
4 Cooperation and fairness in experiments: relevance for democracy

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I Public goods and redistribution

Political interventions in private markets are commonly legitimized by the existence of public goods and redistribution problems. While the extent of such interventions is highly debated in public choice, alternatives to the involvement of the state are hardly considered. We argue that an important alternative is communication. Communication opportunities are a crucial institutional feature which enables individuals to clarify expectations, to coordinate actions and thereby to provide public goods and redistribution.

Communication, whether verbal or non-verbal, plays a small role in economics as it is not needed in perfectly competitive markets where actions of individuals and firms take place in an anonymous, frictionless, zero-transaction cost setting. Also, in public choice theory communication is no issue: in Mueller's (1989) authoritative account of the state of public choice, for instance, 'communication', 'talk' or 'speech' are not even mentioned, let alone treated as a determinant of politico-economic behaviour. While the neglect of communication is warranted as long as one sticks to perfectly competitive markets,¹ even a casual observation of reality immediately suggests that this does not hold beyond that ideal setting. Imperfect markets are characterized by intensive negotiations between buyers and sellers, and talk is also essential in non-market decision-making systems. Following Dahl and Lindblom's (1953) useful classification, communication is of obvious importance in a polyarchy; it suffices to think of Athenian democracy and its rhetoric as well as the endless talking of politicians in modern democracies. The bargaining system consists of little else than talking, and speech also plays a specific role in hierarchical systems.

This circumstantial evidence further suggests that communication is important and has systematic effects on the provision of public goods and on distributive justice. Experiments which have recently been accepted as a useful way to conduct social science research² help to discover these systematics. We argue that the effect of communication depends on two crucial variables: the extent of communication and the decision problem in question. Three variations of communication are distinguished: no communication (anonymity), non-verbal communication (identification) and verbal communication (talk). They are combined with the two politico-economic problems of providing public goods,

represented by a *prisoner's dilemma* game, and of achieving a just redistribution, modelled by *fairness* games, in particular the *dictator* and the *ultimatum* game.

We are able to show that identification and even more so, talk (which presumes identification), systematically and significantly increase cooperation in a prisoner's dilemma situation, that is, under identifiable conditions 'free riding' is rare. In fairness games, on the other hand, mere identification explains all the change in individual behaviour; no additional effect can be observed when introducing talk. Communication seems to have different effects in differing decision situations. Taking communication seriously clearly indicates a departure from (orthodox) rational choice theory, even though it is well compatible with it. Especially a public choice school fostering a process-oriented perspective profits from including communication as one mechanism to be institutionalized before the actual decision is taken. Institutionalized communication opportunities may be provided by various democratic rules.

We argue that a direct democracy is best able to induce citizens to talk to one another because initiatives and referenda create incentives to become involved. In a representative setting, on the other hand, it is only the politicians and the well-organized groups who are part of the political discourse, while the taxpayers are relegated to silence. Citizens can only express their deviating preferences by informal protests, which are difficult to organize and make politically relevant, or wait until election time, when they will still find it difficult to express specific demands on substantive issues.

Section II of this paper considers communication in a prisoner's dilemma setting and presents the experimental results. Section III does so for two fairness games, the dictator and the ultimatum game. We try to explain the results by referring to the role of communication (verbal and non-verbal) when activating social norms of cooperation and fairness and improving coordination possibilities. The results reached in our experiments are in line with other experimental outcomes, but in various respects we go further. In particular, we distinguish between the cost of social norm deviation and the opportunity cost of behaving cooperatively and fairly, and determine under what conditions identification, and under what conditions talk, increases cooperation and fairness. A novel feature of our study is the transverse comparison of the effects of these institutional variations in the prisoner's dilemma, dictator and ultimatum games.

Many, though not all, of our theoretical hypotheses and empirical results contrast with the predictions of (orthodox) game theory that pre-play communication in all forms has no effect on behaviour and outcomes (Johnson, 1993). The reader should note, however, that we do not claim that game theory is 'wrong'. Rather, we argue that under specific conditions game-theoretic analysis would do well to expand its scope by taking into account the cost of deviations from social norms and the benefit from improved predictability of the behaviour of

others and, thereby, better coordination. Section IV argues that the experimental results are relevant for the design of democracies and that they point to small-scale direct-democratic units as a requirement to achieve a meaningful discourse. Section V offers concluding remarks.

II Communication in a prisoner's dilemma

A The game structure

The prisoner's dilemma game is generally used to represent public good and common property resource problems, or more generally social dilemmas in which private rationality and collective rationality systematically conflict.³ Therewith a basic issue of democratic theory is addressed.

For the purpose of experimenting, a specific four-person game⁴ is chosen. Each of the four players may choose between *X* and *Y*. These choices have not been identified normatively with 'cooperation' and 'defection', respectively, on purpose. Table 4.1 shows that the *collective outcome* is best if all four choose *X*, and worst if all choose *Y*.

The payoff structure strongly 'punishes' individual cooperators (*X*), and gives a strong individual incentive to defect (*Y*). The decision to cooperate costs a subject SFr. 9.50 and creates benefits for all players (including the cooperators) amounting to SFr. 3. Choosing *Y* instead of *X* leads to a gain for the respective player of SFr. 6.50 and produces a cost of SFr. 3 for everybody else.

Table 4.1 The four-person prisoner's dilemma game

Number of persons choosing X	Result for X	Number of persons choosing Y	Result for Y	Collective outcome
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

Subjects were confronted with the payoffs in the form of Table 4.1. Examples for the *absolute* payoffs when choosing *X* or *Y* were presented, for example, 'if you and somebody else choose *Y* and the two other players in your group choose *X*, you and the other chooser of *Y* receive SFr. 6 each while the two choosers of *X* each pay SFr. 3.50'. However, no normative expressions such as, for example, 'fine' (Dawes, McTavish and Shaklee, 1977) were used. In a *one-shot* situation — and only these are considered in this paper — a rational

(egoistic) player chooses Y; as may be seen from Table 4.2 this strategy is dominant. Game theory thus predicts that nobody will cooperate (no one chooses X) and that the worst collective outcome results.

Table 4.2 *The dominant strategy*

		Three other players			
		3X	2X 1Y	1X 2Y	3Y
One particular player	X	2.50	-0.50	-3.50	-6.50
	Y	9.00	6.00	3.00	0

B. *Communication*

Formal game theory predicts that communication has no effect as long as no binding contracts are made ('pre-play communication'; see extensively, Farrell, 1987; Crawford, 1990; Johnson, 1993): communication is 'cheap talk'. We start with the presumption that *communication matters* under specific circumstances, even if there are no binding contracts. Communication has two effects on players' behaviour:

1. The *social norm* to cooperate is activated and strengthened by communication. Non-cooperators face rising marginal cost of deviating from the social norm due to the social sanctions imposed by other persons and/or the bad conscience (or internalized social norms) of not following the norm. Communication shifts these costs upwards. For this effect to happen, non-verbal communication suffices; well-established social norms are activated when the players identify each other.⁵ This leads to the first hypothesis to be tested:

Hypothesis 1: Identification raises cooperation due to its norm-activating effect.

2. In a prisoner's dilemma, cooperation entails opportunity costs. A cooperating player misses the chance of making a gain at other players' cost. In our game (Tables 4.1 and 4.2), the marginal opportunity cost is constant in monetary terms (they equal 3.00), but they are increasing in terms of marginal utility lost. Communication serves to *coordinate* cooperation and therewith to include the players to act in a collectively optimal way. To achieve such coordination, verbal communication ('talk') is needed (which, in our experiment, as well as in the real democratic setting considered here, presumes identification). Two hypotheses may therefore be formulated (always compared to an anonymous setting):

Hypothesis 2: Talk raises cooperation due to improved coordination as well as to norm activation.

Hypothesis 3: Talk raises cooperation more than does simple identification.

These three hypotheses may be derived formally, assuming that the individuals involved are utility maximizers. Deviating from the social norm of cooperation involves increasing marginal cost, or, conversely, marginal utility N of cooperating C is positive but decreasing, and shifts upwards by identification I :

$$N = N(C, I); N_C > 0, N_{CC} < 0, N_{CI} > 0, \quad (1)$$

where $NC \equiv \delta N / \delta C$, $N_{CC} = \delta^2 N / \delta C^2$, and so on.

The marginal cost (K) of cooperating is positive and rising, and is shifted downwards by talk T :

$$K = K(C, T); K_C > 0, K_{CC} > 0, K_{CT} < 0. \quad (2)$$

Maximizing the net utility $U = N - K$ from cooperating yields the optimal rate of cooperation, C^* , characterized by equalizing the marginal benefits and cost of cooperating:

$$N_C = K_C \quad (3)$$

Individually optimal cooperation, C^* , is larger with identification:

$$dC^*/dI = N_{CI} / (K_{CC} - N_{CC}) > 0, \quad (4)$$

which is Hypothesis 1.

Individually optimal cooperation, C^* , is also larger with talk (as talk always presumes identification $N_{CT} > 0$ implies $N_{CI} > 0$):

$$dC^*/dT = (N_{CI} - K_{CT}) / (K_{CC} - N_{CC}) > 0, \quad (5)$$

which is Hypothesis 2.

Comparing (5) to (4) yields Hypothesis 3.

C Experiments

The experiments were conducted with 360 students at the University of Zurich in the autumn of 1993. Subjects were recruited from an undergraduate beginner's course in economics and had been at the University for just two weeks at the time of the experiments. Being a rather large University with more than 20,000

students, the test persons were in general only casually acquainted with each other, and there is a positive, but not very large, chance of having significant personal interactions with each other in the future. (Care was taken to form groups of four not closely attached persons.) The experiments were undertaken during lecture time and were not pre-announced but were, of course, voluntary; nevertheless only a very small number of persons (on average about 5 per cent) chose to opt out.

All subjects were paid an endowment of SFr. 7 when signing an agreement to participate in the experiments and to follow the experimental rules.⁶ A written explanation of the game was then distributed, and after a verbal explanation the participants could ask questions. Three different situations were constructed: a completely anonymous one where the four players of the game did not know each other; one where the four participants were identified but could not talk to each other; and one where four members of a group were identified and were given the chance to talk to each other during ten minutes (without being supervised). In all cases, *the decision to choose X or Y was taken anonymously*. The size of the payoffs was set at a level expected to give an incentive to participate seriously in the experiment.⁷

As the cost of the experiment would have been too high if the payoffs had been paid out in full, it was made clear at the beginning of each experiment that a lump sum (depending on the number of persons involved) was to be distributed. Averagely, 50 per cent of the payoffs were paid out in official Swiss currency. (It turned out that the students were quite satisfied with this procedure.)

D Empirical results and discussion

The extent of cooperation among the players was defined as the percentage share (C) of players in the group of four choosing option X ($0 \text{ per cent} \leq C \leq 100 \text{ per cent}$). The following outcomes were observed (with N indicating the number of groups of four participating):

- no-communication groups : $C = 12\%$ ($N = 43$);
- identification groups : $C = 23\%$ ($N = 16$);
- talkgroups : $C = 78\%$ ($N = 25$).

The results support our hypotheses. In groups where the players talked to each other, cooperation is dramatically higher ($p < 0.001$; $F = 207.61$) than in the anonymous setting (Hypothesis 2). Identification, on the other hand, has only a small effect on cooperation as the difference between identification and anonymity is only significant at the 5 per cent level ($p = 0.033$; $F = 4.60$) (Hypothesis 1). Hypothesis 3 is supported as identification and talk effects significantly differ from one another ($p < 0.001$; $F = 65.71$). The predictions of game theory, however, are not borne out. Non-verbal and verbal communica-

tion are not 'cheap talk' at all in this experimental setting, but raise cooperation significantly. Indeed, when players talk to each other, cooperation is the rule rather than the exception. 'Free riding' is not a prevalent strategy under the conditions considered.

Our experimental results are in line with previous research. Dawes, McTavish and Shaklee (1977) and Dawes (1980) show in their eight-person social dilemma game that the possibility to communicate unrestrictedly for ten minutes strongly changes the outcome of the game. Contribution to the public good is significantly higher in the (relevant) communication than in the no-communication (irrelevant communication) setting: it increases from 31 per cent to 72 per cent. These results were further substantiated by later experiments with one-shot communication and decisions (for example, Orbell *et al.*, 1988 or Bornstein and Rapoport, 1988) and with repeated communication and decisions (Isaac and Walker, 1988, 1991). Interestingly, repetition in a communication setting leads to the opposite result than repetition in anonymous games: Isaac and Walker (1988) report an increase of cooperation to 90 per cent for ten or more periods.

III Communication in fairness games

One of the major aims of the experiments undertaken is to allow a crosswise comparison of the effects of communication in various social conditions, or games. In this section we focus on situations where players have to make decisions strongly affecting distributional justice or fairness.

A Game structures

The purest form of fairness game is the dictator game where one player (the allocator) receives a given sum of money, M , and may distribute either nothing, some of it, or everything to the second person (the recipient). The extent of fairness, F , is measured by the percentage share given to the recipient ($0 \text{ per cent} \leq F \leq 100 \text{ per cent}$).⁸

An earlier, and better known, fairness game is the ultimatum game where the allocator has the same options as in the dictator game, but where the recipient can either accept the division (in which case each player gets the allocated share) or reject the division (in which case neither one receives anything).⁹

The predictions of (orthodox) game theory (again for the one-shot game) are straightforward. A rational (egoistic) allocator gives nothing to the recipient in the dictator game ($F = 0$). In the ultimatum game he or she gives the smallest possible positive sum ($F = \epsilon > 0$) because a rational recipient is better off receiving a (very) small amount than not receiving anything.

B Communication

According to formal game theory, pre-play talk has no effect as long as no binding contracts can be made, that is, communication is but 'cheap talk'. In contrast,

in the view pursued here, communication may potentially be relevant in three respects:

1. Communication in non-verbal form (identification) activates and strengthens the social norm of fairness. Under the conditions of our experimental setting, no talk is necessary to establish the respective social norm. If a 'present' is given in the form of money (M) which is in no way connected to any form of *performance* or *desert* (at least compared to the non-recipients), *equal sharing* is an obvious social norm ($F = 50$ per cent). Deviation from this norm leads to increasing marginal cost in the form of social sanctions and/or a bad conscience. Thus non-verbal communication shifts these marginal costs upwards. This communication effect occurs in both fairness games. They can be formalized by a positive, but decreasing, marginal utility of fairness:

$$N = N(F, I); N_F > 0, N_{FF} < 0, N_{FI} > 0. \quad (6)$$

2. It is hypothesized that communication has *no effect* on the opportunity cost of being fair in the dictator game. Being a constant sum game, coordination is impossible. Thus the costs are:

$$K = K(F); K_F > 0, K_{FF} > 0. \quad (7)$$

3. The ultimatum game, in contrast, is a no constant sum game because the players may lose everything if they cannot find an agreement of how to split up the given sum, M . Hence, verbal communication may be hypothesized to perform a useful coordinating function, reducing the probability of rejection:

$$p = p(F, T); p_F < 0, p_T < 0, p_{FT} < 0. \quad (8)$$

The opportunity cost of being fair (instead of keeping everything) for the allocator is:

$$L = K(F) + p(F, T) \cdot K(M - F), \quad (9)$$

where the second term is the loss occurring to the allocator of not being able to keep his or her share ($M - F$) if the recipient rejects the offer. (For $p = 0$ the ultimatum game degenerates to the dictator game.)

The optimal allocation, F^* , in a fairness game is characterized by:

$$N_p = L_p, \quad (10)$$

when, in general:

$$L_F = K_F (I - P) + p_F \cdot K (M - F) \cong 0. \quad (11)$$

Talk has an equivocal effect on the marginal opportunity cost of giving:

$$L_{FT} = -K_F \cdot p_T + p_{FT} \cdot K (M - F) \cong 0, \quad (12)$$

as the first term is positive and the second negative.

The effect of communication on optimal fairness is given by:

$$dF^*/dI = N_{FF}/(K_{FF} - N_{FF}) > 0, \quad (13)$$

for the dictator game, and:

$$dF^*/dT = N_{FT} - L_{FT}/(L_{FF} - N_{pF}) \cong 0, \quad (14)$$

for the ultimatum game.

The following theoretical conclusions follow for the dictator game (always compared to an anonymous setting):

Hypothesis 4: Identification raises fairness due to its norm-activating effect.

Hypothesis 5: Talk raises fairness due to its norm-activating effect.

Hypothesis 6: Talk has no additional effect on fairness over and above identification.

For the ultimatum game we have (again compared to the anonymous setting):

Hypothesis 7: Identification raises fairness due to its norm-activating effect. (This hypothesis is equivalent to Hypothesis 4 for the dictator game.)

Hypothesis 8: Talk may increase or decrease fairness as there are countervailing effects.

As according to equation (11) the marginal loss curve, L_F , in the ultimatum game is below the corresponding cost curve, K_F , for the dictator game, it follows:

Hypothesis 9: Fairness is smaller in a dictator than in an ultimatum game under anonymous conditions.

C Experiments and discussion of the results

The experiments were undertaken with the same students as in the first set of experiments. Thus all subjects were confronted with two games: the prisoner's

dilemma and either an ultimatum or a dictator game, both types of game subject to the same treatment conditions except that in fairness games anonymous, identified and talking groups of two were formed. Within one sample students were allocated to different groups so they would never play with the same persons twice.

The sum of money, M , to be distributed by the allocator is SFr. 13¹⁰ which, though not large, is respectable.¹¹ The money was given to the allocator in chips of 0.50 pieces of game money (which corresponds to the 0.50 coin in Swiss currency). In order to make the experiment as realistic as possible, the allocator had to put the sum of money given to the other person in an envelope, so that the recipient actually received money. In the ultimatum game, the recipient only then decided whether he or she wanted to accept or reject the division.

'Fairness', F , was defined as the share of the Fr. 13 given to the recipients. The results of the experiments are:

1. Dictator game

- no-communication groups : $F = 26\%$ ($N = 39$);
- identification groups : $F = 50\%$ ($N = 28$);
- talk groups : $F = 48\%$ ($N = 17$).

These results correspond well with the theoretical hypotheses. Identification strongly increases the extent of fairness ($p < 0.001$; $F = 25.60$) (Hypothesis 4); talk has a comparable effect ($p < 0.001$; $F = 16.40$) but does not raise the extent of fairness above simple identification ($p = 0.69$; $F = 0.16$) (Hypotheses 5 and 6). The orthodox game-theoretic predictions are, on the other hand, not supported in our experimental setting. Even without communication, one-quarter of the sum received is passed on, and communication does have a marked effect.

2. Ultimatum game

- no-communication groups : $F = 53\%$ ($N = 28$);
- identification groups : $F = 50\%$ ($N = 11$);
- talk groups : $F = 51\%$ ($N = 17$).

These results only partly correspond to the theoretical hypotheses derived. Under all conditions the same amount of fairness is attained (roughly 50 per cent). No significant difference can be observed:¹² non-verbal communication does in this case not have any norm-activating effect compared to the anonymous setting (Hypothesis 7 is rejected). Verbal communication has no predictable effect as stated in Hypothesis 8. Fairness under no-communication conditions is higher in the ultimatum game (53 per cent) than in the dictator game (26 per

cent), as predicted in Hypothesis 9 ($p < 0.001$; $F = 31.60$). On the whole it seems that the recipient's possibility to reject the allocator's offer swamps the communication effect; indeed the allocators were even prepared to give on average slightly more than 50 per cent in an effort to induce the recipient to accept the division. The possibility to 'punish' the allocator has an equally strong effect on converging to the fairness norm of 50 per cent as does communication (when no such punishment exists). This result underlines that two costs of diverging from the fairness norm may be active, namely internal and external social sanctions, as well as external monetary sanctions, that is, punishment by rejection.

The major prediction of orthodox game theory is not supported for the ultimatum game either. The allocators give more than ϵ (which in our experiments would have been SFr. 0.50) to the recipients. The theory correctly predicts that more is given in the ultimatum than in the dictator game (ϵ vs 0), but the level of fairness experimentally observed differs dramatically.

Our experimental results accord well with previous research (as far as it exists). Most of all, bargaining experiments make it clear that people do not act according to the strong rationality axiom of economics, that is, the theoretically expected game outcome hardly ever occurs (as already predicted by Güth, Schmittberger and Schwarze in 1982). The modal offer appears to be a 50 per cent split, not only in ultimatum but also in dictator games. Kahneman, Knetsch and Thaler (1986a) report that allocators divided the stake of \$ 20 in 76 per cent of the cases evenly, although the recipients could not reject an offer. This tendency of allocators to split the cake evenly does not imply, however, that considerations of fairness do not respond to relative prices. Binmore, Shaked and Sutton (1985) show that outcomes are closer to the rationally expected division when it is made clear that players fully understand the structure of the game. Other variations, such as guaranteeing the anonymity of the subjects by also making sure that experimenters cannot identify how each subject behaved (Hoffman *et al.*, 1991), may lead to similar results. If 'there is no such thing as a real taste for fairness', as Güth, Huck and Ockenfels (1994) conclude in a most recent study, conditions must be searched for under which people are more likely to act as 'fairmen' or as 'gamesmen'.

The effect of communication on fairness has so far not been systematically analysed for the dictator game or the ultimatum game because experimenters feared the influence of an uncontrollable social environment (Roth, 1993). However, as bargaining in reality hardly ever occurs in an anonymous setting, these social motivations need to be studied. This paper's task is to explain why the differing effects of verbal and non-verbal communication observed in the prisoner's dilemma do not apply for fairness games: identification seems to make all the difference. Others (Radner and Schotter, 1989) report similar results when comparing anonymous bargaining, bargaining by computer communication

(no identification) and face-to-face bargaining (with identification). Face-to-face communication exerts an *additional* effect on fairness in the dictator game¹³ and on the probability of an offer being rejected by the recipient in the ultimatum game. The 'identification alone' hypothesis is further supported by the findings of Roth (1993) who distinguishes between anonymity, social (that is, irrelevant) communication and unrestricted communication, and points out that no difference in rejection frequencies could be observed between the social and the unrestricted communication settings.

Our experimental results make it clear that communication effects differ according to the specific decision situation. Thus an analysis of communication in game theory should not only care about the possibilities of making binding contracts, but rather consider different types of communication and their roles under various institutional conditions. Identification seems to activate social norms inducing individuals to comply with these norms, and talk facilitates the coordination of behaviour.¹⁴ The relevant social norms are well defined under the conditions investigated, so that the marginal cost of deviating from them in terms of social sanctions and/or bad conscience (internalized social norms) is obvious to all participants. This is only possible if the size of the group is reasonably small. For an application to democracy it will have to be analysed how the cost of deviating from social norms is affected by the number of persons involved. The experiments by Dawes, McTavish and Shaklee (1977) with eight persons in a prisoner's dilemma game suggest that our results do not break down when the number of players is slightly increased.¹⁵ The more people are involved, however, the costlier communication becomes, and therewith the application of social sanctions being a public good in itself.

IV Consequences for democratic theory

The most important result of our experiments is that communication is able to overcome public good and distributional problems to an unexpectedly large extent. This is surprising based on the background of the general notion in economic theory, and in particular in public economics, which suggests and predicts that people are not prepared to cooperate in order to provide a public good.¹⁶ That speech matters in social life has been emphasized, on the other hand, by many non-economists. In philosophy, for example, Habermas (1983) has for a long time taken discourse to be essential for human interaction, and has therefrom derived his normative theory of 'communicative rationality'. Recently this theory has also been applied to representative democracy (Habermas, 1992), but the ideal of 'communicative rationality', and especially the imperative of including all relevant actors, is even better met in a direct democracy (Frey, 1994).

Initiatives and referenda have two specific features inducing not only politicians but also citizens to participate in political discussions: the cost of entering a public discourse is relatively low, as information on political issues is provided

by political entrepreneurs and by the mass media free of charge (that is, without incurring additional cost to the citizens); and the benefit of participating seems to consist of clarifying one's own position relative to other's opinions (Hirschman, 1989). Discussion thereby fulfils a similar role as was attributed to the market – it serves as a mechanism of discovery (Hayek, 1978). By talking to one another, people discover the means of fulfilling their preferences. These means may consist of alternatives previously not considered, for example, gains from coordination, or may activate norms of cooperation and fairness not being relevant in isolation. As the experimental findings demonstrate, these norms influence the choice made even when the actual decision is taken independently and under the shelter of anonymity.

The Swiss experience with direct democracy shows that people indeed have a demand for discussion before casting a vote, and that this demand varies according to the importance of the issue in question. Some referenda motivate intensive and far-reaching discussions which lead to a high rate of vote participation. The proposal to join the European Economic Area, for example, witnessed a participation rate of 79 per cent, while the average between 1985 and 1992 was only 42 per cent. Other referenda which are considered of little importance by voters engender little discussion and low participation rates (down to 25 per cent). This variability in the intensity of discussion and participation overrides the much studied 'paradox of voting' (Tullock, 1967).

We are aware that even though communication may be induced by a direct-democratic setting, the results found in the laboratory may not be achieved in real life. The size of the decision-making unit is of considerable importance. Switzerland is a comparatively small-scale, fiscally very decentralized democracy where sub-federal units (cantonal and communal) play an important role. Of course, not even in the tiniest units are all citizens able to talk to each one of the relevant other participants in a certain decision. We hypothesize, nevertheless, that the probability of contributing to a public good or to a just distribution increases the larger the share of individuals who are able to talk to one another or at least have some form of personalized contact.¹⁷ An extreme form of this face-to-face interaction may be found in those Swiss sub-federal units where the actual voting takes place in public as well (*Landsgemeinden*). From this perspective, 'neighbourhood communes' (for example, Tullock, 1994) and similar closely knit jurisdictions attain increased attractiveness.

Although the size of 'the jurisdiction' in our experiments significantly differs from the size of Swiss sub-federal units, empirical evidence for Switzerland is in line with our experimental findings. The extent of redistribution in Switzerland is higher than in representative democracies such as the Federal Republic of Germany, the United States or Canada, using the same set of assumptions about the incidence of taxes and public expenditure (Kirchgässner and Pommerehne, 1993). Interestingly, this difference is not so much promoted by

the size of the redistributed cake, but rather by rules with a specific redistributive impact. The Swiss tax system is characterized by a strong emphasis on progressive income and wealth taxes decided upon on the cantonal and communal level.

Further empirical evidence for Switzerland may be interpreted as support for our hypothesis that norms are activated by communication. It has been shown that the more direct democratic a Swiss canton is, thereby inducing communication, the higher is the tax moral of the citizens. Compared to the mean of all cantons, there are almost eight percentage points (that is, about Sfr. 1 600 per taxpayer per year) less income concealed in cantons with a high degree of direct political influence. In contrast, in cantons with few direct political participation possibilities, the mean income undeclared exceeds the mean of all cantons by roughly Sfr. 1 500 (Pommerehne and Frey, 1992).

As our experiments have shown, norm activation by communication seems to be especially relevant for distributional aspects. What exactly is to be considered as a distributional question, however, is not obvious. Survey data make clear that many material problems which economists label as purely allocational are interpreted by the population in terms of distributional fairness. As a consequence, the use of the price system is often not considered to be acceptable (Kahneman, Knetsch and Thaler, 1986b; Frey and Pommerehne, 1993). Even though these studies have not explicitly tested for the relevance of communication for solving fairness problems, it might be hypothesized that the more problems are perceived as distributional the more important communication becomes. An empirical application of this insight can be found in the increasing importance attributed to problem-solving by mediation. Especially environmental problems, as, for example, siting decisions, are reported to be successfully solved by explicitly introducing communication among the various parties involved (Dryzek, 1990; Renn, 1992).

The success of mediation in environmental disputes further enlightens an effect of communication which has long been considered by communication theorists (Burgoon, Hunsaker and Dawson, 1994) but which is puzzling to economists. How can individuals systematically stick to an agreement even though no binding contracts were made? By including the people not only in the actual decision-making but also in the 'decision production' beforehand, where alternatives are discovered and defined, communication seems to enhance people's willingness to accept a decision once taken. Tests for the effect of group discussion report that group members are more committed to the group task and to the implementation of some negotiated decision when they have been directly involved in analysing problems and selecting solutions through discussion (Burgoon, Hunsaker and Dawson, 1994). Thus voters in a direct democracy should feel more responsible for whatever the result of a referendum may be because the discussion process made them part of the decision. The relatively high tax

compliance observed in direct-democratic cantons in Switzerland may serve as an indicator supporting this hypothesis.

V Concluding remarks

This paper argues that communication allows for the solving of social dilemmas: it induces people to choose a cooperative strategy when confronted with a public good-type setting and helps to overcome redistribution problems as fairness becomes an important attribute of individuals' behaviour. Nevertheless, communication, whether verbal or non-verbal, plays a small role in public choice or in the design of democracies. Experimental evidence, on the other hand, strongly supports the hypothesis that individuals are able to overcome public good and redistribution problems without external intervention if only they may communicate with one another. Non-verbal communication, that is, pure identification, suffices to induce allocators to choose an even distribution in a dictator game. In prisoner's dilemmas a cooperative solution is much more likely to occur if subjects are allowed actually to talk to one another: cooperation rises from 12 per cent in an anonymous setting ($N = 43$) to 78 per cent when subjects are allowed to talk to each other ($N = 25$).

These outcomes are at variance with traditional economics (including game theory) which do not account for the effect of communication. Talking without making binding contracts is labelled 'cheap talk'. We interpret our results as follows. Identification activates existing social norms with respect to an individual's duty to cooperate and to behave fairly. Discussion has an additional effect because talking to one another makes others' behaviour more predictable and facilitates coordination on collectively beneficial moves. We conclude that institutions providing communication opportunities should be supported in democracies, as they allow social dilemmas to be solved in a non-bureaucratic, non-hierarchical way. Switzerland serves as an example of how an intensive, focused and well-informed discussion is induced by the direct-democratic devices of referenda and initiatives.

Notes

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1. Though not quite. The auctioneer in a Walrasian economy uses speech in order to reach the equilibrium price.
2. Frohlich and Oppenheimer (1992) 'conclude that the experimental laboratory provides a method for making cumulative progress in ethics' (p. 1). For pertinent examples in economics see, for example, Plott (1991) or Isaac and Walker (1991); in political science, for example, Ostrom, Walker and Gardner (1992) and the collection of articles in Kinder and Palfrey (1993). Surveys on experiments are provided by McKelvey and Ordeshook (1990), Ledyard (1993) and Roth (1988, 1993).
3. There exists an enormous literature on PD games, see the most recent survey by Ledyard (1993).

4. It corresponds to the experiment designed by Dawes, McTavish and Shaklee (1977) but has been reduced from eight to four players per group in order to increase the size of the sample for the different experimental variations.
5. For a similar argument see Calvert (1993).
6. This treatment was chosen as students could not be forced to pay for a maximal loss of SFr. 6.50 and as we were not convinced by the Dawes McTavish and Shaklee (1977) solution with recruiting friendship groups.
7. The maximum individual gain of SFr. 9 corresponds to two simple meals in the student cafeteria.
8. Similar experiments were conducted by Kahneman, Knetsch and Thaler (1986a, b) who, however, restricted the allocators' choice set to only two possibilities: the allocators had to divide \$ 20 between themselves and a second person and could either keep \$ 18 for themselves, thereby giving \$ 2 to the other person, or divide the amount equally, that is, \$ 10 each. More complicated versions of these reward allocation experiments were run by Hoffman and Spitzer (1985), while Kravitz and Gunto (1992) explicitly tested for the existence of a 'taste for fairness' in ultimatum games.
9. This game is due to Güth, Schmittberger and Schwarze (1982) where allocators had to divide from DM 4 to DM 10. Variations were tested by Binmore, Shaked and Sutton (1985, 1988) who reported results close to the rationally expected division. For surveys see Thaler (1988) or Güth and Tietz (1990).
10. It corresponds to about three meals in the student cafeteria.
11. The effect of varying the size of M is an open question (Thaler, 1988). We tend to agree with Rabin's (1993) 'stylized fact C' that individuals would be less prepared to sacrifice a large amount of money to maintain fairness than this would be with small amounts.
12. For the comparisons of the effects of anonymity and identification: $p = 0.40$; $F = 0.71$; of anonymity and talk: $p = 0.59$; $F = 0.30$; of identification and talk: $p = 0.81$; $F = 0.06$.
13. For the dictator game see also Forsythe, Kennan and Sopher (1991).
14. Work in the direction of taking fairness notions explicitly into account is underway; for a recent attempt see Rabin (1993).
15. Experimental evidence provides no answer as to whether contributions increase or decrease with group size. Isaac, Walker and Williams (1990) found no effect from varying numbers.
16. Samuelson (1954); Musgrave and Musgrave (1989).
17. They are socially embedded; see Granovetter (1985).

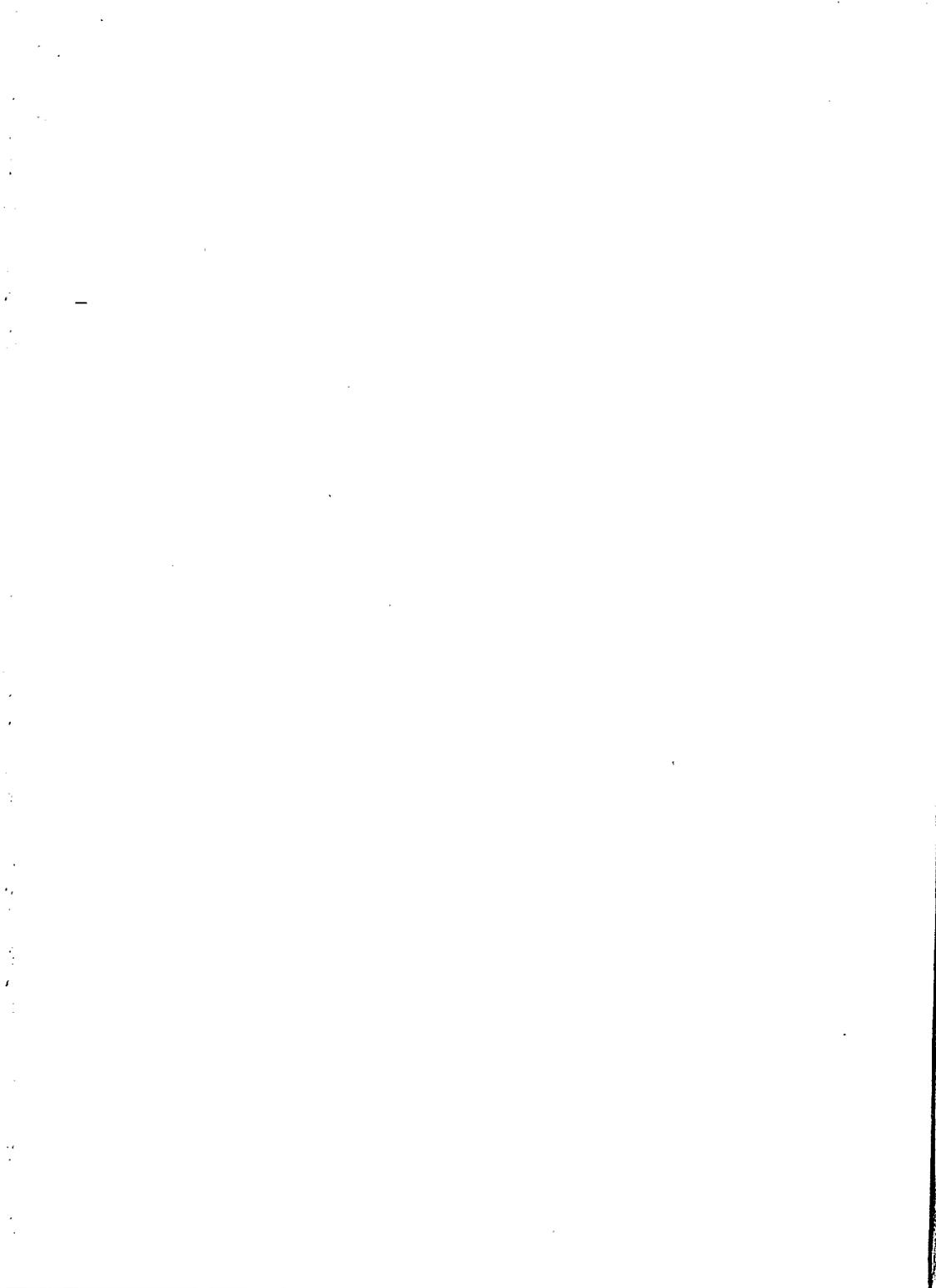
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Contents

<i>List of figures</i>	vii
<i>List of tables</i>	viii
<i>List of contributors</i>	ix
<i>Introduction</i>	x
José Casas Pardo and Friedrich Schneider	
PART I FOUNDATIONS OF PUBLIC CHOICE THEORY	
1 Foundational concerns: a criticism of public choice theory	3
<i>James M. Buchanan</i>	
2 Welfare economics and two approaches to rights	21
<i>Amartya K. Sen</i>	
PART II SCOPE AND METHOD OF PUBLIC CHOICE THEORY	
3 Widening public choice	43
<i>Vani K. Borooah</i>	
4 Cooperation and fairness in experiments: relevance for democracy	51
<i>Bruno S. Frey and Iris Bohnet</i>	
5 Culture and efficiency: economic effects of religion, nationalism and ideology	69
<i>Ulrich Blum and Leonard Dudley</i>	
PART III CONSTITUTIONAL ECONOMICS	
6 The constitution-making process	93
<i>Jon Elster</i>	
7 Does ethical proceduralism underlie James M. Buchanan's constitutional contractualism?	115
<i>José Casas Pardo and Jesús Conill Sancho</i>	
8 Institutional design and the homo economicus	129
<i>Peter Lewisch</i>	

vi *Current issues in public choice*

PART IV PUBLIC CHOICE AND GAME THEORY

- 9 Development of game theory and of public choice: an interaction 145
Francesco Forte

PART V RENT-SEEKING

- 10 Rent-seeking and the law 179
Gordon Tullock
- 11 Congressional influence over decision-making at the ITC 189
Charles K. Rowley and Willem Thorbecke

PART VI CONSTITUTIONAL ECONOMICS AND THE
EUROPEAN UNION

- 12 The design of a minimal European Federal Union: some ideas
using the public choice approach 203
Friedrich Schneider

PART VII PUBLIC CHOICE AND PUBLIC FINANCE

- 13 The socialization of commodities: a revisionist view 223
Geoffrey Brennan

PART VIII THEORY OF SOCIETAL EVOLUTION

- 14 Moral norms and rationality within populations: an
evolutionary theory 237
Ulrich Witt

- Index* 257

