

## Social Capital and Contributions in a Public Goods Experiment

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Recent empirical studies from across the social and behavioral sciences find that social capital is associated with various measures of well-being, including economic growth (Stephen Knack and Phillip Keefer 1997) and mortality (Ichiro Kawachi, Bruce P. Kennedy and Kimberly Lochner 1997). These findings have inspired subsequent studies by economists examining the determinants of individual level measures of social capital (e.g., Alberto Alesina and Elianna La Ferrara 2002). However, experimental evidence from trust games conducted by Edward L. Glaeser, David I. Laibson, Jose A. Scheinkman and Christine L. Soutter (2001) calls into question the efficacy of the most prevalent measures of social capital employed in the literature. In contrast, we show that these same measures are significantly associated with contributions in a public goods experiment and perform as well as the alternative measures of social trust suggested by Glaeser, et al. Because social capital is thought to influence well-being through its effect on public good provision, our results bolster previous empirical work on the causes and consequences of social capital.

### I. Background

Social capital is most often described by non-economists as an attribute of a group that facilitates cooperation within the group (e.g., Robert Putnam 2000). In contrast, economists typically define social capital as an individual attribute. However, because much of the empirical evidence regarding the consequences of social capital is based upon comparisons of aggregate social capital and outcome variables across countries or states, the question of whether social

capital is an individual attribute or a group attribute remains open. In addition, social capital in a country or state is usually measured by averaging individual survey responses to questions about social trust (e.g., agreement with “...most people can be trusted”) and membership in voluntary organizations; studies of individual social capital employ these same types of survey questions, most often from the General Social Survey (GSS).

The efficacy of individual measures of social capital has been demonstrated recently in a novel study by Glaeser, et al.; they find that behavioral measures of trust (e.g., “how often do you leave your door purposely unlocked?”) are significant determinants of trusting behavior in simple experimental games designed to measure a subject’s trust in either a known fellow student (the “trust game”) or unknown pedestrians in Cambridge, MA (the “envelope drop”). However, these authors also find that common attitudinal measures of trust of the sort used in the GSS do not fare so well. In fact, one of the most common attitudinal measures of trust employed in the literature (“..most people can be trusted”) is not significantly associated with trusting behavior (although it is significantly related to trustworthiness). Finally, behavioral measures of participation in voluntary activities (e.g., membership in voluntary groups) are likewise not significantly associated with trusting behavior.

These findings are a potentially strong indictment of much of the existing empirical literature on the causes and consequences of social capital, since the most common measures of social trust and group membership appear to be unrelated to trusting behavior. However, some caveats are in order. First, the experimental setting examined by Glaeser, et al. is unusual; it is not clear whether their findings generalize to public goods experiments. Second, the experimental design paired subjects that were already acquainted (when feasible); therefore, the

effects of pre-existing personal relationships may swamp other factors. Third, Glaeser et al. are primarily concerned with trust, so report only limited results for measures of participation.

Like Glaeser et al., we focus on individual measures of social capital in this study; however, elsewhere we present unique evidence of the efficacy of group cohesion in an experimental analysis of contributions in a public goods game. In Lisa R. Anderson, Jennifer M. Mellor and Jeffrey Milyo (2003), we vary fixed payments in an experimental analysis of an archetypal public goods game; we find that the treatment effect of inequality reduces contributions by all members of the affected group, regardless of their relative standing within the fixed payment distribution. This is novel evidence for the proposition that inequality, a determinant of group cohesion, undermines the ability of groups to cooperate. We analyze data from that same experiment here, but now incorporate information from surveys completed by the experimental subjects.

## II. The Experiment

The public goods experiment used in this study is a variation of the game first introduced by Marwell and Ames (1979). Each individual in a group of  $N$  members is given a number of tokens to divide between a private account and a group account (i.e. the public good). The private account earns a return of  $P$  per token to the individual. The sum of all contributions made to the group account, denoted  $G$ , is multiplied by some amount  $M$  and shared equally by all members of the group. Hence, each group member earns  $(M/N)*G$  from the group account. In the standard design of this game, the return to the group account is a linear function of the total number of tokens in that account. If  $P > M/N$ , it is individually optimal to put all tokens in the private account. Additionally, if  $P < (M/N)*G$ , it is socially optimal for all subjects to put all

tokens in the public account, making this a prisoner's dilemma game. We adopt this standard linear framework, with  $P=1$ ,  $M=2$  and  $N=8$ , so that the return for allocating one token to the public account is \$0.25 (versus \$1 for the private account). We also vary the fixed payments to subjects for the purpose of our analysis of the effects of inequality on group cohesion.

A total of 48 students were recruited from undergraduate classes at the College of William and Mary to participate in 6 sessions of the experiment. Each session consisted of 30 decision-making periods divided into three blocks of ten rounds; the blocks differed only in the "fixed payment" distribution (equal or unequal). Additional details on the experimental design, including the instructions given to subjects are described in Anderson et al.

### III. The Survey

After the experiment, we administered a survey with 42 questions covering demographic characteristics, political attitudes and three sets of social capital measures. The first set is composed of attitudinal trust measures of the sort used in the GSS; subjects are asked if they agree that "most people can be trusted," "most people try to be fair," "most people try to be helpful," "you can't trust strangers anymore," and "I am trustworthy." The second set is composed of behavioral trust measures suggested by Glaeser et al., including whether subjects leave their doors purposely unlocked, loan money to friends or strangers, have been a crime victim, or lie to different categories of persons (parents, friends, acquaintances, etc.). The latter question is transformed into an index ranging from 0 to 1; all other trust measures are binary indicators. The final set of questions measures participation in voluntary activities, including hours spent volunteering, membership in voluntary groups, attendance at religious services, political volunteering, voting and the subject's number of friends. Means for all social capital

variables are listed in Tables 1 and 2.

#### IV. Method

In order to measure the association between social capital measures and group account contributions holding all else equal, we use data from the experiment and survey to conduct multivariate analysis. This also allows us to test whether the effects of group inequality we previously observed are explained by differences in individual social capital attributes within groups. We let contributions in each round of the experiment be a linear function of indicators for round, reset effects at the start of each block, fixed payment amount, inequality treatment, and the order of such treatments across blocks. This is the basic model examined in Anderson et al.; we estimate the marginal effect of social capital by introducing one social capital measure at a time to this base specification.

Because individual contributions to the group account are bound between 0 and 10, we estimate these models using a two-limit Tobit with random subject effects. We report the means and marginal effects of each social capital measure, where the marginal effect is calculated as the tobit coefficient multiplied by the probability that the dependent variable is uncensored.

#### V. Results

The results for the trust measures of social capital are shown in Table 1. The attitudinal measures of trust are all statistically significant, although the “helpful” and “trustworthy” measures are negatively associated with contributions. The latter result is also reported by Glaeser et al. However, the key difference here is that the most common attitudinal trust measure (“most people can be trusted”) is significantly associated with increased contributions. The behavioral trust measures in Table 1 are also all significant (or marginally so). However, we find

that loaning money to friends and leaving doors unlocked are negatively associated with contributions. Therefore, both attitudinal and behavior trust measures give mixed results, but the most common measure of social trust is positive and significant.

In Table 2, we report the estimated marginal effects from measures of participation in voluntary associations. Hours volunteering is only weakly associated with increased contributions, while number of friends is negative and significant. Otherwise, the other participation measures are positively and significantly associated with contributions. Finally, incorporating any of these individual social capital measures as a control variable does not attenuate the effect of inequality on group cooperation that we identify in Anderson et al.

## VI. Discussion

This is the first examination of the efficacy of survey-based measures of social capital measures for predicting contributions in a public goods experiment. We find that the most common measures of individual social capital, agreement with the statement that “most people can be trusted” and membership in voluntary associations, are strongly associated with higher contributions in the public goods experiment. However, not all measures of social capital are significant or have the expected sign. Nevertheless, we do not find any reason to prefer behavioral measures of trust to attitudinal measures. Finally, including controls for individual social capital does not explain the effect of inequality on group cooperation. Consequently, we find evidence to support both conceptualizations of social capital, as a group attribute and as an individual attribute. These results also suggest that the negative findings of Glaeser et al. do not generalize to the context of a traditional public goods experimental setting.

Notes and Acknowledgments:

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Financial support from the National Science Foundation (SES-0094800) is gratefully acknowledged. We also thank Angela Moore for excellent research assistance.

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Table 1: Survey responses regarding trust and tokens contributed in a public goods experiment

	Mean	Marginal Effect
<i>Attitudinal measures of trust</i>		
Most people can be trusted	.313	0.697 (2.63)
Most people try to be fair	.333	0.588 (3.36)
Most people try to be helpful	.313	-0.918 (3.71)
You can't trust strangers anymore	.521	-1.791 (5.96)
I am trustworthy	.917	-1.036 (4.21)
<i>Behavioral measures of trust</i>		
Often leave door unlocked	.438	-1.200 (5.65)
Ever loan money to strangers	.188	0.935 (3.91)
Often loan money to friends	.646	-0.789 (1.77)
Ever victim of a crime	.313	-1.607 (4.48)
Never lie to parents, friends, etc. (index)	.596	0.866 (3.89)

Marginal effects are calculated as the Tobit coefficient of the explanatory variable multiplied by the probability that the dependent variable is uncensored (evaluated at the mean of the explanatory variables); separate models are estimated for each trust measure.

Table 2: Voluntary participation and tokens contributed in a public goods experiment

<i>Participation measures</i>	Mean	Marginal Effect
Hours volunteering in an average week	5.598	0.163 (1.62)
Hours volunteering in the last week	1.792	.033 (0.88)
Number of voluntary groups	2.479	0.210 (5.35)
Attend religious services (times per month)	1.77	0.330 (6.47)
Ever volunteer for a campaign	.85	1.894 (7.96)
Voted in 2002	.521	0.642 (2.29)
Number of friends	6.304	-0.077 (2.71)

Marginal effects are calculated as the Tobit coefficient of the explanatory variable multiplied by the probability that the dependent variable is uncensored (evaluated at the mean of the explanatory variables); separate models are estimated for each trust measure.