Prior Dispositions and Actual Behavior in Dictator and Ultimatum Games

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Abstract

Individuals differ in behavior since neither their ethical constraints, their attitudes towards risk, nor their analytical talents are the same. In an experimental prephase we tried to elicit such differences by confronting participants with suitable one-person-decision problems. In the main phase they played successively the dictator game, the ultimatum game, and finally the combination of the former two, originally studied by Güth and van Damme (1998). A final personality questionnaire elicits self-evaluations concerning ethical constraints, attitude towards risk, and analytic capability in addition to more general personality traits. We mainly investigate the consistency of prior dispositions (inferred from individual decision behavior in the prephase and from the self-reports) and actual behavior (in the main phase).What is reported in this paper is a part of a more complex set of results. The focus here is on the effects of three individual difference variables (benevolence, intelligence, and reciprocity orientation) on behavior in the role of an 'active' player (the giver) and in the role of a 'passive' player (the receiver). Benevolence (as personality trait of the active player) facilitates equity considerations in his/her offers to the powerless, but not to the powerful receiver. Reciprocity orientation makes male (not female) participants in the role of powerful receivers (powerful, because, if they decline the offer, none of the players gets anything) to set higher minimal demands (higher acceptance thresholds). Intelligence had no significant effects on bargaining behavior.

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We report on an experiment that was run, with altogether 44 male and 56 female students of economics, business administration, and psychology, at three different sites: Humboldt University at Berlin, University of Linz, and University of Munich. The primary purpose is to show that bargaining behavior in dictator and ultimatum games can be understood as combined (multiplicative) effects of personality traits and characteristics of the situation.

The Structure of the Games

The players in the active role decide upon their offer to the players in the passive role. In the dictator game, the passive players have no influence at all on the outcome. They just have to accept what they get. In the 2-person-ultimatum game, the passive players can accept or decline what is offered to them by the active players. If they decline, both players get nothing. In the 3-person-ultimatum game, the active player offers a certain share of the common resource to the powerful passive player and to the powerless passive player. Powerful means, he/she can accept or decline the tripartite share. If he/she accepts, everybody gets what the active player suggested; if he/she declines, none of the three players get anything.

The three games are played in fixed order (dictator game, 2-person ultimatum game, 3-person ultimatum game) by the same participants, but with randomly changing partners. Throughout the experiment, the players keep their active or their passive role, respectively.

The decisions (about what to give in the case of the active player and what minimally to demand for acceptance in the case of the powerful passive players) are taken simultaneously both by the active and the passive players. The partners in the game are present in the experimental room, but stay anonymous and are matched randomly by the experimenter, separately for each of the three games.

In the dictator game and in the 2-person-ultimatum game the active players have 8 ECU (experimental currency units) at their disposal. In the 3-person-ultimatum game the active player decides over the distribution of 12 ECU. Whatever the participants in the experiment earn in terms of ECU is converted into Deutschmark (1 ECU = 1 DM) or Austrian Schilling (1 ECU = 7 ATS) and paid in cash.

Intellective tasks. At the beginning of the experimental session the participants were asked to solve two intellective tasks. They are described in more detail in the next paragraph.

The Individual Difference Measures

We wanted to know how intelligence as cognitive trait and benevolence as social (personality) trait influence the participants' economic choices in giving (as active player) and accepting (as passive players). For measuring intelligence and benevolence we selected the following items from the 16-Personality-Adjective List, a short cut measure of the 16PF global personality dimensions (Brandstätter, 1988), complemented by some adjectives particularly relevant for describing social interaction and cognitive abilities in addition to self-reported academic achievements.

Self-reported intelligence. The following items (pa2, *pa20*, pa40), standardized and averaged, make up the intelligence scale (with *pa20* reversed):

slow in thinking	1	2	3	4	5	6	7	8	9	quick in thinking
unexperienced in problem solving	1	2	3	4	5	6	7	8	9	experienced in problem solving
mathematically untalented	1	2	3	4	5	6	7	8	9	mathematically talented

My grade point average of mathematics in the school leaving exam is

My academic achievement, compared to that of my colleagues, is

much lower	1	2	3	4	5	6	7	much higher

Cronbach's Alpha for these 5 items is .66.

Benevolence. Benevolence has been measured by the following items of the extended 16PA questionnaire (pa1 pa8 *pa20 pa24 pa33* pa35 pa37 pa39) where *italic* PA-items have been reversed. A more familiar term for benevolence, although not exactly the same, would be agreeableness as one of the so called Big Five personality dimensions (cf. Goldberg, 1993).

not sociable	1	2	3	4	5	6	7	8	9	sociable
tough-minded	1	2	3	4	5	6	7	8	9	tender-minded
insensitive	1	2	3	4	5	6	7	8	9	sensitive
cold	1	2	3	4	5	6	7	8	9	warm
inconsiderate	1	2	3	4	5	6	7	8	9	considerate
unemotional	1	2	3	4	5	6	7	8	9	emotional
not benevolent	1	2	3	4	5	6	7	8	9	benevolent

Cronbach's Alpha for these 6 items is .82.

As behavioral measure of benevolence the participants were given the opportunity to donate all or part of their earnings from Task 1 (see next paragraph) to a charity organization of their own choice. The donations, contrary to our expectation, were uncorrelated both with the self-report measure of benevolence and with the game behavior of the active players.

The correlation between intelligence and self-reported benevolence is *r(103)= -.08*, thus these two constructs are orthogonal dimensions.

Performance in the cognitive tasks: Task 1. You get now ECU 6 which you can use in the following way: You can decide, whether you distribute this amount of money across 3 time periods only (T = 1, 2, 3, i.e., the minimum number of periods you have to take into account), or whether you distribute it across 4, 5, or 6 periods. x_t is the amount you provide for period t. $x_1+x_2+x_3+,....,x_T<=$ECU 6. Your pay off is the product $x_1*x_2*x_3* ... *x_T$. How many periods do you choose? How do you distribute ECU 6 across the periods? What is your payoff?

Performance in the cognitive tasks: Task 2. You get ECU 10 which you can keep or invest - all or part of it - into a lottery. If the die comes up with 1, 2, 3, or 4, you get ECU 2. If it comes up with the numbers 5 or 6, you get ECU 14. The price of the lottery is a randomly selected number between ECU 0 and ECU 10. You must decide which is the maximal price you want to pay for the lottery. If the randomly selected number is above your maximal price, you don't buy the lottery, but keep ECU 10. Otherwise you buy the lottery, and your payoff is ECU 10 minus the price you have paid for the lottery plus the lottery winnings.

I want to pay maximally

ECU_____

The probability that I will actually buy the lottery is

_____

Three measures are derived from the answers to these tasks: (a) the correctness of the payoff estimation in the preliminary task 1 (the absolute difference between real payoff and payoff estimated by the participant); (b) the absolute difference between lottery price payed by the participant and the optimal price of ECU 6 in case of risk neutrality; (c) the absolute difference between the participant's estimation of probability of buying and the actual probability. All variables are coded in a way that a higher score means better performance. Cronbach's Alpha is .52 for the three items of cognitive performance.

Hypotheses

Some of the following hypotheses are rather trivial in the sense that (almost) nobody would doubt them, but others are apt to augment our knowledge about bargaining behavior. Game theory and material selfishness together suggest that people should and will maximize their monetary payoff irrespective of the others' payoff. Following this principle, in the dictator game the active players will give away nothing, in the 2-person ultimatum game only the smallest positive amount, and in the 3-person ultimatum game only the smallest positive amount to the powerful passive player and nothing to the powerless passive player.

However, this is not a hypothesis social psychologists could adopt. Everyday life experience, familiarity with novels of the world literature, and knowledge of the various kinds of theories of equity and distributive justice irresistably suggest that people more or less (depending on their benevolence) behave equitably in their social interaction.

The Choices of the Active Player

Thus, the active players in the dictator game will not maximize their profit, but share the resources with their completely powerless partners by keeping for themselves more, but not much more than giving to their game partners *(Hypothesis 1)*. How much the dictators will yield to the interests of their powerless companions, will depend on their benevolence *(Hypothesis 2)*.

In the 2-person ultimatum game the effect of the social equity norm is reinforced by rationally taking into account that the partner would decline an offer if it is much less than half the 'pie'. Therefore, the active players' offers will come closer to an equitable share than in the dictator game *(Hypothesis 3)*. Individual differences in these additional concessions, however, are not a matter of benevolence *(Hypothesis 4)*.

In the 3-person ultimatum game the active players differentiate their offers according to the power of the passive players by giving the powerful player more than the powerless player *(Hypothesis 5)*. Only the offers to the powerless players will depend on the active players' benevolence *(Hypothesis 6)*.

The Choices of the Powerful Passive Players

Profit maximazing would mean to accept even a very small offer far below the equitable share. Contrary to the normative model, we expect that the powerful passive players do not accept an offer far below the equitable amount *(Hypothesis 7)*.

Passive players, imagining that the active players give them much less than the equitable share, will experience anger, in particular if they are reciprocity oriented. Being in the role of the powerful passive player, they will avoid this expected anger response by setting higher minimal demands.

According to the theoretical reasoning and empirical evidence of Brandstätter (1985), reciprocity orientation was expected to be highest in emotionally unstable extraverts and emotionally stable introverts, lowest in emotionally stable extraverts and emotionally unstable introverts *(Hypothesis 8)*.

Intelligence and Bargaining Behavior

Deriving an optimal solution according to the logic of game theory demands highly abstract and formal thinking which is more easily accomplished by participants of higher intelligence. However, in a psychological perspective choices in the dictator game and in the ultimatum games are not at all or at least not primarily an intellectual, but a motivational problem. It has to be solved rather by so called emotional intelligence (Salovey & Mayer, 1994) than by abstract logical thinking. These authors say: 'Briefly, emotional intelligence can be desribed in three primary domains: the accurate appraisal and expression of emotion in self and in other people, the adaptive regulation of emotions in self and in other people, and the utilization of emotions to plan, create, and motivate action.' (p. 313). Emotional intelligence might be primarily a clever brand name for marketing the idea that success in social life depends not only, often even not primarily, on what we conventionally call intelligence, but on the right feelings and intuitions.

Anyway, we predict that intelligence, as it appears in self-reports and in the solutions of the preliminary cognitive tasks, is not correlated with bargaining behavior *(Hypothesis 9)*. We

expect, however, a correlation between self-reported intelligence and performance in the cognitive tasks *(Hypothesis 10).*

Results

Hypothesis 1. On average, the active player in the dictator game offers ECU 2.81 (*SD* = 1.52) to the completely powerless partner. This amounts to 35 percent of the ECU 8 to be distributed. It is remarkable that 53 percent of the players offer the equitable amount of ECU 4; only 47 percent offer less, and among them are 14 percent who offer nothing to the powerless partner (see Table 2).

Hypothesis 2. As predicted, the higher the self-reported benevolence of the dictators, the larger their offer to the completely powerless partners; $r(51) = .41$; $p = .003$. No significant correlation was found for the behavioral measure of benevolence.

Hypothesis 3. As Table 1 shows, the offers of the active player in the dictator game are lower than those of the active player in the 2-person ultimatum game, thus supporting hypothesis 3 ($p = .000$) (see Tables 1 and 2).

Table 1
Offer of the Active Player in the Dictator Game and in the 2-Person Ultimatum Game

	N	M	SD
Dictator Game	51	2,81	1,52
2-Person Ultimatum Game	51	3,75	,69

Note. The amount to be distributed is ECU 8 in both games.

Table 2

Frequency Distributions (in Percent) of ECU Offered or Accepted in the Three Types of Games

		0	1	2	3	4	5	6	7
	Offers of active players in	*ECU offered*							
1	Dictator game to powerless receiver	14	12	8	13	53			
2	2-Person ultimatum game to powerful receiver		2	2	22	68	6		
3	3-Person ultimatum game to powerful receiver		2	4	13	61	6	14	
4	3-Person ultimatum game to powerless receiver	14	4	16	23	43			
	Minimal demands of powerful passive players in	*ECU accepted*							
5	2-Person ultimatum game for themselves		11	8	21	54	2	2	2
6	3-Person ultimatum game for themselves		15	4	15	46	4	12	4
7	3-Person ultimatum game for the powerless receiver	27	11	8	15	35	4		

The header "Offers or minimal demands" spans columns 0–7.

Hypothesis 4. Partialing out the dictators' offers, supposed to be influenced by individual differences in benevolence, from the active players' offers in the 2-person ultimatum game leads to a correlation of $r(51) = .02$ of the residuals with self-reported benevolence, a result just as predicted. The correlation of the residuals with the behavioral measure of benevolence, however, is with $r(51) = 0 .32$ positive and significant ($p = .023$).

Hypothesis 5. The average offer of the active player in the 3-person ultimatum game to the powerful passive player is 4.09 (34 percent) out of ECU 12 compared to the offer of 2.83 (24 percent) to the powerless passive player ($p = .000$) (Table 3).

Table 3

Offers of the Active Players in the 3-Person Ultimatum Game

	N	M	SD
Offer to the Powerful Passive Player	51	4,09	1,01
Offer to the Powerless Passive Player	51	2,83	1,40

Hypothesis 6. The offer to the powerless passive player increases with self-reported benevolence ($r = .43$), but decreases slightly with the offer to the powerful passive player. The offer of the active player in the dictator game (not shown in Table 4) is also correlated with self-reported benevolence ($r = .40$). No significant correlations are found with the behavioral measure of benevolence. There is a remarkable individual consistency of the active players' offers across the two situations where a powerless receiver is involved (dictator game and 3-person ultimatum game). The correlation of offers (not shown in Tabel 4) is $r(51) = .64$.

Table 4

Correlations Between Benevolence and Offers in the 3-Person Ultimatum Game

		Offer to the Powerful Passive Players	Offer to the Powerless Passive Players
Benevolence	r	-,25	,43
	p	,07	,00
Offer to the Powerful Passive Player	r		-,28
	p		,05

Note. $N = 51$.

Hypothesis 7. In the 2-person ultimatum game the powerful passive players on average demand 3.40 (43 percent of ECU 8). In the 3-person ultimatum game the average minimal demand is 3.81 (32 percent of ECU 12).

Table 5

Means and Standard Deviations of Minimal Demands (Acceptance Tresholds) of the Powerful Passive Players

	N	M	SD
2-Person Ultimatum Game	52	3,40	1,22
3-Person Ultimatum Game	26	3,81	1,92

Hypothesis 8. It was predicted that reciprocity oriented participants would set a higher minimal demand as condition for acceptance. However, the hypothesis was supported only for the male participants.

Table 6

Regression of Emotional Stability and Extraversion on Demands in the 2-Person Ultimatum Game - Male Participants Only

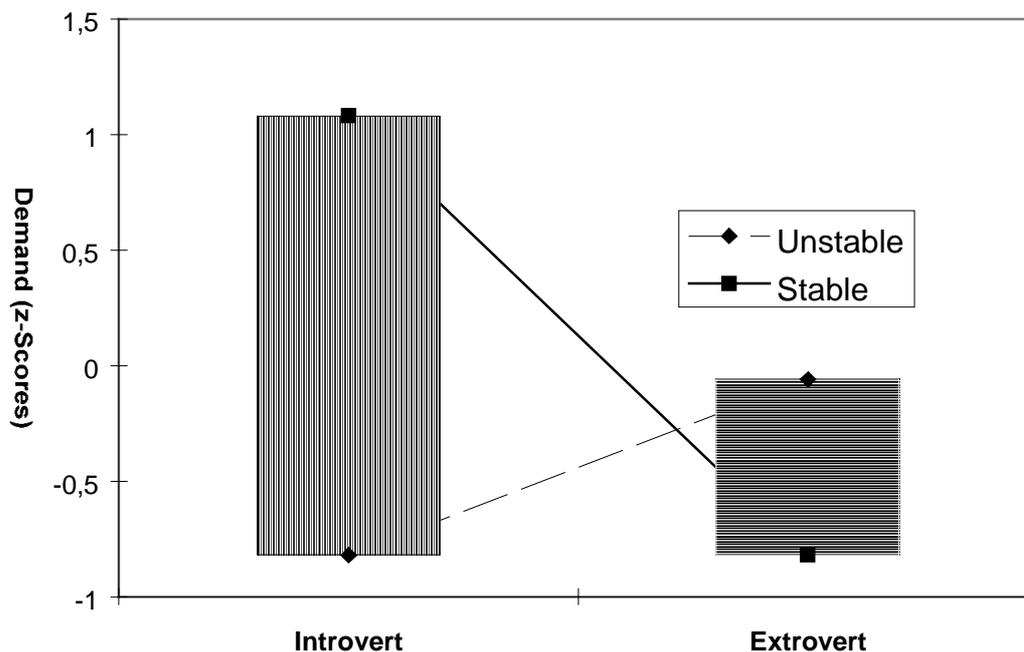| Model		Beta	t	p
1	Emotional Stability (S)	,29	1,48	,15
	Extraversion (E)	-,21	-1,08	,29
2	Emotional Stability (S)	,13	,70	,49
	Extraversion (E)	-,44	-2,18	,04
	S x E	-,51	-2,48	,02

Note. $N = 25$. All variables in z-scores.

Figure 1. Interaction of emotional stability and extraversion on the demands of the passive players. The predicted demands are calculated for $z = -1.0$ (unstable and introvert, respectively) and $z = 1.0$ (stable and extravert, respectively). Reciprocity oriented male players (stable introverts and unstable extraverts) demand more than reinforcement oriented players (unstable introverts and stable extraverts).

Table 7
Correlations of Self-reported Intelligence and Performance in the Cognitive Tasks With the Active Players' Offers

		Self-reported Intelligence	Performance in Cognitive Tasks
Dictator Game	*r*	-,09	-,29
	p	,53	,04
2-Person Ultimatum Game	*r*	,08	-,02
	p	,56	,90
3-Person Ultimatum Game Offer to Powerful Passive Player	*r*	,05	,18
	p	,70	,20
3-Person Ultimatum Game Offer to Powerless Passive Player	*r*	,16	-,12
	p	,26	,42

Hypothesis 9. Contrary to the prediction, we find in the dictator game a significant negative correlation (r =-.29) between cognitive task performance and offer to the (powerless) passive game partner (Table 7). There are no significant correlations between self-reported

intelligence or cognitive task performance and demands of the powerful passive players in the 2-person and 3-person ultimatum games (not presented in Table 7).

Hypothesis 10. The correlation between self-reported intelligence and performance in the cognitive tasks is with $r(103) = .26$ rather low, though significant ($p = .007$).In the 3-person ultimatum game the behavioral measure of benevolence (donations to a charity organization) correlates with the minimal demands of the powerful passive player for himself ($r = .43$, p =.028) and for the powerless passive player ($r = .36$, $p = .072$).

Discussion

Thompson (1990, p. 527) wrote 'It was clear before I wrote this article that normative models do not adequately account for empirical observations of bargaining'. Or, as one of us (Güth, 1995) posed it: 'Experimental studies have not supported this [the game theoretic] prediction which inspired a lively and still ongoing debate about the predictive role of game theory and, more specifically, about how fairness considerations influence decision behaviour'(p. 329/330). Although two of the hypotheses (hypothesis 1 and hypothesis 7) refer to this issue, it was not the primary purpose of the experiment to show once more that people do not maximize their monetary payoffs, even if real money is at stake. There was no doubt that people take the others' interests into account, even if the others do not have the power to retaliate.

What we found in the data is compromising between self interests and others' interests. On average the active players offer less than the equitable amount, which is half (ECU 4 in the dictator game and in the 2-person ultimatum game) and one third (ECU 4 in the 3-person ultimatum game), but not much less. Whenever the passive players (receivers) have no power to accept or reject the offer, they are offered less (see lines 1 and 4 in Table 2), and the powerful passive player in the 3-person Ultimatum game accepts a lower offer for the powerless companion. (see line 7 in Table 2). However, the large majority of offers as well as of demands is equitable, proving the dominant influence of equity considerations. The primary focus of our experiment were individual differences in the importance of these equity considerations, be it for the active (givers) or the passive (receivers) players. Our expectation in hypothesis 6 was that benevolence will be more important towards powerless receivers than toward powerful receivers. Powerless are called receivers who are not able to accept or decline an offer (in the dictator game or in the 3-person ultimatum game). This is clearly supported by the data with self-reported benevolence. The behavioral measure of benevolence (donations to a charity organization) seems to have a different psychological meaning which needs a closer scrutiny in future studies. Obviously, personality traits are relevant only in specific situations which provide an opportunity and/or a stimulation to the behavior characteristic for the trait. The context dependence of the influence of personality traits on behavior has never been denied by personality psychologists, although critics of the trait approach have accused them of just that. Nevertheless, the often overdone critique had the benefit that over the past decades the situational conditions (constraints and stimulations) of the influence of traits on behavior have been clarified (cf Brandstätter & Eliasz, in press).

In hypothesis 6 we had predicted that the demand behavior of the powerful passive players (receivers) would depend on their reciprocity orientation measured by the product of the z-scores in emotional stability and extraversion. This hypothesis was supported by the data of

the male participants only. As yet we do not know whether the gender difference in the impact of reciprocity orientation on behavior is of general significance or specific to the design of our experiment.

Intelligence, as personality dimension orthogonal to benevolence, does not contribute much in explaining the variance of the bargaining behavior of the active or passive players. This is generally in line with our predictions based on the premise that in a psychological (descriptive) perspective bargaining behavior in the context of our experiment is less of an intellectual than of a motivational and emotional problem. The rather low, nevertheless significant negative correlation between the active players' intelligence in the dictator game and their offers (to the powerless recipient) does not really disprove our hypothesis, because all other correlations of intelligence with offers and demands are close to zero.

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