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ABSTRACT

On the Nature of Fair Behaviour*

This Paper shows that identical offers in an ultimatum game generate systematically different rejection rates depending on the other offers that are available to the proposer. This result casts doubt on the consequentialist practice in economics of defining the utility of an action solely in terms of the consequences of the action irrespective of the set of alternatives. It means, in particular, that negatively reciprocal behaviour cannot be fully captured by equity models that are exclusively based on preferences over the distribution of material pay-offs. Models that take into account players' fairness intentions and distributional preferences are consistent with our data while models that focus exclusively on intentions or on the distribution of material pay-offs are not.

JEL Classification: C78 and D63
Keywords: fairness, intentions and models of fairness

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I. INTRODUCTION

There is by now considerable evidence that fairness considerations affect economic behavior in many important areas. In bilateral bargaining situations anonymously interacting agents frequently agree on rather egalitarian outcomes although the standard model with purely selfish preferences predicts rather unequal outcomes (Güth, Schmittberger and Schwarze 1982, Roth 1995, Camerer and Thaler 1995). In competitive experimental labor markets with incomplete contracts, fairness considerations give rise to efficiency wage effects that generate stable deviations from the perfectly competitive outcome (Fehr and Falk 1999). In several questionnaire studies (e.g. Bewley 1999, Campbell and Kamlani 1997) personal managers indicate that despite an excess supply of labor, firms are unwilling to cut wages because they fear that pay cuts are perceived as unfair and hostile by the workers and will, hence, destroy work morale. In principal-agent relationships reciprocally fair behavior causes a considerable increase in the set of enforceable contracts and, hence, large efficiency gains (Fehr, Gächter and Kirchsteiger 1997). To examine the forces that affect the perceptions of fairness and the determinants of fair behavior is, thus, not just of philosophical or academic interest.

A common feature of fair behavior in the above cited situations is, that in response to an act of party A that is favorable for party B, B is willing to take costly actions to return at least part of the favor (positive reciprocity), and in response to an act that is perceived as harmful by B, B is willing to take costly actions to reduce A's material payoff (negative reciprocity). This suggests that reciprocal behavior is an important component of fairness-driven behavior. Reciprocally fair behavior has been shown to prevail in one-shot situations and under rather high stake levels (Berg, Dickhaut and McCabe 1995, Roth, Prasnikar, Okuno-Fujiwara, and Zamir 1991, Cameron 1995).

In this paper, we show that identical offers in an ultimatum game trigger vastly different rejection rates depending on the other offers available to the proposer. In particular, a *given* offer with an unequal distribution of material payoffs is much more likely to be rejected if the proposer could have proposed a more equitable offer than if the proposer could have proposed only more unequal offers. Thus, it is not just the material payoff consequence of an offer that determines the acceptance but the set of available, yet not chosen, offers is also decisive. This result not only casts serious doubt on the consequentialist practice in standard economic theory that defines the utility of an action solely in terms of the consequences of this action. It also shows that the recently developed models of fairness by Bolton and Ockenfels (2000) and Fehr and Schmidt

(1999) are incomplete to the extent that they neglect "nonconsequentialist" reasons for reciprocally fair actions. These models assume that – in addition to their material self-interest - people also value the distributive consequences of outcomes. The impressive feature of these models is that they are capable of predicting correctly a wide variety of seemingly contradictory facts. They predict, e.g., why competitive experimental markets with complete contracts typically converge to the predictions of the "selfish model" while in bilateral bargaining situations or in markets with incomplete contracts stable deviations in the direction of more equitable outcomes are the rule. However, despite their predictive success in important areas, our results indicate that there remain legitimate doubts whether these models capture the phenomenon of reciprocal fairness in a fully satisfactory way.

A parsimonious interpretation of our results, which is also suggested by psychological research, can be given in terms of "intentions".[1] Identical actions by the proposer are – depending on the available alternatives – likely to signal different information about the intentions of the proposer. Hence, if responders do not only take into account the distributive consequences of the proposers' actions but also the fairness of the proposers' intentions, their responses to identical offers may differ. Viewed from this perspective, our results suggest that fairness models should not only take into account that many people have preferences over the distribution of payoffs but also that many people value the fairness intentions behind actions. Models like this have been suggested by Rabin (1993) and Dufwenberg and Kirchsteiger (1998). However, as we will see, the recognition that intentions are important is not sufficient to account for our evidence because distributive concerns are important as well. Ultimately, it needs a model which combines both, preferences for distributive consequences and the role of intentions. An attempt in this direction is made by Falk and Fischbacher (1999).

Before we present our experimental examination in detail, we would like to emphasize that the attribution of intentions for the evaluation of actions is not restricted to laboratory studies. We believe that it is also important in many real life situations. Take for instance the case that your neighbor caused a small damage at your car either intentionally or because of insufficient care. Most people would consider the intentionally caused damage as the more serious offence. Another important real life example that illustrates the importance of the attribution of intentions is the criminal law. It distinguishes carefully between criminal activities that are committed negligently and

[1] For a review of the psychological literature see Krebs (1970).

those committed with criminal intent. Similar distinctions are also made in the commercial law and the labor law. The punishment associated with a failure to meet obligations is, in general, dependent on judgments about the intention that caused the violation.

In the next section we describe our experimental design. Section 3 presents the results. The final section relates our findings to the literature and draws implications for theoretical modeling.

II. EXPERIMENTAL DESIGN AND PROCEDURES

To examine whether identical offers trigger different rejection rates depending on the alternatives available to the proposer, we conducted four so-called mini-ultimatum games. Each one of our 90 experimental subjects participated in all four games. The mini-ultimatum games were extremely simple and share the same structure (see Figures 1a-d). In all games the proposer *P* is asked to divide 10 points between himself and the responder *R*, who can either accept or reject the offer. Accepting the offer leads to a payoff distribution according to the proposer's offer. A rejection implies zero payoffs for both players.

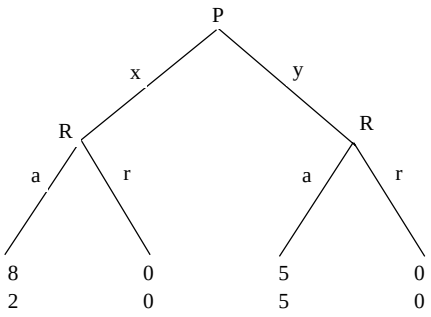
As Figures 1a-d indicate, *P* can choose between two allocations, *x* and *y*. In all four games the allocation *x* is the same while the allocation *y* (the "alternative" to *x*) differs from game to game. If *P* chooses *x* and *R* accepts this offer, *P* gets 8 points while *R* receives 2 points. In game (a) the alternative offer *y* is (5/5). This game is therefore called the **(5/5)-game**. Game (b) is called the **(2/8)-game** because the alternative offer *y* is to keep 2 points and to give 8 points to *R*. Note that in the (2/8)-game *P* has only the choice between an offer that gives *P* much more than *R* (i.e., 8/2) and an offer that gives *P* much less than *R* (i.e., 2/8).[2] In game (c) *P* has in fact no alternative at all, i.e., he is forced to propose the offer (8/2). We call it the **(8/2)-game**. Finally, in game (d) the alternative offer is (10/0), hence it is termed the **(10/0)-game**. In order to get sufficient data we employed the strategy method, i.e., responders had to specify complete strategies in the game-theoretic sense. Thus, every responder had to indicate his action at *both* decision nodes,

[2] The payoff structure of this game is similar to the so-called best-shot game which was first studied by Harrison and Hirshleifer (1989), and subsequently, by Prasnikar and Roth (1992).

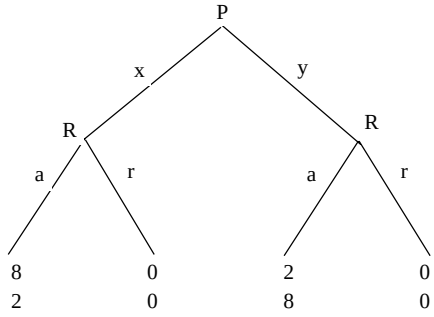
i.e., for the case of an *x*- and for the case of a *y*-offer, *without knowing what P had proposed*.[3]

At the beginning subjects were randomly assigned the *P*- or the *R*-role and they kept this role in all four games. Subjects faced the games in a varying order and in each game they played against a different anonymous opponent. They were informed about the outcome of all four games, i.e., about the choice of their opponents, only *after* they had made their decision in all games. This procedure not only avoids income effects. It also rules out that subjects' behavior is influenced by previous decisions of their opponents. After the end of the fourth game subjects received a show-up fee of CHF 10.- plus their earnings from the experiment. For each point earned they received CHF -.80 so that in all four games together CHF 32.- (about $23 at the time) were at stake. The experiment took approximately 40 minutes. It was programmed and conducted with the software z-Tree (Fischbacher 1999).

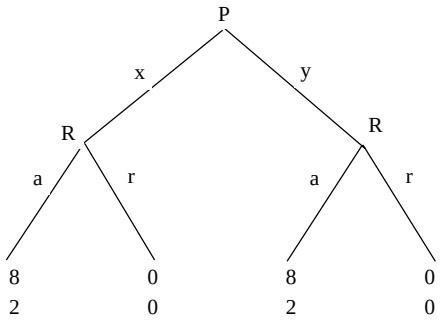
Figure 1: The mini ultimatum games



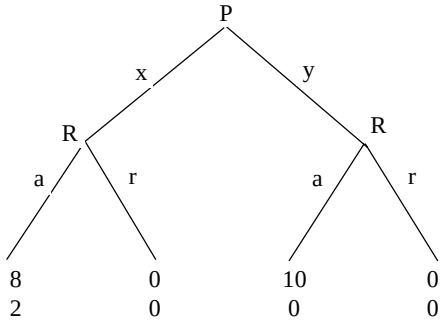
(a) (5/5)-game



(b) (2/8)-game



(c) (8/2)-game



(d) (10/0)-game

[3] In principle, it is possible that the strategy method induces different responder behavior relative to a situation where responders have to decide whether to accept a given, known, offer. However, Brandts and Charness (1998) and Cason and Mui (1998) report evidence indicating that the strategy method does not induce different behaviors.

III. PREDICTIONS AND RESULTS

Since we are mainly interested in the variations of responders' behavior across the four games we shortly present the responder-predictions of the various fairness models. The standard model with selfish preferences predicts that in all games the allocation (8/2) is never rejected. The Bolton-Ockenfels and the Fehr-Schmidt-model predict that the rejection rate of the (8/2)-offer is the same across *all* games. Since these models capture people's dislike for inequality, they are consistent with positive rejection rates. However, since they disregard that identical outcomes may be perceived as more or less fair, depending on the alternatives available to the first mover, they are not consistent with different rejection rates of the (8/2)-offer across the four games.

The purely intention-based models by Rabin (1993) and Dufwenberg and Kirchsteiger (1998) are, in principle, compatible with different rejection rates for identical offers across games. The major reason for this is, however, that both models exhibit multiple equilibria. To be more precise, for each game Rabin's model is compatible with the rejection *and* with the acceptance of the (8/2)-offer. Similarly, the Dufwenberg and Kirchsteiger model is compatible with the rejection *and* the acceptance of the (8/2)-offer in each of the first three games.[4] We would like to stress, however, that a pure intention model, which formalizes the perceived unfairness of the intention as the *only* reason for rejecting an offer, should predict that no rejections occur if proposers cannot signal any intention. This is in our view the case in the (8/2)-game. In this game the proposer has no real choice and can, therefore, signal no intention. Thus, if *only* intentions matter, we should observe no rejections in the (8/2)-game.

Intuitively, one would expect that in the (5/5)-game a proposal of (8/2) is clearly perceived as unfair because *P* could have proposed the egalitarian offer (5/5). In the (2/8)-game offering (8/2) may still be perceived as unfair but probably less so than in the (5/5)-game because the only alternative available to (8/2) gives *P* much less than *R*. In a certain sense, therefore, *P* has an excuse for not choosing (2/8) because one cannot

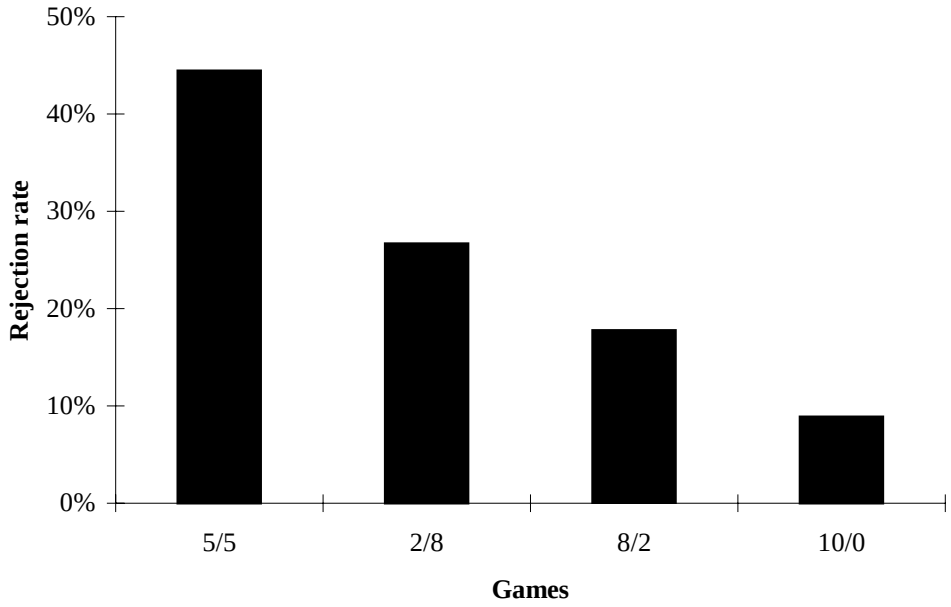
[4] In the Dufwenberg and Kirchsteiger model there exists an interval for the (unobservable) reciprocity parameter such that - if the reciprocity parameter lies in this interval - in each of the three games the rejection as well as the acceptance of the (8/2)-offer can be part of an equilibrium. If one assumes a distribution of reciprocity parameters, the model predicts that the (8/2)-offer is more frequently rejected in the (2/8)-game than in the (5/5)-game. This follows from the fact that in this model the offer (8/2) is perceived as less fair by the responders when (2/8) is the alternative than when (5/5) is the alternative. Therefore, responders reject the (8/2)-offer in the (2/8)-game already at smaller reciprocity parameters. For the (10/0)-game the model makes a precise equilibrium prediction: the (8/2)-offer is always accepted.

unambiguously infer from his unwillingness to propose an unfair offer *to himself* that he wanted to be unfair to the responder. Thus, we would expect that the rejection rate of the (8/2)-offer in the (5/5)-game is higher than in the (2/8)-game. In the (8/2)-game *P* has no choice at all so that *P*'s *behavior* cannot be judged in terms of fairness. Responders can only judge the fairness of the *outcome* (8/2) and if they exhibit sufficient aversion against inequality they will reject this distribution of money. The rejection rate in the (8/2)-game measures, therefore, subjects' pure aversion against disadvantageous inequality. Since any attribution of unfairness to P's behavior is ruled out here we expect an even lower rejection rate compared to the (2/8)-game. Finally, offering (8/2) in the (10/0)-game may even be perceived as a fair (or less unfair) action so that the rejection rate of (8/2) is likely to be the lowest in this game. The model by Falk and Fischbacher captures the essence of these intuitions. It predicts a positive rejection rate for the (8/2)-offers in all games and a higher rejection rate of the (8/2)-offer in the (5/5)-game, compared to the other games.

Figure 2 presents our main result. The bars represent the percentage of responders that reject the (8/2)-offer in the different games. The rejection rate in the (5/5)-game is highest. 44.4 percent (20 of the 45 responders) rejected the (8/2)-offer. 26.7 percent (12 subjects) rejected the (8/2)-offer in the (2/8)-game, 18 percent (8 subjects) in the (8/2)-game and 8.9 percent (4 subjects) in the (10/0)-game.[5] The non-parametric Cochran-Q-test confirms that the differences in rejection rates across the four games are significant ($p < .0001$). It also confirms that the difference between the (5/5)-game and the other three games is statistically significant ($p < .0001$). Pair-wise comparisons confirm that the rejection rate in the (5/5)-game is significantly higher than in the (2/8)-game ($p = .017$, two sided) and that the difference between the (2/8)- and the (10/0)-game is also highly significant ($p = .017$, two-sided). The difference between the (2/8)- and the (8/2)-game is, however, only (weakly) significant if one is willing to apply a one-sided test ($p = .068$, one-sided). The difference between the (8/2)- and the (10/0)-game is clearly not significant ($p = .369$, two-sided). To examine the robustness of these statistical results we also conducted the non-parametric McNemar test. This test confirms all results of the previous tests except one: the rejection rates in the (2/8)- and the (8/2)-game are now significant at the five percent level in a one-sided test ($p = .048$, one-sided).

[5] The rejection rates of the alternative offers (5/5), (2/8) and (10/0) are as follows. Nobody rejected the (5/5)-offer and only one subject rejected the (2/8)-offer. Almost 90 percent rejected the offer (10/0).

Figure 2
Rejection rate of the (8/2)-offer across games



These results indicate that pure aversion against inequitable outcomes plays a role because 18 percent of responders reject the (8/2)-offer when *P* has no choice. This evidence questions the pure intentions models. However, the results also clearly reject the implication of the Bolton-Ockenfels and the Fehr-Schmidt model that there are no differences in rejection rates across games. The rise in the rejection rate from 18 to roughly 45 percent in the (5/5)-game suggests that *intentions-driven* punishment behavior is a major factor. Thus, it seems that reciprocity is actually driven by both, outcomes and intentions.

Finally, we take a look at the proposers' behavior. Given the varying acceptance rate of the (8/2)-offer the expected return from this offer also varied across games. Table 1 shows that it was least profitable to propose (8/2) in the (5/5)-game and most profitable in the (10/0)-game. The expected payoff of the alternative offers exhibits the reverse order.[6] This indicates that – given the rejection behavior of the responders – the payoff-maximizing choice is (5/5) in the (5/5)-game, (8/2) in the (2/8)-game and also (8/2) in the (10/0)-game. The last column in Table 1 shows that the vast majority of the proposers

[6] Since in the (8/2)-game proposers had no choice but to choose (8/2) such a comparison is meaningless for the (8/2)-game.

made indeed the payoff-maximizing choice in each game.[7] While this proposer behavior is consistent with the assumption that the majority of the proposers maximized their expected monetary payoff it is also consistent with the assumption that a majority of the proposers care for fairness. This is so for two reasons. *First*, all reasonable fairness models assume that people are not only concerned with fairness, i.e., they also value their pecuniary returns. Thus, if the (8/2) offer becomes more profitable, on average, the cost of choosing the alternative offer increases, which will induce some fair-minded subjects to prefer the (8/2)-offer. *Second*, even if people were *only* concerned with fairness, it is reasonable to assume that they would choose the (5/5)-offer in the (5/5)-game and the (8/2)- in the (10/0)-game.

Table 1: Expected Payoffs for the Proposers from different Offers

Game	Expected Payoff of the (8/2)-offer	Expected Payoff of the alternative offer	Percentage of (8/2)-Proposals
(5/5)-game	4.44	5.00	31
(2/8)-game	5.87	1.96	73
(10/0)-game	7.29	1.11	100

IV. CONCLUDING REMARKS

The results of our experiment clearly show that the same action by the proposer in a mini-ultimatum game triggers very different responses depending on the alternative action available to the proposer. This suggests that responders do not only take into account the distributive consequences of the proposer's action but also the intention that is signaled by the action. Supporting evidence for this interpretation is also provided by the experiments of Blount (1995)[8], Brandts and Sola (1998), and Güth, Huck and Müller (1998). The work

[7] The Cochran-Q-test indicates that the differences in the frequencies of the (8/2)-proposal across the three games are highly significant ($p < .0001$).

[8] The results of Blount (1995) may be affected by the fact that subjects (in two of three treatments) had to make decisions as a proposer *and* as a responder before they knew their actual roles. After subjects had made their decisions in both roles, the role for which they received payments was determined randomly. In one of Blount's treatments deception was involved. Subjects believed that there were proposers although in fact the experimenters made the proposals. All subjects in this condition were "randomly" assigned to the responder role. In this treatment subjects also were not paid according to their decisions but they received a flat fee instead.

by Offerman (1999) shows that the attribution of fairness intentions is not only an important determinant of punishment behavior in Ultimatum games but that these attributions affect punishment behavior in other games as well.[9]

At a more general level our results also imply that the utility of an action does not solely depend on the material consequences of the action but is also directly affected by the other available actions. This dependence has far-reaching consequences because it means that a decision-maker can more easily enforce his preferred actions against opposition by secretly constraining the set of available actions or by pretending that certain actions are not available. At the theoretical level our results indicate that fairness models that are exclusively based on either distributional concerns or on the attribution of fairness intentions are incomplete. Therefore, the equity models of Bolton and Ockenfels as well as Fehr and Schmidt are not fully satisfactory because they have no explicit role for intentions while the pure intentions models of Rabin and Dufwenberg and Kirchsteiger are incomplete because they do not capture distributional concerns in a satisfactory way. Models which combine both driving forces (as in Falk and Fischbacher) are, therefore, most promising.

[9] Offerman finds evidence that punishment behavior is significantly driven by the attribution of intentions while helping behavior is not. This suggests an asymmetry between negatively reciprocal behavior (i.e., punishment of unfair actions) and positively reciprocal behavior (i.e., the rewarding of fair actions). While negatively reciprocal behavior is strongly affected by perceived intentions, positively reciprocal behavior seems less affected. Support for this asymmetry also comes from (Charness 1996), Bolton, Brandts and Ockenfels (1998) and Cox (2000). All these studies find no support for intentions-driven *positive* reciprocity.

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