

# The Role of Group Size and Competition in Minimum Effort Coordination. An Agent Base Approach

Extended Abstract

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## Outline

The minimum effort coordination game, inspired by Bryant (1983) and introduced into experimental economics by Van Huyck et al. (1987, 1990), uncovers the prevalence of a major economic problem, coordination failure. Involved in a game of imperfect information that displays a number of Pareto ranked equilibria, players (in laboratory experiments) do not choose the efficient, but the inefficient but safe equilibrium.

From various experimental papers, it is known that this problem disappears if the groups playing the game are very small (Van Huyck et al., 1990, 2001) or if the game is played by several groups that compete against each other for a bonus (Bornstein et al., 2002; Riechmann and Weimann, 2004). Yet, up to now, there is no attempt to explain these findings in the framework of a theoretical, behavioral model. There are several experimental findings that make it hard to set up a deductive analytical model of individual behavior in this game:

- Heterogeneity: In experiments, several different behavioral ‘types’ of participants can be observed, e.g. players always choosing the efficient strategy, players always playing myopic best responses, players who are easily frustrated and consequently start playing the safe (instead of the efficient) strategy after some rounds of the game, etc.
- Dynamics: Players tend to change their behavior (and sometimes even their ‘type’) over time.
- Noise: Even if well instructed, players make ‘mistakes’ while playing the game.

In this paper, an agent based model of individual play of the minimum effort coordination game is introduced, which accounts for all three critical facts, behavioral heterogeneity, changing individual behavior over time, and the presence of individual mistakes. The model builds heavily on data and observations from an extensive series of laboratory experiments undertaken during the years 2003 to 2004 in the experimental laboratory of the University of Magdeburg (MaxLab). The artificial agents populating the model are set up to closely resemble individual behavior observed in these experiments.

The model is then used to find out more about the reasons why aggregate behavior in the game changes with the decrease of group size and with the introduction of group competition and, moreover, what can be done to drive aggregate behavior closer towards the efficient outcome.

## References

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