

Chapter 1

Introduction

In this study we will analyze an experiment which is designed to observe experimental subjects in decision situations. The design of our experiment was motivated by the fact that experiments clearly show that subjects do not behave according to the assumptions of neoclassical microeconomics. As Tversky and Kahneman (1986) put it “...the deviations [...] are too widespread to be ignored, too systematic to be dismissed as random error and too fundamental to be accommodated by relaxing the normative system” (p. 68).

Subjects do not behave according to full rationality, i.e. making decisions according to Bayesianism and the game theoretic notion of Nash equilibrium. They behave according to bounded rationality, the goal-oriented systematic behavior human beings show when taking actual decisions. It is an empirical question to discover the determinants of boundedly rational behavior.

Human beings are bounded concerning the access and processing of information as well as their computational capacities. The complexity of optimization goes beyond their cognitive capabilities. This fact was pointed out by Herbert Simon already in the 1950s. He introduced the concept of bounded rationality in human subjects, and stressed the necessity to take into account the empirical behavior of individuals instead of deriving it from abstract principles. He demanded that the global rationality of economic men should be replaced by boundedly rational behavior (Simon, 1955).

In addition to cognitive limitations, also motivational and emotional bounds of rationality may be a feature of bounded rationality: It is not the lack of cognitive capability but the failure of behavioral trust into abstract induction arguments that is likely to guide human behavior (Selten, 1978a, 1993).

Research has provided clear evidence that subjects do behave according to rules that are not guided by full rationality. Yet many experiments show that the typical behavior of experimental subjects is not irrational even if it is nonoptimizing. It is rational in the sense that it is grounded on reasonable

systematic principles which are quite different from those normative decision and game theory assumes (Selten, 1990, 1997).

Since we still have only limited knowledge of boundedly rational economic behavior, the aim of this exploratory study is to look for behavioral regularities in the context of our bargaining experiment, and to learn about subjects' reasoning and motivations. As will be shown later, we found such regularities that facilitate handling the subjects' difficult task of problem solving during a decision process. How do we get the data in order to achieve our aim?

When conducting experiments in a computer laboratory we do get a great number of data in a quick and very efficient way. However, the disadvantage of this method is that only formal decisions can be observed. We get the results of the individuals' decision processes, but we obtain no or only few verbalizations of the players' decisions that allow an interpretation of their motives. Since we are interested in the way how subjects actually behave and in the motives for their behavior, people have to be observed in decision situations and, moreover, they have to be induced to verbalize their thought processes. There are several methods to address the problem:

1. At the beginning, at the end or during the experiment subjects are asked to report on the motives for their decisions by *questionnaires* or other means¹.
2. Interviewing people in field studies could reveal the intentions of decision makers without using questionnaires in order not to impose structure on an interview which might not capture the important aspects of the problem (Bewley, 1997).
3. Strategies can be made observable by the *strategy method* (Selten, 1967). Subjects have to write computer programs for a given problem. For every possible situation they have to program a corresponding solution (see for example Selten, Mitzkewitz, and Uhlich 1997, Keser 1992).
4. The method of *thinking-aloud* asks subjects to vocalize their thoughts, thought processes, motives and reasons when solving a problem. Yet there is evidence that deliberately verbalizing motives or reasons for one's thinking leads to different outcomes than spontaneous remarks (c.f. Ericsson and Simon 1984, pp. 78).

¹Nagel (1998) reports on two experiments the participants of which have been readers of newspapers. They have been asked to comment on their choices. The evaluation of these extensive statements will certainly further the understanding of subjects' reasoning.

5. Subjects are observed during experiments by recording their spontaneous remarks during their decision process either on audio (Klemisch-Ahlert, 1996) or on videotapes (Ostmann, 1990). Two or three subjects act together in a group and have to perform a common task. The discussions between the group members are transcribed into text protocols, and these protocols are investigated.

In our experiment we decided to follow the latter approach. The methodology of videotaping does provide a unique opportunity to observe the spontaneous behavior of subjects during their decision processes, and therefore extremely well meets the methodological requirement that hypotheses and conclusions in economics should be based on entities that are observable and thereby are falsifiable.²

Controversies about how to explain deviations from normative predictions on behavior in equilibrium provoked a lot of papers hypothesizing on the motivations that might have led people to the observed behavior³. Most of the authors quoted by Roth (1995a) address the deviations from game theoretic predictions by including noneconomic concerns into utility functions. Other authors strictly reject this approach since their results from ultimatum bargaining indicate that subjects are not maximizing (Güth, 1994, 1995, Güth and Tietz, 1990). This statement complies with the findings from our experiment; the videotapes clearly show that subjects do not maximize. Since we have a means of observing directly what people are doing and how they are arguing in a certain experimental setup we should use it to learn which motives might lead subjects to certain actions. If we find behavioral regularities being valid in different setups we possibly can make better predictions and design better descriptive theories.

We will see that the regularities we found are not at all new findings. What is new is that in our experiment they are directly observable in contrast to the most common practice in designing experiments where one can at best hypothesize on the existence of behavioral regularities underlying the obtained results. In this context it is worthwhile to quote Herbert Simon (1962, p. 12) who wrote that if the words could be recorded that accompany the thoughts being induced by problem solving a great deal could be learned about the process. He notes that decision making in groups is "... a means of externalizing the phenomena and making them accessible to observation."⁴

²C.f. Hildenbrand (1994a,b, 1998)

³See for instance Roth (1995a) for an overview on experiments in ultimatum bargaining.

⁴See also Camerer and Thaler (1995) and Camerer (1997b) who writes that ignoring almost all data but choices in experimental economics "...wastes a valuable opportunity to learn something more from a group of subjects who are often eager to

Looking closely at actual behavior shows that there is a lot more to be discovered than an even intensely contemplating theorist may imagine. People are different, and the behavior of others could be guided by motives that may not be worthwhile thinking about or may even not be conceivable for another person. We found for instance that non of the noneconomist students and less than 50% of the economists knew the concept of “Split the Difference” which, however, is a commonly used solution concept in game theory .

From a game-theoretic point of view the game played in our experiment is classified as a game with complete information. However, there are uncertainties in many respects. The guaranteed payoff is the only information on opponents that groups receive. The number of possible decision alternatives, i.e. the possible divisions of the coalition value, is very large. Moreover, groups don't have any knowledge of their opponents. They have no information on most of the variables game theory assumes as common knowledge, and they don't know all the determinants which may affect decisions and which are possibly different from those game theory takes for granted, e.g. whether opponent's decisions are purely payoff-oriented.

There is a whole range of factors that may affect bargaining behavior , and, as we saw from the experiment, in fact do have influence. Therefore, players have to find guidelines for their behavior that makes the decision problem manageable and criteria that allow them to select the alternative that is to be taken as final decision.

explain their thinking processes and inferences. Whether their thoughts are useful or not is difficult to answer, but it is surely less difficult if we collect such data!” (p. 325).