

The sound of silence in prisoner's dilemma and dictator games

Iris Bohnet^{a,*}, Bruno S. Frey^b

^a*Kennedy School of Government, Harvard University, Cambridge, MA 02138, USA*

^b*Institute for Empirical Economic Research, University of Zurich, Blumlisalpstrasse 10,
CH-8006, Zurich, Switzerland*

Received 8 April 1997; received in revised form 20 July 1998

Abstract

Communication increases contributions to public goods. Our experimental results indicate that communication is not always required. Silent identification suffices to raise solidarity in prisoner's dilemma and dictator games. Increases in solidarity are not only due to expectations of reciprocity. While mutual identification induces individuals to converge to the social norm, the spread of the distribution of choices increases with one-way identification and with communication. As others are no longer faceless entities, one-way identification decreases social distance, inducing interaction-specific solutions. Communication allows more information to be transferred and, therefore, more scope for abandoning the norms. © 1999 Elsevier Science B.V. All rights reserved.

JEL classification: A13; C72; C91

Keywords: Prisoner's dilemma; Dictator game; Fairness; Communication; Anonymity

1. Introduction

It is well established that non-binding pre-play communication raises cooperation in public good-type settings.¹ Dialogue, however, is not always required. Experimental research has jumped from totally isolating subjects (anonymous silence) to allowing a

* Corresponding author. Tel.: +1-617-495-5605; fax: +1-617-496-5747; e-mail: iris-bohnet@harvard.edu

¹ See the meta-analysis by Sally (1995) and the surveys by Ledyard (1995) and Davis and Holt (1993). Experimental evidence does not support the game theory assumption that individuals' willingness to cooperate is not affected by nonbinding pre-play verbal interaction. The label 'cheap talk' seems not to be warranted (Farrell and Rabin, 1996).

powerful form of interaction, namely, verbal communication. While both, anonymous and non-anonymous communication have been tested for, the fourth cell of the 2×2 matrix has been neglected: identified silence. We posit that it is not (only) the information exchanged in face-to-face interactions which induces individuals to change their behavior, but rather the participants' identification. While mutual identification allows for reciprocity, one-way identification excludes future social sanctions. In the prisoner's dilemma (PD) game, silent, but identified interaction leads to significantly higher cooperation rates than anonymity. In the dictator game (DG), one-way and two-way identification induces more 'other-regarding' behavior. Our experimental results thus indicate that removing anonymity suffices to increase solidarity. The 'Sound of Silence' has a power of its own.

Our combination of the two games is unusual. While cooperation in PD is Pareto-improving in pay-offs as the pie gets bigger, this property does not apply to DG. For the purpose of this paper, however, we do not need to differentiate between altruism in the form of purely helping others and cooperative behavior in the form of helping others and oneself. In both cases, keeping all of the payoff is the dominant strategy. Behavior which is not income-maximizing has been referred to as fairness or kindness in other experimental investigations.² As it implies caring about the other's welfare, we call it solidarity.

Human beings do not care about the other's welfare per se, but they react to the restrictions which are relevant in a specific context.³ Mutual identification allows for social norms to become relevant, or as Roth (1995, p. 295) puts it, "face-to-face interactions call into play all of the social training we are endowed with." Manners are important but – in contrast to Camerer and Thaler (1995, p. 218) – not 'regardless of the situation.' The more anonymous and abstract an interaction is (as in many laboratories), the less influenced individual behavior is by manners. On the other hand, the greater the extent to which a decision is taken in a social context, the more relevant manners become.

Social distance has recently started to be addressed by experimental economists. Hoffman et al. (1994, 1996) used DG to study how experimental procedures, especially the language used to explain the experimental task, affect "subjects' degree of social distance from the experimenter and expectations of reciprocity" (1996, p. 653). They find that the more the procedures and the language used remind subjects of reciprocal relationships outside the laboratory, the more other-regarding individuals become.

While this paper does not question these results, it argues that reciprocity is not all that matters when decreasing social distance. Rather, social distance is a much broader phenomenon that is not only relevant for social exchange-type relations but applies to all human interactions where some kind of other-regarding behavior is involved. In our experiments, reciprocity only accounts for behavior induced by mutual identification. It is

² For fairness in bargaining games (ultimatum and dictator games) see Forsythe et al. (1994), and for kindness in public goods experiments, Andreoni (1995) who shows that cooperation cannot be explained by confusion alone. Including the simple dictator game makes it almost impossible to attribute charitable behavior to a lack of rationality.

³ Context-dependence has been labeled 'institutional framing' by Isaac et al. (1991). The idea has been further developed by Frey and Bohnet (1995) and has recently been applied to ultimatum and dictator games by Schotter et al. (1996).

with this treatment that individuals' behavior becomes focused within social norms. One-way identification and communication lead to qualitatively different results. As the deviation from the norm cannot be socially sanctioned with one-way identification, no convergence to the social norm is induced. Dialogue, while not excluding social sanctions, allows more information to be transferred and therefore more scope for actually abandoning these norms. It leads to a divergence of behavior corresponding to the heterogeneous composition of the group of individuals involved. The interaction is transformed into a personal relationship where manners can be substituted by interaction-specific rules.

The effects of identification are discussed in Section 2. Section 3 presents the experimental design, and Section 4 reports the results and indicates their relevance for economics. We conclude with final remarks in Section 5.

2. The role of identification

Many experimental economists fear that identification contaminates incentives, as the prospect of a continued interaction between participants outside the laboratory creates a multi-stage game (Hey, 1991, p. 176). Identification clearly puts an interaction into a social environment. Norms defined by society must be added to the rules of the game. The non-anonymous silent treatment condition helps in explaining a puzzle so far not solved in experimental economics (Roth, 1995, p. 296). Computer communication (anonymous talk) does not include all aspects of communication: in bargaining contexts, face-to-face interactions (identified talk) lead to more efficiency than when bargaining is conducted anonymously via computer terminals (Roth and Murnighan, 1982). Our study isolates the effect of identification alone by excluding the linguistic channel.

Mutual identification strengthens social or cultural propensities for specific behavior.⁴ Drawing analogy to the focal point adduced by Schelling (1960) on which the players of a game can agree in the absence of communication, we call the respective meeting point a 'Schelling norm.' This Schelling norm of fairness is equal division in most societies.⁵ A similar concept holds for the PD game where the Schelling norm is to cooperate (Elster, 1989). In most cases there is a trade-off between norm-guided behavior and individual income maximization. Mutual identification allows for social sanctions to become relevant. However, as the importance of reciprocal fairness has been explored by several theoretical and experimental papers (e.g. Fehr et al., 1993; Rabin, 1993), we focus on solidarity not induced by expectations of reciprocity. Might identification influence other-related behavior just because identified individuals are no longer faceless entities?

⁴ Young (1994, p. 127) states for sharing decisions: "The outcome is strongly influenced by what the bargainers expect it to be *a priori* but these expectations do not normally involve the claimants' utility functions for the simple reason that people typically do not know others' utility functions. Instead, expectations are shaped by the visible qualifications that the claimants bring with them, and the distributive norms that apply to the situation at hand."

⁵ For empirical evidence, see Güth (1994), Young (1994) as well as Brams and Taylor (1996). Theoretically, the Schelling norm corresponds to the norm of equity (Homans, 1961).

Identifying another person decreases social distance, thereby allowing empathy⁶ for the other person to exist. The ‘other’ is no longer some unknown individual from some anonymous crowd but a specific human being. Standing by and neglecting a specific child who has fallen into a well is much more difficult than not rescuing an unspecified statistical life, for example, the anonymous children starving from hunger. Charities have long recognized the importance of a victim’s closeness and try to decrease social distance between donors and recipients by various means. Many people do not donate for some good cause but rather sponsor-specific recipients, for example, a child in a third world country. Social psychologists have pointed out that individuals’ reactions depend on how vivid and salient other people’s destinies are (Nisbett and Ross, 1980, p. 43). The different treatment of identified victims and statistical lives is discussed in health care. Critics point out that too few resources are allocated to preventive measures such as hygiene, nutrition, inoculations, mammographies etc. because victims have not been identified yet (Weinstein and Quinn, 1983).

The fact that identification may be achieved at low cost was demonstrated by the ‘Child B-effect’ in England in spring 1995. ‘Child B’ became famous when the media reported the fate of a child who was denied the resources for a difficult but possibly life-saving procedure. The National Health Service was convinced that the high cost was not justified by the very small survival chances of the child. Although the child was not identified by her name but only by the letter ‘B’, this specification and personification sufficed to encourage an anonymous donor to step in and provide the necessary resources (£75,000). While this is a tragic example, it reminds of Schelling’s (1968) ‘identifiable victim effect’.⁷

We thus hypothesize that silent identification suffices to induce a larger degree of solidarity than anonymous conditions (Hypothesis 1). It is not only the expected social sanctions which lead subjects to be more giving, but also a specific effect of increased closeness to the other person. In order to discriminate between solidarity motivated by reciprocity and by closeness, we compare mutual identification with one-way identification where the ‘victims’ do not know the identity of their potential benefactors. As social sanctions are excluded in the latter treatment, no convergence to the social norm is expected.

Communication enables individuals to express their specific expectations about the outcome of a game. In contrast to mutual identification, dialogue favors the development of particular outcomes in accordance with the heterogeneous composition of the groups of players. Specifying norms according to the differentiating criteria at hand transforms the Schelling norm into an interaction-specific solution. We thus expect individuals’ choices to converge to a Schelling norm where mutual identification was allowed, whereas one-way identification and communication increase the spread of the distribution of choices (Hypothesis 2).

⁶ See Frank (1988) and Frey (1997) for explanations of why such preferences can be rational.

⁷ The effect has recently been studied by Jenni and Loewenstein (1997) who report that a victim becomes identifiable if a high proportion of those at risk can be saved. This dimension is kept constant in our study as the ‘victims,’ the recipients in the experiment, always comprise 100 percent.

3. Experimental design

The experiments were conducted in the winter semesters 1993–1994 and 1995–1996 with first semester economics students at the University of Zurich who had no prior knowledge of game theory or experimental economics. The subjects were recruited during their second week at the university. Therefore most students did not know each other before the experiment. Experiments were run in class⁸; participation, however, was voluntary. Students were given the chance to leave the room after we had announced that we would be running an experiment. Less than 5 percent of the prospective participants chose to opt out.⁹ In the first experimental series (1993–1994), the two games were played in three variants: (a) anonymously; (b) with silent identification; and (c) with face-to-face communication, each with different subjects. The students were assigned randomly to groups of four in the PD and pairs of two in the DG. While anonymous subjects did not know who the other group members were, identified subjects were asked to stand up and look at each other in silence. Communication meant a discussion among the group members which was not supervised by the experimenters. No binding contracts between the participants were possible as the decision for or against solidarity was taken later in private (the necessary documents were only distributed at a later point in time).

The experiment was divided into three phases: the participants were first given a written instruction and an unmarked, sealed envelope containing a decision sheet as well as a small envelope, both marked with the identification number, and for dictators in the DG, the endowment.¹⁰ Instructions were repeated orally, allowing subjects to ask questions and to control that everybody faced the same decision task. The second phase consisted of the experiment. The third and final phase consisted of debriefing the participants. The participants' actual decision was always made in isolation and anonymity was maintained. The experiments were conducted by an experimenter who did not have any contact with the students before or after the experiment and not by the participants' tutor. The subjects were identified by numbers, no names being revealed at any time. Experimenter–subject anonymity was thus guaranteed.¹¹

The PD game employed a framework previously used by Dawes et al. (1977) but reduced the group size from eight to four persons. The subjects had to choose between

⁸ Nine different classes were used. All were sub-samples of the pool of the first year economics course. While the lecture is given to the whole pool, students are divided into nine discussion groups. Classroom experiments have the advantage of not creating any self-selection problems and of increasing the credibility of the experiment. Frohlich and Oppenheimer (1997) report a substantial amount of doubt if parts of the subjects are not present during the experiment (be they in another room, another lab or hidden by some room dividing device). The subjects did not believe that the money would actually be delivered to another student. As the dictator game seems especially prone to such mistrust in the experimental set-up, we chose to run the experiment in class with all participants present. The drawback of such a set-up is that participants are more likely to interact in the future than randomly selected subjects which may affect the power of expected social sanctions.

⁹ Those ready to participate were asked to sign an agreement in which the experimental rules were detailed. Each participant received CHF7 (about \$5) for participating.

¹⁰ Instructions may be provided upon request.

¹¹ Compared to Hoffman et al. (1996), our procedures resemble their double blind 2 treatment as we took precaution that no one, including the experimenter, could ever know any subject's decision, without, however, using blank envelopes or a monitor. The importance of experimenter–subject anonymity is not corroborated by later experimental investigations for public goods games (Laury et al., 1995) and for ultimatum games (Bolton and Zwick, 1995).

Table 1
The four-person prisoner's dilemma game

Number of persons choosing X	Outcome for X (CHF)	Number of persons choosing Y	Outcome for Y (CHF)	Group outcome (CHF)
4	2.50	0	–	10.00
3	–0.50	1	9.00	7.50
2	–3.50	2	6.00	5.00
1	–6.50	3	3.00	2.50
0	–	4	0	0

two options, X and Y, to which no normative evaluation was attributed. The choice of X is cooperative in the sense of contributing to the public good; the choice of Y corresponds to a defective strategy. Table 1 indicates that the best outcome for the group as a whole is reached if all four members choose X. The game theory prediction is unequivocal: rational individuals choose Y, implying that the solidarity rate measured by the share of subjects who choose X (in percent), is zero.

The DG¹² is characterized by the interaction of two players, the dictator and the recipient. The dictator is asked to allocate a sum previously received from the experimenter between himself and the recipient, deciding unilaterally about the allocation of the money. The DG thus tests whether subjects are willing to pass some positive amount of money on to a second person even where the recipient has no sanctioning power.¹³ We formed groups of two (the dictator and the recipient) by using a random mechanism. The dictators were given CHF13 (appr. \$10).¹⁴ They could either keep this entirely for themselves, or hand some on to the recipient in whatever proportion they wanted. In order to make the experiment realistic, the dictator had to put the money which he wanted to give to the second person into an envelope so that the recipient received actual money. Envelopes were put into a box which was only emptied after everybody had deposited their envelope. Recipients could then take the envelope marked with their number.

The extent of solidarity is measured by the amount offered to the recipient relative to the endowment (in percentage terms). While splitting the pie equally is an obvious solution, it has the properties of a norm only under specific conditions. A gift randomly endowed to the subjects present puts dictators into a more favorable position than the recipients without justifying this advantage. Without any property rights assigned and any outside options available, an equal split seems fair.¹⁵ As long as pure income-maximizing is assumed, however, nothing should be passed on in the DG.

¹² Kahneman et al. (1986), Bolton (1991), Forsythe et al. (1994).

¹³ Compare the ultimatum game where the recipient may reject the share received in which case neither of the two players gets anything (for a survey, see Camerer and Thaler, 1995).

¹⁴ The money was given in pieces of 50 cents of Swiss currency.

¹⁵ Experimental evidence indicates that the dictator is normatively entitled to keep more than half for himself if the initial endowment has been earned by the dictator (see Hoffman and Spitzer, 1985 and Güth, 1994). Oberholzer-Gee and Eichenberger (1997) show how an additional, normally not preferred choice can affect fairness in dictator games.

Table 2
Solidarity rates in the PD and DG (number of groups)

Treatment condition	Prisoner's dilemma game (%)	Dictator game (%)
Anonymity	12 ($N = 43$)	26 ($N = 39$)
Mutual identification	23 ($N = 17$)	50 ($N = 28$)
Communication	78 ($N = 25$)	48 ($N = 17$)

Source: First experimental series at the University of Zurich, 1993–1994.

4. Experimental results

The experimental findings are discussed according to the hypotheses advanced.

Hypothesis 1: Increase in solidarity

Table 2 exhibits the results of our experiments for the three stages of interaction – anonymity, mutual identification and communication – and the two game variations.¹⁶ Solidarity rates indicate the average percentage share of subjects choosing X in PD and the average percentage share of CHF13 allocated to the recipients in the DG.

Hypothesis 1 is generally well borne out. In PD, identification increases solidarity to 23% compared to an anonymous setting value of 12%. The hypothesis that solidarity rates are independent of the treatment conditions, anonymity and identification, can be rejected at the 10% level ($\chi^2(1) = 3.71$, $p = 0.05$). In DG an increase from 26 to 50% is affected. The hypothesis that solidarity has the same mean and the same distribution for anonymity and identification is rejected (Wilcoxon $W = 1296.0$, $p < 0.01$; Kolmogorov–Smirnov $Z = 2.40$, $p < 0.01$). Communication, compared to identification, further increases the solidarity rate to 78% in the PD game ($\chi^2(1) = 51.26$, $p < 0.01$)¹⁷ while it exhibits no additional effect in the DG.

Table 3 shows how many groups chose the dominant solution.¹⁸ For the PD, it presents the percentage share of groups in which all four subjects defected, and for the DG, the percentage share of dictators who kept all the money for themselves is shown.

In the anonymous PD, in 27 out of 43 groups all four participants defected while seven out of 17 groups chose this option with identification. A χ^2 -test cannot reject the probability that the share of groups who chose the dominant strategy is independent of the treatment conditions, anonymity and mutual identification ($\chi^2(1) = 2.32$, $p = 0.13$).

¹⁶ Sample sizes vary because the experiments were undertaken during the regular instruction time with the students who happened to be present.

¹⁷ These results are corroborated by Sally's meta-analysis comparing over 100 studies in the principal (English language) journals of political science, social psychology, economics and sociology. It strongly supports the cooperation-increasing effect of communication. One hundred and thirty different treatment conditions are included, one-third of which involve communication among the participants. In a multiple analysis, the author finds that the presence of discussion in one-shot games is highly significant, and on average raises the cooperation rate by more than 45 percentage points. In repeated games, subjects who may talk to each other before each round are 40 percentage points more likely to contribute to the public good than they would in an anonymous setting. For the relevance of communication in experimental and real life public good-type (common pool resource) settings, see Ostrom et al. (1994).

¹⁸ For the cumulative choice distributions, see Figs. 1 and 2 in the Appendix A.

Table 3
 Choices of dominant strategy in the PD and DG (number of groups)

Treatment condition	Prisoner's dilemma game (%)	Dictator game (%)
Anonymity	63 ($N = 43$)	28 ($N = 39$)
Mutual identification	41 ($N = 17$)	0 ($N = 28$)
Communication	4 ($N = 25$)	6 ($N = 17$)

Source: First experimental series at the University of Zurich, 1993–1994.

When subjects can talk to each other, there remains one group in which everybody defected. The probability that the share of groups who chose defection is independent of the treatment conditions, anonymity and communication ($\chi^2(1) = 22.56, p < 0.01$), and identification and communication ($\chi^2(1) = 9.07, p < 0.01$) is rejected. In the DG, 11 out of 39 anonymous dictators did not offer any money to their recipient, nobody chose the Nash equilibrium with identification (Fisher's Exact test, $p < 0.01$) and just one dictator walked away with all the money after having talked to the recipient (Fisher's Exact test, $p < 0.01$).

To our knowledge no study has tested for a pure identification effect. In his survey on bargaining games, Roth also stresses this missing link in the logical chain between anonymous silence and identified talk. He provides some support for the 'identification-alone' hypothesis when distinguishing between anonymity, social (irrelevant) communication, and unrestricted communication. Using an ultimatum game he points out that no difference in rejection frequencies could be observed between the social and the unrestricted communication settings. Others stress the additional power of face-to-face relationships for PD games (Sell and Wilson, 1991), for ultimatum games (Roth and Murnighan, 1982) and for DG (Forsythe et al., 1991) when comparing anonymous bargaining, bargaining by exchange of written information or by computer communication (no identification) and face-to-face bargaining (with identification).

Identification suffices to substantially increase solidarity in the non-strategic two-person DG.¹⁹ In order to discriminate between external norm enforcement and the identifiable victim effect, we checked for one-way identification. As the DG seems to be most sensitive to the degree of anonymity with respect to other persons, we used this game for further investigation. In this new DG, which we ran during the winter semester in 1995–1996 under the same conditions as the first series, the dictators knew who their potential recipients were, but not vice versa. Identified recipients had a number in their hands by which dictators could identify them. While in one session dictators were simply allowed to visually identify their respective recipients, in the other session they also received some information about their counterparts. Recipients were asked to show their numbers and to tell the audience their names, where they came from, what major they planned to choose and what their hobbies were. The results are presented in Table 4.

¹⁹ We agree with an anonymous referee who has suggested that the stronger effect of mutual identification in the DG than in the PD game is not only due to the difference in the strategic nature of the two games but also to the former being a two-person and the latter a four-person game. While mutual identification allows exact recognition of who the dictator is and what action he took, this exact recognition is no longer necessarily present in the PD game.

Table 4
Solidarity rates and choices of dominant strategy in the one-way identification DG (number of pairs)

Treatment condition	Solidarity rate (%)	Percent choosing dominant strategy (%)
Anonymity	26 ($N = 39$)	28
One-way identification	35 ($N = 18$)	11
One-way identification with information	52 ($N = 25$)	0

Source: Second experimental series at the University of Zurich, 1995–1996.

An analysis of variance (Kruskal–Wallis test) suggests that solidarity rates are not the same for all three treatment conditions ($\chi^2(2) = 16.69$, $p < 0.01$). Even without the potential for social sanctions we observe a significant increase in solidarity as soon as dictators are given the chance to learn more about who the other person is. Knowing more about a recipient significantly increases the dictators' solidarity from 26% to 52% ($W = 1087.50$, $p < 0.01$; $Z = 1.52$, $p = 0.02$). Accordingly, the share of dictators who choose the dominant strategy and do not offer anything decreases from 28% to 0% (Fisher's Exact test, $p < 0.01$). However, the hypothesis that solidarity has the same mean and the same distribution for anonymity and pure one-way identification cannot be rejected ($W = 604.50$, $p = 0.15$; $Z = 0.87$, $p = 0.44$). While anonymity leads 11 out of 39 dictators to take all the money, two out of 18 dictators choose this strategy with one-way identification. No significant difference can be observed (Fisher's Exact test, $p = 0.16$). Comparing one-way identification with and without information reveals a significant difference between the two means and the two distributions, though only at the 10 percent level for the Kolmogorov–Smirnov distribution test ($W = 304.5$, $p = 0.02$, $Z = 1.29$, $p = 0.07$). With information, the share of the dictators who kept all the money for themselves drops to 0% which, however, is not significantly different from 11% (Fisher's Exact test, $p = 0.17$).

The results for the two one-sided visual identification treatments support Schelling's (1968) claim that “the more we know, the more we care.” The mean of 52% in the information treatment cannot be interpreted as an approximation to the Schelling norm. The distributions for one-way identification reveal that knowing who the other person is increases the generosity of dictators to the extent that some dictators give more than half. It is not the social norm of equity which determines this behavior, but interaction-specific variables. Dictators give more than the norm requires to recipients they like and less to individuals they dislike.²⁰

Hypothesis 2: Convergence

Table 5 shows that mutual identification creates a sharp convergence to the Schelling norm in the DG, while communication and one-way identification lead to interaction-specific solutions diverging from the Schelling norm.

²⁰ In the Jenny and Loewenstein study, the additional information provided about the victim had surprisingly little effect on individuals' concerns for others. Eckel and Grossman (1996a) who compared an anonymous student with an established charity as recipients in a DG, observe an increase in donations from 10.6 percent to 31.0 percent when the recipient is the ‘deserving’ Red Cross.

Table 5
 Choices of equal division in the dictator games

Treatment condition	Percent choosing equal division	Standard deviation
Anonymity	25	2.75
Mutual identification	71	2.43
Communication	24	3.71
One-way identification	39	2.23
One-way identification with information	16	3.15

Source: First and second experimental series at the University of Zurich, 1993–1994 and 1995–1996.

The share of dictators choosing the Schelling norm of equal division is 71 percent if subjects identify one another, communication makes the decision less homogeneous, with only 24 percent choosing equal division.²¹ A χ^2 -test rejects the probability that the share of subjects who choose equal division is independent of the treatment conditions, communication and mutual identification ($\chi^2(1) = 9.75$, $p < 0.01$). Variances of the two choice distributions significantly differ from each other (F -test, $p < 0.01$). Likewise, the null hypothesis of equal variation can be rejected for mutual identification and one-way identification with information (F -test, $p < 0.01$). Mutual identification results in a higher convergence to the Schelling norm of equal division compared to one-way identification with information ($\chi^2(1) = 16.38$, $p < 0.01$). Hypothesis 2 is supported; mutual identification induces dictators to split the pie evenly and decreases the variance of the choice distribution. Individuals deviate from the social norm of equal division if either the linguistic channel is added to silent mutual identification in which case subjects may find justifications for abandoning or ‘over-observing’ the norm, or if ex post sanctions are excluded by only allowing one-way identification.²²

What goes on when people receive some information about a potential recipient of their generosity? Reciprocity seems a powerful motivator of solidarity. However, it is hard to imagine that reciprocity also accounts for situations where no exchange takes place, that is, where sanctioning of deviating behavior is not possible. One-way identification with information does not induce allocators to converge to some norm but increases the value of the other’s well-being by decreasing social distance.

Sensitivity to social distance is interaction-specific. While we do not have any information on the individual characteristics of the participants, the results do not preclude that sensitivity to social distance is systematically influenced by observable variables such as gender,²³ age or race. In order to preclude such ‘confounding’ effects, it is often argued that in economic experiments, social distance should be increased as much

²¹ Similar results were found for proposers in an ultimatum game which was run under the same conditions as the DG (see Bohnet, 1997).

²² Accordingly, no significant difference between the variances of communication and one-way identification with information can be observed (F -test, $p = 0.44$).

²³ The evidence for anonymous DG is mixed. Bolton and Katok (1995) find no difference between the behavior of men and women while Eckel and Grossman (1996b) report that women donate approximately twice as much as men dictators to an anonymous partner. The studies, however, did not investigate the relationship between gender and social distance.

as possible. If interaction between the participants is required, only “computer-transmitted, experimenter-censored text” ought to be allowed (Hey, 1991, p. 176). Our findings, however, suggest that putting individuals into an abstract environment in the laboratory may produce ‘confounding’ effects as well. Anonymity and social isolation lead to heavy discounting of another person’s well-being.

5. Conclusions

Solidarity is not an immutable taste but crucially depends on the social context. Our results indicate that solidarity increases with decreasing social distance. Mutual identification affects cooperation in the PD and fairness in the DG (Hypothesis 1). Thus, relaxing anonymity while still forbidding dialogue suffices to induce individuals to change their behavior. Previous research has, in contrast, focused on communication as the decisive factor in raising solidarity.

While two-way identification includes the potential for future social sanctions, subjects are prepared to give away substantial amounts of money in the DG even without the threat of punishment. One-way identification where potential benefactors receive some information on who their counterpart is induces solidarity by transforming an abstract, anonymous stranger into a visible, specified individual. The socially closer recipients are to potential benefactors, the more the latter value the former’s well-being. It could be argued that the other’s well-being is discounted depending on social distance as future benefits are discounted depending on temporal distance. This behavior cannot be attributed to reciprocity but is the result of increased closeness, that is, of the ‘identifiable victim effect.’ Communication enables the subjects to consider a broad set of individually relevant issues and makes convergence to the obvious normative solution less likely (Hypothesis 2). On the other hand, mutual identification leads to a convergence to general norms of solidarity. Deviations from the ‘Schelling norm’ seem arbitrary as long as they cannot be justified by arguments. It is thus not talk but the ‘Sound of Silence’ which makes people observe norms.

In other disciplines such as law, the potential influence of identification on judgments has long been recognized. Judges are asked to withdraw if social closeness inhibits them from making a neutral judgment. Attorneys seem to be well aware of how social distance (or the lack of) can influence a juror’s judgment. During the pre-trial selection process, defense attorneys try to have those jurors dismissed who feel sympathy for the victim, but seek to keep the ones who are socially close to the defendant, be it by gender, race, social class or some other common experience. Plaintiffs’ lawyers, of course, try to achieve the opposite.

Law is much more concerned with social distance than economics because it primarily deals with individual decision making rather than with aggregate behavior. It has been pointed out that much of the seemingly anomalous behavior observed in individual decision making cancels out in a competitive environment where substantive amounts of money are at stake (Harrison, 1992). As experimental stakes typically are rather small, we cannot provide empirical evidence that the identification effect is a general phenomenon at this point. However, even if stakes matter, they are of less importance in environments

where the monetary opportunity cost of a ‘wrong’ decision is comparatively small for the decision maker. The jury provides a good example. Jurors’ income does not depend on the jurors’ verdict. The decision of a single juror is nearly irrelevant for himself but the

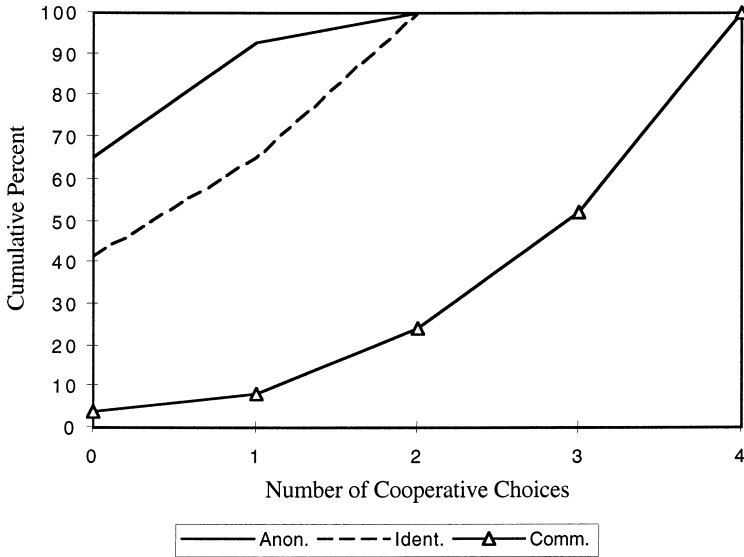


Fig. 1. Cumulative distributions of choices in PD games.

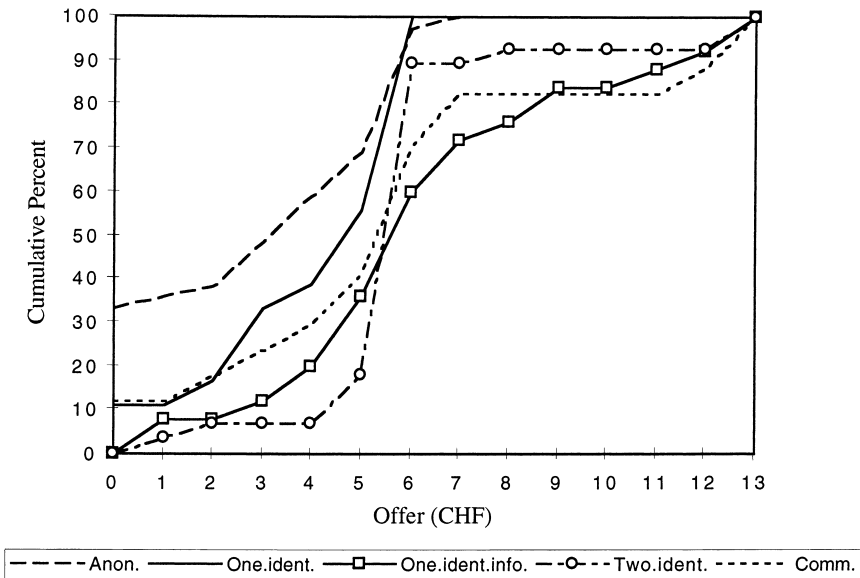


Fig. 2. Cumulative distributions of offers in the DG.

collective outcome, the jury's verdict, is highly relevant for the litigants. We thus expect identification to exhibit a strong influence on jurors' decisions.

The importance of identification has been demonstrated for PD and DG. For the purpose of our study it has proved useful to interpret cooperative and fair behavior as solidarity. Solidarity is not an adopted rule of behavior regardless of the situation at hand. Rather, it is context-dependent. We have focused on the context of identified silence.

Acknowledgements

We are grateful to Reiner Eichenberger, Felix Oberholzer-Gee, Angel Serna and Isabelle Vautravers for their help in conducting the experiments and their most valuable suggestions. We thank Gary Bolton, Monika Büttler, Ernst Fehr, Simon Gächter, Roy Gardner, Werner Güth, Elena Katok, Jack Knetsch, Alan V. Levy, David Longworth, Elinor Ostrom, Arthur Schramm, James Walker and two anonymous referees for their very helpful comments. Financial support of Phare P96-7448-0 and COST A7 is gratefully acknowledged. The paper was revised while the first author was a research fellow at the Haas School of Business in Berkeley. She wishes to thank Oliver Williamson for his hospitality and intellectual feedback.

Appendix A

Fig. 1. Fig. 2.

References

- Andreoni, J., 1995. Cooperation in public-goods experiments: kindness or confusion? *American Economic Review*, September, 85(4), 891–904.
- Bohnet, I., 1997. *Kooperation und Kommunikation. Eine ökonomische Analyse individueller Entscheidungen*, Mohr/Siebeck, Tübingen.
- Bolton, G., 1991. A comparative model of bargaining: Theory and evidence. *American Economic Review* 81(5), 1096–1136.
- Bolton, G., Katok, E., 1995. An experimental test for gender differences in beneficent behavior. *Economic Letters* 48, 287–292.
- Bolton, G., Zwick, R., 1995. Anonymity versus punishment in ultimatum bargaining. *Games and Economic Behavior* 10(1), 95–121.
- Brams, S.J., Taylor, A.D., 1996. *Fair Division. From Cake-cutting to Dispute Resolution*, Cambridge University Press, Cambridge.
- Camerer, C., Thaler, R.H., 1995. Anomalies: Ultimatums, dictators and manners. *Journal of Economic Perspectives* 9(2), 209–221.
- Davis, D.D., Holt, C.A., 1993. *Experimental Economics*, Princeton University Press, Princeton, NJ.
- Dawes, R.M., McTavish, J., Shaklee, H., 1977. Behavior, communication, and assumptions about other people's behavior in a commons dilemma situation. *Journal of Personality and Social Psychology* 35(1), 1–11.
- Eckel, C.C., Grossman, P.J., 1996a. Altruism in anonymous dictator games, *Games and Economic Behavior*, 16, 181–191.
- Eckel, C.C., Grossman, P.J., 1996b. The relative price of fairness: Gender differences in a punishment game, *Journal of Economic Behavior and Organization*, 30, 143–158.

- Elster, J., 1989. Social norms and economic theory. *Journal of Economic Perspectives* 3(4), 99–117.
- Farrell, J., Rabin, M., 1996. Cheap Talk. *Journal of Economic Perspectives* 10(3), 103–118.
- Fehr, E., Kirchsteiger, G., Riedl, A., 1993. Does fairness prevent market clearing? An experimental investigation. *Quarterly Journal of Economics* 108(2), 437–459.
- Forsythe, R., Kennan, J., Sopher, B., 1991. An experimental analysis of bargaining and strikes with one-sided private information. *American Economic Review* 81(1), 253–278.
- Forsythe, R., Horowitz, J.L., Savin, N.E., Sefton, M., 1994. Fairness in simple bargaining experiments. *Games and Economic Behavior* 6(3), 347–369.
- Frank, R.H., 1988. *Passions Within Reason*, W.W. Norton, New York.
- Frey, B.S., 1997. *Not Just for the Money. An Economic Theory of Personal Motivation*, Edward Elgar, Cheltenham/Brookfield.
- Frey, B.S., Bohnet, I., 1995. Institutions affect fairness. Experimental investigations. *Journal of Institutional and Theoretical Economics* 151(2), 286–303.
- Frohlich, N., Oppenheimer, J., 1997. Testing for some problems associated with doubt in dictator game experiments. Paper presented at the Annual Meeting of the Economic Science Association, Tucson, AZ, 18–21 September.
- Güth, W., 1994. Distributive justice. A behavioral theory and empirical evidence, In: Brandstätter, Hermann Güth, W., (Eds.), *Essays on Economic Psychology*, Springer, Berlin 153–176.
- Harrison, G.W., 1992. Theory and misbehavior of first price auctions: Reply. *American Economic Review* 82, 1426–1443.
- Hey, J.D., 1991. *Experiments in Economics*, Blackwell, Oxford.
- Hoffman, E., Spitzer, M.L., 1985. Entitlements, rights and fairness: An experimental examination of subjects' concepts of distributive justice. *Journal of Legal Studies* 14, 259–297.
- Hoffman, E., McCabe, K., Shachat, K., Smith, V.L., 1994. Preferences, property rights and anonymity in bargaining games. *Games and Economic Behavior* 7, 346–380.
- Hoffman, E., McCabe, K., Smith, V., 1996. Social distance and other-regarding behavior in dictator games. *American Economic Review* 86(3), 653–660.
- Homans, G.C., 1961. *Social Behavior. Its Elementary Forms*, Harcourt Brace Jovanovich, New York.
- Isaac, R.M., Mathieu, D.R., Zajac, E.E., 1991. Institutional framing and perceptions of fairness. *Constitutional Political Economy* 3(3), 329–377.
- Jenni, K.E., Loewenstein, G., 1997. Explaining the Identifiable Victim Effect. *Journal of Risk and Uncertainty* 14(3), 235–257.
- Kahneman, D., Knetsch, J., Thaler, R., 1986. Fairness and the assumption of economics. *Journal of Business* 59(4), 285–300.
- 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.O., 1995. Public goods: A survey of experimental research, In: Kagel, J.H., Roth, A.E., (Eds.), *Handbook of Experimental Economics*, Princeton University Press, Princeton, NJ pp. 111–194.
- Nisbett, R., Ross, L., 1980. *Human Inference: Strategies and Shortcomings of Social Judgment*, Prentice-Hall, Englewood Cliffs, NJ.
- Oberholzer-Gee, F., Eichenberger, R., 1997. Fairness! What fairness? Focusing effects in dictator game experiments, Working paper, University of Zurich.
- Ostrom, E., Gardner, R., Walker, J., 1994. *Rules, Games, and Common-pool Resources*, University of Michigan Press, Ann Arbor.
- Rabin, M., 1993. Incorporating fairness into game theory and economics. *American Economic Review* 83(5), 1281–1302.
- Roth, A.E., 1995. Bargaining experiments, In: Kagel, J.H., Roth, A.E., (Eds.), *Handbook of Experimental Economics* Princeton University Press, Princeton, pp. 253–348.
- Roth, A.E., Murnighan, J.K., 1982. The role of information in bargaining: An experimental study. *Econometrica* 50(5), 1123–1142.
- Sally, D., 1995. Conversation and cooperation in social dilemmas. *Rationality and Society* 7(1), 58–92.
- Schelling, T.C., 1960. *The Strategy of Conflict*, Oxford University Press, Oxford.

- Schelling, T.C., 1968. The life you save may be your own, In: Chase, S., (Ed.), *Problems in Public Expenditure Analysis*, Washington, pp. 127–162.
- Schotter, A., Weiss, A., Zapater, I., 1996. Fairness and survival in ultimatum and dictatorship games. *Journal of Economic Behavior and Organization* 31, 37–56.
- Sell, J., Wilson, R., 1991. Levels of information and contributions to public goods. *Social Forces* 70(1), 107–124.
- Weinstein, M.C., Quinn, R.J., 1983. Psychological considerations in valuing health risk reductions. *Natural Resources Journal* 23, 659–673.
- Young, H.P., 1994. *Equity – In Theory and Practice*, Princeton University Press, Princeton, NJ.