



ELSEVIER

Journal of Public Economics 88 (2004) 1625–1644

JOURNAL OF
PUBLIC
ECONOMICS

www.elsevier.com/locate/econbase

The impact of social approval and framing on cooperation in public good situations

Mari Rege^{a,*}, Kjetil Telle^b

^a *Case Western Reserve University, Department of Economics, 11119 Bellflower Road, Cleveland, OH 44106, USA*

^b *Statistics Norway, Research Department, Kongensgt. 6, 0033 Oslo, Norway*

Received 8 September 2001; received in revised form 16 October 2002; accepted 28 December 2002

Abstract

Several economists have maintained that social and internalized norms can enforce cooperation in public good situations. This experimental study investigates how two important channels for social and internalized norms, social approval and framing, affect cooperation among strangers in a public good game. The experiment has two treatment effects. Firstly, it reveals each person's identity and his contribution to the public good. Secondly, it presents the public good game in a language that suggests associations to social and internalized norms for cooperation. The first treatment effect increases voluntary contributions significantly.

© 2003 Elsevier B.V. All rights reserved.

JEL classification: A13; C91; D11; H41

Keywords: Cooperation; Framing; Public good; Social approval; Social norms

1. Introduction

Several economists have maintained that social and internalized norms can enforce cooperation in public good situations (Arrow, 1971; Ullmann-Margalit, 1977; North, 1981; Andreoni, 1990; Holländer, 1990). A social norm is a rule of behavior that is enforced by social sanctions (Coleman, 1990). These sanctions take the form of approval or disapproval. A social norm is internalized if it is enforced by internal sanctions such as

* Corresponding author. Tel.: +1-216-368-4185; fax: +1-216-368-5039.

E-mail address: mari.rege@weatherhead.cwru.edu (M. Rege).

feelings of self-respect or guilt (Lindbeck, 1997). Typically, social approval and disapproval need not be verbal or direct. Simply the suspicion that someone dislikes one's behavior may constitute a significant social cost for somebody disobeying a social norm. Such informal and intangible social sanctioning will be referred to as *indirect* social approval and disapproval.

'One should not litter' is an example of a social norm. In many cities a social norm against littering is strictly enforced. In these cities littering is socially unacceptable, and a person throwing his ice-cream wrapper on the street will feel social disapproval from people observing him. Many people do not litter even if they know that nobody is observing them, because littering imposes a feeling of guilt. These people have internalized the norm against littering.

This experimental study investigates how two important channels for social and internalized norms, social approval and framing, affect cooperation among strangers in a public good game. The experiment has two treatment effects. The first treatment effect reveals each person's identity and his contribution to the public good. In this treatment all subjects first decide anonymously how much to contribute to the public good. Thereafter, each subject has to stand up and write his contribution on a blackboard in front of the other participants. The second treatment effect presents the public good game in a language that suggests associations to social and internalized norms for cooperation. Words like 'cooperate' and 'free-ride' are used frequently in this presentation. The data show that revealing each person's identity and his contribution to the public good increases voluntary contributions significantly. However, the support for the hypothesis, that giving subjects associations to norms for cooperation increases contributions, is weak.

Several economists have maintained that social norms can have an impact on economic outcomes. Involuntary unemployment has been explained on the basis of social norms that discourage unfair wages (Akerlof, 1980) and social norms that discourage underbidding of wages (Lindbeck and Snower, 1988). Moreover, Lindbeck et al. (1999) analyze the economic consequences of social norms discouraging people from living on welfare. A number of authors have also argued that social norms might evolve and enforce cooperation (Arrow, 1971; Ullmann-Margalit, 1977; North, 1981). Holländer (1990) provides a formal analysis of such an argument by modeling social norms for cooperation in a public good game.

A common approach in the economic analysis of social norms is to assume that people have preferences for social approval (see e.g. Akerlof, 1980; Lindbeck and Snower, 1988; Lindbeck et al., 1999; Holländer, 1990). Also, the choice of whether to approve or disapprove of a person is not explicitly modeled. It is instead simply assumed that people who do not obey a social norm experience social disapproval. The experiment presented in this paper finds empirical support for the assumption that people have preferences for social approval. Moreover, it indicates that simply a person's suspicion that someone dislikes his behavior may make him feel social disapproval. This evidence of indirect social approval and disapproval is in line with Brennan and Pettit (1993) and Loewenstein (2000) who argue that social sanctions can be indirect in nature and thus, need not involve considerable costs on the sanctioner's part. This finding is, however, in contrast to Coleman (1990) and Elster (1988, 1989) who both stress that sanctioning of others

generally involves costs and that it is only in an individual's self-interest to sanction if the benefits of sanctioning exceed these costs.

The experiment presented in this paper is related to [Gächter and Fehr \(1999\)](#), which also investigates behavioral impacts of social approval and disapproval. In their experiment, an introduction of social approval incentives has a significant effect on behavior among people who have some knowledge of each other.¹ However, in contrast to the present study, the introduction of social approval incentives does not have a significant effect on behavior among strangers. The differences between the experiment of [Gächter and Fehr \(1999\)](#) and the present study are elaborated on in Section 3.

2. Experimental design

The experiment is embedded in the following public good game. The 10 participants have 10×150 kroner ($10 \times \$17$) in a box. Each subject i has to decide how much money $g_i \in [0, 150]$ to take from this box. Subject i 's monetary payoff is given by

$$\pi_i = g_i + 2 \frac{1}{10} \sum_j (150 - g_j), \quad j = 1, \dots, 10.$$

This payoff formula ensures each participant an income of at least 30 kroner (\$4) and at most 420 kroner (\$49). The participants receive no payment other than what they earn in the one period public good game.² This payoff structure does not differ from the ones normally used in experimental research on public goods (see [Ledyard, 1995](#)).

The following main procedure is held in all treatments: one person at a time is asked to come up to the box. He then receives two envelopes, a 'group envelope' and a 'personal envelope'. In addition, he receives 150 kroner from the box. He has to bring the money and the envelopes behind a screen where nobody, including the experimenters, can see him. Behind this screen he has to divide the 150 kroner between the two envelopes, and seal them. To secure absolute discretion, he then has to put both envelopes into one large envelope, which he brings back to his seat.

When all of the participants have been through the above procedure, one person at a time steps forward to the box to return the group envelope. The sum of the money in the group-envelopes is then calculated. This sum is multiplied by two, and thereafter divided equally between all 10 participants. In addition to this money, each participant receives the money he puts in his personal envelope. He must keep this envelope sealed until he has left the lab.

¹ See [Fox and Guyer \(1978\)](#), [Andreoni and Petri \(2000\)](#) and [Dufwenberg and Murren \(2003\)](#) for similar results.

² On average each student earned 238 kroner (\$27), which covers opportunity costs for the 1-h session.

		Approval incentives	
		no-approval	approval
Framing	non-associative	non-associative/no-approval	non-associative/approval
	associative	associative/no-approval	associative/ approval

Fig. 1. The four different treatments.

The experiment has two treatment effects: introduction of indirect social approval and introduction of associative framing. This yields four different treatments (see Fig. 1). In a no-approval-treatment one person at a time has to return his sealed group envelope to the box. An experimenter mixes the 10 group envelopes. Then, he randomly draws one envelope at a time from the box, counts the amount of money in the envelope, and writes the sum on the blackboard. This is done in sight of all of the participants. This procedure ensures full anonymity with regard to the contribution of each participant,³ thus making social approval and disapproval impossible.

In an approval-treatment one person at a time has to come up to the box with his sealed group envelope. In sight of all of the participants he then opens his envelope, counts the amount of money in the envelope, writes the sum on the blackboard, and puts the money into the box. This procedure ensures revelation of each participant's choice and identity, thus making indirect social approval and disapproval possible.

In an associative-treatment the public good game is presented in language that suggests associations to social and internalized norms for cooperation. The 10 subjects are referred to as a 'community'. The box is referred to as 'the community box'. The money in the box is said to belong to the community. The group envelope is marked 'the community', whereas the personal envelope is marked 'mine'. Finally, the strategy choice is presented as follows: each person can choose either to be a free-rider by taking money from the community box, or to be a cooperator by not taking money from the community box.

In a non-associative-treatment the instructions are written in a language that is not meant to give associations to social norms for cooperation. The 10 subjects are referred to as 'participants in the experiment'. The box is simply referred to as 'the box'. The money in the box is said to belong to the participants in the experiment. The group envelope is marked 'back in the box', whereas the personal envelope is marked 'mine'. Finally, the strategy choice is presented as follows: each person can choose either to take money from the box, or not to take money from the box.

For each treatment, the instructions (see Appendix A) make all the relevant information given above common knowledge for all participants. The instructions are read aloud. Then, the participants get time to study the instructions individually. Finally, each participant has to answer questions that test the subjects' understanding of the instructions. Those subjects revealing a lack of understanding get special tutoring before the experiment

³ Of course, this would not be strictly true if, for example, all subjects contributed nothing.

starts. No oral communication between participants is allowed at any stage of the experiment.

Eight experimental sessions were conducted in February and March 2001. Ten students participated in each session and two sessions were conducted for each treatment. No student participated in more than one session. Altogether 80 students took part in the experiment, 20 in each treatment. Each session lasted ~ 1 h. The students were recruited from the Blindern campus of the University of Oslo.⁴ The size of the pool and precautions taken in the recruiting process ensured that the participants in each session were strangers. This was confirmed in an anonymous questionnaire filled out by the participants after the experiment.⁵ As no oral communication was allowed, participants remained unfamiliar with each other throughout the experiment. When a session was over, the participants had to leave the experimental lab individually. These precautions were taken to reduce the possibility that participants might sanction each other after the experiment.

3. Predictions

The traditional neoclassical model does not explicitly consider the impact of social and internalized norms on behavior. If all subjects care only about their material payoff, the model predicts that none of the subjects will contribute to the public good. In contrast to this prediction of the neoclassical model, however, experiments have shown that subjects will contribute from 30% to 70% in one-shot public good games or in the early rounds of finitely repeated public good games (see survey by [Ledyard, 1995](#)). One explanation for these contributions may be that subjects do not understand the game. It is well-known that people learn not to be a sucker during the first periods in a repeated public good experiment ([Andreoni, 1995](#); [Ledyard, 1995](#)). A second explanation is that people contribute due to internalized norms. This has been shown in a theoretical analysis by [Andreoni \(1990\)](#),⁶ and in experimental analyses by [Andreoni \(1995\)](#) and [Palfrey and Prisbrey \(1997\)](#). Moreover, an experiment by [Bohnet and Frey \(1999\)](#) indicates that internalized social norms for giving are reinforced if the members of each group are allowed to observe each other's faces prior to playing.

In the experiment presented in this article, misunderstanding of the game and internalized norms are motives to contribute which are present in all four treatments. The following two subsections will discuss treatment-dependent motives to contribute: social approval and associative framing.

⁴ About 25 000 students are registered at the Blindern campus of the University of Oslo.

⁵ A total of 80% of the participants reported not to have seen the face of any of the other participants in their session before. Only two persons (2.5%) reported that they knew both the name and the face of some of the other participants in their session (one contributed 100% (associative/approval-treatment) and one contributed 3% (non-associative/no-approval-treatment)).

⁶ [Andreoni \(1990\)](#) refers to a positive internal sanction as a 'warm glow'.

3.1. Social approval

Theories of social exchange address behavioral impacts of social approval incentives (see Homans, 1961; Blau, 1964). Especially, they argue that the possibility of exchanging pecuniary rewards for social approval can enforce cooperation in many social dilemmas. Such exchanges take place because people are anxious to receive social approval from others. Moreover, a person receives social approval from another person if his actions imply a pecuniary reward to that person. In the present experiment, this implies that a person who contributes in an approval-treatment will receive a benefit in the form of increased social approval. Such a benefit does, however, not exist in a no-approval-treatment in which there is full anonymity with regard to the contribution of each participant. This indicates that the introduction of opportunities to give and receive indirect social approval should increase contributions. Thus,

Hypothesis 1. Introduction of indirect social approval incentives among strangers increases contributions.

This hypothesis is also supported by Fehr and Schmidt's (1999) theory of social utility. They show that if a share of the population is inequity averse, then there may exist equilibria in which inequity averse people contribute a positive amount to the public good, whereas people not caring for equity contribute nothing.⁷ In this framework, an introduction of social approval incentives should make voluntary contributions more likely. Then, even people not caring for equity may contribute because the benefit, in terms of avoiding social disapproval from inequity averse people, outweighs the cost.

Gächter and Fehr (1999), hereafter GF, have conducted an experiment that is closely related to Hypothesis 1. In GF, social approval incentives are introduced at the end of a 10-period public good game by first revealing the identity and the contributions of each subject, and then making subjects discuss their contributions with each other. It is common knowledge before the start of period 1 that such a revelation of identities and contributions will occur after period 10. GF find that the introduction of social approval incentives does not lead to a significant increase in the contribution level among strangers. There are arguments supporting that social approval incentives may be stronger in the present experiment compared to that of GF, and hence that Hypothesis 1 may hold despite the results of GF. Firstly, in GF the *experimenter* reveals each participant's identity and contribution to the public good, while in the present study the *participant* himself has to reveal his own contribution in sight of all participants. Secondly, in GF the participants' attention on the social approval at the end of all 10 periods may be distracted by the revelation of encouraging (or discouraging) monetary payoffs after each period. In the one-shot game of the present study such possible focus on monetary payoffs is not present.

⁷ In such equilibria people contribute because the benefit of doing so, in terms of decreased inequity, outweighs the cost, in terms of decreased material payoff.

Another related experiment is [Maschlet et al. \(2001\)](#), which replicates and extends the experiment of [Fehr and Gächter \(2000\)](#) to study behavioral effects of non-monetary social sanctions. In [Maschlet et al. \(2001\)](#), at the end of each period, each subject gets to know the contribution of each of his group members. Thereafter, each subject can assign 0 to 10 punishment points to each of the other group members. These punishment points are costless to assign and have no direct effect on final earnings. Nevertheless, the punishment points give subjects an opportunity to express disapproval of others' decisions. The experimental results show that simply giving a subject this opportunity increases contributions significantly.

[Laury et al. \(1995\)](#) present one of the first experimental investigations of the importance of anonymity in public good games. They introduce a treatment in which neither the experimenter nor the participants can associate any subject's decision with that subject's identity. Their data shows that this double-blind treatment, compared to a treatment in which the experimenter can associate each subjects' decision with that subjects' identity, has no effect on contribution levels.

3.2. Associative framing

[Selten \(1998\)](#) argues that three kinds of mental processes interact in determining human behavior: motivation, adaptation and cognition. In addition to material payoff, fairness and reciprocity are important factors in determining motivation. Moreover, whether an act is perceived as friendly and fair depends on cognition, which is influenced by framing. Thus, framing may change peoples' behavior by changing people's construal of what is fair and friendly. This indicates that a presentation of the public good game that enhances the subjects' associations to real life norms for cooperation should increase contributions. Thus,

Hypothesis 2. Giving subjects associations to norms for cooperation increases contributions.

This hypothesis is also supported by newly developed theories of social utility ([Rabin, 1993](#); [Falk and Fischbacher, 1998](#); [Fehr and Schmidt, 1999](#); [Bolton and Ockenfels, 2000](#); [Dufwenberg and Kirchsteiger, 2002](#)). By taking fairness into consideration, these models show that a game, which constitutes a public good game in material payoffs, may constitute a coordination game in utility payoff. On the one hand, if a person believes that other people will contribute to the public good, then the best response for him is to contribute as well. He will contribute because he believes the benefit of doing so, in terms of decreased inequity or decreased fairness, outweighs the cost, in terms of decreased material payoff. On the other hand, if a person believes that most of the other people will not contribute to the public good, then the best response for him is not to contribute either. Thus, a person's beliefs about other people's strategies will influence his own strategy. By changing these beliefs, framing may play a significant role in determining the equilibrium of the coordination game ([Camerer and Fehr, 2001](#)). If the framing of the public good game makes a person more optimistic about other peoples' adherence to a norm for cooperation, then his dominant strategy may no longer be to defect.

Hypothesis 2 is also closely related to an experiment by Ross and Samuels, reported in Ross and Ward (1996). Ross and Samuels study the effect of framing on cooperation in a prisoners' dilemma. Their experiment has two treatments, one in which the prisoners' dilemma game is labeled *The Wall Street Game*, and one in which it is labeled *The Community Game*. In line with Hypothesis 2 they find that the contribution level in the latter framing is significantly higher than in the former.

In addition to the experiment by Ross and Samuels, there is a large amount of experimental literature suggesting that behavior in public good games is dependent upon framing (see e.g. Pruitt, 1967, 1970; Selten and Berg, 1970; Andreoni, 1995; Elliot et al., 1998; Sonnemans et al., 1998; Willinger and Ziegelmeyer, 1999; Park, 2000; Cookson, 2000). It has been shown, for example, that contributions are significantly higher if the social dilemma is presented as the provision of a public good instead of the prevention of a public bad (Andreoni, 1995; Sonnemans et al., 1998; Willinger and Ziegelmeyer, 1999; Park, 2000). Moreover, Elliot et al. (1998) have shown that institutional frames that emphasize business standards of teamwork can increase cooperation.

4. Results

In the following, a person's contribution is denoted in percent of his maximum possible contribution. Fig. 2 shows the contribution mean and median for the four different treatments. As expected, even when social approval incentives and associations to norms for cooperation are absent, subjects contribute considerable amounts: in the non-associative/no-approval-treatment, subjects on average contribute 34.4%. Introducing associations to norms for cooperation in the associative/no-approval-treatment increases the average contribution to 55.1%, whereas introducing indirect social approval incentives in the non-associative/approval-treatment increases the average contribution to 68.2%. Finally, introducing both indirect social approval incentives and associations to norms

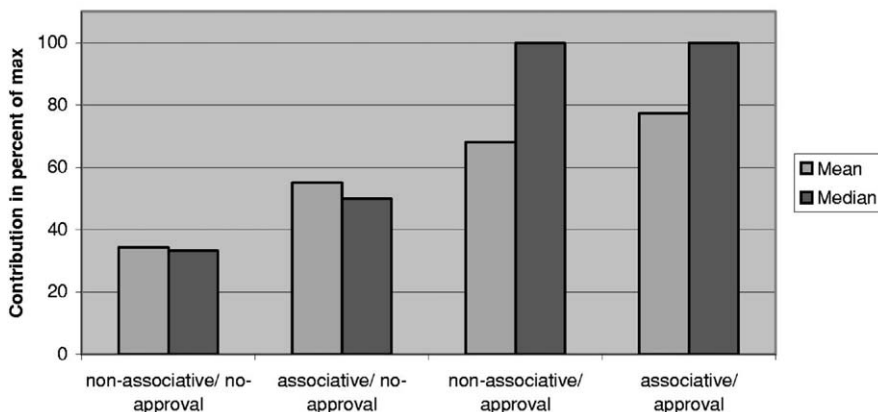


Fig. 2. Mean and median contribution levels.

Table 1

Mean and median contributions (in percent of maximum contribution), row and column differences (in percentage points), and *P*-values of the Wilcoxon–Mann–Whitney test (exact, one sided)

		Approval incentives		Column differences
		No-approval	Approval	
Framing	Non-associative	<i>n</i> = 20	<i>n</i> = 20	Diff-mean = 33.8
		Mean = 34.4%	Mean = 68.2%	Diff-median = 66.7
		Median = 33.3%	Median = 100.0%	<i>P</i> = 0.011
	Associative	<i>n</i> = 20	<i>n</i> = 20	Diff-mean = 22.2
		Mean = 55.1%	Mean = 77.3%	Diff-median = 50.0
		Median = 50.0%	Median = 100.0%	<i>P</i> = 0.044
Row differences		Diff-mean = 20.7	Diff-mean = 9.1	
		Diff-median = 16.7	Diff-median = 0	
		<i>P</i> = 0.090	<i>P</i> = 0.25	

Example: the *P*-value given in the associative row (0.044) is the *P*-value of the test that the contributions are not higher in the associative/approval-treatment than in the associative/no-approval-treatment.

for cooperation in the associative/approval-treatment increases the average contribution to 77.3%.

The summary statistics presented in Fig. 2 and Table 1 strongly indicate that the contributions differ systematically across treatments.⁸ A Kruskal–Wallis test confirms this impression: a hypothesis that the contributions are identical in all of the four treatments is rejected at a 0.05 level of significance (*P* = 0.016).⁹

The data clearly support Hypothesis 1: introduction of indirect social approval incentives among strangers increases contributions. A hypothesis that contributions in the non-associative/approval-treatment are *not* higher than contributions in the non-associative/no-approval-treatment is rejected at a 0.05 level of significance (*P* = 0.011, Wilcoxon–Mann–Whitney one-sided exact test; see Table 1). A hypothesis that contributions in the associative/approval-treatment are *not* higher than contributions in the associative/no-approval-treatment is also rejected at a 0.05 level of significance (*P* = 0.044, same test). Moreover, a hypothesis that contributions in the non-associative/approval-treatment and the associative/approval-treatment are *not* higher than contributions in the non-associative/no-approval-treatment and the associative/no-approval-treatment can be rejected at a 0.005 level of significance (*P* = 0.0021). These results provide empirical support for the underlying assumption of economic analysis of social norms (Akerlof, 1980; Lindbeck and Snower, 1988; Lindbeck et al., 1999; Holländer, 1990). People do indeed seem to have preferences for indirect social approval.

The data are consistent with what is stated in Hypothesis 2: giving subjects associations to norms for cooperation does increase contributions. However, the support for Hypothesis 2 is weak. A hypothesis that contributions in the associative/no-approval-treatment are *not* higher than contributions in the non-associative/no-approval-treatment can be rejected at a 0.1 level of significance (*P* = 0.090). Moreover, a hypothesis that

⁸ See Fig. A.1 and Table A.1 in Appendix A for the cumulative distribution and the raw data, respectively.

⁹ The independence condition of the formal tests is met because no student participates more than one time.

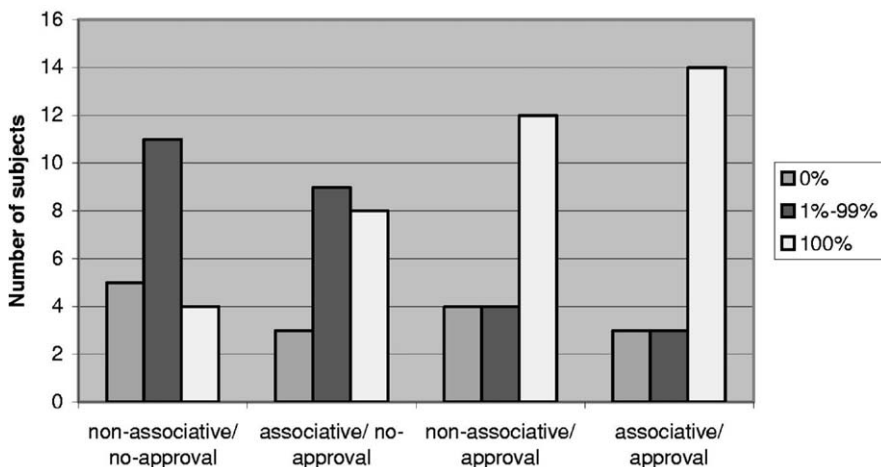


Fig. 3. Number of subjects in different contribution intervals.

contributions in the associative/approval-treatment and the associative/no-approval-treatment are *not* higher than contributions in the non-associative/approval-treatment and the non-associative/no-approval-treatment, can be rejected at a 0.1 level of significance ($P=0.079$).

A hypothesis that contributions in the associative/approval-treatment are *not* higher than contributions in the non-associative/approval-treatment cannot be rejected ($P=0.25$). This insignificant effect of associative framing in an approval-treatment can be explained by a ‘ceiling effect’. There is not much room for a significant increase in voluntary contributions due to associative framing, because the contribution level is already very high due to social approval incentives.

Fig. 3 shows the number of subjects contributing: (1) nothing, (2) an amount strictly between zero and 100%, and (3) 100%. In the following, these subjects will be referred to as non-contributors, intermediate contributors, and full contributors, respectively. Note from the figure that the number of non-contributors is similar across all four treatments.¹⁰ Observe also that there is a non-negligible fraction of full contributors in all treatments. Moreover, introducing social approval incentives or associative framing decreases the number of intermediate contributors, while increasing the number of full contributors.¹¹ These observations suggest that there are three types of people:¹² firstly, there are some people who do not contribute anything irrespective

¹⁰ A Fisher–Freeman–Halton exact test fails to reject the hypothesis that the number of non-contributors is equally distributed across treatments ($P=0.922$).

¹¹ A Fisher–Freeman–Halton exact test rejects the hypothesis that the number of intermediate contributors is equally distributed across the four treatments ($P=0.019$), and the hypothesis that the number of full contributors is equally distributed across the four treatments ($P=0.008$).

¹² A similar classification of people is suggested in Ledyard (1995), pp. 172–173).

of the presence of social approval incentives or associative framing. These people do not seem to care about social approval, or have any internalized norms for cooperation. This observation is in line with an experiment by [Andreoni and Miller \(2002\)](#) in which approximately one quarter of the subjects behave as selfish money-maximizers. Secondly, there are some people who are full contributors even when there is no introduction of social approval incentives or associative framing. These people seem to either have strongly internalized norms for cooperation or they may have misunderstood the game. Thirdly, more than 80% seem to be responsive to the introduction of social approval incentives or associative framing. Such people seem to care about social approval. Moreover, they seem to have internalized social norms for cooperation.

5. Discussion

Several economists have maintained that social and internalized norms can enforce cooperation in public good situations ([Arrow, 1971](#); [Ullmann-Margalit, 1977](#); [North, 1981](#); [Andreoni, 1990](#); [Holländer, 1990](#)). This experimental study investigates how two important channels for social and internalized norms, social approval and framing, affect cooperation among strangers in a public good game. The data strongly support the hypothesis that introduction of indirect social approval incentives increases contributions. However, the support for the hypothesis, that giving subjects associations to norms for cooperation increases contributions, is weak.

The experimental results in this paper suggest identity-revelation as an important policy for increasing contributions to public goods. Revealing each person's identity and his contribution to the public good may increase voluntary contributions. This insight seems to be known to charities that publicly list benefactors and their respective contributions. Blood banks also make use of this insight by providing donors with stickers or T-shirts proclaiming 'I give blood'.

An important task for future research is to investigate the robustness of the identity-revealing policy. Under different circumstances than the one investigated in this experiment, it may be that this policy will not work, or even work in the opposite direction. For example, if social approval incentives are conditional (as described in Section 3.2) and the share of people adhering to the social norm for contribution is low, then revealing each person's identity and his contribution to the public good may decrease voluntary contributions.

Another important question for future research is whether the identity-revealing policy for increasing contributions to public goods, can complement or replace traditional public policies as governmental provision and subsidies. In addressing this question, it is worth noting that a possible cost of the traditional policies is dead weight loss from taxes, whereas a possible cost of a provision enforced by social approval incentives may be utility loss in terms of decreased social approval. Moreover, it is important to understand the relation between social approval incentives and public policies. It is, for example, not clear that monetary incentives will increase contributions if people are contributing due to social approval incentives. Indeed, experimental evidence indicates that monetary incen-

tives can crowd out social approval incentives and thereby result in a decrease in contributions (see survey by [Fehr and Falk, 2001](#)).

Acknowledgements

We are indebted to two anonymous referees for valuable comments and suggestions, and to Rosemarie Nagel for numerous discussions in the process of designing this experiment. We are also grateful to Rolf Aaberge, James Andreoni, Geir Asheim, David Cooper, Ernst Fehr, Karine Nyborg, Bob Slonim, Morten SØberg and Ylva SØvik for helpful comments, to Ole Christian Moen for excellent research assistance, and to Christopher Shepard for helping us with the English language. For financial support we acknowledge the Norwegian Research Council.

Appendix A

The cumulative distribution function ([Fig. A.1](#)).

The raw data ([Table A.1](#)).

Instructions (translated from Norwegian)

Non-associative framing treatments

The experiment is to proceed in silence. Talking is prohibited.

You and the nine other experimental participants in the room have 1500 kroner in this box.

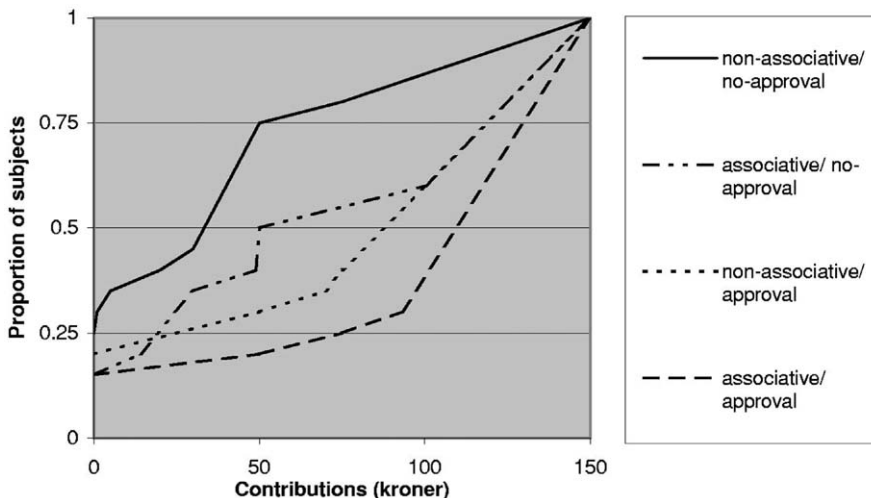


Fig. A.1. The cumulative distribution function (proportion of subjects contributing the given amount or less).

Table A.1
The raw data: each subject's contribution in kroner

		Approval incentives	
		No-approval	Approval
Framing	Non-associative	0	0
		0	0
		0	0
		0	0
		0	50
		1	50
		5	70
		20	75
		30	150
		50	150
		50	150
		50	150
		50	150
		50	150
		50	150
	75	150	
	150	150	
	150	150	
	150	150	
	150	150	
	Associative	0	0
		0	0
		0	0
		14	50
		30	75
		30	93
		30	150
49		150	
50		150	
50		150	
100		150	
100		150	
150	150		
150	150		
150	150		
150	150		
150	150		
150	150		
150	150		
150	150		

You can either take money out of the box or you can leave the money in the box. If you decide to take money from the box, you may decide for yourself how much money to take, but the amount may not exceed 150 kroner. After all participants have had the opportunity to take or not to take money out of the box, the amount of money remaining in the box will be counted. This amount will be doubled and will then be divided between *all* 10 participants.

This means that your total earnings from this experiment are dependent upon the choices that you and the other participants make under the following rule:

Your total earnings =

The money you take from the box

+ one tenth of twice the sum of money remaining in the box.

Note that regardless of what the other participants choose to do, you will receive the most money if you take all 150 kroner out of the box. However, as a group, all of the participants will receive the most money if no one takes any money out of the box.

[No-approval treatment: no one will know whether you take money out of the box or not.]

[Approval treatment: all of the other participants will know if you take money out of the box or not.]

One person at a time will be asked to come forward. After coming forward you will receive two envelopes, one marked ‘back in the box’ and one marked ‘mine’. You will also receive 150 kroner from the box (two 50 kroner notes, one 20 kroner coin, two 10 kroner coins, one 5 kroner coin and five 1 kroner coins). You will bring both the money and the envelopes with you behind a screen. While no one can see, you will divide the money between the two envelopes as you see fit: if you don’t want to take any money out of the box, put all 150 kroner in the envelope marked ‘back in the box’ and put nothing into the envelope marked ‘mine’. If you want to take all 150 kroner out of the box, put all 150 kroner into the envelope marked ‘mine’ and put nothing into the envelope marked ‘back in the box’. If you want to take some money then put some money into the envelope marked ‘mine’ and put the rest into the envelope marked ‘back in the box’.

After you have done this, seal both envelopes and put them both into a big, brown envelope which you will then take with you back to your seat. You may take the envelope marked ‘mine’ home with you when the experiment is finished but you will put the contents of the envelope marked ‘back in the box’ back into the box at a later point in the experiment.

Once everyone has divided the money between the two envelopes, one person at a time will be asked to come forward with the envelope marked ‘back in the box’.

[No-approval treatment: when you come forward you will put the closed envelope into the box. You will then return to your seat. Once everyone has placed their envelopes marked ‘back in the box’ into the box, the envelopes will be mixed. We will then open the envelopes one at a time, count the money, write the amount on the blackboard, and put the money back into the box.

Thus no one will know whether or not you have taken money from the box. Likewise, you won’t know what any of the other participants have chosen to do.]

[Approval treatment: when you come forward you will open the envelope and count the money in front of the other participants. You will then write the amount on the blackboard. You will then put the money into the box and return to your seat.

Thus the other participants will know whether or not you have taken any money from the box. Likewise, you will know what each of the other participants has chosen to do.]

The amount of money now present in the box is doubled, and this new sum is divided equally between *all* 10 experimental participants.

At the end of the experiment each person will leave the lab separately.

Examples

- If no one takes anything from the box, 1500 kroner will remain in it. Double this sum (= 3000) is then divided equally between all participants such that each participant will receive 300 kroner.
- If everyone takes 150 kroner from the box, no money will remain in it, thus leaving no money to be divided equally. Each participant will then only receive the 150 kroner that he took.
- If none of the other participants take anything, but you take 150 kroner, then $(1500 - 150 =)$ 1350 kroner will remain in the box. Double this sum (= 2700) is then divided equally between all participants (= 270 for each). You will then receive the 150 kroner you have taken and the additional share from the box; making a total of $(150 + 270 =)$ 420 kroner. Each of the other participants will then receive 270 kroner.
- If all of the other participants take 150 kroner, but you take nothing, then 150 kroner will remain in the box (the money you did not take). Double this sum (= 300) is then divided equally between all participants. You will then receive only the share from the box, i.e. 30 kroner. Each of the others will receive $(150 + 30 =)$ 180 kroner.
- Suppose half of the experimental participants (five persons) take 150 kroner, four take nothing and you:

5.1 take nothing.

- The box then contains 750 kroner $(1500 - 5 \times 150)$.
- Double this sum (= 1500) is then divided equally (150 for each).
- **You receive 150 kroner.**
- The four who did not take anything receive 150 kroner each (the same as you).
- The five who took 150 kroner receive 300 kroner each $(150 + 150)$.
- **In total all experimental participants receive 2250 kroner** $(150 + 4 \times 150 + 5 \times 300)$.

5.2 take as much as possible (150 kroner).

- The box then contains 600 kroner $(1500 - 6 \times 150)$.
- Double this sum (= 1200) is then divided equally (120 for each).
- **You receive 270 kroner** $(150 + 120)$.
- The four who did not take anything receive 120 kroner each.
- The five who took 150 kroner from the box receive 270 kroner (the same as you).
- **In total all experimental participants receive 2100 kroner** $(270 + 4 \times 120 + 5 \times 270)$.

Note the following.

- In total, the group receives more money the more the people choose not to take money from the box. In the example above we see that the total payment to all of the

participants declines from 2250 to 2100 when you take 150 kroner from the box as compared to when you take nothing.

- Regardless of what the others choose to do, the more you take from the box the greater your payment. In the example above we see that your payment increases from 150 to 270 when you take 150 kroner as compared to when you take nothing.

Associative framing treatments

The experiment is to proceed in silence. Talking is prohibited.

You and the nine other experimental participants in this room constitute a community. The community has 1500 kroner in a community box.

You can either free ride on the community by taking money from the community box, or cooperate with the community by not taking anything from the community box. If you want to free ride on the community, you may decide how much money to take from the community box, but the amount may not exceed 150 kroner. After everyone in the community has the opportunity to free ride on the community or to cooperate with the community, the amount of money remaining in the community box will be counted. This amount will be doubled and will then be divided equally between *all* 10 community members.

This means that your total earnings from this experiment are dependent upon the choices that you and the other participants make under the following rule:

Your total earnings =

The money you take from the community box

+ one tenth of twice the sum of money remaining in the community box.

Note that regardless of what the other community members choose to do, you will receive the most money if you free ride on the community by taking all 150 kroner out of the community box. However, as a group, the community will receive the most money if everyone cooperates by not taking any money out of the community box.

[No-approval treatment: no one will know whether you free ride on the community or not.]

[Approval treatment: all of the members of the community will know if you free ride on them or not.]

One person at a time will be asked to come forward. After coming forward you will receive two envelopes, one marked ‘community’ and one marked ‘mine’. You will also receive 150 kroner from the box (two 50 kroner notes, one 20 kroner coin, two 10 kroner coins, one 5 kroner coin and five 1 kroner coins). You will bring both the money and the envelopes with you behind a screen. While no one can see, you will divide the money between the two envelopes as you see fit: if you want to cooperate, put all 150 kroner in the envelope marked ‘community’ and put nothing into the envelope marked ‘mine’. If you want to free ride as much as possible, put all 150 kroner into the envelope marked ‘mine’ and put nothing into the envelope marked ‘community’. If you want to free ride a bit, put some money into the envelope marked ‘mine’ and put the rest into the envelope marked ‘community’.

After you have done this, seal both envelopes and put them both into a big, brown envelope which you will then take with you back to your seat. You may take the envelope marked ‘mine’ home with you when the experiment is finished but you will put the contents of the envelope marked ‘community’ back into the box at a later point in the experiment.

Once everyone has divided the money between the two envelopes, one person at a time will be asked to come forward with the envelope marked ‘community’.

[No-approval treatment: when you come forward you will put the closed envelope into the box. You will then return to your seat. Once everyone has placed their envelopes marked ‘community’ into the box, the envelopes will be mixed. We will then open the envelopes one at a time, count the money, write the amount on the blackboard, and put the money back into the community box.

Thus no one will know whether or not you chose to free ride on the community. Likewise, you won’t know what any of the other community members have chosen to do.]

[Approval treatment: when you come forward you will open the envelope and count the money in front of the other community members. You will write the amount on the blackboard. You will then put the money into the community box and return to your seat.

Thus the other community members will know whether or not you have taken any money from the box. Likewise, you will know what each of the other community members has chosen to do.]

The amount of money now present in the community box is doubled, and this new sum is divided equally between *all* 10 community members.

At the end of the experiment each person will leave the lab separately.

Examples

- If everyone in the community cooperates, 1500 kroner will remain in the community box. Double this sum (=3000) is then divided equally between everyone in the community such that each community member will receive 300 kroner.
- If everyone in the community free rides as much as possible by taking 150 kroner from the community box, no money will remain in the community box, thus leaving no money to be divided equally. Each community member will then only receive the 150 kroner he took.
- If all other community members cooperate, but you take 150 kroner, then $(1500 - 150 =)$ 1350 kroner will remain in the community box. Double this sum (=2700) is then divided equally between everyone in the community (=270 for each). You will then receive the 150 kroner you have taken and the additional share from the community box; a total of $(150 + 270 =)$ 420 kroner. Each of the other community members will then receive 270 kroner.
- If all other community members free ride as much as possible (takes 150 kroner), but you cooperate, then 150 kroner will remain in the community box (the money you did not take). Double this sum (=300) is then divided equally between everyone in the community. You will then receive only the share from the community box, i.e. 30 kroner. Each of the others receives $(150 + 30 =)$ 180 kroner.

- Suppose half of the community members (five persons) free ride as much as possible, four cooperate and you:
 - 5.1 cooperate.
 - The community box then contains 750 kroner ($1500 - 5 \times 150$).
 - Double this sum ($= 1500$) is then divided equally (150 for each).
 - **You receive 150 kroner.**
 - The four who cooperated receive 150 kroner each (the same as you).
 - The five who free rode as much as possible receive 300 kroner each ($150 + 150$).
 - **In total the community receives 2250 kroner** ($150 + 4 \times 150 + 5 \times 300$).
 - 5.2 free ride as much as possible (150 kroner).
 - The community box then contains 600 kroner ($1500 - 6 \times 150$).
 - Double this sum ($= 1200$) is then divided equally (120 for each).
 - **You receive 270 kroner** ($150 + 120$).
 - The four who cooperated receive 120 kroner each.
 - The five who free rode as much as possible receive 270 kroner (the same as you).
 - **In total the community receives 2100 kroner** ($270 + 4 \times 120 + 5 \times 270$).

Note the following.

- In total, the community receives more money the more people choose to cooperate. In the example above we see that the total payment to the community declines from 2250 to 2100 when you free ride as compared to when you cooperate.
- Regardless of what the other community members choose to do, the more you free ride on the community, the greater your payment will be. In the example above we see that your payment increases from 150 to 270 when you free ride as compared to when you cooperate.

References

- Akerlof, G.A., 1980. A theory of social custom, of which unemployment may be one consequence. *The Quarterly Journal of Economics* 94 (4), 749–775.
- Andreoni, J., 1990. Impure altruism and donations to public goods: a theory of warm-glow giving. *The Economic Journal* 100, 464–477.
- Andreoni, J., 1995. Warm-glow versus cold-prickle: the effect of positive and negative framing on cooperation in experiments. *Quarterly Journal of Economics* 110, 1–22.
- Andreoni, J., Miller, J., 2002. Giving according to GARP: an experimental test of the consistency of preferences for altruism. *Econometrica* 70 (2), 737–753.
- Andreoni, J., Petri, R., 2000. Social Motives to Giving: Can These Explain Fund Raising Institutions? University of Wisconsin, Madison Mimeo.
- Arrow, K.J., 1971. Political and economic evaluation of social effects and externalities. In: Intrilligator, M. (Ed.), *Frontiers of Quantitative Economics*. North-Holland, Amsterdam.
- Blau, P.M., 1964. *Exchange and Power in Social Life*. John Wiley, New York.
- Bohnet, I., Frey, B., 1999. The sound of silence in prisoner's dilemma and dictator games. *Journal of Economic Behavior and Organization* 38, 43–57.

- Bolton, G.E., Ockenfels, A., 2000. ERC: a theory of equity, reciprocity and competition. *American Economic Review* 92 (1), 166–193.
- Brennan, G., Pettit, P., 1993. Hands invisible and intangible. *Synthese* 94, 191–225.
- Camerer, C., Fehr, E., 2002. Measuring social norms and preferences using experimental games: a guide for social scientists. In: Heinrich, J., Boyd, R., Bowles, S., Gintis, H., Fehr, E., McElreath, R. (Eds.), *Foundations of Human Sociality—Experimental and Ethnographic Evidence from 15 Small-Scale Societies*, forthcoming, Oxford University Press.
- Coleman, J., 1990. *Foundations of Social Theory*. Harvard University Press, Cambridge, MA.
- Cookson, R., 2000. Framing effects in public goods experiments. *Experimental Economics* 3 (1), 55–79.
- Dufwenberg, M., Murren, A., 2003. Discrimination by gender and social distance. Department of Economics Stockholm University, Working paper.
- Dufwenberg, M., Kirchsteiger, G., 2002. A Theory of Sequential Reciprocity. Department of Economics, Stockholm University Working paper.
- Elliot, C.S., Hayward, D.M., Canon, S., 1998. Institutional framing: some experimental evidence. *Journal of Economic Behavior and Organization* 35, 455–464.
- Elster, J., 1988. Economic order and social norms. *Journal of Institutional and Theoretical Economics* 144 (2), 357–366.
- Elster, J., 1989. Social norms and economic theory. *Journal of Economic Perspectives* 3 (4), 99–117.
- Falk, A., Fischbacher, U., 1998. A Theory of Reciprocity. University of Zurich. Working paper no. 6.
- Fehr, E., Falk, A., 2002. Psychological foundations of incentives. *European Economic Review* 46, 687–724.
- Fehr, E., Gächter, S., 2000. Cooperation and punishment in public goods experiments. *American Economic Review* 90, 980–994.
- Fehr, E., Schmidt, K.M., 1999. A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics* 114, 817–868.
- Fox, J., Guyer, M., 1978. Public choice and cooperation in n -person prisoner's dilemma. *Journal of Conflict Resolution* 22, 469–481.
- Gächter, S., Fehr, E., 1999. Collective action as a social exchange. *Journal of Economic Behavior and Organization* 39 (4), 341–369.
- Holländer, H., 1990. A social exchange approach to voluntary cooperation. *American Economic Review* 80 (5), 1157–1167.
- Homans, G.C., 1961. *Social Behavior: Its Elementary Forms*. Harcourt Brace Jovanovich, New York.
- Laury, S.K., Walker, J.M., Williams, A.W., 1995. Anonymity and the voluntary provision of public goods. *Journal of Economic Behavior and Organization* 27, 365–380.
- Ledyard, J., 1995. Public goods: a survey of experimental research. In: Kagel, J., Toth, A. (Eds.), *Handbook of Experimental Economics*. Princeton University Press, Princeton, NJ.
- Lindbeck, A., 1997. Incentives and social norms in household behavior. *American Economic Review* 87 (2), 370–377.
- Lindbeck, A., Snower, D.J., 1988. Cooperation, harassment and involuntary unemployment: an insider–outsider approach. *American Economic Review* 78 (1), 167–188.
- Lindbeck, A., Nyberg, S., Weibull, J., 1999. Social norms, the welfare state and voting. *The Quarterly Journal of Economics* CXIV (1), 1–35.
- Loewenstein, G., 2000. Emotions in economic theory and economic behavior. *American Economic Review* 90 (2), 426–432.
- Masclet, D., Noussair, C., Tucker, S., Villeval, M.-C., 2001. Monetary and Non-Monetary Punishment in the Voluntary Contributions Mechanism. Purdue University, Krannert Graduate School of Management, USA Working paper.
- North, D., 1981. *Structure and Change in Economic History*. WW Norton + Company.
- Palfrey, T., Prisbrey, J., 1997. Anomalous behavior in public goods experiments: how much and why? *American Economic Review* 87 (5), 829–846.
- Park, E., 2000. Warm-glow versus cold-prickle: a further experimental study of framing effects on free-riding. *Journal of Economic Behavior and Organization* 43, 405–421.
- Pruitt, D.G., 1967. Reward structure and cooperation: the decomposed prisoners dilemma game. *Journal of Personality and Social Psychology* 7, 21–27.

- Pruitt, D.G., 1970. Motivational processes in the decomposed prisoners dilemma game. *Journal of Personality and Social Psychology* 14, 227–238.
- Rabin, M., 1993. Incorporating fairness into game theory and economics. *American Economic Review* 83 (5), 1281–1302.
- Ross, L., Ward, A., 1996. Naive realism in everyday life: implications for social conflict and misunderstanding. In: Reed, E.S., Turell, E., Brown, T. (Eds.), *Values and Knowledge*. Lawrence Erlbaum, New Jersey.
- Selten, R., 1998. Features of experimentally observed bounded rationality. *European Economic Review* 42, 413–436.
- Selten, R., Berg, C.C., 1970. Drei Experimentelle Oligopolspielsereien mit kontinuierlichem Zeitarblauf. In: Sauermann, H. (Ed.), *Beiträge zur Experimentellen Wirtschaftsforschung*, Vol. II. Mohr, Tübingen.
- Sonnemans, J., Scram, A., Offerman, T., 1998. Public good provision and public bad prevention: the effect of framing. *Journal of Economic Behavior and Organization* 34, 143–161.
- Ullmann-Margalit, E., 1977. *The Emergence of Norms*. Oxford University Press, Oxford.
- Willinger, M., Ziegelmeyer, A., 1999. Framing and cooperation in public good games: an experiment with an interior solution. *Economic Letters* 65 (3), 323–328.