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### Keeping up appearances: Experiments on cooperation in social dilemmas

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## Chapter 5: Conclusion

The tension between mine and thine, or between self-interest and the group's collective interest, is at the heart of many social interactions. Natural selection tends to favor individuals who maximize their own resources (as markets favor firms that maximize their own profits); however, in many social dilemmas, like voting, housekeeping, and academic peer review, we display cooperative behavior. Both economists and biologists, among others, have studied such social dilemmas. They share an interest in the aggregated effects of individual behavior (cooperation, social behavior), apply the same methods to study these effects (evolutionary game theory, controlled laboratory experiments), and even show some overlap in their vocabulary – although when confronted with an economist who uses the term ‘evolution’ for a gradual learning process in the lab, a biologist might bring up the span of a single human reproductive cycle. In this thesis I build on both the economics and biology literature to study how the institutional environment steers behavior in situations in which an individual's interest is not in line with the general interest. I use laboratory experiments to assess the effect of information about (others') previous behavior on cooperative decisions. With a series of laboratory experiments that capture the nature of the tradeoff between two individuals, I show that both reputation and own experience jointly influence helping behavior. In Chapter 2 and 3 I turn to groups of three and larger to show how voluntary grouping boosts cooperation rates, and how competition together with punishment increases cooperation rates.

In Chapter 2, our results show how people integrate direct and indirect information about past social interactions, confirming the commonly held belief that people use both personal experience and reputations to decide whether or not to help others. We build on simulation studies that suggest that evolution has driven our preference to help others at our own cost. In these simulations, agents can help each other at a cost to themselves. Reciprocal altruism (“I help you and you help me”) accounts for many of the instances of cooperation in the animal kingdom. People, on the other hand, offer favors to others who they may never meet again (“I help you and someone else helps me”, or indirect reciprocity). It has been shown that agents selectively helping only those who have a reputation of being nice, fare relatively well. Both memory and gossip from others may influence this helping tendency. In our study we offer

people the choice between costly direct and indirect information about their partner's history of cooperative behavior. We show that people use both types of information when deciding about a reciprocal gift, even when the indirect information (e.g., gossip) is known to be less reliable but more abundant. We find that in such a noisy environment, the helping levels remain the same; but people compensate for the noisiness of the indirect information by switching to the more reliable direct information. In environments without noise, too, direct information is on average more decisive for helping.

In Chapter 3, we turn to social dilemmas in groups. In situations in which group structure has been imposed, like in the army or at the office, non-contributors have the chance to hurt the group welfare and punishing them improves efficiency. Groups, however, are often formed voluntarily, for instance in the case of treaties or food gatherers. The exclusion of free riders is often a more straightforward option than punishing them. To study the interplay between voluntary grouping and punishment, we conducted an experiment in which people can rank and exclude their fellow players based on their previous behavior, including both contribution and punishment levels in previous periods. Our results show that endogenous grouping increases contributions more than the punishment option does. The combination of the two mechanisms increases contributions even further, since subjects use the possibility to rank and exclude others and therefore punish less. Exclusion and the allocation of low ranks are directed towards non-contributors as well as to punishers. Altogether the lower punishment rates account for a large part for the higher efficiency of the combination of the two regimes. In other words, having a say about one's interaction partner reduces the need for punishment, but preserves the threat. This complementary effect of punishment and endogenous grouping may well account for the level of cooperation we observe in real institutions.

In Chapter 4, I zoom out further and study the interaction of two groups of players who face a social dilemma. Competition is known to spur higher helping rates within a group. If punishing is costly, however, group members may hesitate to resort to punishing free riders, out of fear of reducing their group's chances of winning the competition even further- as in a football game in which the star player runs solo, but gets away with it. Although our implementation of competition is very conservative and linear (winning group members

receive  $1/3$  of the difference between the groups), we show that competition reduces the number of allocated punishment points. The interaction between the two mechanisms makes punishment lose its destructive effect on earnings, without losing its deterring force. Indeed, observation without any financial consequences drives up the contributions to a public good as much as competition does. Although competition reduces the number of allocated punishment points, it increases at the same time the impact per punishment point on contributions in the subsequent period.

The results presented in this thesis show that the subtle interplay between two institutions amplifies their effect on human social behavior. First, since participants in the lab substitute noisy reputational information with direct information, reputation appears to be a multilayered construct that cannot be studied in isolation. Theory on either direct or indirect reciprocity has been shown to have large predictive powers, but further study of human cooperative behavior requires assumptions on how the two types of information, direct experience and reputation, are integrated in social decision making. Second, if a punishment institution is bolstered by partner choice, higher contributions are achieved with less punishment. This means that the puzzle of the evolution of costly punishment perhaps has shrunk a little; or even that the theoretical puzzle has been inflated from the start, by isolating the social dilemma from its supporting institutions. Third, competing with another group - even if the competition takes place only in the minds of the participants - increases the impact of punishment. Merely evoking the mental scheme of an institution may be enough to bring forth a stronger reaction to another institution.

In all the cases described above, unweaving social institutions has led to a systematic underestimation of their effects on human social behavior. A potential reason is that incorporating a specific stylized behavioral phenomenon by extending the preference function (for instance with spiteful or competitive preferences) overestimates the modularity of human cognition. Social dilemmas in real life evoke, depending on the framing, various psychological schemes that do not add up. Our results suggest that incentive-neutral changes to laboratory settings alter the behavior of participants by tapping into other psychological schemes: “is this my partner”, “what would she do to me”, “did I choose him personally”; “are we in the same

boat?” These contextual characteristics have been decisive in social relations throughout human history and therefore deserve a role in economic theory – and therefore also in the laboratory.

The institutions above – reputation, punishment, competition, partner selection - build on memory and comparison between partners or groups. More importantly, our results show that people apply these mental faculties recursively: we are self-conscious and know others will judge us in comparison to others. It is in this self-consciousness that egoism and altruism meet. Of all psychological mechanisms that play a role in such situations, *keeping up appearances* may be the killer app<sup>60</sup> of humankind.

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<sup>60</sup> “A computer application of such great value or popularity that it assures the success of the technology with which it is associated” (Merriam-Webster, [www.m-w.com](http://www.m-w.com)).