IS ALTRUISTIC PUNISHMENT IN FACT ALTRUISTIC? AN EXPERIMENTAL APPROACH

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Abstract

The thesis intends to present an exhaustive description of a newly-emerging field of economic methodology: experimental economics, including its history, methods and most important literature; moreover, it demonstrates how the method works in practice. The experiment is designed to test a hypothesis, according to which third-party punishment reveals altruistic motives of the subjects. The alternative hypothesis is that the punishment is purely of normative or at least non-altruistic type. The results of the experiment suggest that altruism is clearly included in the motives of the punishment, which does not contradict with *a priori* expectations of the literature.

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Introduction

"Experimental economics has been the protagonist of one of the most stunning methodological revolutions in the history of science." (*Francesco Guala* [2008]) This is a very new and dynamically growing field of economics, which is about to reshape the whole discipline in our decades. This is why it is worth discussing the merits and flaws of this emerging field. This thesis aims to present actual knowledge about experiments and the ways they can be used to answer existing puzzles of economics. Furthermore, the methodology is illustrated through an application, in which newly emerged questions of economics are examined. In the experiment, a redesigned Trust Game is used to analyze the motive scheme of third-party punishment.

The experiment is designed to test a hypothesis, according to which third-party punishment reveals altruistic motives of the subjects. The alternative hypothesis is that the punishment is purely of normative or at least non-altruistic type. The results of the experiment suggest that altruism is clearly included in the motives of the punishment, which does not contradict with the *a priori* expectations of the literature (*Ernst Fehr and Urs Fischbacher* [2004]).

The rest of the thesis is organized as follows. In the first chapter, the brief history of experimental economics is presented. Next, the second chapter introduces the various types of experimental fields; moreover it discusses the critiques of the methodology. At the end of this chapter, a small detour to neuroeconomics is taken, which is a field related to experimental economics so closely, that it cannot be excluded from an exhaustive description of the discipline. In chapter 3, methodological issues of experimental economics are widely discussed, including data handling, choosing subjects and preparing a design for the experiment. Up to this point, mainly the methodological foundations .are discussed. The reason for not leaving methodology to the end, as

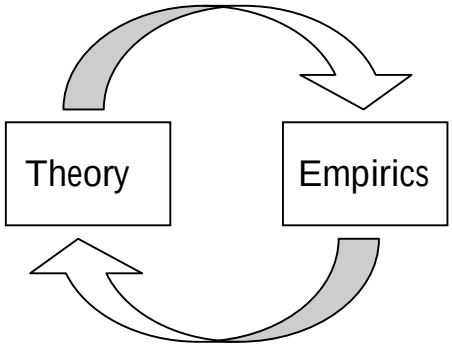
usual, is that the focus of the thesis is on the experimental methodology, rather than the hypothesis tested and the theory of fairness and normative behavior. In the fourth chapter, fairness and normative issues are theoretically grounded; furthermore the case of third-party punishment is presented. In the final part of the thesis the theory and the methodology meet in the form of an experiment, designed by the author of the thesis. To the best knowledge of the author, an experiment with the same design has not yet been conducted. The technicalities and the results of the experiment are discussed in the chapter, and a testable hypothesis is generated as an additional output of the analysis.

1. The Story of Experiments

According to *Daniel Friedman and Shyam Sunder* [1994] there is a revolution going on in economics in the 20th and 21st centuries. It is similar to the methodological changes which were introduced by Bacon and Galileo in physics (early 17th century), Boyle in chemistry (late 17th century) or Mendel and Pasteur in biology (19th century). 2000 years ago physics, chemistry and biology were also considered non-experimental sciences, which is not the case any more. "History suggests that a discipline becomes experimental when innovators develop techniques for conducting relevant experiments." (*Friedman and Sunder* [1994 p. 1])

At a very general level, in the middle of the twentieth century economics was in the process of becoming a "tool-based" science (*Mary S. Morgan* [2003]): from the old, discursive "moral science" of political economy, it was changing into a discipline where models, statistics, and mathematics played the role both of instruments and, crucially, of objects of investigation. (*Guala* [2008]) Up to the 1950's, economics relied only on theoretical foundations and passive observation. Since then, the usual scientific cycle started to develop in this field also, thus theory implies new experiments, and new experimental results induce creating new hypotheses, as Figure 1 demonstrates.

FIGURE 1: THEORY AND EMPIRICS



Source: *Friedman and Sunder* [1994 p. 3]

"One challenge faced by historians of the discipline is its strikingly interdisciplinary character". (*Guala* [2008]) Throughout this section, we follow *John H. Kagel and Alvin E. Roth* [1995 p. 4-86], *Friedman and Sunder* [1994 p. 121-34] and *Guala* [2008] to briefly review the less than 80-year history of experiments in economics.

Pioneering works (1930-55)

In 1931 *Louis Leon Thurstone* – a psychometrician – reported the results of his experiment, the goal of which was to chart the indifference curves of individuals. The idea came from the field of psychophysics, in which field experiments started in the late 1800's. In the experiment, he asked the individuals to choose between hypothetical bundles, so that the indifference curves and relative trade-offs could be inferred. W. Allen Wallis and Milton Friedman criticized the experiment because – as they argued – individuals may decide differently in real and hypothetical situations. If the individuals are not affected at all by the consequences of their decisions, then there are no incentives to try hard to decide right. The methodology of Thurstone`s experiment nowadays may seem odd,

still, had important role in starting a brand-new field in economics. In a subsequent experiment carried out by *Stephen W. Rousseas and Albert G. Hart* in 1951, attempted to solve the problems raised by Wallis and Friedman by offering breakfast meal choices under the condition that the entire chosen meal should be eaten. This altering made the situation more life-like.

In the next few decades more and more experiments were carried out, testing hypotheses on expected utility functions, individual choice, choice under uncertainty, basic assumptions of economics etc. (See e.g. *Maurice Allais* [1953], *Donald Davidson, Patrick Suppes and Sidney Siegel* [1957] etc.) As *Guala* [2008] points out, from this period on the experiments became fully institutionalized and reflecting to each other, unlike the previous years' isolated experiments. The use of real money in experiments as a motivation tool started to spread among economists. After *John von Neumann and Oskar Morgenstern* publishing the book "Theory of Games and Economic Behavior" in 1944, "gaming", participating in game-theory exercises became very popular at Princeton. It was started by John Nash, Lloyd Shapley, John Milnor and others, and it spread soon to other universities, as game theory became more commonly known.

Economics started to focus on interactions and strategic behavior, which resulted in inventing several 2-player and n-player games such as prisoner's dilemma (conducted by *Dresher and Flood* in 1950 for the first time). In these years, the fundamental rules of experimental methodology were established. Some of them resulted directly from theory, for instance, not to let the same players play repeatedly with each other, because of the tendency to play the game as one turn of a much more complicated strategic game. Others were observed as an experimental regularity, such as the phenomenon that players tend to divide the gain equally rather than trying to maximize the monetary payoff.

The experiments covered industrial structures (*Edward Chamberlin* [1948]) by examining experimental markets with buyers and sellers interacting. This framework allowed researchers to

study market forces under controlled conditions, ceteris paribus, which would have never been possible in real markets.

A new field emerges (1955-70)

In late 50's and early 60's the experiments aimed at duopoly and oligopoly behavior, (see for instance *Heinz Sauermann and Reinhard Selten* [1959], *Sidney Siegel and Lawrence E Fouraker* [1960]) and great emphasis was put on the available information for players and the "level of aspiration". *Siegel and Fouraker* [1960 p. 72-3] point out, that "…in science the shift from relying on existing information collected for other purposes to using information collected specifically for research purposes is analogous to primitive man's shift from food collecting to agriculture…". In these years using monetary rewards was already wide-spread in experiments.

In the 60's the field continued to grow, experimental computer laboratories were established. (*Austin C. Hogatt, J. Esherich and J. T. Wheeler* [1969]) By the time numerous experimental research teams and centers were existing, for instance the Stanford Value Project or the Carnegie Group. These were interdisciplinary associations including economists and psychologists, using role playing, business games and simulations among other methodologies. Some researchers started to measure the individuals' expected utility functions, (see *Gordon M. Becker, Morris H. DeGroot and Jacob Marschak* [1964]) and subsequently many experiments used similar techniques.

Friedman and Sunder [1994] report that remarkable experimental economics started in this decade. By that time sharp division emerged between microeconomics and macroeconomics, which facilitated the development of experiments. On the other hand, parallel hypotheses started to compete with each other (e.g. competitive equilibrium, Nash equilibrium, core), and experiments

were a suitable tool to decide between them. An experiment cannot verify any hypothesis but may help decide under what circumstances which model has the stronger prediction power.

The field started to develop simultaneously in the United States and Germany. In the USA Sidney Siegel (Stanford) and Lawrence Fouraker (PSU) documented how different payoffs and information conditions affected dramatically the experiment results. Siegel, Fouraker and Martin Shubik (Princeton) were planning to open an experimental laboratory, which plan finally failed because of the death of Siegel. In the 1960's Austin Hoggatt opened up the gates of the first large-scale computerized laboratory at Berkeley. Hoggatt and James Friedman tested the implications of game theory. It can be generally stated that American economists dealt with the outcomes of the economic theory.

German economists followed a somewhat different path. The German group consisted of Sauermann and his students like Selten and Tietz. They were mainly concerned with decisions of the individuals and bounded rationality. They were interested in the process rather than the outcome.

Modern age of experiments (1970-today)

In the 60's doing merely experiments was not respected in the scientific community. Many publication attempts failed because of the lack of sponsors, for instance the publication of the papers presented in 1964-65 on Faculty Research Workshops in Experimental Economics at Carnegie Tech organized by Vernon L. Smith and some others. However, it shows the increasing acceptance of the field that from the 1970's National Science Foundation provided financial support to experimental laboratories. In these years Smith and Charles Plott started a fruitful conversation on experiments, and as a result, they realized that experiments can be useful to examine additional fields, such as social choice theory, public economics and political science issues. *Morris P. Fiorina and Charles R. Plott*

[1978] engaged in examining committee processes and other theoretical political economy questions. *Charles L. Plott and Vernon L. Smith* [1978] examined the influence of economic institutions. These papers were not simply further steps of experiments. These substantiated some common principles of experimental economics; for instance, concentrate on deciding between rival theories, or extension of experimental methods to policy questions. The 1980's and 90's experienced a boom in experimental economics, with increasing number of publications in mainstream economics journals and starting up with new fields, as neuroeconomics. Many laboratories appeared, the three largest were in Arizona, Caltech and Bonn. Friedman and Sunder [1994] provides a partial list on the institutions conducting experiments in the 90's, which consists of 80 institutions. In 1988 Maurice Allais[1] was the first in this field to win the Nobel Memorial Prize in Economics, and soon others followed him: Vernon L. Smith[2] in 2002 and Thomas C. Schelling[3] in 2005. These prizes show that experimental economics gained respect in economics and can be well regarded as a mainstream field nowadays.

1 "for his pioneering contributions to the theory of markets and efficient utilization of resources"
2 "for having established laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms"
3 "for having enhanced our understanding of conflict and cooperation through game-theory analysis"

2. Experimental Economics

Following Al Roth's categorization, we can distinguish between three main types of experiments. This taxonomy relies mainly on the type of questions the experiments want to answer. The first is "Speaking to Theorists". The experiments of this category aim to test existing theories and hypotheses. Experiments help map the applicability of different theories. It is a dialogue between theoretical economists and experimenters. (e.g. *Fiorina and Plott* [1978]) In the second group, "Searching for Facts", the experiments are designed to search for new observations and regularities in individual behavior and economic activity. These experiments promote the emergence of new theories and facilitate research in new fields. Here mainly experimenters respond to each other, and at the end of the process theorists may join the scientific conversation (e.g. *McCabe, Rassenti and Smith* [1993]). Last, but not least, in the category "Whispering in the Ears of Princes" policy makers make use of the results experimental economists. These can include market design, taxing problems and many others. (e.g. *David M. Grether and Charles R. Plott* [1984])

Friedman and Sunder [1994 p. 2] point out that the experiments are vastly connected to microeconomics, industrial organizations, public choice, individual decision making, game theory etc. Macroeconomic theories are less suitable for experimental testing because of their complexity. It seems that macroeconomics will become an indirectly experimental science, where the main assumptions are built on experimental findings but the central theories cannot be directly tested.

There are a few more fields which make use of experimental methods. There are so called "test bed" experiments in which economists and policymakers test new institutional designs before launching them in real markets. Moreover, experiments are widely used for pedagogical purposes,

similarly to chemistry or physics lectures. (see *N. Scott Cardell et al.* [1996]) Last, but not least, commercial application is also becoming increasingly known and popular worldwide. For example, Cohen [1992] conducted experiments about responsiveness for advertisements. Apart from this, there are a lot of applications in marketing.

Critiques of Experimental Economics

Georg von Bekesy, an experimental psychologist wrote about the critics: "Another way of dealing with [experimental research] errors is to have friends who are willing to spend the time necessary to carry out a critical examination of the experimental design beforehand and the results after the experiments have been completed. An even better way is to have an enemy. An enemy is willing to devote a vast amount of time and brain power to ferreting out errors both large and small, and this without any compensation. The trouble is that really capable enemies are scarce; most of them are only ordinary. Another trouble with enemies is that they sometimes develop into friends and lose a good deal of their zeal. It was in this way that the writer lost his three best enemies. " (*Bekesy* [1960, p. 8-9])

According to *Herbert Gintis* [2000], the methodology of behavioral game theory was criticized from many sides. To mention the first, the behavior of subjects in a simplified, sterile laboratory environment does not provide an adequate guidance to the behavior in a complex situation which often includes intertemporal decisions, moral issues, social and psychological phenomena. In practice one can see that experiments in other sciences are similarly simplified, nevertheless undeniably useful.

A second counter-argument against experiments is that the subjects carry over their everyday-life contexts for their behavior, so that they do not behave according to the rules of the experiment, rather according to the rules of their lives. This may result in playing a one-shot game as

a repeated one, or playing an anonym game as though the partners were known, and reputation could be built. Some evidence support this idea, for instance, this was clearly the case in some experiments which were using professionals (see *Penny Burns* [1985] and *Matthew J. Anderson and Shyam Sunder* [1989]). On the contrary, when the possibility of reputation building is given, significant adjustments can be observed in the subjects' behavior. (Ernst Fehr and Simon Gächter [2000])

Friedman and Sunder [1994] report that some experiments in connection with asset markets were criticized because the traders might use very different heuristics than naïve students. This is a point that may need to be further analyzed.

Additionally, some critiques targeted, as *Colin F. Camerer, Richard Thaler* [1995] mentioned, the small stakes, typically a maximum of 10-20 dollars per experiment per subject. The objection was that relatively small stakes induce different incentives than larger stakes. *Elizabeth Hoffman, Kevin McCabe, Vernon L. Smith* [1996] invested $5000 to investigate what would happen if stakes were substantially larger in laboratory experiments. They have found no significant difference between the outcomes, so they concluded that the size of the stakes does not in fact matter.

A further critique may arise while the results of the experiments are planned to be used in a different country with totally different culture, religion, belief system and mettle opposed to where the experiment was conducted. Are those results still valid in a totally different human environment? The question has been examined widely. For instance, *Roth, Prasnikar, Zamir and Okuno-Fujiwara* [1991] conducted experiments in Jerusalem, Ljubljana, Pittsburgh and Tokyo to uncover differences between behaviors of subjects from different cultures. There were some interesting differences, at the same time, these deviations did not reverse the hypothesis tested, and the central pattern of the behavior remained similar. On the other hand, *Joseph Henrich et al.* [2001] examined fifteen small-scale societies, just like the Hadza camp in Tanzania or a group of resettled villagers in Zimbabwe. These groups were asked to play ultimatum game, and showed very similar results to European laboratory

experiments. The deviations from standard results largely resulted from very specific local traditions or rules of everyday life. From these one can infer the conclusion that the experiment results more or less are adequate in similar countries, but should be carefully used for people with radically different norms and culture.

By now, critiques which question the grounds of experimental economics became rare. Critics are more likely to be inquisitive about the explanatory power, the design or the implementation of the experiments. In our days, experimental economics resembles a grandiose dialogue between experimentalists, whose critiques inspire further and better designed experiments, thus boosting the engine of economics.

Neuroeconomics

Neuroeconomics is a very closely related topic with experimental economics, and as such, is worth mentioning it for a few paragraphs. Many experimental economists – Ernest Fehr, for instance – integrate experiments and neuroscience in their academic work, in order to get precious hints and also for the fields to support each other's results.

Neuroscience, according to *Colin F. Camerer, George Loewenstein, and Drazen Prelec* [2005] uses brain imaging among others to investigate how the brain works. This technology enables economists to find measures of utility, satisfaction, thoughts and feelings, which were until recent years considered being immeasurable theoretical factors. The axiom of revealed preferences enabled economists to "equate unobserved preferences with observed choices" (*Camerer, Loewenstein and Prelec* [2005 p. 10]). Thus economists could investigate human decisions without being able to in fact see what was going on in the brain.

Neuroscientific methods reshape economics just like telescope reshaped astronomy, and microscope boosted biology. Currently brain imaging is the most popular tool of this field. As a result of brain imaging, a picture is made on the brain activity of the subjects performing different tasks. These pictures are created with either EEG[4], PET[5] or fMRI[6] technique. (for an example, see Appendix 1, 2) The difference between the pictures show which parts of the brain are activated during the activities. Another method for examining brain activity is single-neuron measurement. Here small electrodes are inserted into the brain to measure a single neuron's firing. This method is much more refined, only not applicable to humans for damaging brain neurons. Electrical brain stimulation (EBS) is a method which is also mainly used by animals. In EBS some part of the brain is stimulated by electric pulses, thus causing good feeling to the animals. An additional technique to inspect brain functioning is looking at psychopathological or brain damaged humans. When the damage affected a limited part of the brain and the subject is worse in performing some tasks, but equally good at doing other tasks than the healthy subjects, then it can be inferred what kind of function that specific part of the brain may have. Psychophysical measurement measures heart rate, blood pressure, galvanic skin response and pupil dilation in order to investigate the inner reactions of the subject. The problem is that many different feelings can induce the same psychophysical reactions, so the method is not always appropriate. Finally, diffusion tensor imaging can be used to determine the timing of different events in the brain.

Neuroeconomics integrates the experimental principles of economics with the biological inferences drawn from neuroscience, together applied to study human behavior. Neuroscience can provide economics with some useful hints on the concepts it uses. It is commonly accepted in economics to classify subjects on dimensions like time preference, risk attitude or degree of altruism.

[4] electro-encephalogram
[5] positron-emission topography
[6] functional magnetic resonance imaging

It is also assumed that an individual remains consistently in his category through different situations. However, empirical findings state that these characteristics are very weakly correlated across situations. The same subject can be risk averse in one situation and outstandingly risk-taking in another.

Mainstream economics theory assumes that money causes only indirect utility, through the goods that can be bought for it, unlike other goods which cause direct utility for subjects. Neuroscientific experiments revealed that exactly the same parts of the brain are affected ("the same dopaminergic reward circuitry of the brain in the midbrain (mesolimbic system) is activated" *Camerer, Loewenstein and Prelec* [2005 p. 35]) when eating food, looking at funny cartoons or receiving money. This evidence suggests at least rethinking of the role of money in economic theory. If money indeed causes direct utility, it can imply that paying is probably painful, which can explain some puzzles in connection with oversubscribing flat-payment plans for utilities and telephone service. (see *McFadden and Ben-Akiva* [1987] or *Lambrecht and Skiera* [2004])

Studying neural processes can give hints for building new models of consumer decision making or behavior under uncertainty. For instance, the brain often processes information according to the "winner-take-all" rule (*M. James Nichols and William T. Newsome* [2002]). Thus, when two groups of neurons transmit different information about the external environment, the resulting judgment often adopts one item of information and entirely ignores the other one. This leads to unambiguous decisions even if the subject receives confusing signals from outside. This method is not yet implemented in economic models, but may be in the future.

Neuroscience results are applicable in many more fields, for example, intertemporal choice, risk aversion, altruistic punishment etc. The field is relatively new, and probably it still hides most of its potential for economic theory.

3. Methodology

In this section we mainly follow *Friedman and Sunder* [1994] in describing the whole experimental process and design from a methodological point of view.

Data sources

There are two broad categorizations of data source. The first is connected to the environment. If the data are collected in a natural environment, these are called field data. On the other hand, data gathered in laboratory or other artificial milieu, are called laboratory data. The second categorization is in connection with the degree of control used in the experiment. Experimental data are gathered in fully controlled experiments; conversely, happenstance data arise in uncontrolled situations.

Traditionally all economics data were field-happenstance type, rate of inflation, firm achievement, commodity prices are some examples. The field of econometrics attempts to handle the problems arising with happenstance data, namely unobserved characteristics, measurement errors, selection bias etc. In modern experimental economics usually laboratory-experimental data are generated. These data are usually more expensive than happenstance data, but are free from the problems mentioned above. There are also some field-experimental data, for instance the analysis of the television game show Deal or No Deal (*Thaler et al.* [2007])

Experiment design

The purpose of the experiment decides which variables are focus variables, that is, factors that we are interested in. The variables which are not important for us, but can alter the outcome, are called nuisance variables. A well-designed experiment is able to separate and adequately control for these variables.

Throughout the experiment the nuisance variables should be kept constant to achieve ceteris paribus effect. The variables of interest are often examined by changing them between the experiments leaving everything else the same. Thus the difference in the results can entirely be attributed to the focus variable. In general, the more focus variables are chosen, the more expensive the experiment will be. If there are more than one focus variables examined in one stream of experiments, they should be varied independently one-by-one, otherwise their effects are confounded.

It is sometimes problematic to keep nuisances constant, since they are sometimes uncontrollable, or even unobservable. For instance mood, alertness and interest of the subjects are such factors. One way to handle this problem, suggested by *Friedman and Sunder* [1994 p. 24] is randomization. If the different treatment levels of focus variables are assigned randomly to individuals, this randomness helps not to confound nuisance and focus variables effects.

As mostly all the focus and nuisance parameters are constant within an individual and time period, the nuisance variables can be effectively controlled for by within-subjects design. In this design all the treatments are used for each of the subjects and the within-individual differences are averaged. However, there can be some dynamic effects also, learning for instance, which should also be handled. Crossover design is suitable for this purpose. If we have treatment A and B, we can use a session beginning with four A periods, followed by eight B periods, closing the series with four A periods. For other subjects the experiment can be conducted in a BAB design, so the averaged

differences control well enough for cases in which the subjects are more comfortable with the rules by the end of the experiment. Another possibility is dual trial, in which the subjects are asked to play simultaneously A and B, in each round indicating their choice for one A, and one B type situation. This ensures that on average the same individual has the same understanding of the game in each treatment.

The subjects

While choosing the subjects for the experiment, many aspects should be taken into account. One can choose students or professionals, experienced or novice subjects randomly picked or selected carefully one-by-one, they can be male or female, old and young etc. In the next section the most important factors of subject pool selection are presented.

Most often the experiments are conducted with university students. It has some undeniable advantages, namely, that subjects are readily available with relatively low alternative costs, they have steep learning curves and are familiar with the language and mathematics required from the subjects. However, subjects with too much game theory knowledge, doctoral students for instance, may have the disadvantage that they do not react as they would in a real-life situation, but they rather mimic the implications of the theory they recognize in the experiment.

On the other hand, employing professionals proved many times to be inefficient in experiments. *Burns* [1985] and *Anderson and Sunder* [1989] report that the professionals totally ignored the rules of the experiments, and used the rules of their work field instead, which they were familiar with.

An additional aspect, gender issues in experimental economics has not yet been widely examined. There is not much evidence on whether gender difference matters in the laboratory

outcomes. *Jamie Brown-Kruse and David Hummels* [1990] did not find significant difference in public goods contributions, nevertheless, other experiments revealed some gender differences, see *Catherine C. Eckel and Philip J. Grossman* [1998] for selfishness, *Christiane Schwieren and Mathias Sutter* [2003] for trust. On the other hand, in face-to-face bargaining experiments gender may matter a lot (see *Sheryl B. Ball and Paula-Ann Cech* [1990])

Rewards

It is a crucial point in laboratory experiments, whether the experiment is relevant from the aspect of the tested theories. How can we infer serious results from the behavior of subjects whose utility function and preferences are not a priori (nor a posteriori) known? We cannot be sure what kind of "home-grown" preferences are taken into the laboratory, and cannot measure the fatigue, tiredness and mood of the subjects which can seriously distort the outcome.

These problems can be overcome by using induced-value theory (*Smith* [1976]), which is elegant theoretically and provides with handy rules in the laboratory. The theory to be tested often specifies characteristics regarding preferences, technology, resource endowments and information distribution of the agents. Induced-value theory helps to control such characteristics of the subjects by using reward medium; hence the uncontrollable characteristics of the individual become irrelevant. There are three conditions that that should be satisfied. First is monotonicity, which means that more reward is more desirable for the subjects. When using money as a reward, this condition is easily satisfied. Salience is the second condition, which requires that the utility of the subject depend on his actions, and maybe on the actions of others, and he understands these rules of the game. Salience can be understood as the presence of incentives to achieve better results, so the subjects should not be getting a fixed amount, rather a sum that is closely connected to their achievements

during the experiment. Finally, dominance should be satisfied in order to allow for neglecting influences other than the utility from the experiment. The higher the reward, the more confident one can be that dominance is satisfied.

The most frequently used reward is cash, but sometimes school grades are also used for this purpose. In some cases on-time bonus is paid in order to reduce tardiness, especially when it is important for the whole group to start at the same time. Points or quasi-money can also be given to the subjects, with pre-announced conversion rate to domestic currency. Bankruptcy of the subjects should be avoided, because negative payments are not credible. This induces risk-taking behavior for those with negative points, because further losses do not feasibly affect their final reward (zero payoff), but a gain can increase it. This kind of reversal in risk taking behavior can ruin the inferences of the experiment so best to be avoided. There are some practices to be used for such cases. For instance, the individuals can be given an initial endowment, some restrictions can be placed (e.g. no short sale), or it can be announced that those who reach a minimum wealth threshold are automatically disqualified from the game.

During the experiment

The first step in the laboratory is to clarify all the rules the subjects need to know. It is best to make the printed instructions available to the subjects throughout the whole experiment, so that they can return to it any time. The instructions should contain all the relevant rules and institutions, all the available public and private information for the subjects that they need to know for the game. When the rules of the game are very complicated, it may be advisable to give illustrative examples. But these examples should be very carefully used, because they can influence the actual behavior of the individuals. This is the so-called demand effect: the subject builds a preconception based on the

example on what phenomenon the experimenter is looking for, what kind of behavior is expected from the subjects, and he will behave (or not behave) according to this idea.

An additional question of the experiment is how realistic the circumstances should be. As a rule of thumb it is better to avoid using real company names or colors in the laboratory, as these might bring additional uncontrolled factors to the experiment, realistic elements can have different effect on different subject depending on their previous experience.

Finally, the duration of the experiment is also an important factor. As a common practice, a maximum of three hours can be accepted, in longer experiments the subjects may become bored, tired or hungry, and this hinders them in concentrating on the task.

Facilities

The experiments can be and have been for long conducted manually, using merely a classroom, some papers and pencils and a chalkboard. These manual experiments have the advantage that they are easy to prepare and change some details quickly even during the experiment. The design, treatments, parameters and procedures can be modified with very low cost and within short time. If human communication and its aspects are examined, it is also better to choose manual work. On the other hand, from the 1980's increasing share of the experiments are conducted with computers. These allow the economist to easily maintain anonymity of the subjects, and keep private information (known to only some of the subjects) really private. With the help of internet the experiment can be really flexible, because it does not require the physical presence of the subjects. In the future it may support international experiments, in which interesting cultural and behavioral differences can be examined. Additionally, there are some types of experiments which can only be conducted with computer software programs, such as market structure, induced labor market or

large scale stock market experiments. If there is huge amount of data collected during the experiment, computerization makes it much easier to organize, summarize and analyze.

4. Fairness, reciprocity and altruism

Rationality, norms and fairness

Economics has been focusing on utility of humans and the rational actor was standing in the center of the analysis for centuries. According to *Paul Samuelson* [1947], utility maximization needs no more assumptions, only the transitivity of preferences and some maximization conditions. These are basically technical assumptions, and do not include any moral judgment. However, sometimes the rational actor model is misrepresented (see *Gintis* [2000]). It is sometimes supposed that the rational actor is self-interested. This generally means in the interpretations that the subject behaves selfishly, and tries to maximize his own welfare. However, as Gintis points out, there is nothing irrational in following norms or giving donations. "…It is just as "rational" for me to prefer to have *you* enjoy a fine meal as for me to enjoy the meal myself. It is just as "rational" to enjoy being virtuous as it is to enjoy having clean clothes. It is just as "rational" for me to care about the rain forests as to care about my beautiful cashmere sweater. And it is just as "rational" to reject an unfair offer as it is to discard an ugly article of clothing…" (*Gintis* [2000 p. 68])

In the next sections behavior patterns are presented, such as normative behavior and fairness issues. However, rationality of the subjects are not questioned, the analysis remains inside the barriers of classical mainstream microeconomics.

Human altruism and experiments

Human altruism is unique in the animal world, thus this phenomenon receives high attention from social sciences. Altruism plays an important role in human interactions, for instance, a few altruists can force selfish individuals to cooperate. Humans are different from animals in another aspect also; they show a high degree of division of labor and a wide cooperation between genetically not connected large groups. In contrast, most animal species do not have division of labor at all, or it is much simpler as that of humans, and is mostly genetically determined (e.g. ants and bees). Animals cooperate in very small groups, mostly within family. (*Fehr and Fischbacher* [2003])

There have been several experiments aiming to discover reciprocity or altruism among not closely related animals which were interacting through several repeated games. (see *Robert Axelrod and William D. Hamilton*, [1981], *Hauser, Marc D., Keith M. Chen, Frances Chen and Emmeline Chuang* [in press]) However, the evidence on such cooperation in the animal world remained scarce. Animals are not susceptible of building reputation, whereas for humans it is very common to build reputation.

Human altruism is much more than "reciprocal altruism or reputation-based cooperation". It involves also altruistic rewarding, and altruistic punishment. (*Fehr and Fischbacher* [2003]) Altruistic rewarding means that the individual is ready to sacrifice some part of his payoff in order to reward the other individual for his norm-abiding behavior or cooperation. On the contrary, altruistic punishment means that the subject agrees to have a smaller payoff for himself, if the other subject, who violated the norms, is punished. Strong reciprocators bear the costs of punishment or rewarding even if they do not have any direct or indirect benefit from punishing or rewarding.

Phenomena like altruism, strong reciprocity and trust can be examined by a few games. Such games are the Ultimatum Game, the Trust Game, and the Dictator Game, and some more, like public goods games (*Toshio Yamagishi* [1986], *Elinor Ostrom, James Walker and Roy Gardner* [1992], *Fehr and Gächter* [2002]), gift exchange games (*Ernst Fehr, Simon Gächter and Georg Kirchsteiger* [1997]) and

repeated prisoner's dilemmas. In the Ultimatum Game (see *Colin F. Camerer* [2003], *Werner Güth, Rolf Schmittberger and Bernd Schwarze* [1982]) originally there are two players, the Proposer and the Responder. The Proposer has to make one offer to the Responder, how he wants to divide 100 dollars between the Responder and himself. The Responder can accept the offer, in which case each gets the proposed sum. On the other hand, the Responder can reject the Proposer's offer; in this case, both of them get nothing. If the players would be purely payoff-maximizers, than the Proposer would offer the smallest possible positive amount, and the Responder would accept it, while it is more than zero. But in practice, it is a robust result that Responders tend to reject 25% and smaller offers, because they find it unfair. Moreover, the Proposers are able to anticipate this pattern, so the modal offer is 50%. The rejections are in many cases considered altruistic, while subjects reject also in cases when they cannot have any future gain from building a reputation of harsh punisher. Most frequently, such circumstances can be generated by letting subjects playing anonym, one-shot games. Thus, they are aware that they will not be playing with the same player again. Still, rejections are significantly present during the game. It was also shown that the rejections are a response for violating some norms. When the subjects were told that their share was randomly picked by a computer, they were willing to accept very small amounts also. (*Sally Blount* [1995]) There can be at least two motives for proposing high amounts to the Responder. One is that the Proposer fears that the Responder will reject the offer and he will be left with a payoff of zero. The other is that it gives a positive utility for the Proposer to abide norms, and to behave altruistically.

The Dictator Game (see *Camerer and Thaler* [1995]) was designed to clarify the motives of Proposers for offering high shares to Responders. Dictator Game is the same as Ultimatum Game, except, that the Responder has no choice here; he has to accept whatever amount is offered. In Dictator Game experiments the offers were lower compared to UG, but they were significantly

different from zero. This indicates that both fear and altruism and norms affected the behavior of Proposers.

The Trust Game (see *Camerer* [2003]) is played as follows. There are originally two players in the game, the Truster and the Trustee. First, the Truster is given a 100 dollar endowment. He can decide to give some or all or none of the endowment to the Trustee. Then the amount offered by the Truster is quadrupled, thus the Trustee gets five times the offer. As a last step, the Trustee can decide what – if any – amount to return to the Truster. If the Trustee is payoff-maximizer, he will return nothing to the Truster. But as the Truster is rational, he can anticipate this, and will not give anything to the Trustee. In experiment games there are some cases with zero payment, but in most cases the subjects realize that they are better off with cooperating.

Third party punishment and experiments

As the series of experiments of *Fehr and Fischbacher* [2004] show, the enforcement of social norms and fairness is not only characteristic of those subjects who are economically affected by the norm violations, but also subjects who are not affected at all. Third party punishment in human society is a very important factor of enforcing norms, while there are many cases in which very few people, or maybe nobody is affected directly by the norm violation. For instance, not voting or voting for the "wrong party" or shirking in a relatively large work team. If a third party would be entirely selfish, then he would not devote any amount for punishing the norm violators. But according to the notion of strong reciprocity (see e.g. *Gintis et al.* [2003]), third parties are willing to punish norm violators.

Thus third-party punishment deserves attention. Another reason, why this phenomenon is worth studying is its ability to clearly distinguish between motives of punishment. In the experiments

the subject who is negatively affected by somebody's norm violation is called the second party. Second-party punishment can be altruistic or normative, but it may also uncover selfish motives just as vengeance. On the contrary, third-party punishment can be assumed to be merely normative or altruistic. (*Fehr and Fiscbacher* [2004]) Thus analysis of third-party punishment enables to separate selfish motives from non-selfish motives.

The way this phenomenon can be examined has been worked out by experimentalists. *Fehr and Fiscbacher* [2004] set up an experiment design where third parties are involved in dictator games and prisoner's dilemmas. The game is played between Player 1 and Player 2. Then Player 3 can decide whether he wants to buy deduction points, practically, whether he wants to pay for punishing any of the players. This technique can be applied basically for any type of games.

Motivation of third-party punishment

Though it is likely that selfish motives can be excluded when examining the possible motives of third-party punishment, it is still a question, what kind of reasons are standing behind this behavior. *Peacock* [2007] mentions possible causes for the punishment, but there are some further potential causes also. These are:

i. A sense of justice
ii. Desire to harm an offender
iii. The emotion anger
iv. Desire to benefit the norm violator's future interacting partners

Fehr and Fiscbacher [2004] suggests that second-party punishments may have egocentric motives; on the other hand, third-party punishment is clearly normative or altruistic. Moreover, when

a second-party is negatively affected by norm-violation, a natural response is retaliation. But in this case retaliation has nothing to do with the second-party's sense of social norms. Third parties can be assumed to punish only if the behavior of the subject violated some norms, and not when – while following these norms – he economically harmed the interacting partner. In *Fehr and Fischbacher* [2004] it is clearly claimed that "sanctions of third parties reveal the truly normative behavior". The truly normative behavior includes punishing because of the sense of justice. It may also include desire to harm an offender.

Fehr et al. [2004] bring an alternative explanation to the punishments. Altruism of the third parties towards future interacting partners of norm violators makes them to punish. This explanation is in line with the fourth motive mentioned by *Peacock* [2007], desire to benefit future partners. The next section introduces a new type of experiment, which supposedly brings us closer to the genuine motives of third party punishment. The goal of the experiment is to decide between the two existing alternative hypotheses about the motives of punishment, or perhaps to unify these theories and give a general explanation for punishments.

A few more questions arise in connection with the motives of third-party punishment, which should be mentioned, though these are not tested in the experiment presented in the next section. First, it is still a question whether a pure cognitive process can induce an act or, there should be some emotions so that the action is started. This is, however, indirectly tested in the experiment, while anger can be a possible motive of the punishments. Second, and more importantly, it is not clear whether sense of justice and the desire to harm the norm violator can be regarded as two separate motives or these are just the two sides of the same normative behavior. Moreover, what can be said if the norm means "measure for measure" rule for someone, which includes both motives at once? In the experiment these two motives are not separated intentionally, moreover, they are largely

washed together under the title normative behavior. However, to what extent these to phenomena are connected, could be the question of a future analysis.

5. Experiment on Third-Party Punishment

Technical description

The experiment involved 13 subjects, with 11 observations for each on average. The subjects were students of Central European University, Economics Department. The recruitment happened through e-mail advertisement, and subjects were volunteers. The mean payoff the players received amounted HUF 627 (USD 3,23). This payoff was handed to them immediately after the experiment. The experiment on average lasted for 80 minutes.

The game was based on trust game, with slightly modified instructions. Player 1 is given HUF 100, of which he/she can give any amount to Player 2. Player 2 receives the amount; moreover, the Bank quadruples the amount given, this way Player 2 will finally get 5 times the amount offered by Player 1. Then Player 2 can decide to give some money back to Player 1.

Next, Player 3 is given a HUF 100 endowment. Player 3 can keep the money or may use a part or all of it to punish Player 2 if he/she seemed unfair in the game. Player 3 can choose 2 types of punishment.

a. Player 3 can pay HUF 10 to have HUF 20 deducted from Player 2 immediately. (Player 3 can choose any integer multiple of the punishment.)
b. Player 3 can pay HUF 10 to have HUF 5 deducted from Player 2 in each of the next 3 rounds if he/she behaves unfairly again. (Player 3 can choose any integer multiple of the punishment.) Unfair behavior is defined by Player 3, by specifying a percentage. If Player 2 returns a lower percentage of Player 1's offer than

specified, it will be considered unfair. Player 2 will get to know about this punishment before the next round.

At the end of the game, the payoffs are summarized and paid to the players.

In the experiment, every subject were Player 3, the decisions of Player 1 and Player 2 were simulated based on previous trust game experiment results. Technically, the game was conducted in classrooms, with tools like paper, pen and whiteboard. The players were placed in separate rooms, so that they met only the experimenter. They were given a written instruction sheet (see Appendix 3). They were free to ask further questions from the experimenter. After clarifying the rules, the players were asked to answer check questions (see Appendix 4), in order to make sure that they really understood the rules. Then, in each round the decisions of Player 1 and Player 2 were announced to the players, who indicated their decisions on an answer sheet.

Following the experiment, the participants were sent a short questionnaire, which was filled out by a few volunteers. (see Appendix 5)

Analysis of the Results

The main purpose of the experiment was to find evidence for or against the existing hypotheses about the cause of third-party punishment, prevalent in human interactions. Moreover, the ultimate goal was to decide between two specific hypotheses, introduced in the previous chapter. The first hypothesis (*Fehr and Fischbacher* [2004]) claims that third-party punishment reveals truly normative behavior. The other hypothesis (*Fehr et al.* [2004]) suggests that third-party punishment can be explained with altruistic motives, the will that the subject wants to benefit future interacting partners of the individual being punished.

So far the experiments aimed to confirm the existence of third-party punishment phenomenon, but – to my knowledge – no experiments were designed to reveal the true motives. The presented experiment design was set up in order to distinguish between these hypothesized motives, or even verify or falsify one of them.

Punishment A was designed to express immediate punishment towards the player who was violating the norms. On the other hand, B was rather meant to express altruistic motives of the subjects.

TABLE 1: MOTIVES OF PUNISHMENT A

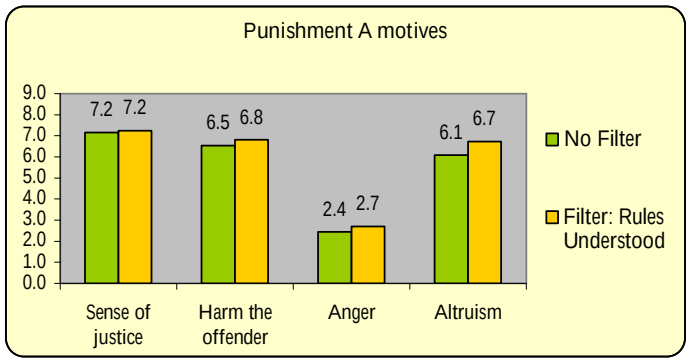


TABLE 2: MOTIVES OF PUNISHMENT B

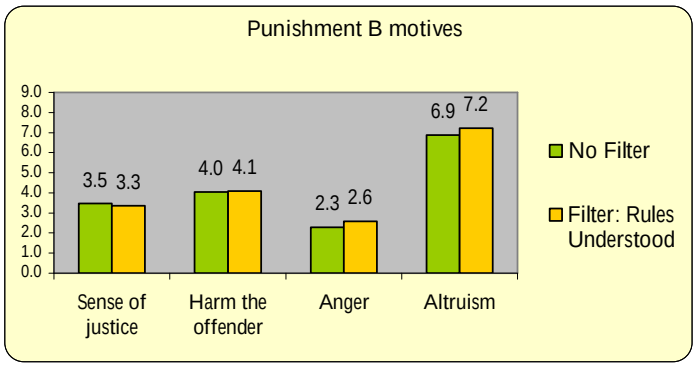


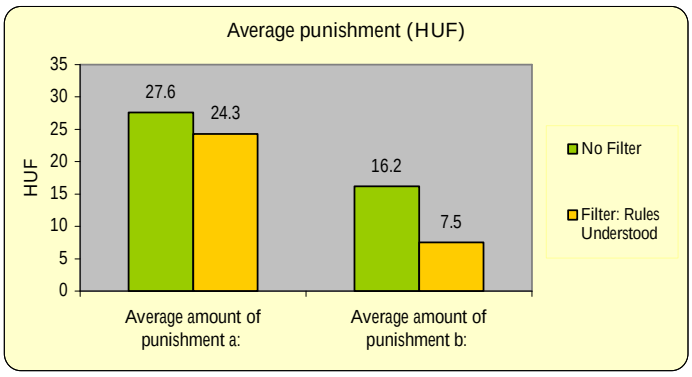
Table 1 and Table 2 show which motives worked in players while using punishment A and B. The data sources of the tables are players' answers for questions 7 and 8 in the questionnaire

(Appendix 5). These questions asked the participants to indicate on a 1-10 scale which the main purpose when setting the given punishment was. 1 meant that "it was not a motive at all" and 10 meant that "it was my strongest motive". Table 1 indicates that the most important driver of punishment A was sense of justice on average. Moreover, harming the offender and altruism were also very important. From Table 2 it can be inferred that altruism was clearly far more important than any other motives. The data also suggest that anger did not play a significant role in using either of the punishments. The results are robust for filtering out the rounds and players who appeared not to entirely understand the rules. This filtering was needed because more participants reported that they experienced a learning-by doing effect during the experiment, such that by the end of the game they understood better the rules of the game and the behavior of the other players compared to the first few rounds. As a conclusion, it can be said that the design of the punishment types in fact meant for the players what it should have, that is, the participants and the experimenter had more or less the same understanding of the punishment types.

Punishment B was more expensive[7], so ex ante it could have been expected that the players would use it only in case when they really want to be altruistic. As a matter of fact, the subjects used both types of punishment, as Table 3 shows.

[7] With punishment A one had to pay HUF 10 to have HUF 20 deducted from Player 2, but with punishment B, with a HUF 10 payment one could only have a maximum of HUF 15 deducted from Player 2

TABLE 3: ACTUAL SIZE OF PUNISHMENT TYPES



The ratio of punishment A to punishment B is 1.7 : 1 in non-filtered sample and 3.2 : 1 in the filtered sample. This means that in both samples, at least 23% of the amount of overall punishments was punishment B. This reveals a significant presence of altruism in the motive scheme of the average player. Of course, average sometimes hides significant differences; there were players who used punishment B much more than punishment A and, on the contrary, entire ignorance of punishment B also occurred. The presence of punishment B thus fails to falsify the hypothesis that one of the most important drivers of third-party punishment is altruism. Altruism, according to the experiment constitutes a significant part of the motives. From the high percentage of punishment A, it can be concluded that the sense of justice and harming the norm violator are also strong factors of third-party punishment. Though, a further experiment would be needed to make sure that these factors are indeed important factors and punishment A was not used by the participants merely because it was cheaper. An experiment design, which made punishment A more expensive would be decisive in this question.

So far, it can be claimed that most apparently altruism and normative behavior are both present in third-party punishments. It can mean that these two separate phenomena, for some reason, occur abreast in the examined process. On the other hand, this parallelism can indicate for the

analyst that these phenomena are somehow deeply connected, and this connection is much tighter that it was to be thought. It is worth continuing analysis in this direction to clarify the correspondence between these two phenomena.

My hypothesis about the relation of altruism and normative behavior, grounded on the observations during the experiment is the following. Norms are in work so that they enhance the social welfare and facilitate human cooperation. On the other hand, altruism can be phrased most simply as "I do to my human fellow-beings what I would like them to do with me". Norms can be regarded as the institutionalized form of altruism, which facilitate altruistic behavior in large groups and also towards unknown people. This hypothesis, as any other, should be further tested either through experiments or neuroscientific analysis.

Critical points

There are several points in the experiment which could bring bias into the results, thus they are worth mentioning. Most likely that the bias occurred rather in the size of the punishments but not in the ratio of punishment types, which was the main target of the experiment. Consequently, in face of the bias, the final results and the conclusions inferred from the experiment can be regarded as reliable.

The first problem arises with the framing of the problem. The word "punishment" was used in the instructions, thus the participants could understand the rules as an expectation towards their behavior, so that they had to punish. It would have been better to use neutral phrasing, such as "deducting points". This framing problem could bias upwards the amount of overall punishment. Probably it could increase the ratio of punishment A, which was interpreted as a direct punishment by the participants, compared to punishment B.

Another problem in the sample is the presence of experts. There are some participants, who extensively took advanced microeconomics, game theory and evolutionary game theory courses, and as such, they can be considered experts in such games, and it may be that they behave not as their senses tell them to behave, but rather according to the theory they have in mind. In fact, in the pool of non-experts the punishment A to punishment B ratio is 7.8, the same ratio in the pool of experts is only 1.2. This is a huge difference, which should be accounted for the results. On the other hand, the experts were only three people, approximately one-fourth of the group. Moreover, there was one outlier among the experts, who did not use punishment B at all. Taking this outlier out of experts pool, the ratio improves to 4.95, which is much closer to the result of non-expert pool. So finally the experts were not excluded from the sample, but it should be taken into account, that this reduced the ratio of punishment B in the final results.

The fact that the participants knew the experimenter also brought a bias into the results, for two reasons. First, the subjects had to write their decisions on a paper, which they knew that the experimenter would read. As a result, there could have been some unwanted social motives brought into the laboratory, which could have been closed out in a computer experiment which would have granted full anonymity for the players. Second, the participants could tell that the experiment was financed by the experimenter, so they tried to punish more so that they do not take so much money from the experimenter, their colleague. These both could increase overall amount of punishment significantly, but possibly did not affect the ratio of punishment types.

There are two more concerns which should be noted, though they do not directly bias the results. First, when relying on the results of the experiment is should be taken into account, that the sample is very small, thus any drawback connected to small sample can occur in these results. This is the reason why only simple averages are calculated from the outcomes. In case of a larger sample, maybe 30-50 subjects, it could be meaningful to calculate modes, variances or even run regressions

on the amount of overall punishment of one person and the ratio of punishments. But in this small sample these would not be knowledgeable. Last, but not least, it should be noted that some of the participants indicated a further explanation for using punishment B. Their reasoning was that through using punishment B, they could send a signal towards Player 2 about their expectation on his behavior. This signaling aspect of punishment B was not expected by the experimenter, but ex post it should be accounted for.

As a conclusion, it can be inferred that there are significant biases introduced partly by the experiment design and partly by some accidental factors. Most of these biases are prevalent in the overall amount of punishment. Moreover, there are two further biases, one of which most likely to increase the rate of punishment A, the other decreases the rate of punishment B. So, both of them increase punishment A to punishment B ratio. Only one bias, the signaling effect decreases this ratio in the results. Consequently, it is likely that the reported 23% of punishment B is a lower bound of the real value. Possibly this number would be even higher in absence of the upper mentioned biases. This conclusion supports the statement that the biases, though they are serious, do not influence the results of the experiment.

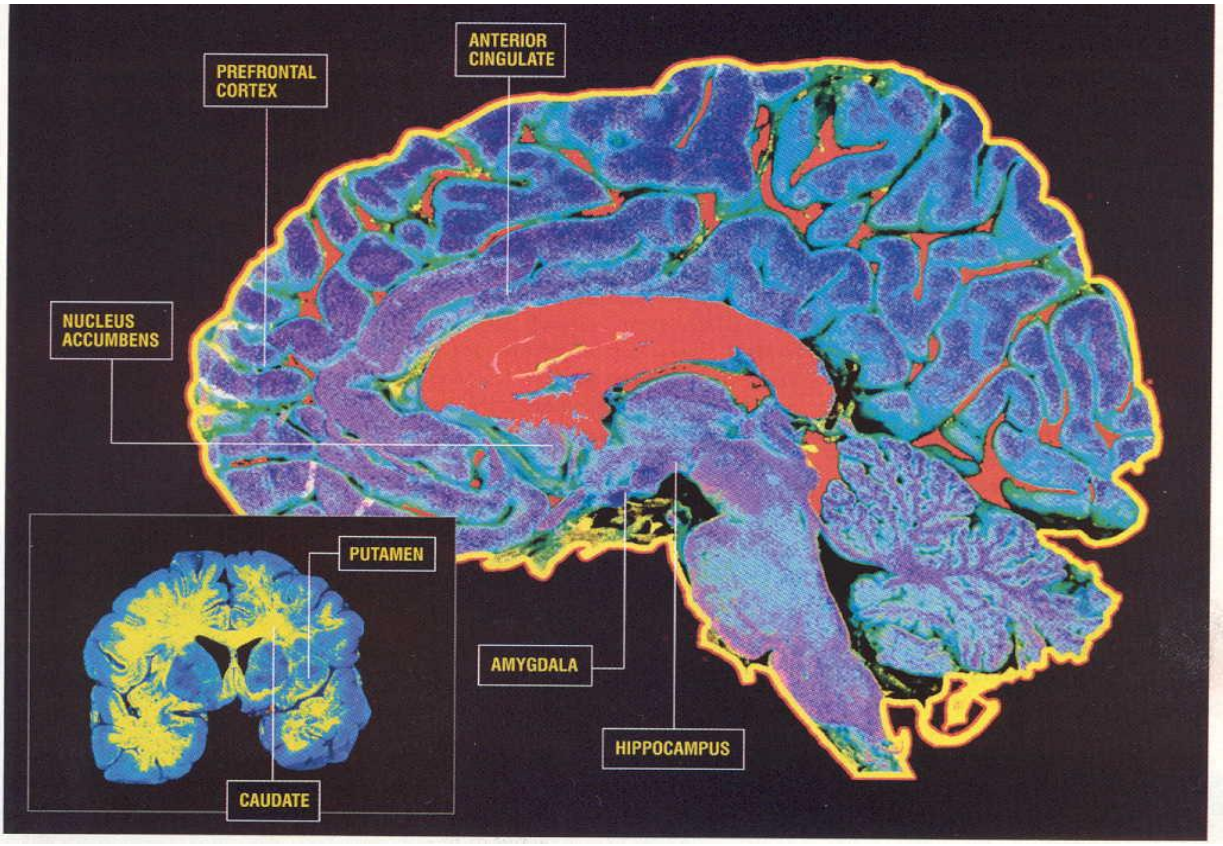
Conclusion

The thesis was intended to introduce the reader to the theory and practice of the newly emerging methodology of experimental economics. Great emphasis is put on presenting even the small details of experiments and the theories that can be examined with them. A newly designed experiment stands in the focus, which is presented in detail. This is a Trust Game experiment, with some slight modifications. The experiment is designed to test the hypothesis that third-party punishment is in fact driven by altruism, among other motives. If not, then third-party punishment is truly normative, which has nothing to do with altruism. The hypothesis is tested and analyzed, and it is concluded that altruism is significant part of the motivation scheme of third-party punishment. This result is not shocking, while it is in line with presumptions of the literature (*Fehr and Fischbacher* [2004]). What is new that with the experiment design presented here, these presumptions could have been tested.

On the other hand, the experiment presented here, cannot answer the question, whether other motives are in fact present in third-party punishment, and it also cannot uncover the relative strength of these motives. A possible design of future experiments is sketched in the analysis, which may be worth conducting.

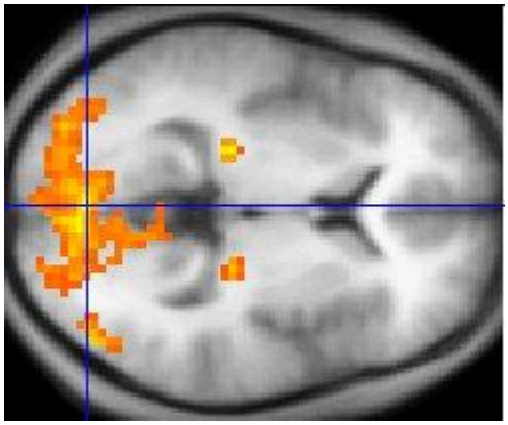
Appendices

Appendix 1



Source: *Camerer et al.* [2004]

Appendix 2



Source: Wikipedia

Appendix 3

Dear Participant,

Welcome to the Game!

Below you will find the instructions of the game. Please read carefully, and if you have any questions, please ask. After you have read the instructions, please, answer the questions on the sheet. In case of false answers, you will be warned to correct those. If you cannot correct them, you will be disqualified from the Game.

Please keep secret on the topic and details of the Game until next Friday, to keep your colleague's results unbiased. Thanks a lot.

Good luck!

Instructions

The players are set to be Player 1, 2 and 3. You are Player 3. You may or may not know the other players in the game, but you will not be told who they are and they will not be told either who you are during the whole game and even after the game. You are not told in advance for how many rounds the game will last.

The game goes as follows. P1 (Player 1) is given HUF 100, of which he/she can give any amount to P2. P2 receives the amount, moreover, the Bank quadruples the amount given, this way P2 will finally get 5 times the amount offered by P1. Then P2 can decide to give some money back to P1.

Next comes P3, who is given a HUF 100 endowment. P3 can keep the money or may use a part or all of it to punish P2 if he/she seemed unfair in the game. P3 can choose 2 types of punishment.

c. P3 can pay HUF 10 to have HUF 20 deducted from P2 immediately. (P3 can choose any integer multiple of the punishment.)
d. P3 can pay HUF 10 to have HUF 5 deducted from P2 in each of the next 3 rounds if he/she behaves unfairly again. (P3 can choose any integer multiple of the punishment.) Unfair behavior is defined by P3, by specifying a percentage. If P2 returns a lower percentage of P1's offer than specified, it will be considered unfair. P2 will get to know about this punishment before the next round.

At the end of the game, the payoffs are summarized and paid to the players.

You are encouraged to use the provided scrap paper for your calculations if needed. Please fill out the forms carefully.

Appendix 4

Check questions

1. If P1 decides to offer HUF 30, how much will P2 get?

……

2. If P2 decides then to give back HUF 10 how much will each have finally?

……

3. If P3 pays HUF 20 for the a-type punishment and HUF 10 for the b-type punishment with 70% specified, how much will P3 earn?

……

4. How much will be deducted from P2's payoff, under what circumstances?
……

Appendix 5

Dear Player,

it would help me a lot in analyzing the results of The Game if you answered the following questions. There are no right answers; I just really want to know, what you honestly were thinking while playing the game. Thanks a lot.

Agi

1. Give an approximate number, how many players you think were playing the game at the same time as you were playing. (including player1, 2 and 3 too)
   ……..
2. From which round do you think that the rules were clear enough for you so that you could decide according to them?
   ……..
3. Please rank the clarity of the instructions on a scale between 1-10. (1: not understandable at all; 10: everything was clear.)
   ……..
4. Was there any specific principle or rule of your own according to which you decided what to consider unfair?
   ……..
   ……..
   ……..
   ……..
   ……..
5. Did you realize that punishment b was more costly? (Remember, with punishment "a" you had to pay 10 to have 20 deducted from Player 2, but with punishment "b", with a HUF 10 payment you could only have HUF 15 deducted from Player 2)
   Yes, I realized No, I did not realize

6. If you answered yes, then why did you still use punishment "b"?

   ……..

   ……..

   ……..

7. What was your main purpose when setting punishment "a"? (1: it was not a motive at all; 10: it was my strongest motive)

   a. Fulfill a sense of justice

   1 2 3 4 5 6 7 8 9 10

   b. Desire to harm an offender

   1 2 3 4 5 6 7 8 9 10

   c. I became angry

   1 2 3 4 5 6 7 8 9 10

   d. Desire to benefit future player 1-s who will subsequently play with player 2

   1 2 3 4 5 6 7 8 9 10

8. What was your main purpose when setting punishment "b"? (1: it was not a motive at all; 10: it was my strongest motive)

   a. Fulfill a sense of justice

   1 2 3 4 5 6 7 8 9 10

   b. Desire to harm an offender

   1 2 3 4 5 6 7 8 9 10

   c. I became angry

   1 2 3 4 5 6 7 8 9 10

   d. Desire to benefit future player 1-s who will subsequently play with player 2

   1 2 3 4 5 6 7 8 9 10

9. If you have any further comments and ideas in connection with the experiment, you can share with me.

……..
……..
……..
……..
……..

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