

## A B S T R A C T

### DO ECONOMISTS DESTROY SOCIAL CAPITAL?

Ephraim Kleiman\*

Everyday observations reveal that individuals often behave in ways that seem inconsistent with individual welfare maximization. One hears of taxi drivers returning large sums of money that were left in their cabs; of good students allowing cribbing by weaker ones in competitive examinations; and even when we decide in the negative, many of us will hesitate for a moment whether not to point out an error in our favour in a restaurant bill.

One subset of such seemingly irrational behaviour pertains to what is nowadays known as *social capital* – the set of values, ethics and norms that make a collection of individuals a society. Being shared, they facilitate communication and increase trust, thereby reducing the cost of transactions and increasing economic efficiency, besides making life pleasanter.

There are manifold explanations, not mutually exclusive, of such behaviour, ranging from sheer irrationality, through social or genetic programming, to a perception of the world differing from that assumed by economists.

This paper describes some of the evidence of both natural and controlled experiments of “irrational” co-operative behaviour, and examine possible explanation for it. A salient feature of these experiments is the failure of individuals to opt for either the optimal solution for an isolated individual or that optimal for the relevant group as a whole, but for some point in between them. Existing economic theory being predicated on the notion of each individual maximizing her/his welfare in isolation, it does not, on the whole, allow for full co-operation, nor does it explain the revealed preference for a “mixed” solution. It thus not only fails to satisfactory explain certain real world phenomena, but might also be (unintentionally) changing individuals’ behaviour in a manner adversely affecting total economic welfare.

Keywords: Social capital; altruism; so-operative behaviour; educators’ dilemma

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**DRAFT - TO BE COMPLETED**

**DO ECONOMISTS DESTROY SOCIAL CAPITAL?\***

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1. Introduction

Everyday observations reveal that individuals often behave in ways that seem inconsistent with individual welfare maximization. One hears of taxi drivers returning large sums of money that were left in their cabs; of good students allowing cribbing by weaker ones in competitive examinations; and even when we decide in the negative, many of us will hesitate for a moment whether not to point out an error in our favour in a restaurant bill.

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## 2. A notional “thought” experiment

The term notional, or “thought” experiment is used here to denote those experiments, mainly classroom ones, that tests respondents’ attitudes to a hypothetical question, or to behaviour in hypothetical situations. As we all know, individuals actual behaviour might well differ when faced with a real-life situation rather than a hypothetical one. Nevertheless, such experiments do reveal something about attitudes, or about the manner in which respondents perceive themselves. And if we find them to yield similar results when applied to different samples or at different times, they allow us to generalize, provided we keep in mind their hypothetical setting. Let me add that such experiments might turn out to differ only slightly, if at all, from many real controlled ones where, however, the gain and loss values are very small, reflecting the budget restrictions of the experimenters.<sup>1</sup>

One such experiment was that devised by Jane Leuthold of the University of Illinois as a didactic aide illustrating the free rider problem.<sup>2</sup> In this, students in her public finance course were presented with the following hypothetical situation: Given a \$100 each they could invest all or some of it in a private, individual scheme that would yield them a 5 per cent profit. But, subject to the budget constraint, they also could also put some or all of it in a communal kitty, with a 10 per cent yield, but which yield would then be distributed equally among all members of the class. To reduce noise, both yields were known with full certainty. And the question the students had then to answer was how did they intend investing their (hypothetical) money, all linear combinations, from (1,0) to (0,1) being admissible.

The main result of that experiment is presented in the first row of Table 1 below. They show students to have divided their funds in the proportion of one- to two-thirds among the public and the private options. If we stop to think, this is a somewhat surprising result. Given the situation as presented to the respondents, they would have been all better off by all of them investing communally, gaining \$10 each, than by investing privately, gaining only \$5 each. The best *individual* strategy, however, would be to only invest in the private scheme, hoping that everybody else

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<sup>1</sup> For a summary and discussion of controlled and other experiments relevant to the present discussion, see Ledyard, J. O., “Public Goods: A Survey of Experimental Research”, in Kagel, J.H. and A. E. Roth, eds., *The Handbook of Experimental Economics*, Princeton University Press 1995.

<sup>2</sup> Leuthold, J.H., “A Free Rider Experiment for the Large Class”, *Journal of Economic Education*, 24, 1993, 353-363.

will invest communally and by taking a free-ride on them gaining, in the present case, another \$9.86, the free riders' share from the investment of the rest, to a total of \$14.86.<sup>3</sup> But as we well know, everybody adopting this individually optimal strategy, will result in them all being poorer by \$5 than they could have been otherwise. This is a case of the familiar "Prisoner's Dilemma" situation where individual optimizing yields a sub-Paretian outcome. But in this experiment, for one, the outcome did not conform to the textbook.

On the basis of some systematic association between individual responses and certain personal characteristics provided (anonymously) by the respondents, Leuthold tried to speculate about the possible explanations for this finding, some of which will be mentioned later. But because of the small size of her sample these partial results lacked statistical validity.

The results of such an experiment could be expected to be strongly culture bound. Given the common perception of the differences between American and Israeli society, it comes a bit as a surprise to find out that, as shown in the next two rows of Table 1, the preliminary results there were mixed and showed, if at all, a stronger tendency towards "rational" individualistic behaviour. So the experiment was repeated again on a class of over 350 first year economics undergraduates - a number large enough to allow for statistical analyses. As shown in the penultimate two rows of the table, the result was almost identical with the Illinois one: On the average, the funds were allocated in the proportion of one-to-two to the communal and private investments.

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<sup>3</sup> This is sometimes known as the Linear Public Good Game, because the situation facing the individual can be formulated as

$$U_i = U_i(Y) = U_i[ \alpha_i (A_i - X_i) + (1/N) \beta \sum_i X_i ]$$

Where  $A_i$  is her/his initial endowment,  $X_i$  is the sum the individual invests communally,  $\alpha_i$  and  $\beta$  are the private and public rates of return, respectively, and  $i = 1, \dots, N$ . It can be seen that  $dU_i / dX_i = [-\alpha_i + \beta/N] (\partial U / \partial Y)_i$ , where  $[-\alpha_i + \beta/N] = (dY_i / dX_i)$

which will be negative for all values of  $N > \beta / \alpha_i$ . Thus, in the present case,  $X_i > 0$  will be sub-optimal for all  $N > 2$ .

The result might have been different had the individual's utility function been additive not in income but in utilities. But there is no particular reason to assume that people derive a higher utility from a \$ or an Euro received from one investment  $y$  than another.

Table 1: **SHARE CONTRIBUTED TO PUBLIC GOOD**

<u>SAMPLE</u>	<u>AVERAGE</u>	<u>OBSERVATIONS</u>
ILLINOIS UNDERGRADUATES PUBLIC FINANCE CLASS, 1991/92	<b>0.34</b>	73
H.U. GRADUATE STUDENTS, 1992/93	<b>0.30</b>	36
H.U. INTRODUCTORY ECONOMICS 2 SECTIONS 1992/93	<b>0.20</b>	118
9 SECTIONS, 1993/94	<b>0.31</b>	352
OF WHICH: 6 (a) SECTIONS*	<b>0.34</b>	230
3 (b) SECTIONS**	<b>0.23</b>	122

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\* Section average ranging between 0.34 and 0.37 for all 6 sections, and practically identical (between 0.347 and 0.352) I 4 of them.

\*\* Section average ranging between 0.21 and 0.23.

### 3. Some other findings

The above results are far from being exceptional. The finding that people do not take a full free-riding position, i.e., behave, apparently, in an irrational way, is supported by many other experiments. In fact, such behaviour is so common, that the authors of one well known article on the subject chose to entitle it “Economists Free Ride, Does Anyone Else?”.<sup>4</sup> Having conducted a basically similar experiment on 32 high-school students, the psychologist authors found that on the average they allocated as much as 42 percent of their tokens’ endowment to the public, rather than private investment alternative. Various variations in the relative payoffs and other conditions of the experiment did not lower this proportion. Reporting on these and other experiments, the author concluded that, in general, in single-shot-games, it varied between 40 and 60 percent.

But when they repeated their experiment on a class of 32 economic graduate students of the University of Wisconsin, they found the public, communal investment option receiving only 20 per cent of the funds...

This last result, as well as some discussions of the inferences to be drawn from what we may call the “laymen” population, raised considerable interest in the question whether exposure to the study of economics enhances free-riding behaviour; or, alternatively, whether self-selection is at work here, the discipline attracting individuals who would be more prone to free-ride in the first instance. One, still basically notional experiment conducted what is known as the “Ultimatum Bargaining Game”, distinguishing between economists and non-economists, and between freshmen and seniors. In this two-person game, one participant, the Proposer, proposes the allocation of a given sum, while the other participant, the Responder, can accept or reject it, in the latter case neither of them gets anything. The sum in this case was \$10, and the proposals had to be in multiples of \$0.50. As the authors put it:

“The game-theoretic solution is straightforward... Assume that both players act in accordance with the rational/self-interest model. Responder prefers any positive offer to \$0. Knowing this, Proposer proposes a division with \$9.50 to Proposer and \$0.50 to Responder. Responder accepts.”<sup>5</sup>

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<sup>4</sup> Marwell G., and R.E. Ames, *Journal of Public Economics*, 15, 1981, 295-310.

<sup>5</sup> Carter, J. R. and M. D. Irons, “Are Economists Different, and If So, Why?”, *Journal of Economic Perspectives*, 5, 1991, 171-177.

Conducted on 92 students of the College of the Holy Cross in Massachusetts this experiment yielded rather strong results. From our point of view the interest lies mainly in the offers of the Proposers, which are reproduced below in Table 2. As can be seen there, the results, for all groups, are a far cry from what game theory would lead us to expect. On the average for all four groups, the Proposers offered to give up as much as 42 percent of their endowment, a proportion roughly consistent with the findings cited earlier. However, there was a marked difference between the attitude of economists and non-economists, the proposals of the former being on the average 7 per cent points lower. While still not conducting themselves according to the game theoretic prediction, economists seemed to be closer to it than the rest. The difference was not dramatic, but it was nevertheless systematic, repeating itself in both the freshmen and the seniors groups.

Perhaps the most interesting finding of this experiment was the absence of almost any difference, among the economists, between the average offers of seniors and freshmen. In other words, while economist Proposers were prone to offer less to Respondents than non-economist ones, the extent of their exposure to economics seems to have had no effect on their behaviour. The difference would have to be ascribed to self-selection, rather than to indoctrination. In the authors' words, "economists are born, not made".<sup>6</sup>

Further notional tests along these and similar lines failed to provide definitive support or rebuttal to this hypothesis, their conflicting results possibly reflecting differences in sample composition, as well as in design of experiment.<sup>7</sup> But they all tended to confirm the view that economists (or, rather, economics students) tend to be less cooperative than others.

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<sup>6</sup> The freshmen economists having had only two months of (macro-) economics at the time, while the seniors had three years, seems to rule out the two groups being equally influenced by being exposed to it. Typically of semi-controlled experiments, however, the authors could not ensure that the data were not contaminated by the non-economists taking courses in economics in high-school.

<sup>7</sup> For the opposite view, that training in economics does adversely affect the tendency to cooperate, see the results of monetary Prisoner's Dilemma games reported by Frank, R.H., T. Gilovich and D. T. Regan, "Does Studying Economics Inhibit Cooperation?", *Journal of Economic Perspectives*, 7, 1993, 159-171.

Table 2: THE ULTIMATUM GAME  
College of the Holy Cross, MA

SAMPLE MEANS FOR PROPOSER'S OFFER\*

	<u>FRESHMEN</u>	<u>SENIORS</u>	<u>TOTAL</u>
ECONOMISTS	<b>3.70</b> (1.41)	<b>3.98</b> (1.36)	<b>3.85</b> (1.37)
NON-ECONOMISTS	<b>4.35</b> (1.07)	<b>4.80</b> (0.49)	<b>4.56</b> (0.87)
TOTAL	<b>4.07</b> (1.25)	<b>4.39</b> (1.10)	<b>4.23</b> (1.18)

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\* Derived from Carter, J.R., and M.D. Irons, "Are Economists Different, and if So, Why?", *Journal of Public Economics*, 15, 1981, 295-310, who presented the complementary figure of Proposer's amount kept.. N = 92. Standard deviations in parentheses.

#### 4. Some real world experiments

The weakness of experiments of the type described above is that they refer to purely hypothetical situations or, else, involve minuscule pecuniary rewards or temptations. In none of them people had, so to say, to put their money where their mouth was. Hence the importance of the two real world experiments described below.

In the "Lost Letter" experiment, unsealed stamped envelopes, containing each the same number of money bills but carrying no return addresses, were placed in 64 different classrooms at George Washington University, purporting to contain the repayment of a \$10 loan of a few days before. Students turned in 29 such envelopes, i.e., 44 per cent of the total, a rate that seems to tally with the earlier observations of a tendency to cooperate of similar orders of magnitude.<sup>8</sup>

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<sup>8</sup> Yezer, A.M., R. S. Gofarb and P.J. Poppen, "Does Studying Economics Discourage Cooperation? Watch What We Do, Not What We Say of How We Play", *Journal of Economic Perspectives*, 10, 1996, 177-186.

Somewhat surprisingly, perhaps, this proportion was nearly twice as high, 18 out of 32, for the envelopes left in economics classes than for the rest, which was 11 out of 32.<sup>9</sup>

Finally, mention should be made of possibly the most elaborate and imaginative of such experiments, conducted some twenty-odd years ago at the University of Zurich. There, a publisher's purported representative offered prepublication copies of a textbook written by their professor to students who were to sit shortly for their finals. These were offered, successively, as going first to a small number of the highest bidders; then as going to the whole class, provided the sum of the individual bids met a certain target sum; and finally, at any non-zero sum, the difference to be covered by some foundation.<sup>10</sup>

On the average, the 42 economics students in this class offered practically the same sum when the bid was collective as when it was individual. And even when the promise of a third party to virtually pick up the whole bill allowed them to do so, they abstained from full free riding, offering, on the average, as much as 61 percent of the sum submitted in the individual bid case, which can be regarded as measuring their real willingness to pay.

##### 5. Why do we do it?

Whatever the shortcomings of both the notional and the real-life semi-controlled experiments described here (and there are many more in the literature), they do suggest that, on the whole, peoples' behaviour, does not conform with the individualistic maximization model postulated by economic theory. Before considering some of the implications of this conclusion, we may wish to try and explain it. One can think of a number of possible explanations, some of which correspond to different categories of these phenomena:

(a) *Irrationality*: The simplest explanation is that people do not behave rationally. But as the departure of their behaviour from that postulated seems to be systematic rather than erratic, this only begs the question.

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<sup>9</sup> One ingenious explanation mentioned by the authors is that economics being a more difficult subject, its students might tend to be more studious and well-behaved... See *ibid.*, footnote 6.

<sup>10</sup> Schneider, F and W. W. Pommerehne, "Free Riding and Collective Action: An experiment in Public Economics", *The Quarterly Journal of Economics*, 1981, 690-704. The framework of the present paper does not allow doing justice to this experiment.

(b) *Confusion*: Participants might have misunderstood the instructions or the incentives of the experiments in which they participated. In the Linear Public Goods Games described earlier, not a few participants allocated the collective alternative one per cent or less of their endowment, suggesting their acting on the belief that sharing in its profits was conditional on having made at least a token contribution to it.<sup>11</sup> An experiment that tried to neutralize the effect of other motives indicated that as much as one-third to one-half of the observed cooperation in these tests might be due to such misunderstandings.<sup>12</sup>

(c) *Utility interdependence*: If, unlike in the standard assumption underlying most theoretical analysis, the income or utility of others enters the individual's utility function, straightforward utility maximization would require her/him to allocate some income to them.

(d) *Warm glow effect of giving*: The mere act of giving, irrespective of the identity of the donees, might be an argument in individuals' utility function, feeding their self-image.

When contributions are not anonymous there should be added to these also:

(e) *Self aggrandisement*: Individuals might derive satisfaction from the public recognition of their charity.

(f) *Reciprocity*: Individual might act under the expectation that their seemingly altruistic behaviour creates a moral obligation on the part of the recipients to treat them similarly in the future.

The list is not exhaustive, and peoples' behaviour may also well stem from mixed motives. In fact, none of those listed above can satisfactorily explain phenomena such as people bothering to vote in national elections or of some of them, at least, cleaning after themselves in a picnic spot they don't expect ever to visit again and whose other frequenters they don't anticipate meeting anywhere.

## 6. Social capital

Whatever the motives behind it, there are many situations where co-operative, rather than isolated individual maximizing behaviour brings us closer to Pareto-optimum. In

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<sup>11</sup> See below, in section 7.

<sup>12</sup> Andreoni, J., "Cooperation in Public Goods Experiments: Kindness or Confusion?", *American Economic Review*, 85, 1995, 891-904. With only 40 participants, the results of this experiment have, however, to be treated with caution.

particular, there exists a whole set of intangibles, going loosely by the name of *social capital*, that have considerable impact on the costs of transactions and, hence, on economic welfare.<sup>13</sup> Felt perhaps more in their absence than in their presence, we tend to take them for granted, as if they were part of the state of nature. Obvious examples are common language, spelling, idiom, not to mention body language, which facilitate communications. But so also are social norms and conventions that, insofar as they build up trust, reduce transactions costs. They make it possible to dispense with the need of spelling everything out, i.e., to have incomplete contracts: The terms “word of honour” and *parole* might perhaps sound outdated to our ears, but even today not a few business deals are clinched only by a handshake. In one well known example, the polished diamond industry, such unwritten contracts are the norm.

Conformity with social norms is not necessarily purely voluntary. A diamond dealer renegeing on an oral contract will find himself practically banished from the industry. Social disapprobation, the obverse of the self-aggrandisement motive mentioned above, probably plays a role in many other situations. But in many other cases the observance of social norms seem not to be buttressed by either legal or societal sanctions. Consider the, except perhaps to their owners, pretty useless and valueless odds and ends crowding the shelves of “Lost and Found” offices in big cities. Their founders may have had no material incentive (and had a legal disincentive) to keep them.<sup>14</sup> But bringing them in entailed some effort and waste of time as compared to leaving them *in situ*, and no prospect of a reward.

It seems we ought to add to the earlier listed possible explanations for cooperative behaviour also:

(g) *Guilt*: The intrinsic cost, or penalty, individuals might self-inflict on themselves for having transgressed some internalized behavioural norm.

(h) *Sense of fairness*: Whether inbred or inculcated by upbringing and education, such a sense would prevent us from imposing, as well as acquiesce, in acts that offend some standard of what is and what isn't done.<sup>15</sup>

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<sup>13</sup> For a discussion of the concept of social capital and its implications see, e.g., Putnam, R.D., *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press, 1993, chapter Six.

<sup>14</sup> The words of the English nursery rhyme – founders keepers, losers weepers – notwithstanding.

<sup>15</sup> For a discussion of fairness, see, e.g., Kahneman, D., J. Knetsch and R. Thaler, “Fairness and the Assumptions of Economics”, *Journal of Business*, 1986, S285-S300. In the ultimatum game experiment described earlier, unfairness was suggested as the reason for the Respondants rejecting

Finally, it may be true that our models that are flawed. It may well be that, for some deeply ingrained human trait, there is no such thing as a “one-shot” game. Sociologists distinguish between immediate, *qui quo pro*, reciprocity, and an intertemporal one of unspecified duration, both involving the same individuals.<sup>16</sup> But one can think also of a diffused, generalized reciprocity, where the reciprocation is effected through a third or, possibly, even the thirtieth or three-hundreth party. Individuals might believe, or intuit, that their behaviour has a signalling content that will influence the behaviour of others.<sup>17</sup> They might not necessarily expect to be themselves directly affected by the latter, but cannot rule out the possibility of being so at some remove. They could, in fact, be envisioning a long chain of what we might term *transitive* reciprocity, with some probability of finding themselves one day at some end of it.<sup>18</sup>

It has been observed that, given repeated games and a belief in signalling and reciprocity, what seems in the short term to be altruism is really nothing but long term self-interest. But given its probable dissipation *en route*, the effects of the transitive reciprocity posited here will be much too weak to account for the many acts of unrequitable kindness, bestowed anonymously on anonymous recipients, observed in real life. It seems that there are certain spheres of social life where, when the invisible hand of self-interest fails to yield a Pareto optimal outcome, some deeply ingrained behavioural norms induce a more cooperative conduct that brings us closer to it.

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some non-zero proposals at the cost of not receiving anything at all. See Carter, J.D. and M.D. Irons, *loc. cit.*

<sup>16</sup> Compare Putnam, *loc. cit.*, p. 172. I prefer these terms to the “balanced” (or “specific”) and “general” (or “diffused”), used there, as the latter term seems more appropriate to the multi person case.

<sup>17</sup> See, e.g., the experimental evidence presented in Isaac, R.M., J.M. Walker and A.W. Williams, “Group Size and the Voluntary Provision of Public Goods”, *Journal of Public Economics*, 54, 1994, 1-35, and the discussion there.

<sup>18</sup> As the author of Ecclesiastes put it more than twenty centuries ago, “Cast thy bread upon the waters, for thou shall find it after many days” (XI:1).

## 7. The Linear Games' evidence on the shaping of norms

[to be expanded]

*Salient features of Appendix tables:*

Large proportion (over one-third if also token contributors included) of pure free riders

Gender differences – nature or nurture?

Age and army service – bonding only in the small; temporary conditioning.

Field of study – self-selection or indoctrination?

Instructors' seniority – ideological bias or self-selection?

To ride or not to ride separate from “how far”?

Do tipping and alms-giving patterns predict free-riding tendencies?

## 8. Do economists destroy social capital?

The existing body of evidence shows that while people do free-ride, they do not take full advantage of the possibility to do so. They tend to cooperate to a greater extent than predicted by economic theory. While some self-interest explanations can be offered for some types of this behaviour, they are not very easily applicable to others. In all probability, certain behavioural norms are involved here, only some of which are enforceable through sanctions for non-observance. The findings of some of the relevant experiments indicate that both genetics and culture might be at play here. The resultant conditioning, whatever its source, is one of the “moral resources” forming our present day social capital.<sup>19</sup>

From the positivist aspect it thus seems that our models are based on incomplete specifications. The normative aspect raises a more serious question. In many situations a cooperative, not fully maximizing “irrational” behaviour brings us closer to the Pareto-optimum. But by abstracting from its logic and showing it as individually non-optimal, we may be leading society to equilibria that are societally sub-optimal, relatively to what might have been attained in the absence of our teaching. In the blunt language of one pair of authors, “by equating rational behaviour with free riding economists might be proselytizing rather than educating”.<sup>20</sup>

Furthermore, whether economists are born or made, the experimental evidence suggests that attitudes towards free-riding are amenable to change through certain form of education, such as army life or, though the verdict on this is not yet in, the study of economics. Given that the object of scientific inquiry is the pursuit of truth, this raises a serious moral dilemma for teachers of our dismal science: Should we tell our students the truth about the optimality, for the isolated individual, of free riding, and thereby destroy social capital and move away from the social optimum, or should we lie to them?

There have been some attempts to deal with this question, although not exactly as formulated here. On the defence side, it has been argued that before becoming acquainted with economics students tend to believe that every market transaction is a zero-sum game. So that

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<sup>19</sup> The term “moral resources” seems to have been coined by A.O. Hirshman.

<sup>20</sup> Asch, P., and G.A. Gigliotti, “The Free Rider Paradox: theory, evidence and teaching”, *Journal of Economic Education*, 22, 1991, 33-38.

“For many students, learning of the possibility for mutual benefit [such as mutual gains from trade and exchange – E.K.] may be a more far-reaching change in their understanding than a reiteration of the well known maxim that people are often selfish.”<sup>21</sup>

While there is no doubt much truth in this argument, it nevertheless strikes one as specious. It does not exonerate the standard classroom and textbook treatment of free riding, but only claims that its effect might be outweighed by other lessons learned from economics.

Taken as a whole, economics does not necessarily “make bad citizens”. But one cannot escape the conclusion that “training in economics encourages the belief that people are self-interested”.<sup>22</sup> In other words, we are building up individual human capital at the cost of eroding social capital.

There is today a growing body of literature identifying altruistic or cooperative behaviour in the animal world, and explaining them in evolutionary terms. as serving the collective need of a species to propagate itself. It cannot be ruled out that some such evolutionary development occurred also in the human race. “Recent developments in evolutionary theory and supporting empirical research provide strong support for the assumption that modern humans have inherited a propensity to learn social norms, similar to our inherited propensity to learn grammatical rules”<sup>23</sup>

Finally, and perhaps more persuasively insofar as economists are concerned, there seem to exist some evidence that people who are not cooperative might be “smelled out” by others. Coupled with the observation that people tend to cooperate more with those whom they perceive also to be cooperators, this means that the free-riders might end up worse than had they diverged from pure individualistic maximization.<sup>24</sup>

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<sup>21</sup> Yezer, A.M., *et al.*, *op. cit.*, 178.

<sup>22</sup> Frank, R.H. , T.D. Gilovich, and D.T. Regan, “Do Economists Make bad Citizens?”, *Journal of Economic Perspectives*, 10, 1996, 187-192.

<sup>23</sup> Ostrom, E., “Collective Action and the Evolution of Social Norms”, *Journal of Economic Perspectives*, 14, @000, 137-158/. See also Witt, U., *Evolution in Markets and Institutions*, Heidelberg 1992, p.13.

<sup>24</sup> Fehr, E., and S. Gächter, “Fairness and Retaliation: The Economics of Reciprocity”, *Journal of Economic Perspectives*, 14, 2000, 159-181.

Appendix Table 1: Sum Allocated to Private Option by Group Characteristics (NIS)<sup>a</sup>

	Whole sample		Female		Male	
	Mean	Observ.	Mean	Observ.	Mean	Observ.
All	696	352	679	183	713	169
Age: average	22.6		21.7		23.6	
18 yrs	740	5	750	4	700	1
19	665	13	667	3	665	10
20	660	43	662	32	654	11
21	654	55	639	50	800	5
22	704	70	684	50	753	20
23	753	71	732	25	764	46
24	689	45	677	11	692	34
25	684	26	687	4	684	22
26+	696	24	875	4	660	20
<i>Study subject</i> <sup>b</sup>						
Economics etc.	732	130	724	75	742	55
Economics	693	27	760	15	608	12
Business	742	103	715	60	780	43
Other:						
Humanities	542	25	462	12	615	13
Soc. Science	695	146	673	82	724	64
Law	663	15	533	3	695	12
Others	686	36	700	11	680	25
Alms-giving						
Always	573	11	625	8	432	3
Only needy	700	214	684	126	721	88
Avoid	728	43	685	20	765	23
Refuse	684	84	664	29	694	55
Faculty						
Senior <sup>c</sup>	769	107	760	43	774	64
Junior <sup>d</sup>	664	245	655	140	676	105

<sup>a</sup> Out of a total allowance of NIS 1,000.

<sup>b</sup> Second field of study if not majoring exclusively in economics or business administration.

<sup>c</sup> Associate or full professor.

<sup>d</sup> Graduate students

Appendix Table 2: Sum Allocated to Private Investment Option:  
Multiple Regression Results<sup>a</sup>

	All			Post-army <sup>b</sup>			Econ. Bus.		All others	
	All (1)	Fem. (2)	Male (3)	All (4)	Fem. (5)	Male (6)	Fem. (7)	Male (8)	Fem. (9)	Male (10)
Constant	674 (9.74)	579 (5.09)	644 (10.59)	813 (11.92)	519 (8.68)	836 (10.73)	522 (4.48)	702 (5.81)	842 (3.88)	629 (5.12)
Gender (female)	-189 (2.40)			-264 (2.93)						
Post-army <sup>b</sup>	99 (1.36)	-54 (0.46)	178 (1.79)				71 (0.55)	254 (1.83)	-369 (1.64)	127 (0.87)
Age (years over 18)	-16 (1.71)	31 (2.27)	-22 (2.02)	-21 (2.13)	31 (2.28)	-23 (2.08)	22 (1.41)	-34 (2.15)	49 (2.14)	-9 (0.55)
Age females <sup>c</sup>	34 (2.13)			46 (2.65)						
Economics	56 (1.54)	51 (1.19)	63 (1.03)	65 (1.73)	62 (1.40)	62 (0.95)				
Humanities	-149 (2.21)	-302 (3.34)	-44 (0.43)	-164 (2.31)	-298 (3.27)	-57 (0.51)			-285 (2.85)	-66 (0.62)
Alms-giver	-67 (0.70)	48 (0.47)	-225 (1.12)	-32 (0.33)	48 (0.46)	-187 (0.78)	248 (1.64)	.. <sup>d</sup>	-95 (0.69)	-239 (1.17)
Senior faculty	99 (2.70)	149 (2.95)	69 (1.26)	84 (2.18)	149 (2.85)	45 (0.77)	223 (3.00)	103 (1.04)	83 (1.22)	44 (0.63)
No. of obs.	352	183	169	323	176	147	75	55	108	114
R <sup>2</sup>	0.065	0.112	0.061	0.070	0.116	0.050	0.151	0.126	0.122	0.038
Adj. R <sup>2</sup>	0.043	0.081	0.026	0.050	0.090	0.016	0.102	0.075	0.079	-0.006

<sup>a</sup> Out of NIS 1,000. Figures in parentheses are t values.

<sup>b</sup> Post-army defined as females over the age of 20 and males over 21. All others regarded as "pre-army".

<sup>c</sup> Excess of age over 18, females only.

<sup>d</sup> No observations in this category.

Appendix Table 3: Probability of Participating in Collective Option:  
the Whole Sample and Non-token Participants<sup>a</sup>

	B ≥ 0	B ≥ NIS 5		
	All (1)	All (2)	Female (3)	Male (4)
Gender (female)	0.232 (0.16)	0.320 (0.04)		
Post-army	-0.032 (0.69)	-0.099 (0.21)	0.001 (0.99)	-0.166 (0.15)
Age	0.092 (0.37)	0.084 (0.36)	-0.045 (0.67)	0.136 (0.24)
Female age	-0.088 (0.56)	-0.041 (0.78)		
Economics	-0.117 (0.09)	-0.091 (0.18)	-0.096 (0.34)	-0.104 (0.27)
Humanities	0.089 (0.28)	0.096 (0.21)	0.224 (0.14)	0.051 (0.60)
Alms-giver	-0.077 (0.23)	-0.051 (0.42)	-0.138 (0.13)	0.015 (0.87)
Senior faculty	-0.140 (0.04)	-0.109 (0.09)	-0.203 (0.04)	-0.043 (0.62)
Observations	352	231	137	94

<sup>a</sup> See notes to Table 2.

Appendix Table 4: Sum Allocated to Collective Option:  
the Whole Sample and Free Riders<sup>a</sup>

	Whole sample			B ≥ NIS 5		
	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)
Constant	326 (4.71)	421 (3.70)	356 (4.08)	494 (6.69)	507 (4.14)	511 (5.37)
Gender (female)	189 (2.40)			76 (0.92)		
Post-army	-99 (1.36)	54 (0.46)	-178 (1.79)	-30 (0.37)	62 (0.49)	-75 (0.65)
Age	16 (1.71)	-31 (2.27)	22 (2.02)	13 (1.32)	-33 (2.43)	17 (1.36)
Female age	-34 (2.13)			-39 (2.46)		
Economics	-56 (1.54)	-51 (1.19)	-63 (1.03)	-32 (0.80)	-35 (0.76)	-19 (0.26)
Humanities	149 (2.21)	302 (3.34)	44 (0.43)	112 (1.69)	211 (2.46)	22 (0.20)
Alms-giver	67 (0.70)	-48 (0.47)	225 (1.12)	179 (1.69)	79 (0.67)	318 (1.44)
Senior faculty	-99 (2.70)	-149 (2.95)	-69 (1.26)	-95 (2.27)	-109 (1.96)	-85 (1.24)
Observations	352	183	169	231	137	94
R <sup>2</sup>	0.065	0.112	0.061	0.101	0.111	0.078
Adj. R <sup>2</sup>	0.043	0.081	0.026	0.068	0.070	0.014

<sup>a</sup> See notes to Table 2.