# Chapter 1 Introduction

Trust, reciprocity and fairness are central aspects of our social life. In many social interactions, we form expectations about the behavior of another person, who might harm or benefit us. Trust is the confidence in the benevolent behavior of others. If we trust someone, this person can either reciprocate or exploit our trusting behavior. In a situation of trust and reciprocity, fairness often plays an important role in defining an appropriate behavior that reciprocates trust.

The relationships between a patient and a physician, between a child and its parent or between an employee and an employer are characterized by trust, reciprocity and fairness. As an employee, you may have frequently worked overtime trusting that your effort will be reciprocated accordingly in a higher and fair wage. All these situations share some common features: They are asymmetrical in the sense that one individual depends on the other, and both individuals have different decision alternatives, which lead to different consequences for both individuals.

Why is trust an important component of social relations? Trust enables individuals to cooperate and thereby increase their mutual payoff. On the contrary, if trust cannot be established, either cooperation will break down, or cooperation will only be possible by specifying a contract that ensures each individual's contributions. However, a contract could result in extra costs, which could make the entire exchange not worthwhile anymore, and a contract can never specify all eventualities, so that again trust will be necessary.

Fairness plays an important role as it specifies the appropriate behavior that reciprocates trust. If individuals are motivated to reach fair outcomes, they trust that other individuals will also want to reach a fair outcome and make fair decisions, justifying trust in them. If an individual reciprocates trust because it aims for fair outcomes, a particular fairness principle explicates for instance, how a potential surplus is allocated. Therefore, fairness might act as a device that coordinates relationships.

When can trust and fairness be observed? To answer this question an important distinction between interactions with a final end and with an open end have to be made. If an interaction between two individual takes place only once, individuals that try to maximize their personal payoffs have no incentive to reciprocate trust, and, on the contrary, they will exploit other individuals to increase their payoff. This behavior can be anticipated by the individual who depends on the other person and will therefore distrust that person. The situation does not change systematically if a social interaction is repeated finitely, because in the final interaction the situation is the same as in a single interaction.

As individuals know that in the final period both individuals will only follow their self-interest, they will already exploit and distrust each other in the second last period and so forth. By backward induction, the argument can be extended from the last interaction backwards to the first interaction, so that finally trust and reciprocity is not consistent with a game-theoretical analysis for any period of the finitely repeated interaction.

How can trust then be explained? The argument, which will be elaborated in the present work, is that most of our interactions are ongoing, and a final end is never sure. If the end of an interaction is uncertain, individuals will hesitate to exploit others because this will presumably destroy a beneficial future relationship. This threat of a breakdown of the profitable relationship provides the foundation for individuals to trust others. Therefore, indefinite repetition of a game allows the development of cooperative interaction in which trust, reciprocity, and fairness exist. This type of interaction is studied in the present work by utilizing a two-person bargaining game called the "investment game."

Past research has illustrated how the degree of cooperation can be influenced by various factors. For instance, the possibility of communication or the availability of punishment options is able to increase cooperation (see for instance Pruitt & Kimmel, 1977). However, what is still missing are models that describe the underlying decision process in social interactions involving trust and fairness. The present work, therefore, focuses on the development and evaluation of models that can describe the decision process. Simple decision strategies appear as psychologically plausible models since they take human cognitive limitations into account.

Besides their psychological plausibility, many authors have demonstrated that simple strategies often perform astonishingly well in solving particular judgment and decision problems (Gigerenzer, Todd, & the ABC Research Group, 1999; Thorngate, 1980; Payne, Bettman, & Johnson, 1988). Axelrod's studies reported below (Axelrod, 1984; see also Axelrod & Dion, 1988; Axelrod & Hamilton, 1981) are presumably the most eloquent in demonstrating how powerful simple strategies can be for interactive decision making. The simple *Tit-for-Tat* strategy, which cooperates in the first period of the prisoner's dilemma game (see Figure 3 on page 11) and then does what the opponent did in the previous period, on average outperformed various other more complex strategies in various tournaments of repeated prisoner's dilemma games.

The present work follows three main goals: First, the extent of trust and reciprocity and the impact of motivation for fair outcomes should be investigated in the social interaction of a particular bargaining game. Second, the performance of candidate

strategies for the bargaining game should be evaluated by using various classical and evolutionary concepts of game theory. Third, individuals' decision process in the bargaining game involving trust and reciprocity is examined experimentally, and the ability of simple decision strategies to predict the decision process should be tested.

The present work is structured as follows: The following five chapters provide a background of the research topic. The first chapter introduces the particular bargaining game that is used to study the social interaction of trust and fairness. In the following chapter, the concepts of trust, reciprocity and fairness are introduced, and important experimental studies are reported. Chapter 3 draws particular attention to individuals' behavior in ongoing social interactions. The following chapter highlights the advantages of simple strategies–heuristics–for solving judgment and decision problems. Subsequently, it is elaborated how indefinite repetition of a game changes the game-theoretical prediction, and past research on well performing strategies for repeated games are reported.

In the second part of the present work, the experimental and evolutionary studies are presented. In chapter 7 and in chapter 8, the results of experimental studies are reported which investigate the degree of trust, reciprocity and fairness in a game without and, respectively, with repetition, thereby following the first goalof the present work. Chapter 9 explores the performance of a candidate group of strategies and distinguishes a few particular strategies, thereby following the second goal. Chapter 10 follows the third goal by developing strategies for predicting individuals' decision process. In the last part of the present work, the connections between the experimental and evolutionary studies are drawn and general conclusions are made.