Chapter X
Human Nature in the Adaptation of Trust

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ABSTRACT

This chapter pleads for more inspiration from human nature in agent-based modeling. As an illustration of an effort in that direction, it summarizes and discusses an agent-based model of the build-up and adaptation of trust between multiple producers and suppliers. The central question is whether, and under what conditions, trust and loyalty are viable in markets. While the model incorporates some well-known behavioral phenomena from the trust literature, more extended modeling of human nature is called for. The chapter explores a line of further research on the basis of notions of mental framing and frame switching on the basis of relational signaling, derived from social psychology.

INTRODUCTION

For the object of study, I choose trust for several reasons. First, if anything is human, it is (dis)trust. Second, if anything is subject to adaptation, it is trust in its build-up and breakdown, and as both the basis for a relationship and its outcome. Third, trust forms an important issue in economics, and in behavioral science more widely. Trust is needed to limit transaction costs and costs of contracting and control. In the literature on transaction costs and inter-firm relations, there has been a debate whether trust can exist in markets, under pressures of competition. Agent-based simulation seems an appropriate tool for experimentation, to investigate under what conditions trust is viable in markets.

Many attempts have been made at agent-based modeling of trust and related issues. The purpose of trust models varies widely. Generally, they study emergent properties of complex interaction that would be hard or impossible to tackle analytically. Some study the effectiveness of sanctions and/or reputation mechanisms and agencies to support them, for example, in information systems or supply chains (Zacharia et al., 1999; Meijer & Verwaart,

2005; Diekmann & Przepiorka, 2005), or in artificial societies (Younger, 2005). Some study self-organization, for example, in the internalization of externalities in a common pool resource (Pahl-Wostl & Ebenhöh, 2004), the emergence of leadership in open-source communities (Muller, 2003), or the emergence of cooperative social action (Brichoux & Johnson, 2002). Others investigate the working of decision heuristics (Pahl-Wostl & Ebenhöh, 2004; Marsella, Pynadath, & Read, 2004).

The general set-up is that of multiple agents who can profit from each other, but who are uncertain about the quality or competence that is offered, sometimes allowing for multiple dimensions of quality, and dependencies between them (Maximilien & Singh, 2005). Other studies focus on the benevolence or intentions of agents—that is, absence of cheating in free-ridership, defection, or expropriation of knowledge or other resources—and many look at both competence and intentions (Castelfranchi & Falcone, 1999; Pahl-Wostl & Ebenhöh, 2004; Breban, 2002; Muller, 2003; Gans et al., 2001). This is in line with the distinction made in the trust literature between competence trust and intentional trust (e.g., Nooteboom, 2002).

Mostly, agents are oriented only towards their self-interest, such as maximum profit, but some studies also allow for fairness and equity as objectives or dimensions of value (Pahl-Wostl & Ebenhöh, 2004). Mostly, trust is measured as a number between 0 and 1, and, following Gambetta (1988), is often interpreted as a subjective probability that goals will be achieved or no harm will be done. Mostly, conduct is individual, but sometimes allowance is made for coalitions (Breban, 2002).

Few studies of defection explicitly model both sides of the coin: the expectation of defection by others (trust) and one's own inclination to defect (trustworthiness). Also, most studies treat trust as of purely extrinsic value in the achievement of profit, and do not include the possible intrinsic value of trust. Notable exceptions are Pahl-Wostl and Ebenhöh (2004) and Marsella et al. (2004).

Trust is generally updated on the basis of experience: sometimes only one's own experience in interaction, sometimes (also) on the basis of reputation mechanisms, sometimes with the services of some "tracing agency" (Zacharia et al., 1999; Meijer & Verwaart, 2005; Diekman & Przepiorka, 2005). Few studies are based on an explicit inference of competence or intentions, and even fewer studies explicitly model the decision heuristics used. Exceptions here also are Pahl-Wostl and Ebenhöh (2004) and, with great psychological sophistication, Marsella et al. (2004). Those studies will be considered in more detail later. A key question is whether agents have 'a theory of mind' on the basis of which they attribute competencies and intentions to others.

While most studies model trust as adaptive, in the sense that it develops as a function of private or public experience, there is very little study, as far as I know, of adaptiveness of the importance attached to trust relative to profit, and of the adaptiveness of one's own trustworthiness or inclination to defect.

In this chapter, by way of illustration, a model is discussed with some of these features. It focuses on intentional trust, in terms of loyalty or defection, based on private experience (no reputation effects). Trust is adapted on the basis of observed defection, but only with simple reinforcement, without theory of mind and explicit decision heuristics. Next to trust, it includes trustworthiness—that is, inclination to defect. Trustworthiness and the importance attached to trust are both adaptive as a function of experience.

The central purpose of the study is theoretical: to investigate whether the claim of transaction cost economics that trust cannot survive

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