherent in concepts like fairness, and for that reason gave less easily coded responses to the follow-up questions.

Yet another concern with the Marwell and Ames experiments is not easily dismissed. Although the authors do not report the sex composition of their group of economics graduate students, such groups are almost always preponderantly male. The authors' control groups of high school and undergraduate

students, by contrast, consisted equally of males and females.[1] As our own evidence will later show, there is a sharp tendency for males to behave less cooperatively in experiments of this sort. So while the Marwell and Ames findings are suggestive, they do not clearly establish that economists behave differently.

Economists and the Ultimatum Bargaining Game

Another study of whether economists behave differently from members of other disciplines is by John Carter and Michael Irons (1991). These authors measured self-interestedness by examining behavior in an ultimatum bargaining game. This simple game has two players, an "allocator" and a "receiver." The allocator is given a sum of money (in these experiments, $10), and must then propose a division of this sum between herself and the receiver. Once the allocator makes this proposal, the receiver has two choices: (1) he may accept, in which case each player gets the amount proposed by the allocator; or (2) he may refuse, in which case each player gets zero. The game is played only once by the same partners.

Assuming the money cannot be divided into units smaller than one cent, the self-interest model unequivocally predicts that the allocator will propose $9.99 for herself and the remaining $0.01 for the receiver, and that the receiver will accept on the grounds that a penny is better than nothing. Since the game will not be repeated, there is no point in the receiver turning down a low offer in the hope of generating a better offer in the future.

Other researchers have shown that the strategy predicted by the self-interest model is almost never followed in practice: 50–50 splits are the most common proposal, and most highly one-sided offers are rejected in the name of fairness (Guth, et al., 1982; Kahneman, et al., 1986). Carter and Irons found that in both roles (allocator and receiver) economics majors performed significantly more in accord with the predictions of the self-interest model than did nonmajors.[2]

As always, questions can be raised about experimental design. In this case, for example, Carter and Irons assigned the allocator and receiver roles by choosing as allocators those who achieved higher scores on a preliminary word game.[3] Allocators trained in the marginal productivity theory of wages (that is, economics majors) might thus be more likely than others to reason that they were entitled to a greater share of the surplus on the strength of their earlier performance. But while not conclusive, the Carter and Irons results are again suggestive.

[1]This was the case, in any event, for the groups whose sex composition the authors reported.

[2]Kahneman, Knetsch, and Thaler (1986) report findings similar to those of Carter and Irons: commerce students (the term used to describe business students in Canadian universities) were more likely than psychology students to make one-sided offers in ultimatum bargaining games.

[3]This allocation procedure is described in a longer, unpublished version of the Carter and Irons paper (1990).

Survey Data on Charitable Giving

The free-rider hypothesis suggests that economists might be less likely than others to donate to private charities. To explore this possibility, we mailed questionnaires to 1245 college professors randomly chosen from the professional directories of 23 disciplines, asking them to report the annual dollar amounts they gave to a variety of private charities. We received 576 responses with sufficient detail for inclusion in our study. Respondents were grouped into the following disciplines: economics ($N = 75$); other social sciences ($N = 106$); math, computer science, and engineering ($N = 48$); natural sciences ($N = 98$); humanities ($N = 94$); architecture, art, and music ($N = 68$); and professional ($N = 87$).[4] The proportion of pure free riders among economists—that is, those who reported giving no money to any charity—was 9.3 percent. By contrast, only 1.1 percent of the professional school respondents gave no money to charity, and the share of those in the other five disciplines who reported zero donations ranged between 2.9 and 4.2 percent.[5] Despite their generally higher incomes, economists were also among the least generous in terms of their median gifts to large charities like viewer-supported television and the United Way.[6]

On a number of other dimensions covered in our survey, the behavior of economists was little different from the behavior of members of other disciplines. For example, economists were only marginally less likely than members of other disciplines to report that they would take costly administrative action to prosecute a student suspected of cheating. Economists were slightly above average for the entire sample in terms of the numbers of hours they reported

[4]The "other social sciences" category includes psychology, sociology, political science, and anthropology; "natural sciences" includes physics, chemistry, biology, and geology; "humanities" includes philosophy, history, English, foreign languages, and religion; and "professional" includes education, business, and nursing.

[5]Although we do not have data on the gender of each survey respondent, gender differences by discipline do not appear to account for the observed pattern of free-ridership. For example, the natural sciences, which are also preponderantly male, had only one-third as many free riders as did economics.

[6]The annual median gift of economists to charities is actually slightly larger, in absolute terms, than the median for all disciplines taken as a whole. But because economists have significantly higher salaries than do the members of most other disciplines, the median gift overstates the relative generosity of economists. To correct for income differences by discipline, we proceeded as follows: First, we estimated earnings functions (salary vs. years of experience) for each discipline using data from a large private university. We then applied the estimated coefficients from these earnings functions to the experience data from our survey to impute an income for each respondent in our survey. Using these imputed income figures, together with our respondents' reports of their total charitable giving, we estimated the relationship between income and total giving. (In the latter exercise, all economists were dropped from the sample on the grounds that our object was to see whether the giving pattern of economists deviates from the pattern we see for other disciplines.) We then calculated our measure of a discipline's generosity as the ratio of the average value of gifts actually reported by members of the discipline to the average value of gifts expected on the basis of the members' imputed incomes. The computed ratio for economists was 0.91, which means that economists in our sample gave 91 percent as much as they would have been expected to give on the basis of their imputed incomes.

Figure 1
Monetary Payoffs for a Prisoner's Dilemma Game

		Player *X*	
		Cooperate	Defect
You	Cooperate	2 for *X* 2 for *Y*	3 for *X* 0 for *Y*
	Defect	0 for *X* 3 for *Y*	1 for *X* 1 for *Y*

spending in "volunteer activities." And in terms of their reported frequency of voting in presidential elections, economists were only slightly below the sample average.[7]

Economists and the Prisoner's Dilemma

One of the most celebrated and controversial predictions of the self-interest model is that people will always defect in a one-shot prisoner's dilemma game. Figure 1 shows the monetary payoffs in dollars to two players, *X* and *Y*, in a standard prisoner's dilemma. The key feature of such a game is that for each player, defection has a higher payoff irrespective of the choice made by the other player. Yet if both players follow this self-interested logic and defect, both end up with a lower payoff than if each cooperates. The game thus provides a rich opportunity to examine self-interested behavior.

We conducted a prisoner's dilemma experiment involving both economics majors and nonmajors. All groups were given an extensive briefing on the prisoner's dilemma at the start of the experiment and each subject was required to complete a questionnaire at the end to verify that he or she had indeed understood the consequences of different combinations of choices; in addition, many of our subjects were students recruited from courses in which the prisoner's dilemma is an item on the syllabus. Our subjects met in groups of three and each was told that he or she would play the game once only with

[7]In fairness to the self-interest model, we should note that there may be self-interested reasons for volunteering or contributing even in the case of charities like the United Way and public television. United Way campaigns, for example, are usually organized in the workplace and there is often considerable social pressure to contribute. Public television fund drives often make on-the-air announcements of donors' names and economists stand to benefit just as much as the members of any other discipline from being hailed as community-minded citizens. In the case of smaller, more personal charitable organizations, there are often even more compelling self-interested reasons for giving or volunteering. After all, failure to contribute in accordance with one's financial ability may mean outright exclusion from the substantial private benefits associated with membership in religious groups, fraternal organizations, and the like.

each of the other two subjects. The payoff matrix, shown in Figure 1, was the same for each play of the game. Subjects were told that the games would be played for real money, and that confidentiality would be maintained so that none of the players would learn how their partners had responded in any play of the game.

Following a period in which subjects were given an opportunity to get to know one another, each subject was taken to a separate room and asked to fill out a form indicating a response (cooperate or defect) to each of the other two players in the group. After the subjects had filled out their forms, the results were tallied and the payments disbursed. Each subject received a single payment that was the sum of three separate amounts: the payoff from the game with the first partner; the payoff from the game with the second partner; and a term that was drawn at random from a large list of positive and negative values. None of these three elements could be observed separately, only their sum. The purpose of this procedure was to prevent subjects from inferring both individual and group patterns of choice. Thus, unlike earlier prisoner's dilemma experiments,[8] ours did not enable the subject to infer what happened even when each (or neither) of the other players defected.

In one version of the experiment (the "unlimited" version), subjects were told that they could make promises not to defect during the time they were getting to know each other, but they were also told that the anonymity of their responses would render such promises unenforceable. In two other versions of the experiment (the "intermediate" and "limited" versions), subjects were not permitted to make promises about their strategies. The latter two versions differed from one another in terms of the length of pre-game interaction, with up to 30 minutes permitted for the intermediate groups and no more than ten minutes for the limited groups.

For the sample as a whole there were a total of 267 games, which means a total of 534 choices between cooperation and defection. For these choices, the defection rate for economics majors was 60.4 percent, as compared to only 38.8 percent for nonmajors. This pattern of differences strongly supports the hypothesis that economics majors are more likely than nonmajors to behave self-interestedly ($p < .005$).[9]

One possible explanation for the observed differences between economics students and others is that economics students are more likely to be male, and males have lower cooperation rates. To control for possible influences of sex, age, and experimental condition, we performed the ordinary least squares

[8]For an extensive survey, see Dawes (1980).

[9]Because each subject responded twice, the 534 choices are not statistically independent, and so the most direct test of statistical significance, the chi-square test, is inappropriate for the sample as a whole. To overcome this problem, we performed a chi-square test on the number of subjects who made the same choice—cooperate or defect—in both of their games. There were 207 such subjects (78 percent of the sample). The pattern of results observed in this restricted sample is essentially the same as the one observed for the sample as a whole.

Figure 2
Whole Sample Regression

Dependent variable: cooperate (0) or defect (1)

Variable	Coefficient	s.e.	*t*-ratio
Constant	0.579127	0.1041	5.57
econ	0.168835	0.0780	2.16
limited	0.00	—	—
intermediate	−0.091189	0.0806	−1.13
unlimited	−0.329572	0.0728	−4.53
sex	0.239944	0.0642	3.74
class	−0.065363	0.0303	−2.16

R^2 = 22.2% R^2(adjusted) = 20.3%
s = 0.4402 with 207 − 6 = 201 degrees of freedom

Source	Sum of Squares	*df*	Mean Square	*F*-ratio
Regression	11.1426	5	2.229	11.5
Residual	38.9540	201	0.193801	

regression reported in Figure 2.[10] Because each subject played the game twice, the individual responses are not statistically independent. To get around this problem, we limited our sample to the 207 subjects who either cooperated with, or defected from, each of their two partners. The 60 subjects who cooperated with one partner and defected on the other were deleted from the sample. The dependent variable is the subject's choice of strategy, coded as 0 for "cooperate" and 1 for "defect." The independent variables are "econ" which takes the value 1 for economics majors, 0 for all others; "unlimited," which is 1 for subjects in the unlimited version of the experiment, 0 for all others; "intermediate," which is 1 for subjects in the intermediate version, 0 for all others; "limited," which is the reference category; "sex," coded as 1 for males, 0 for females; and "class," coded as 1 for freshmen, 2 for sophomores, 3 for juniors, and 4 for seniors.

Consistent with a variety of other findings on sex differences in cooperation,[11] we estimate that, other factors the same, the probability of a male defecting is almost 0.24 higher than the corresponding probability for a female. But even after controlling for the influence of gender, we see that the

[10]Because the conventional assumptions regarding the distribution of the error term are not satisfied in the case of linear models with dichotomous dependent variables, the standard ordinary least squares significance tests are not valid. In an appendix available on request from the authors, we report the results of models based on the probit and logit transformations. The statistical significance patterns shown by the coefficients from these transformed models are the same as for the ordinary least squares model. Because the coefficients of the ordinary least squares model are more easily interpreted, we report the remainder of our results in that format only.

[11]See, for example, the studies cited in Gilligan (1982).

probability of an economics major defecting is almost 0.17 higher than the corresponding probability for a nonmajor.

The coefficients for the unlimited and intermediate experimental categories represent effects relative to the defection rate for the limited category. As expected, the defection rate is smaller in the intermediate category (where subjects have more time to interact than in the limited category), and falls sharply further in the unlimited category (where subjects are permitted to make promises to cooperate).[12]

Note, finally, that the overall defection rate declines significantly as students progress through school. The class coefficient is interpreted to mean that with the passage of each year the probability of defection declines, on the average, by almost 0.07. This pattern will prove important when we take up the question of whether training in economics is the cause of higher defection rates for economics majors.

For subjects in the unlimited subsample, we found that the difference between economics majors and nonmajors virtually disappears once subjects are permitted to make promises to cooperate. For this subsample, the defection rate for economics majors is 28.6 percent, compared to 25.9 percent for nonmajors. Because the higher defection rates for economics majors are largely attributable to the no-promises conditions of the experiment, the remainder of our analysis focuses on subjects in the limited and intermediate groups. The conditions encountered by these groups are of special significance, because they come closest to approximating the conditions that characterize social dilemmas encountered in practice. After all, people rarely have an opportunity to look one another in the eye and promise not to litter on deserted beaches or disconnect the smog control devices on their cars.

When the choices are pooled for the limited and intermediate groups, both economics majors and nonmajors defect more often, but the effect is considerably larger for economists. In those groups, the defection rate was 71.8 percent for economics majors and just 47.3 percent for nonmajors, levels that differ significantly at the .01 level.

As part of the exit questionnaire that tested understanding of the payoffs associated with different combinations of choices, we also asked subjects to state reasons for their choices. We hypothesized that economists would be more inclined to construe the objective of the game in self-interested terms, and therefore more likely to refer exclusively to features of the game itself, while noneconomists would be more open to alternative ways of interpreting the game, and would refer more often to their feelings about their partners, aspects of human nature, and so on. Indeed, among the sample of economics students, 31 percent referred only to features of the game itself in explaining their

[12]With the permission of subjects, we tape-recorded the conversations of several of the unlimited groups, and invariably each person promised each partner to cooperate. There would be little point, after all, in promising to defect.

chosen strategies, compared with only 17 percent of the noneconomists. The probability of obtaining such divergent responses by chance is less than .05.

Another possible explanation for the economists' higher defection rates is that economists may be more likely to expect their partners to defect. The self-interest model, after all, encourages such an expectation, and we know from other experiments that most subjects defect if they are told that their partners are going to defect. To investigate this possibility, we asked students in an upper division public finance course in Cornell's economics department whether they would cooperate or defect in a one-shot prisoner's dilemma if they knew *with certainty* that their partner was going to cooperate. Most of these students were economics majors in their junior and senior years. Of the 31 students returning our questionnaires, 18 (58 percent) reported that they would defect, only 13 that they would cooperate. By contrast, just 34 percent of noneconomics Cornell undergraduates who were given the same questionnaire reported that they would defect from a partner they knew would cooperate ($p < .05$). For the same two groups of subjects, almost all respondents (30 of 31 economics students and 36 of 41 noneconomics students) said they would defect if they knew their partner would defect. From these responses, we conclude that while expectations of partner performance play a strong role in predicting behavior, defection rates would remain significantly higher for economists than for noneconomists even if both groups held identical expectations about partner performance.

Why Do Economists Behave Differently?

Economists appear to behave less cooperatively than noneconomists along a variety of dimensions. This difference in behavior might result from training in economics; alternatively, it might exist because people who chose to major in economics were different initially; or it might be some combination of these two effects. We now report evidence on whether training in economics plays a causal role.

Comparing Upperclassmen and Underclassmen

If economics training causes uncooperative behavior, then defection rates in the prisoner's dilemma should rise with exposure to training in economics, all other factors held constant. Recalling our earlier finding that defection rates for the sample as a whole fall steadily between the freshman and senior years, the question is thus whether defection rates fall to the same degree over time for economists as for noneconomists. We found that the pattern of falling defection rates holds more strongly for noneconomics majors than for economics majors in the no-promises subsample. For noneconomics underclassmen in this group (freshmen and sophomores), the defection rate is 53.7 percent, compared to only 40.2 percent for upperclassmen. By contrast, the

trend toward lower defection rates is virtually absent from economics majors in the no-promises subsample (73.7 percent for underclassmen, 70.0 percent for upperclassmen). In other words, students generally show a pronounced tendency toward more cooperative behavior with movement toward graduation, but this trend is conspicuously absent for economics majors.[13]

Naturally, we are in no position to say whether the trend for noneconomists reflects something about the content of noneconomics courses. But the fact that this trend is not present for economists is at least consistent with the hypothesis that training in economics plays some causal role in the lower observed cooperation rates of economists.

Honesty Surveys

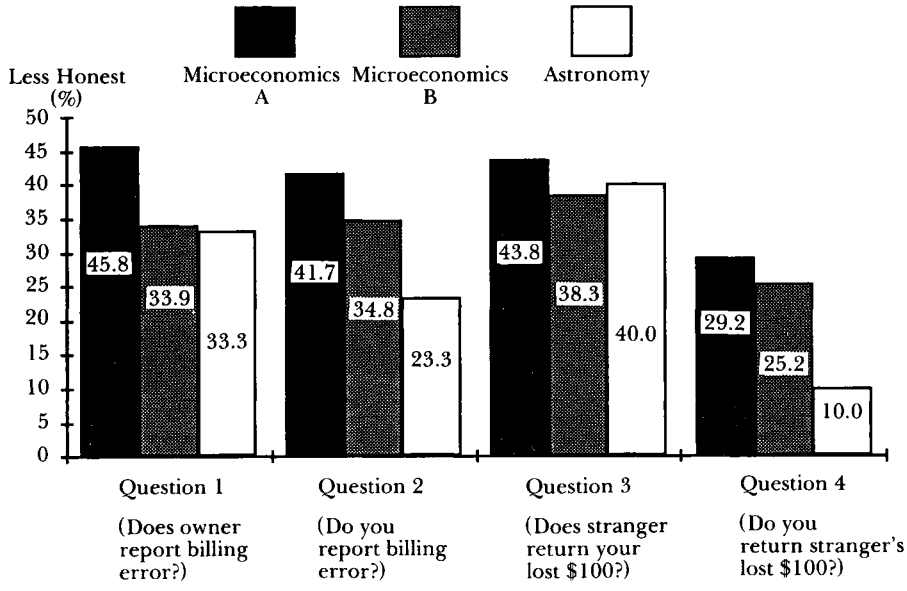
In a further attempt to assess whether training in economics inhibits cooperation, we posed a pair of ethical dilemmas to students in two introductory microeconomics courses at Cornell University and to a control group of students in an introductory astronomy course, also at Cornell. In one dilemma, the owner of a small business is shipped ten microcomputers but is billed for only nine; the question is whether the owner will inform the computer company of the error. Subjects are first asked to estimate the likelihood that the owner would point out the mistake; and then, on the same response scale, to indicate how likely *they* would be to point out the error if they were the owner. The second dilemma concerns whether a lost envelope containing $100 and bearing the owner's name and address is likely to be returned by the person who finds it. Subjects are first asked to imagine that they have lost the envelope and to estimate the likelihood that a stranger would return it. They are then asked to assume that the roles are reversed and to indicate the likelihood that they would return the money to a stranger.

Students in each class completed the questionnaire on two occasions: during the initial week of class in September, and then during the final week of class in December. For each of the four questions, each student was coded as being "more honest" if the probability checked for that question rose between September and December; "less honest" if it fell during that period; and "no change" if it remained the same.

The first introductory microeconomics instructor (instructor A) whose students we surveyed is a mainstream economist with research interests in industrial organization and game theory. In class lectures, this instructor placed heavy emphasis on the prisoner's dilemma and related illustrations of how survival imperatives often militate against cooperation. The second microeconomics instructor (instructor B) is a specialist in economic development in Maoist China who did not emphasize such material to the same degree, but did assign a mainstream introductory text. On the basis of these differences, we

[13]A regression similar to the one shown in Figure 2 confirms that this pattern continues to hold even when controlling for other factors that might influence defection rates.

Figure 3
Freshmen Honesty Survey Results



expected that any observed effects of economics training should be stronger in instructor A's class than in instructor B's.

The results for these two classes, plus the class of noneconomists, are summarized in Figure 3, which shows the proportion of each class reporting a "less honest" result at the end of the semester than at the beginning. As the figure indicates, one semester's training was accompanied by greater movement toward more cynical ("less honest") responses in instructor A's introductory economics class than in instructor B's. Subjects in instructor B's class, in turn, showed greater movement toward less honest responses than did those in our control group of introductory astronomy students.

It may seem natural to wonder whether some of the differences between the two economics classes might stem from the fact that students chose their instructors rather than being randomly assigned. Perhaps the ideological reputations of the two professors were known in advance to many students, with the result that a disproportionate number of less cynical students chose to take instructor B's course. However, the average values of the initial responses to the four questions were virtually the same for both classes. Moreover, even if students had differed across the two classes, this would not alter the interpretation of our findings, since the entries in Figure 3 record not the *level* of cynicism but the *change* in that level between the beginning and end of the course. Even if the students in Microeconomics A were more cynical to begin with, they became still more so during the course of the semester. This finding

is consistent with the hypothesis that emphasis on the self-interest model tends to inhibit cooperation.

Discussion

A variety of evidence suggests a large difference in the extent to which economists and noneconomists behave self-interestedly. We believe our survey of charitable giving and our prisoner's dilemma results lend additional support to the hypothesis that economists are more likely than others to free-ride.

Both of these exercises, however, also produced evidence that economists behave in traditionally communitarian ways under at least some circumstances. For example, economists reported spending as much time as others in volunteer activities, and were only marginally less likely than others to vote in presidental elections. Moreover, in the unlimited version of our prisoner's dilemma experiments, where subjects were allowed to promise to cooperate, economists were almost as likely to cooperate as noneconomists.

We also found evidence consistent with the view that differences in cooperativeness are caused in part by training in economics. This evidence is clearly less compelling than the evidence for a difference in cooperativeness. But it would be remarkable indeed if none of the observed differences in behavior were the result of repeated and intensive exposure to a model whose unequivocal prediction is that people will defect whenever self-interest dictates.

Should we be concerned that economics training may inhibit cooperation? Some might respond that while society would benefit if more people cooperated in social dilemmas, economists cannot be faulted for pointing out the unpleasant truth that self-interest dictates defection. One difficulty with this response is that it may be wrong. Several researchers have recently suggested that the ultimate victims of noncooperative behavior may be the very people who practice it (see, for example, Akerlof, 1983; Hirshleifer, 1987; Frank, 1988; and the essays in Mansbridge, 1990). Suppose, by way of illustration, that some people always cooperate in one-shot prisoner's dilemmas while others always follow the seemingly dominant strategy of defecting. If people are free to interact with others of their own choosing, and if there are cues that distinguish cooperators from defectors, then cooperators will interact selectively with one another and earn higher payoffs than defectors. Elsewhere we have shown that even on the basis of brief encounters involving strangers, experimental subjects are adept at predicting who will cooperate and who will defect in prisoner's dilemma games (Frank, 1988, ch. 7; Frank, Gilovich, and Regan, 1992). If people are even better at predicting the behavior of people they know well—a reasonable enough presumption—then the direct pursuit of material self-interest may indeed often be self-defeating.

In an ever more interdependent world, social cooperation has become increasingly important—and yet increasingly fragile. With an eye toward both

the social good and the well-being of their own students, economists may wish to stress a broader view of human motivation in their teaching.

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