# Does anticipated aid create the need it wants to avoid? An experimental investigation

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**Abstract**

A novel two-person "charity game" is used to experimentally investigate whether anticipation of help crowds out incentives to work, and therefore impulses to help. We distinguish two treatments differing in whether the causes of neediness are verifiable or not. Helping behavior does not vary significantly between treatments, but is positively correlated with dictator giving, suggesting idiosyncratic attitudes to help. Needy subjects are unaffected by anticipated help, but react optimally to chance.

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# 1 Introduction

Helping the needy ones is an immediate impulse of many of us. Providing help to avoid current and future need has often inspired aid programmes by private agents (e.g., the Soros Foundation, Open Society Institute) as well as by public authorities and (inter)national organizations (e.g., the US Agency for International Development, the German Technical Cooperation, the World Bank, the Interamerican Development Bank). People seem to enjoy their own affluence less if somebody else suffers. It is more questionable, however, how this depends on responsibility. Do we want to help the needy ones regardless of the original cause of inequality (see, e.g., Alesina and Glaeser, 2004)?

In this paper, we explore the individual disposition to help others due to moral or ethical standards, neglecting issues like how effective aid programs are or whether there exist better ways of providing help.[1] Specifically, we try to answer the following research questions: Can anticipation of helping behavior cause the neediness that helping behavior wants to avoid? Will wealthy individuals help if they realize that neediness is self-inflicted? Can our disposition to help generate a poverty trap? Is helping behavior an idiosyncratic attitude of people independently of whether the poor just wait for help, without trying to get better?

Self-infliction is hard to observe in the field for the involved parties have good reasons to hide their misbehavior. Moreover, there are inherent difficulties in collecting sound empirical data on beliefs about what originates neediness. Thus, we use a complementary approach and rely on controlled laboratory experiments. Although they raise other objections (such as the external validity of the results), laboratory studies allow for direct observation of both the amount of effort a needy person exerts given her expected level of help and the amount of help an affluent person offers given her beliefs about what causes neediness.

[1] For a general discussion on these issues see, e.g., Besley and Kanbur, 1993; van de Walle, 1998; Ravaillon, 1999; Baker, 2000.

The experimental methodology makes it also possible to focus on fundamental principles, without being bothered by the ambiguities and uncertainties present in real world situations (cf., Abbink and Ellman, 2005).

In the tradition of solidarity-type experiments (Selten and Ockenfels, 1998; Ockenfels and Weimann, 1999; Büchner et al., forthcoming),[2] we consider a *charity game* with rich and poor individuals, where the rich can freely choose whether and to what extent they want to help the poor, and the poor can improve their situation by engaging in effort, whose effect depends on chance. As optimal effort does not vary with expected help, less effort due to anticipated help implies that helping behavior creates the neediness it wants to avoid. Thus, we abstract from moral hazard incentives for low effort.

To assess whether willingness to help depends on the causes of neediness, we distinguish between two treatments, depending on whether the wealthy individuals can or cannot verify what causes neediness (low effort or bad luck). Equal help across treatments would suggest that the disposition to help is an idiosyncratic attitude. When people help less in case of self-inflicted neediness, those who are responsible for their own suffering may get more if the causes of neediness remain ambiguous.

More details about our experimental game are provided in the following Section 2. Section 3 describes the experimental protocol. Section 4 presents our findings, and Section 5 concludes.

## 2 The charity game

To address our main research questions, we rely on a scenario that captures features of the real world, but keeps things simple. Let us distinguish between wealthy and needy individuals by endowing the two members of a pair, indexed

[2] In the standard solidarity game three participants play a one-shot game in which each of them can independently win either a fixed positive amount of money with probability 2/3 or zero with probability 1/3. Before the random draws are made, each subject must indicate, in case she is going to be a winner, how much she would give to the only loser and to each of the two losers.

by $i = 1, 2$, with an asymmetric monetary income $e_i$, where $e_i \in \{\underline{e}, \bar{e}\}$ and $0 < \underline{e} < \bar{e}$ holds. Thus, in each pair, one individual is relatively rich (i.e., $e_i = \bar{e}$ for $i = 1$), and the other is relatively poor (i.e., $e_i = \underline{e}$ for $i = 2$). Like in the solidarity game, rich player 1 chooses how much she is willing to hand over to her (poor) co-player.[3] But, differently from the solidarity game, poor player 2 can improve her status by engaging in costly effort, knowing that her payoff depends on chance as well.

Let $h$ denote the help that the rich member of the pair decides to provide to the poor member, with $0 \leq h \leq \bar{e}$, and let $x$ be the level of effort that the poor member decides to exert, with $x \in [\underline{x}, \bar{x}]$ and $0 < \underline{x} < \bar{x} < \underline{e}$. The random move selecting $\varepsilon$ is independent and uses an iid-distribution with support $[-\underline{x}, \underline{x}]$. The following decisions determine the outcome: player 2 (endowed with $\underline{e}$) chooses an effort level $x$, knowing or not $\varepsilon$ (depending on the treatment); player 1 (endowed with $\bar{e}$) decides on the amount of help $h$ she wants to transfer to player 2, knowing either only $x + \varepsilon$ or both $x$ and $\varepsilon$ (depending on the treatment).

The earning, $u_1$, of player 1 depends on the help she gives via

$$u_1 = \bar{e} - h. \tag{1}$$

The earning, $u_2$, of player 2, on the other hand, depends on her own effort choice $x$, on player 1's help choice $h$, and on the realization of the random variable $\varepsilon$ as follows:

$$u_2 = (\underline{e} - x)(x + \varepsilon) + h, \tag{2}$$

where, for the sake of simplicity, we assume that $\varepsilon$ can assume one of three values: $-\underline{x}$ (bad luck), 0, or $\underline{x}$ (good luck), with probability 1/3 each. Hence, chance can have favorable or adverse effects on player 2's payoff, or keep it unchanged. Payoff functions 1 and 2 imply that, as in dictator-like games, gifts cannot be reciprocated and efficiency is not an issue when helping.

[3] Unlike the solidarity game, in the charity game, roles are assigned *ex-ante*, and only the rich players decide on help. Büchner et al. (forthcoming) have shown that being either aware or unaware of one's role triggers the same solidarity behavior.

The game-theoretic solution, assuming opportunistic (i.e., motivated by own monetary rewards) players, can be easily derived. Since help decreases her own monetary payoff, player 1 should provide no help (i.e., $h^* = 0$). A rational player 2, who expects chance to select $\varepsilon$, should choose $x^* = \frac{e}{2} - \frac{\varepsilon}{2}$. Therefore, compared to expecting $\varepsilon = 0$, a positive (negative) expected $\varepsilon$ would lead to less (more) effort by needy player 2.

Notwithstanding this clear-cut theoretical prediction, previous experimental and field evidence reveals strong impulses to help those who are in need.[4] Several explanations for this benevolent behavior have been put forward, most of which involve other-regarding preferences like altruism (Becker, 1976; Levine, 1998), inequity aversion (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000), and "pure" solidarity (which excludes reciprocal behavior as in Arnsperger and Varoufakis, 2003). We expect these other-regarding concerns to work also in our setting, thereby inducing positive help by rich players 1.

According to the benchmark solution, expectations of positive help should not change player 2's optimal behavior. However, there exists evidence showing that anticipation of help crowds out incentives to work (see Krueger and Meyer, 2002, for a literature review). For example, in a recent study undertaken in Canada and the United States for a large data set (50 years), Kuhn and Riddell (2006) observed large and significant adverse effects of unemployment insurance on labor supply. On the other hand, Hausman (1985) and Atkinson (1995) found small, though positive, effects of income transfers on labor supply. As the evidence on the effects of positive help on needy individuals' behavior is ambiguous, we refrain from formulating a specific hypothesis.

[4]For experimental evidence see Selten and Ockenfels, 1998; Ockenfels and Weimann, 1999; Büchner at al., forthcoming. Field evidence also suggests that donations are not negligible. For instance, in 2002, donations tied to the flood disaster in Germany and East-Europe reached a peak of 59.1 million euros (cf., Caritas International annual report). For the hurricane Katrina & Rita relief the American Red Cross received approximately 1.2 billion dollars in gifts and pledges (http://www.redcross.or). Finally, following the Asia earthquake and Tsunami, the International Federation of Red Cross and Red Crescent Societies launched the largest-ever emergency, relief and recovery operation in their history (cf., International Federation of Red Cross and Red Crescent Societies – Monitoring and Evaluation Department, "Asia: Earthquake and Tsunami Operation. Evaluation Framework").

## 3 Experimental protocol

The experiment is based on the two-person game introduced in the previous section. In each pair, one member (the "rich") is endowed with $e_1 = 100$ ECU (Experimental Currency Units) and has pecuniary payoff function (1), while the other member (the "poor") is endowed with $e_2 = 10$ ECU and has payoff function (2). The type of each subject (either rich or poor) is randomly assigned at the beginning, and subjects know their type before making their decisions.

In order to elicit complete vectors of decisions, we employ a variant of the strategy method (cf., Fischbacher et al., 2001) for both rich and poor subjects. We use discrete choice sets and, for the sake of symmetry, limit the number of decisions for both players to seven. Specifically, player 1's possible help $h$, and player 2's feasible effort $x$ are constrained as follows: $h \in H = \{0, 10, 20, 30, 40, 50, 60\}$, and $x \in X = \{2, 3, 4, 5, 6, 7, 8\}$.[5] The realization of the random variable is confined to $\varepsilon \in \Upsilon = \{-2, 0, 2\}$. Given these parameters values, the optimal level of effort, $x^*$, that a self-interested player 2 should exert equals 6, 5 or 4 depending on whether she expects $\varepsilon$ to be $-2$, 0, or 2, respectively.

All participants (whatever their role) have to make their decisions in two ways so that the experiment is divided in two parts. In the first part, subjects have to provide an "*unconditional decision*": rich players must decide how much they are willing to give to their poor partner and, simultaneously, poor players must decide how much effort they want to exert. In this part, players have also to predict their counterpart's decision and the realization of the random variable. In the second part, after all participants have made their unconditional decision and stated their expectations, without any feedback on previous decisions, rich players 1 and poor players 2 have to fill out a "*transfer table*"

[5]Thus, player 1's strategy set does not allow her to hand over all her endowment. This is done both for limiting subjects' decisions and for avoiding too high self-sacrifice. In light of previous solidarity experiments (showing that people give, on average, less than half of their endowment) setting the upper bound of $h$ equal to 60 does not seem a strong restriction.

and an "*effort table*", respectively. In this part, we distinguish two treatments, which differ only with respect to the "conditional" decisions to be made.

In one treatment, players 1 (2) have to decide about the amount of ECU (effort) they want to transfer (exert) for each of the seven possible levels of effort (help) of the other member, and for each of the three possible realizations of the random variable. Thus, all players, whatever their role, face a table with 21 entries: 7 rows (i.e., the partner's possible actions) by 3 columns (i.e., the realizations of the random move). In this treatment, the wealthy players can always disentangle individual efforts from random events, and thus identify the cause(s) of potential need. Furthermore, the poor players can react to all possible transfers, knowing how chance affects them. Therefore, we refer to this situation as the "perfect information" ($PI$) treatment.

In the other treatment, players have to make decisions dependent only on what they can infer when $\varepsilon$ is unknown. Specifically, rich players 1 have to decide how much they want to give to their poor partner for each possible level of $x+\varepsilon$, implying 11 helping choices in total. Poor players 2, on the other hand, have to choose their effort dependent on the received transfer $h \in H$, yielding a total of 7 effort choices. Since, under such a treatment, the rich players cannot always ascertain the effective cause of neediness,[6] and the poor players must decide without knowing the influences of chance on their own choices, we speak of "imperfect information" ($II$) treatment. Comparing helping choices in the two treatments allows us to investigate how impulses to help depend on the unambiguous verification of luck and self-infliction. Table 1 provides an overview of our experimental design.

<u>Insert Table 1 about here</u>

To incentivize subjects, we employ the following payment procedure. After going through both experimental parts, one member of the pair is randomly

[6]For $x+\varepsilon \in \{2,3\}$, it remains unclear whether neediness is due to low effort or bad luck. Similarly, for $x+\varepsilon \in \{4,5,6\}$, it remains ambiguous whether the poor player has exerted rather high effort and has been unlucky, or she has put in low effort and has been lucky.

selected, with the same probability for each member. For this member the unconditional decision determines her payoff, while the member who is not selected is paid according to her conditional table, based on the selected subject's choice and the actual realization of $\varepsilon$.[7]

For each of the two treatments ($PI$ vs. $II$), we ran three sessions with 32 participants each, yielding 48 independent observations per player and treatment. There were no repetitions, and subjects were aware of this.

To unambiguously verify whether willingness to help is an idiosyncratic predisposition, in one of the $PI$-sessions as well as in one of the $II$-sessions, after completing the two experimental parts, subjects played (unannounced) a standard dictator game where players 1 had to decide how much of 100 ECU they wanted to give to players 2 while players 2 had no decisions to make. Dictators had to decide before receiving feedback on the previous parts.

All six sessions were ran computerized, with the help of z-Tree (Fischbacher 1999), at the laboratory of the Max Planck Institute in Jena (Germany). Participants were undergraduate students from different disciplines at the University of Jena. After being seated at a visually isolated computer terminal, participants received written instructions (see the Appendix for an English translation). Understanding of the rules was assured by a control questionnaire that subjects had to answer in order for the experiment to start. To help participants compute the poor players' payoffs, we provided them with a payoff-calculator as part of the experimental software as well as with payoff tables showing how much the poor player would earn depending on effort and chance for each possible help. The four (two) sessions with the charity game (and the dictator game) lasted about 60 (90) minutes. We implemented an exchange rate of 10 ECU = €1. Rich subjects earned, on average, €11.5, and poor subjects €5.8 (including a show-up fee of €2.50).

[7] See the instructions in the Appendix for more details about the payment procedure.

# 4 Experimental Results

We first compare helping behavior within and across treatments to investigate whether willingness to help is affected by effort of player 2 and how this depends on being able to distinguish between effort and chance. Then, we turn to the analysis of effort decisions and try to identify if effort is crowded out by anticipated help.

## 4.1 Help decisions

We begin by examining subjects' help decisions in the "transfer tables", i.e., players' elicited willingness to help depending on effort $x$ and chance $\varepsilon$ ($PI$-treatment), or only on their sum $x+\varepsilon$ ($II$-treatment). Figures 1 and 2 contain the individual help schedules of all 48 subjects in the $PI$- and $II$-treatment, respectively.

Insert Figures 1 and 2 about here

As to the $PI$-treatment, twenty subjects (i.e., about 42%) behave mainly opportunistically, and submit a transfer table with "0" in all 21 entries (seventeen subjects) or in at least 18 entries (three subjects). Other six subjects (i.e., 12.5%) stick to the same positive transfer through almost all entries. The remaining twenty-two participants (about 46%) engage in "active" help by submitting different decisions in the various entries, although only few subjects consistently condition help on $\varepsilon$ (see subjects 11, 16, 31 and 45) and/or $x$ (see, e.g., subject 8). In the $II$-treatment, the overwhelming majority of rich subjects (37, i.e., 77%) show a nearly constant behavior in all 11 entries of the respective transfer table, with 26 of them (about 54%) giving always nothing. The experimental results for the two treatments are summarized in Tables 2 and 3 and Figure 3.

Insert Tables 2 and 3 and Figure 3 about here

The tables and the figure convey some important messages. First, in both treatments, rich players give, on average, about 10 ECU, which is at odds with opportunism (predicting 0-givings). Second, when rich subjects can clearly distinguish between effort and chance ($PI$-treatment), they do not condition their decisions on these variables. The same holds for the $II$-treatment, where help does not seem to vary with $x + \varepsilon$-values. The impossibility of distinguishing what causes neediness does not appear to trigger a different behavior, questioning the crowding in of self-inflicted neediness by anticipated aid.

To check whether, for a specific level of effort, transfers do not depend on luck in $PI$, we performed a series of Wilcoxon signed-rank tests (two-sided) comparing helping decisions for each value of $x$ across the various realizations of $\varepsilon$. The results confirm that transfers for a specific effort $x$ do not significantly differ depending on $\varepsilon$ ($p > 0.12$ for all $7 \times 3$ pairwise comparisons).[8] Further statistical tests comparing help across different levels of effort for each given realization of $\varepsilon$ indicate that the effort exerted by the poor partner has no impact on helping decisions either ($p > 0.11$ for all $21 \times 3$ pairwise comparisons).

The effects of $\varepsilon$ and $x$ on helping decisions in the $PI$-treatment are explored in more detail via a generalized linear mixed model (based on a quasi-Poisson distribution, with individual random effects) regressing helping decisions on the seven feasible effort levels (*Effort*), and the dummies *GoodLuck* and *BadLuck*. The variable *Good* (*Bad*)*Luck* takes value 1 for $\varepsilon = 2$ ($-2$) and 0 otherwise ($\varepsilon = 0$ is the baseline). The coefficients of all regressors are not significant (*Effort*: $\beta = -0.001$, $p = 0.958$; *BadLuck*: $\beta = -0.060$, $p = 0.306$; *GoodLuck*: $\beta = 0.001$, $p = 0.99$; *Effort*×*BadLuck*: $\beta = 0.0307$, $p = 0.173$).[9] Thus, in line with the results of the non-parametric tests, effort decisions as well as random events have no significant impact on helping decisions in the $PI$-treatment.

[8]Unless otherwise stated, all statistical tests reported in the paper are based on the 48 individual data as independent observations.

[9]We estimated several models to test the interaction between the various explanatory variables. The reported model fits better the data on the basis of both the Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC).

Non-parametric statistical tests conducted for the $II$-treatment reveal a significant difference only when comparing help in case of $x + \varepsilon = 3$ with help for $x + \varepsilon = 0$, 8, 9, or 10 ($p < 0.04$ for all four comparisons, two-sided Wilcoxon signed-rank tests). All other 51 pairwise comparisons deliver $p > 0.10$. The stability of help across different values of $x + \varepsilon$ is confirmed by a generalized linear model regressing help average levels on the 11 possible $x + \varepsilon$-values (slope coefficient $-0.03$; $p = 0.93$). We summarize our findings about help behavior under each treatment in our first main result:

**Result 1** *On average, in neither treatment, wealthy players condition their help on effort and/or chance.*

A major question of our analysis is whether help is affected by the possibility of distinguishing what causes neediness. In the $II$-treatment, various combinations of effort and chance may explain $x + \varepsilon$ between 2 and 8, whereas in the $PI$-treatment bad luck and low effort can always be diagnosed. Let us compare help provided in the ambiguous cases of the $II$-treatment with the corresponding transparent cases of the $PI$-treatment: for instance, compare help if $x + \varepsilon = 2$ in $II$ with help under the combinations $(x, \varepsilon) = (2, 0)$ and $(x, \varepsilon) = (4, -2)$ in $PI$. All pairwise comparisons yield a lack of significance difference between treatments (see Table 4), thereby confirming that help is not significantly different when effort and luck are verifiable.

**Result 2** *The possibility of unambiguously disentangling effort from luck has not significant impact on helping decisions.*

Insert Table 4 about here

From Results 1 and 2, it seems that help attitudes result from idiosyncratic preferences, which are not or only hardly affected by what causes neediness. The unconditional help decisions, which rich players 1 had to submit in the first experimental part, may shed more light on the issue. Figure 4 shows the distributions of unconditional help and predicted effort in each treatment.

Insert Figure 4 about here

The mean (with standard deviations in parentheses) help over all 48 unconditional decisions is 11.04 (14.02) in the $PI$-treatment, and 9.58 (13.04) in the $II$-treatment. Although unconditional transfers are higher in $PI$ than in $II$, the difference is not statistically significant ($p = 0.428$ in two-sided Wilcoxon rank-sum test; $p = 0.687$ in Kolmogorov-Smirnov test).

As to point-predictions about effort and chance move, expectations of $x = 5$ and $\varepsilon = 0$ are the mode in each treatment, indicating that most rich players expect their poor partner to behave optimally. No correlation is detected between unconditional help and beliefs about either effort or chance: the Spearman correlation coefficients between help and expected effort are $\rho = 0.168$ ($p = 0.254$) in $PI$, and $\rho = -0.230$ ($p = 0.116$) in $II$; the respective Spearman $\rho$ between help and expected chance are $-0.080$ ($p = 0.589$) and $0.074$ ($p = 0.615$).

To further corroborate that unconditional help does not react to beliefs about effort and chance, we estimated a generalized linear model (based on a quasi-Poisson distribution due to over-dispersion in the data) regressing unconditional individual help decisions on expected effort (*ExpEff*), expected chance (*ExpChance*), and a treatment dummy ($Treat$, taking value 0 in $PI$ and 1 in $II$). The results confirm that expectations about effort and chance have no significant impact on unconditional help (*ExpEff*: $\beta = -0.318$, $p = 0.877$; *ExpChance*: $\beta = -0.760$, $p = 0.634$), and that the difference in treatments has no effect *per se* nor when interacting with expectations ($Treat$: $\beta = 8.576$, $p = 0.443$; $Treat \times$*ExpEff*: $\beta = -2.337$, $p = 0.290$; $Treat \times$*ExpChance*: $\beta = 2.640$, $p = 0.200$). The findings about unconditional help decisions can be summarized as follows:

**Result 3** *Unconditional help does not significantly differ between treatments, and it does not react to point-predictions about effort and chance. Whatever the treatment, most rich players expect their poor partner to behave rationally.*

Thus, according to our data, regardless of the way in which decisions are submitted, help is not affected by exerted effort or chance. By contrast, transferred amounts are significantly correlated with the rich players' decisions in the dictator game that subjects were asked to play, without previous warning, in one $PI$-session and in one $II$-session. The Pearson correlation coefficients (relying on 16 independent observations) between amounts given in the charity game and amounts given in the dictator game are 0.435 ($p = 0.043$) in $PI$, and 0.806 ($p = 0.001$) in $II$. This positive correlation suggests that help may be explained in terms of idiosyncratic preferences.

Is a subject's unconditional choice in the first part, given her beliefs about effort and chance, consistent with her conditional decision in the second part? A Wilcoxon signed-rank test (two-sided) comparing the 48 individual unconditional decisions to the individual conditional decisions corresponding to the elicited expectations in the transfer table does not allow to reject the hypothesis that they are the same ($p = 0.237$ in $II$, $p = 0.856$ in $PI$). In particular, 77.08% (72.9%) of all rich subjects behave consistently in $II$ ($PI$). Not surprisingly, most consistencies (33 out of 37 in $II$; 26 out of 35 in $PI$) result from constant effort schedules in the second part.

### 4.2 Effort decisions

Figures 5 and 6 display the 48 individual effort schedules in each treatment.

<u>Insert Figures 5 and 6 about here</u>

In the $PI$-treatment, twenty-six subjects (i.e., about 55%) adjust their effort to the three $\epsilon$-values optimally, i.e., they choose $x = 6$, $x = 5$, and $x = 4$ in all the seven entries of the $\epsilon = -2$-, $\epsilon = 0$- and $\epsilon = 2$-column, respectively. Of the remaining twenty-two schedules, half shows a constant trend and the other half does not exhibit a readily interpretable pattern (except, perhaps, randomness). As to the $II$-treatment, with eleven exceptions, we always observe constant effort schedules, with thirty-two poor subjects (i.e., 66%) entering "5" in each cell of the corresponding table.

Tables 5 and 6 and Figure 7 summarize our results.

Insert Tables 5 and 6 and Figure 7 about here

In both the $PI$- and the $II$-treatments, conditional effort decisions are at odds with the claim that positive help crowds in self-infliction. When poor subjects can condition their choice on both received transfers and chance, effort reacts to different values of $\varepsilon$, but not to changes in $h$. Wilcoxon signed-rank tests (one-sided) confirm that, for each possible level of help, effort decisions are significantly higher when $\epsilon = -2$ than when $\epsilon = 0$ or 2, and when $\epsilon = 0$ than when $\epsilon = 2$ ($p < 0.01$ for all $7 \times 3$ pairwise comparisons). In contrast, when comparing the effort decisions across various levels of help for each realization of $\epsilon$, we cannot reject the null hypothesis of equality ($p > 0.05$ in all $21 \times 3$ cases). Effort does not respond significantly to differences in help-amounts in the $II$-treatment too ($p > 0.18$ for each of the 21 possible comparisons, two-sided Wilcoxon signed-rank tests). These findings justify our next result:

**Result 4** *In both treatments, conditional effort decisions are constant across different help-amounts. In the $PI$-treatment, they react optimally to the three possible chance values.*

Next we compare conditional decisions under the two treatments. From Figure 7, it seems that, for each help, average effort in the $II$-treatment parallels average effort that is contingent on $\epsilon = 0$ in the $PI$-treatment. Kolmogorov-Smirnov tests comparing the distribution of average effort in $II$ with each of the three distributions (one for each $\varepsilon$-value) in $PI$ cannot reject the null hypothesis of equality for $II$ vs. $PI$ when $\varepsilon = 0$ ($p = 0.957$); for both the other comparisons the difference in effort is highly significant ($p < 0.001$).

**Result 5** *Effort decisions in the $II$-treatment do not differ significantly from those for $\epsilon = 0$ in the $PI$-treatment.*

Turning to the unconditional effort decisions, Figure 8 shows the distributions of unconditional effort and predicted help in each treatment. The mean (with standard deviations in parentheses) effort over all 48 unconditional decisions is 5.13 (1.04) in the $PI$-treatment, and 4.90 (0.88) in the $II$-treatment. A Kolmogorov-Smirnov test (two-sided) rejects that there is a significant difference in unconditional effort decisions between treatments ($p = 0.687$).

Insert Figure 8 about here

Poor subjects expect to receive, on average, 11.88 ECU in the $PI$-treatment, and 13.54 ECU in the $II$-treatment. Both expectations are in line with observed help: statistical tests confirm that, whatever treatment, there is no significant difference between expected and actual help ($p = 0.957$ for $PI$ and $p = 0.161$ for $II$; two-sided Kolmogorov-Smirnov test). Although the percentage of needy subjects expecting positive help is higher in $II$ than in $PI$, a Kolmogorov-Smirnov test does not allow rejecting the null hypothesis that expected help does not differ across treatments ($p = 0.848$).

The relationship between expected help and unconditional effort is explored via a generalized linear regression (based on a Poisson distribution) with unconditional individual effort decision as dependent variable, and beliefs about transfer ($ExpHelp$) and a treatment dummy ($Treat$, being 0 in $PI$ and 1 in $II$) as independent variables. The specification of the model includes the interaction of $ExpHelp$ with $Treat$. The results support the independence of effort from expected help in each treatment and the lack of significance in effort decisions between treatments ($ExpHelp$: $\beta = 0.011$, $p = 0.595$; $ExpHelp \times Treat$: $\beta = -0.009$, $p = 0.765$; $Treat$: $\beta = -0.123$, $p = 0.836$).

Since $x = 5$ is the mode of unconditional effort decisions in both treatments (see Figure 8), game theory suggests that most player 2-participants expect $\epsilon = 0$ in either treatment. This prediction is clearly confirmed in the $PI$-treatment (where about 65% of the subjects do not expect chance to affect them), but less so in the $II$-treatment (where about 48% of the subjects expect not to be affected by chance, and about 44% expect to be lucky). We summarize the findings about unconditional effort decisions by

**Result 6** *Unconditional effort choices are rational: they are not affected by beliefs on help, and react optimally to expected chance effects, especially in the $PI$-treatment.*

Do poor subjects behave consistently across the two experimental parts? To answer this question, we compare the unconditional decision with the conditional decision corresponding to the elicited expectations in the effort table. For both the $II$- and the $PI$-treatments, the difference between decisions is not statistically significant ($p = 0.52$, two-sided Wilcoxon signed-rank test). More specifically, 87.50% (72.92%) of all poor subjects behave consistently in the $II$- ($PI$-)treatment and, given their expectations about help (and chance), choose an unconditional effort which is coherent with their decision in the effort table.[10]

# 5 Conclusions

In this paper, we have investigated two main issues. The first was whether well-off agents would refrain from aid when they are aware that neediness is self-inflicted. Previous evidence shows that we want to help those in need, but suggests that this may depend on beliefs about what originates poverty. It is a widespread claim (above all among Americans) that effort, rather than forces beyond one's control, determines income (cf., Alesina and Glaeser, 2004).

The second issue we explored was whether needy individuals, anticipating aid, would abstain from exerting effort, although this would conflict with their own self-interest. World Bank reports indicate that, though rarely, some parents keep one child in the family thoroughly famished so that the family qualifies to get nutritional support (see van de Walle, 1998, p. 18).

[10] Most of the inconsistencies (53.9% in $PI$ and 66.67% in $II$) concern subjects with an erratic behavioral pattern in their effort schedule.

To address these issues, we have conducted a so-called charity experiment with one rich and one poor player: the rich decides how much she is willing to hand to the poor, and the latter can spend effort to improve her situation, which is also influenced by chance. In one treatment, the wealthy individual can unambiguously verify what causes neediness (low effort or bad luck) and the poor knows how luck affects her. In another treatment, verifying the causes of neediness is not possible and the poor cannot condition on chance events.

According to our results, helping is not affected by the effort exerted by the poor or by random events, and it does not differ between treatments. There is a positive correlation between help in the charity game and offers in an unrelated and unexpected dictator game. This suggests that impulses to help are largely idiosyncratic and do not depend on what causes neediness. In this sense, besides confirming the relevance of other-regarding concerns in people's behavior, our experiment reveals that beliefs about what originates neediness do not affect such concerns.

Anticipation of help behavior does not seem to crowd out incentives to work: exerted effort remains constant across different help-amounts, but reacts optimally to random events. Although we avoid moral hazard problems in modeling incentives to work, the experimental evidence garnered here is suggestive of self-interested behavior by the poor. These findings shed new light on the so far inconclusive evidence of how income transfers may affect labor supply.

Hopefully, our study suggests laboratory experiments as valid tools to design and assess the effects of aid programs. Evaluating these influences becomes more relevant when a growing number of developing countries are implementing conditional cash-transfers to improve the access of poor people to health and educational services without taking into account the effects of such transfers on labor supply.

# Appendix: Experimental instructions

This appendix reports the instructions (originally in German) we used for the $II$-treatment and the dictator game. The instructions for the $PI$-treatment were adapted accordingly and are available upon request.

## A.1 Instructions for the $II$-treatment

Welcome and thanks for participating in this experiment. You receive €2.50 for having shown up on time. Please read the instructions – which are identical for all participants – carefully. From now on any communication with other participants is forbidden. If you have any questions or concerns, please raise your hand. We will answer your questions individually.

During the experiment you will be able to earn money. Your experimental income will be calculated in ECU (Experimental Currency Unit), where 10 ECU = €1. At the end of the experiment, the ECU you have earned will be converted to Euros, and the obtained amount will be immediately paid to you in cash.

Detailed information on the experiment

In this experiment, you will be randomly matched with another participant, whose identity will not be revealed to you at any time. One of you will be of type $X$ and the other one will be of type $Y$. You will learn your type before the experiment starts. The experiment will be conducted only once.

Each of the two types receives a certain number of ECU. In the following we shall refer to this as your *endowment*. The endowment you receive as well as the task you have to do depend on which type you are. We first describe the basic task of each type. You will learn how decisions are made later on.

**Task description**

**$X$'s task**

If you are a participant of type $X$, you receive an endowment of 100 ECU. Your task is to decide **how much of your endowment you want to transfer to $Y$**.

The amount $X$ can voluntarily transfer to $Y$ is 0, 10, 20, 30, 40, 50, or 60 ECU, i.e., the chosen amount must be not smaller than 0 and not greater than 60; furthermore, it must be a multiple of 10. $X$'s experimental earnings are his or her initial endowment *minus* what (s)he transfers to $Y$.

$$\boldsymbol{X\text{'s earnings} = 100\ \text{ECU} - \text{ECU transferred to } Y}$$

**$Y$'s task**

If you are a participant of type $Y$, you receive an endowment of 10 ECU. Your task is to decide **how much of a costly effort you want to exert** in order to improve your situation.

The effort $Y$ can exert is 2, 3, 4, 5, 6, 7, or 8, i.e., $Y$'s effort must be not smaller than 2 and not greater than 8; furthermore, it must be an integer number.

Whatever effort $Y$ decides to exert, chance can increase it by 2, decrease it by 2 or leave it unchanged, where each of these events has the same probability to occur. This means that $Y$'s "*actual effort*" can be:

I. "his or her selected effort" **+ 2**, with probability 1/3,

II. "his or her selected effort" **− 2**, with probability 1/3, or

III. "his or her selected effort", with probability 1/3.

$Y$'s experimental earnings depend on his or her "*selected effort*", on his or her "*actual effort*" (which includes the chance move), and on the transfer from $X$. In particular, $Y$'s earnings are calculated as follows: the *selected effort* is subtracted from his or her initial endowment, this difference is multiplied by $Y$'s *actual effort*, and the resulting amount is added to the ECU transferred from $X$.

$$\boldsymbol{Y\text{'s earnings} = (10\ \text{ECU} - \textit{selected}\ \text{effort}) \times \textit{actual}\ \text{effort} + }$$
$$\boldsymbol{+\ \text{ECU transferred from } X}$$

Attached to these instructions, you can find seven tables displaying $Y$'s earnings depending on his or her selected effort and the value selected by chance. Each of the tables refers to a specific number of ECU transferred from $X$ to $Y$. Hence, the first table displays $Y$'s earnings for each possible level of effort and each chance move when $X$'s transfer is zero; the second table displays $Y$'s earnings for each possible level of effort and each chance move when $X$'s transfer is 10 ECU, and so on until the last table, which displays $Y$'s earnings when $X$'s transfer is 60 ECU.

In addition to these tables, we provide you with a calculator that allows you to compute $X$'s and $Y$'s earnings. You can start the calculator by pressing the corresponding button on your screen. If you do so, a window will appear on your screen. If you are

an $X$-type, you must enter into the window how many ECU you want to transfer to $Y$ (i.e., 0, 10, 20, 30, 40, 50, or 60), how much effort you expect $Y$ to exert (i.e., 2, 3, 4, 5, 6, 7, or 8), and your expected chance move (i.e., $-2$, 0, or 2). Given these figures, if you press the apposite button, you will know your own and $Y$'s corresponding earnings.
Similarly, if you are a $Y$-type, you must enter into the window how much effort you want to exert (i.e., 2, 3, 4, 5, 6, 7, or 8), how many ECU you expect $X$ to transfer to you (i.e., 0, 10, 20, 30, 40, 50, or 60), and your expected chance move (i.e., $-2$, 0, or 2). Then, if you press the apposite button, you will know your own and $X$'s corresponding earnings.
The seven attached tables and the computerized calculator will help you in making your decisions. How each type will make the decisions in the experiment is what we explain next.

## How to decide

### $X$-types

If you are a participant of type $X$, you have to make your decision about how much to transfer to $Y$ in two different ways.

- First, you have to decide how many ECU you want to transfer to $Y$. You will enter this amount into the following input screen: (*original instructions included a screen-figure here*). The first line shows your endowment (i.e., 100 ECU). In the input field below you must enter the amount of ECU you want to transfer to $Y$. Additionally, you have to predict the effort $Y$ will exert *and* the value chance will select. You must enter your expectation about $Y$'s effort in the second input field and your expectation about the chance move in the third and last field. After you have selected your transfer and stated your expectations, you must press the "OK"-button.
- You will then face the following "transfer table":

| *$Y$'s actual effort* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Your transfer to $Y$* | | | | | | | | | | | |

For *each* level of $Y$'s "actual effort" (that is, $Y$'s selected effort + the chance move) you, as an $X$-type, must insert in the corresponding blank entry of the table how much of your 100 ECU you want to transfer to $Y$; i.e., you must insert 0, 10, 20, 30, 40, 50, or 60 in each blank entry. Since the effort that $Y$ can select ranges from 2 to 8 and the chance move can be $-2$, 0, and 2, $Y$'s actual effort varies within 0 and 10. The $X$-types are required to fill out all the 11 entries of the transfer table.

**$Y$-types**

If you are a participant of type $Y$, similarly to $X$, you have to make your decision about effort in two different ways.

- First, you have to decide how much effort you want to exert. You will enter the selected level of effort into the following input screen: (*original instructions included a screen-figure here*). The first line shows your endowment (i.e., 10 ECU). In the input field below you must enter the level of effort you want to exert. Additionally, you have to predict how many ECU $X$ will transfer to you *and* the value chance will select. You must enter your expectation about $X$'s transfer in the second input field and your expectation about the chance move in the third and last field. After you have selected your level of effort and stated your expectations, you must press the "OK"-button.
- You will then face the following "effort table":

| *Transfer from X* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| *Your choice of effort* | | | | | | | |

For *each* amount of ECU that $X$ can transfer (0, 10, 20, 30, 40, 50, and 60), you, as a $Y$-type, must insert in the corresponding blank entry of the table how much effort you want to exert; i.e., you must insert 2, 3, 4, 5, 6, 7, or 8 in each blank entry. The $Y$-types are required to fill out all the 7 entries of the transfer table.

### Payoffs computation

After all participants have made their decisions in both ways, the computer will determine the chance move ($-2$, 0, or 2) and randomly select one type (either $X$ or $Y$). For the randomly selected type, the first decision will be payoff-relevant. For the other type, the filled out table will determine his or her payoff. When you make your first decision and when you fill out your table, you do not know whether your type will be randomly selected. Thus, you will have to think carefully about all decisions because all can become relevant to your payoff. Two examples should make this clear.

**Example 1** Suppose that the computer determines that the chance move is $-2$ and randomly selects the $Y$-type. If you are a $Y$-type, this means that you will be paid according to your first decision while $X$ will be paid on the basis of his or her transfer table. Assume that you selected an effort of 3. Then, your actual effort is $3-2=1$. If $X$ has indicated in his or her transfer table that (s)he would transfer to you 20 ECU when your actual effort is 1, then your earnings are $(10-3)\times 1+20=7\times 1+20=7+20=27$ ECU, and $X$'s earnings are: $100-20=80$ ECU.

**Example 2** Suppose that the computer determines that the chance move is 0 and randomly selects the $X$-type. If you are a $Y$-type, this implies that you will be paid according to your effort table while $X$ will be paid on the basis of his or her first transfer decision. Assume that $X$ has transferred to you 10 ECU. If you have indicated in your effort table that you would exert an effort of 4 when $X$'s transfer is 10 ECU, then your earnings are $(10-4)\times(4-0)+10=6\times 4+10=24+10=34$ ECU, and $X$'s earnings are: $100-10=90$ ECU.

Before the experiment starts, you will have to answer some control questions to verify your understanding of the rules of the experiment.

*Please remain quiet until the experiment starts and switch off your mobile phone. If you have any questions, please raise your hand now.*

## A.2 Instructions for the dictator game

The following instructions were distributed after all subjects had completed the two experimental parts and before any feedback on the previous parts.

Please take your time to read the instructions for Experiment II at your own pace. If you have any questions while reading them, please raise your hand and one of the experimenters will come to your place.

In this experiment you will be of the same type as in Experiment I, and you will be interacting with a participant of the other type. That is, if you were an $X$-type in the previous experiment, you will be of type $X$ in this experiment too, and will be matched with a participant of type $Y$. Similarly, if you were a $Y$-type in the previous experiment, you will be of type $Y$ in this experiment too, and will be matched with a participant of type $X$. You will never know which of the other participants is in your group. However, you will NOT interact with the same person as in Experiment I.

**$X$'s task**

As before, if you are a participant of type $X$ you receive an endowment of 100 ECU, and must decide how much of your endowment you want to transfer to $Y$, where the transferred amount can be 0, 10, 20, 30, 40, 50 or 60 ECU.

Like in the previous experiment, $X$'s experimental earnings are his or her initial endowment *minus* what (s)he transfers to $Y$.

| $X$**'s earnings = 100 ECU − ECU transferred to** $Y$ |
|---|

**$Y$'s task**

If you are a participant of type $Y$, you receive an endowment of 10 ECU, but now you have no possibility to improve your situation on your own. Your experimental earnings depend only on the transfer from $X$, which you have to accept. Therefore, $Y$'s experimental earnings are:

| $Y$**'s earnings = 10 ECU + ECU transferred from** $X$ |
|---|

Like in the first experiment, the experimental earnings will be converted to euros at the exchange rate 10 ECU= €1.

At the end of the experiment, the allocation of the 60 ECU proposed by $X$ will be paid out in cash, together with the earnings made during the first experiment and the show-up fee of €2.50.

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Table 1: Design overview

| | First part | Second part |
|---|---|---|
| | | Conditional choices |
| $PI$-treatment | Unconditional choice | Help table: 21 entries |
| | Prediction of other's behavior | Effort table: 21 entries |
| | Expectation about chance move | Conditional choices |
| $II$-treatment | | Help table: 11 entries |
| | | Effort table: 7 entries |

Table 2: Mean conditional help decisions for each level of effort and each realization of $\varepsilon$ in the $PI$-treatment (std. dev. in parentheses)

| **Effort** | $\varepsilon = -2$ | $\varepsilon = 0$ | $\varepsilon = 2$ |
|---|---|---|---|
| 2 | 10.83 (13.34) | 10.63 (13.11) | 10.63 (16.30) |
| 3 | 12.29 (14.48) | 10.83 (12.52) | 10.83 (15.69) |
| 4 | 10.63 (12.78) | 10.83 (13.50) | 10.63 (14.93) |
| 5 | 11.25 (12.31) | 10.83 (12.52) | 10.83 (15.82) |
| 6 | 10.21 (11.94) | 9.58 (11.84) | 10.00 (15.44) |
| 7 | 10.63 (13.27) | 9.58 (13.20) | 8.96 (14.18) |
| 8 | 10.63 (13.59) | 9.17 (11.64) | 10.00 (14.44) |

Table 3: Mean conditional help decisions for each value of $x + \varepsilon$ in the $II$-treatment

| $x + \varepsilon$ | Mean | Std. dev. |
|---|---|---|
| 0 | 8.54 | (14.73) |
| 1 | 9.79 | (14.80) |
| 2 | 9.79 | (14.51) |
| 3 | 11.46 | (15.71) |
| 4 | 10.83 | (15.14) |
| 5 | 10.42 | (15.15) |
| 6 | 10.00 | (14.88) |
| 7 | 10.63 | (15.77) |
| 8 | 9.58 | (15.15) |
| 9 | 9.38 | (14.35) |
| 10 | 8.96 | (14.91) |

Table 4: Wilcoxon tests comparing $II$ and $PI$

| $II$-treatment | | $PI$-treatment | | $p$-value |
|---|---|---|---|---|
| $x+\varepsilon=2$ | vs. | $x$=4 | $\varepsilon=-2$ | 0.52 |
| $x+\varepsilon=2$ | vs. | $x$=2 | $\varepsilon=0$ | 0.48 |
| $x+\varepsilon=3$ | vs. | $x$=5 | $\varepsilon=-2$ | 0.57 |
| $x+\varepsilon=3$ | vs. | $x$=3 | $\varepsilon=0$ | 0.68 |
| $x+\varepsilon=4$ | vs. | $x$=6 | $\varepsilon=-2$ | 0.73 |
| $x+\varepsilon=4$ | vs. | $x$=4 | $\varepsilon=0$ | 0.69 |
| $x+\varepsilon=4$ | vs. | $x$=2 | $\varepsilon=2$ | 0.80 |
| $x+\varepsilon=5$ | vs. | $x$=7 | $\varepsilon=-2$ | 0.63 |
| $x+\varepsilon=5$ | vs. | $x$=5 | $\varepsilon=0$ | 0.43 |
| $x+\varepsilon=5$ | vs. | $x$=3 | $\varepsilon=2$ | 0.84 |
| $x+\varepsilon=6$ | vs. | $x$=8 | $\varepsilon=-2$ | 0.57 |
| $x+\varepsilon=6$ | vs. | $x$=6 | $\varepsilon=0$ | 0.61 |
| $x+\varepsilon=6$ | vs. | $x$=4 | $\varepsilon=2$ | 0.77 |
| $x+\varepsilon=7$ | vs. | $x$=7 | $\varepsilon=0$ | 0.85 |
| $x+\varepsilon=7$ | vs. | $x$=5 | $\varepsilon=2$ | 0.80 |
| $x+\varepsilon=8$ | vs. | $x$=8 | $\varepsilon=0$ | 0.53 |
| $x+\varepsilon=8$ | vs. | $x$=6 | $\varepsilon=2$ | 0.73 |

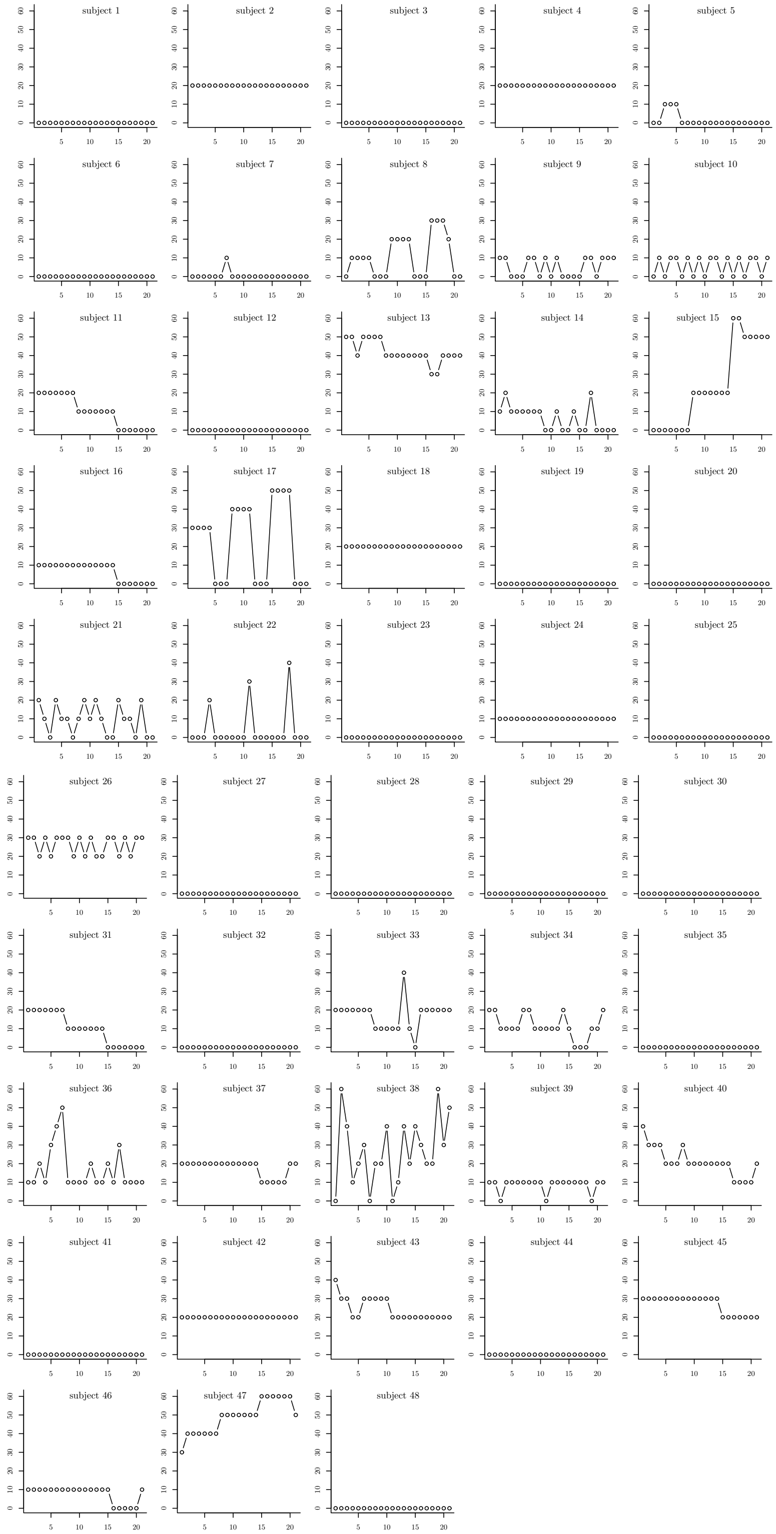
Table 5: Mean conditional effort decisions for each level of help and each realization of $\varepsilon$ in the $PI$-treatment (std. dev. in parentheses)

| **Help** | $\varepsilon = -2$ | $\varepsilon = 0$ | $\varepsilon = 2$ |
|---|---|---|---|
| 0 | 5.69 (1.07) | 5.10 (0.95) | 4.58 (1.38) |
| 10 | 5.54 (1.01) | 5.04 (0.82) | 4.52 (1.24) |
| 20 | 5.60 (1.12) | 5.06 (0.91) | 4.52 (1.22) |
| 30 | 5.46 (1.09) | 4.96 (0.77) | 4.42 (1.09) |
| 40 | 5.46 (1.20) | 5.06 (0.89) | 4.50 (1.32) |
| 50 | 5.40 (1.14) | 4.92 (0.79) | 4.40 (1.20) |
| 60 | 5.50 (1.19) | 5.00 (0.97) | 4.46 (1.37) |

Table 6: Mean conditional effort decisions for each level of help in the $II$-treatment

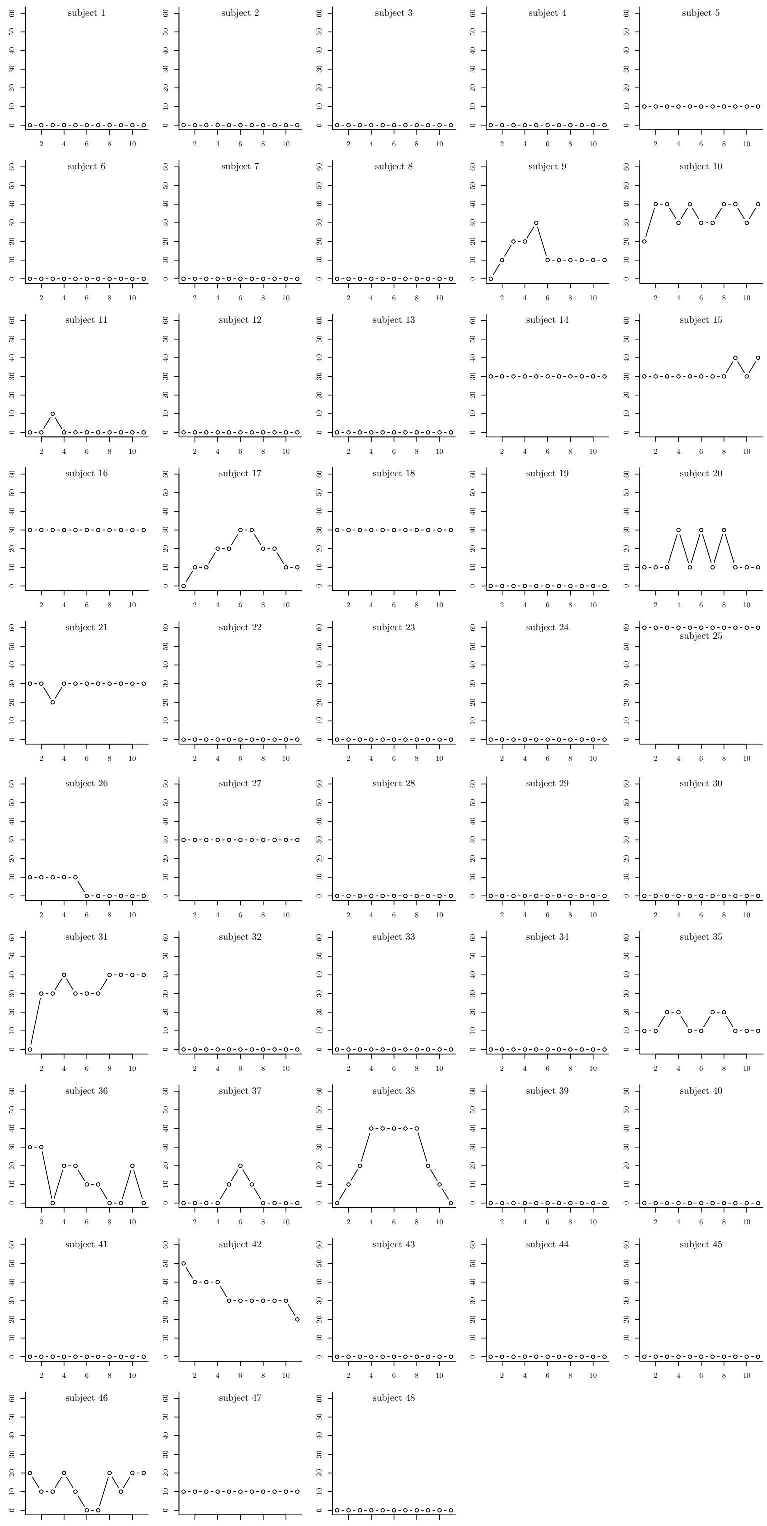
| **Help** | Mean | Std. dev. |
|---|---|---|
| 0 | 4.90 | (0.75) |
| 10 | 4.96 | (0.71) |
| 20 | 5.00 | (0.62) |
| 30 | 4.94 | (0.63) |
| 40 | 4.98 | (0.64) |
| 50 | 5.00 | (0.90) |
| 60 | 5.04 | (0.87) |

Figure 1: Individual help schedules in the $PI$-treatment




*Note:* The horizontal axis reports the 21 entries $(x, \varepsilon)$ of the transfer table. The first seven values correspond to $x \in [2, 8]$ and $\varepsilon = -2$; the following seven values to $x \in [2, 8]$ and $\varepsilon = 0$; the last seven values to $x \in [2, 8]$ and $\varepsilon = 2$. The vertical axis reports the seven help-levels.

Figure 2: Individual help schedules in the $II$-treatment.



*Note:* The horizontal axis reports the 11 entries $x + \varepsilon$ of the transfer table. The vertical axis reports the seven help-levels.

Figure 3: Average conditional help decisions for all levels of effort in each treatment

$PI$-treatment $\qquad\qquad$ $II$-treatment

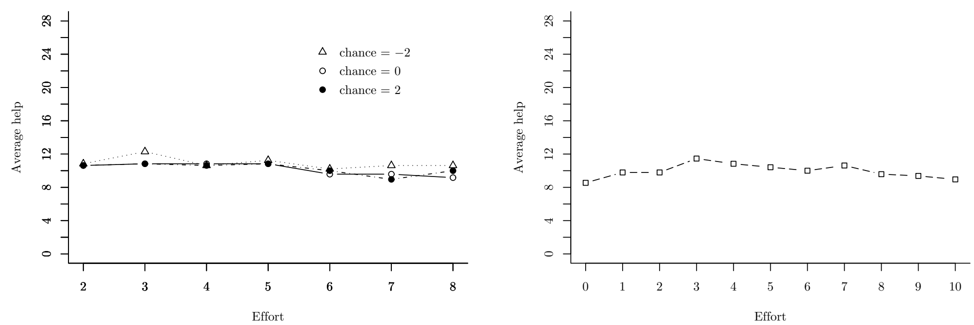



Figure 4: Distributions of unconditional help decisions and expected effort in each treatment

$PI$-treatment

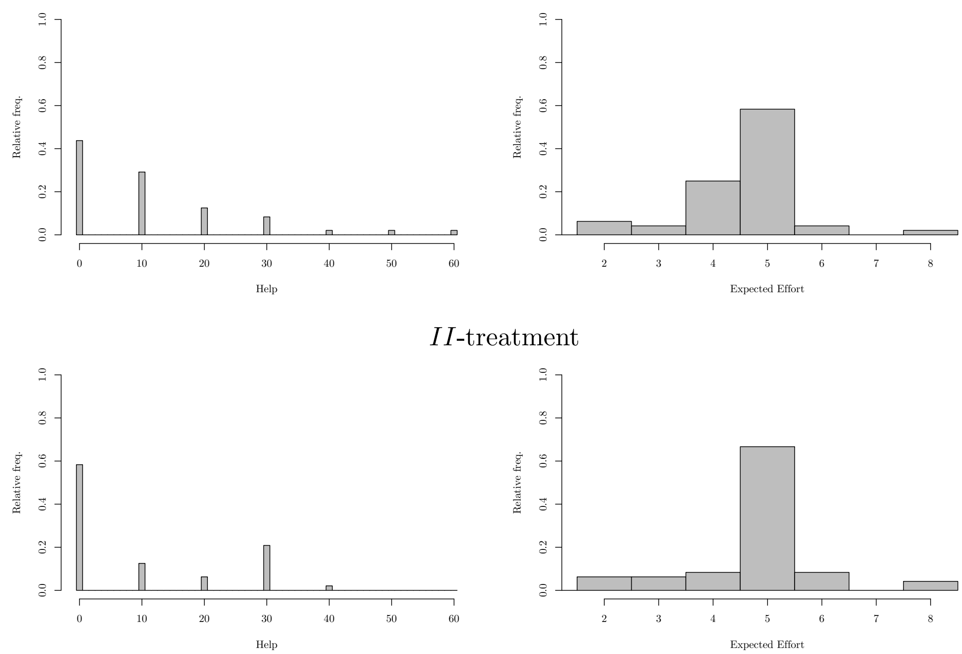
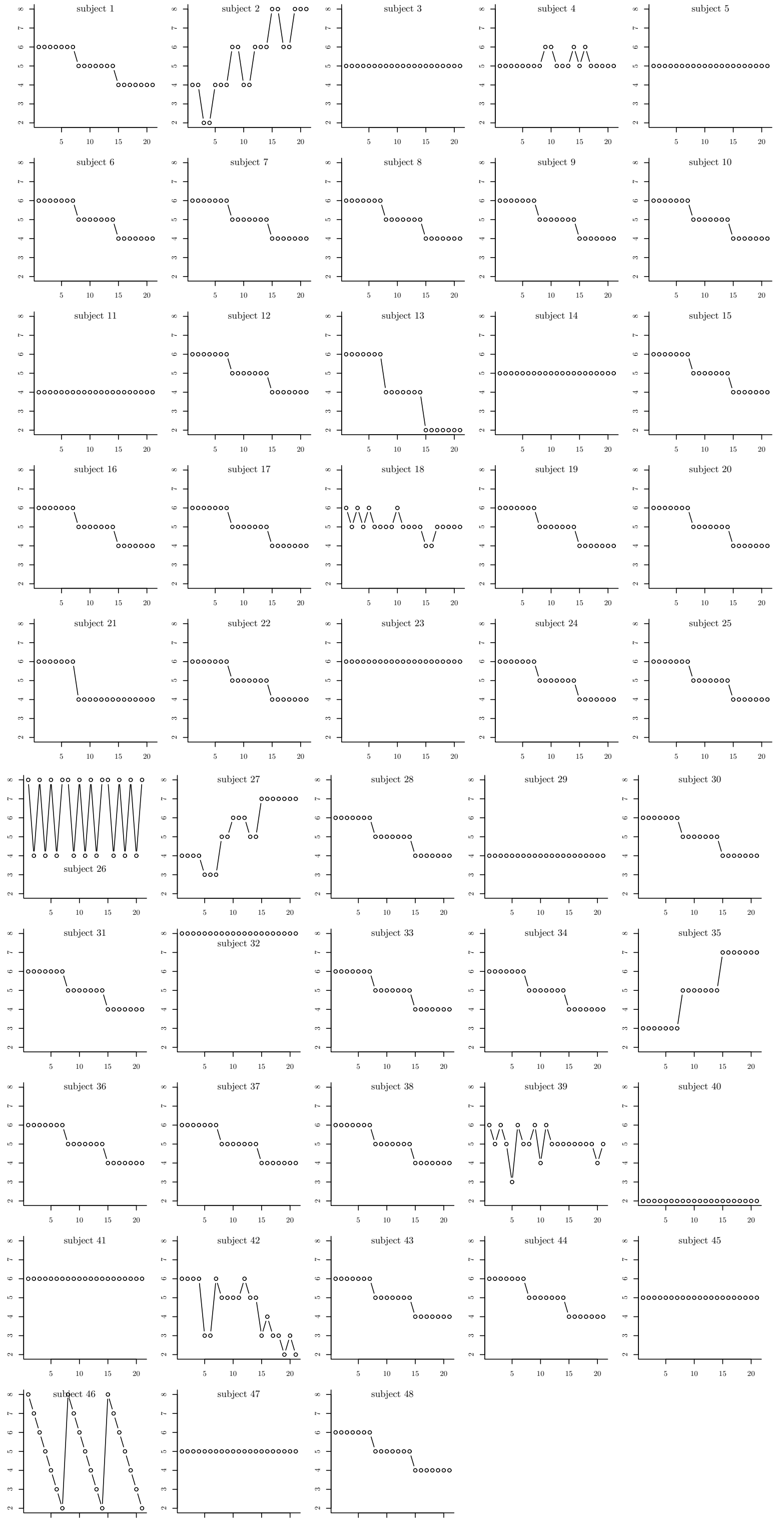
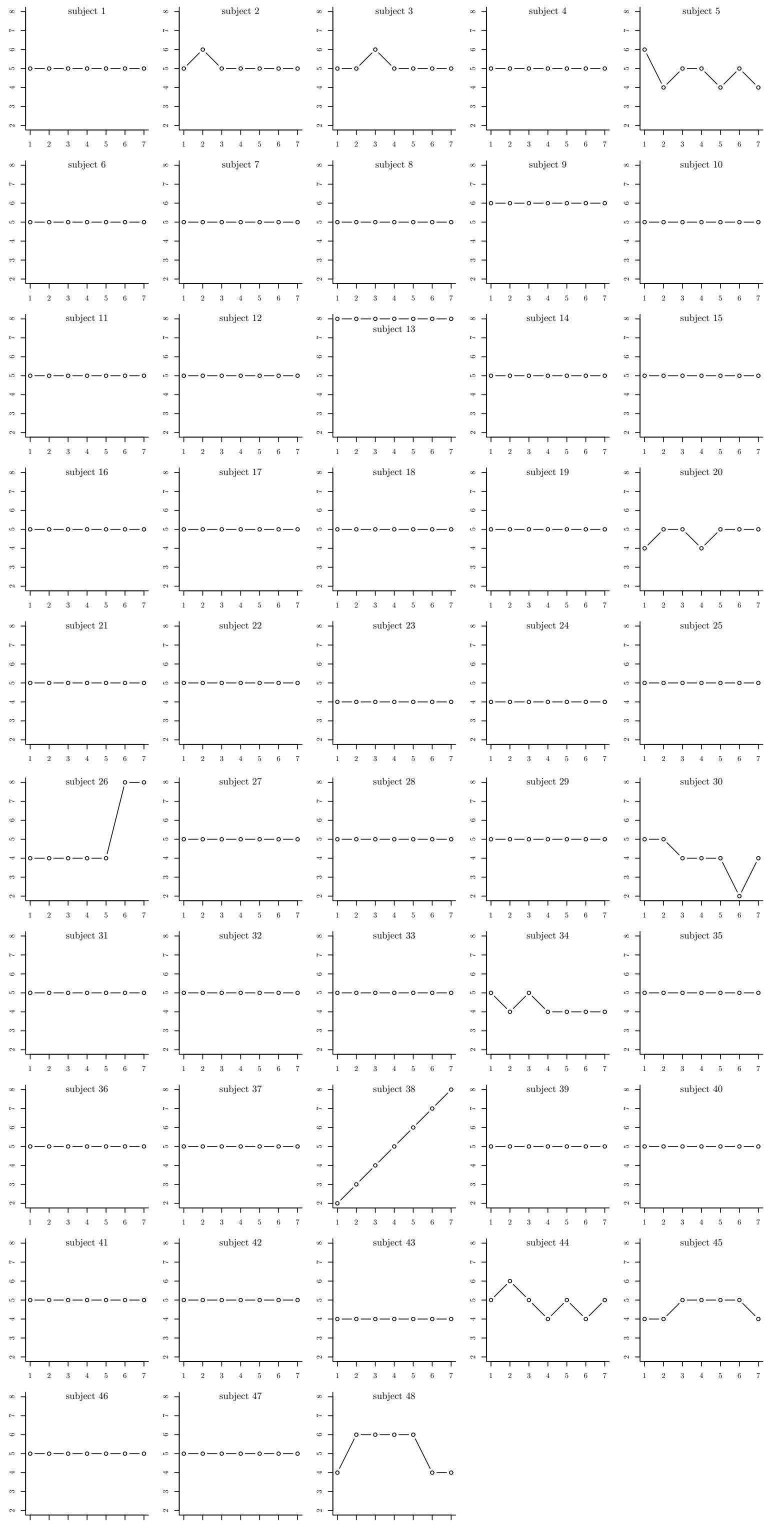


Figure 5: Individual effort schedules in the $PI$-treatment




*Note:* The horizontal axis reports the 21 entries $(h, \varepsilon)$ of the effort table. The first seven values correspond to $h \in [0, 60]$ and $\varepsilon = -2$; the following seven values to $h \in [0, 60]$ and $\varepsilon = 0$; the last seven values to $h \in [0, 60]$ and $\varepsilon = 2$. The vertical axis reports the seven effort-levels.

Figure 6: Individual effort schedules in the $II$-treatment.



*Note:* The horizontal axis reports the 7 entries $h$ of the effort table in the order 0, 10, 20, 30, 40, 50, 60. The vertical axis reports the seven effort-levels.

Figure 7: Average conditional effort decisions for all levels of help in each treatment

$PI$-treatment $II$-treatment

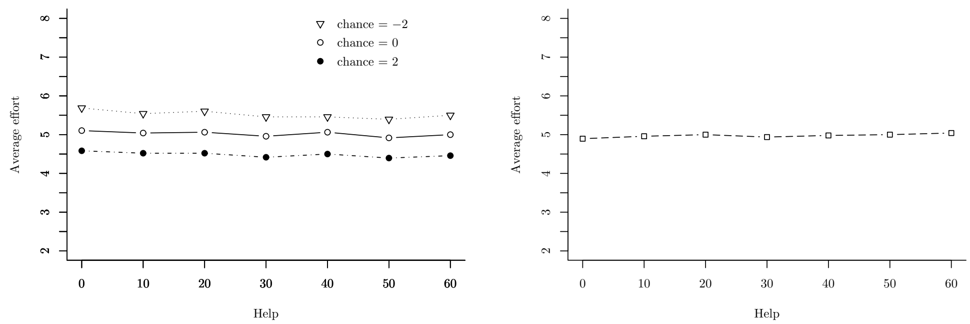
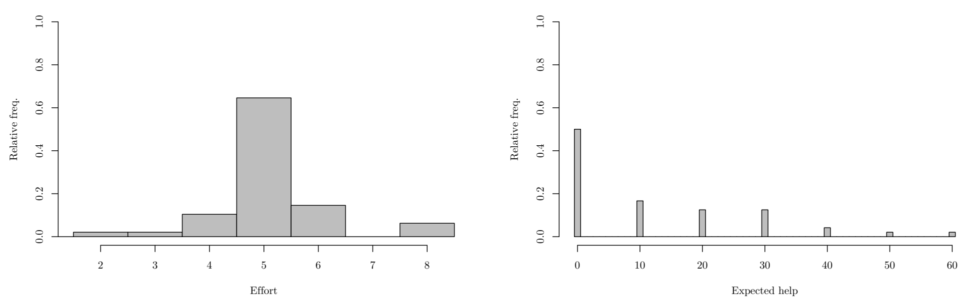



Figure 8: Distributions of unconditional effort decisions and expected help in each treatment

$PI$-treatment




$II$-treatment