The Role of Observational Skill in Coordination Games

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A M × M coordination game is analyzed in an evolutionary environment. Agents are assumed to be able to make noisy observations of opponent's behavior, called reputation, and form preferences over opponents based on their reputation. A strategy is contains an action and a preference order over all feasible opponents. The both strategies and observational skills in the population are subjected to a constant level of perturbations. The growth dynamic is identical to Kandori et al. (1993). A game takes place when two agents agree to play.

We find that if the observational skill is sufficiently accurate, the efficient outcome is a unique evolutionarily stable strategy ESS even if it is risk-dominated by an inefficient outcome. These results are consistent with e.g. Oechssler (1999) and Levine & Pesendorfer (2007).
However this result is ultimately dependent on how well agents can observe their feasible opponents. The key question is just how accurate agents can observe reputation. This has so far been an unsolved issue. In this paper we endogenize observational skill. We show how evolutionary pressure improves observational skill endogenously. In contrast to e.g. Kandori et al. (1993) and Young (1993), we find that evolutionary forces will bring the population to a point where all agents have perfect observational skill and play the efficient strategy.

The results above are made under the assumption that observational skill is costless. In a more realistic setting where cost is strictly increasing in observational skill, we find that there exist cost functions leading to a state where agents can observe the opponents reputation sufficiently well which in turn result in an efficient outcome.
In the general 2 × 2 case, we show that a fixed cost function results in partition Γ such that the set Γ' containing games with a significantly risk dominant strategy converge to the risk-dominant equilibrium whereas all other games $\Gamma \backslash \Gamma'$ converge to the efficient equilibrium. Furthermore, the observational skill will regress as the population converges to equilibrium.