REFEREE REPORT:

"RESILIENT COOPERATORS STABILIZE LONG-RUN COOPERATION IN THE FINITELY REPEATED PRISONER'S DILEMMA"

MAO ET. AL, 2017

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This paper studies in an experimental setting the cooperation dynamics on a finitely repeated Prisoner's Dilemma. The authors expose their main research question in the first paragraph of the paper. They ask, "what happens to cooperation on finitely repeated games when individuals within the same population repeatedly play these games over long intervals of times? Do they begin to exploit one another leading to the eventual erosion of cooperation? Or do they instead remain resilient in the face of occasional exploitation and continue to cooperate even when it is costly to them?" (Mao et al. 2017, p. 2)

According to the authors, these are still open questions mostly because the number of repetitions needed to observe the cooperation dynamics exceeds the possible amount of repeating periods on a lab experiment. Then, to answer their research questions, the authors take advantage of the virtual labs on Amazon's Mechanical Turk, where at a low cost they can have the same sample of players on a longer timescale. In this setting, the authors can disentangle the learning dynamics of the players and analyze how these dynamics evolution in time.

The experiment structure consisted of 20 sessions where the players were randomly paired to play the prisoner's dilemma. After 10 rounds, they randomly reassign each pair, this process was repeated 20 times during each session. Sessions lasted approximately 35 minutes and paid an average of $4.47. For their experiment, the authors recruited 113 subjects of which 94 completed the twenty sessions. Each of these subjects made 3,720 individual decisions for a total of 374,251 observations.

With the data that the authors got from their experiment, they answer their research question but with some caveats. They observed that 60% of their population had a behavior consistent with the "rational cooperation hypothesis." These players started cooperating and then unravel to a threshold strategy where they start to defect in one of 10 rounds. However, they also observed that the remaining 40% where conditionally cooperating in every round. The existence of this 40% conditional cooperators stops the unraveling in the seventh session and make possible a stable phase where the cooperation never unravels completely.

A big concern that appears in the first part of the paper is that the Mechanical Turk non-representative sample shows from the beginning a substantially higher rate of cooperation, what overestimates the percentage of conditional cooperators. The authors try to asses this concern by simulating the results, nonetheless the computational model parameters where estimate from the same sample. Overall, it is not possible to accurately predict the minimum proportion of resilient cooperators needed to avoid a zero cooperation equilibrium.

Paper extension

One possible extension of this paper is to assess one of the open questions that the authors describe in the paper's discussion section. Particularly the long run sustainability of cooperation in a setting where the players don´t expect to play with the same group of people repeatedly. The research question is, what are the dynamics of cooperation when the group of people with whom you are playing is different in each session? How do these dynamics change compared to those of a static group of people?

To answer these questions is necessary to design a new experiment with the same game structure but allowing for two different groups of players. The idea is to assign people at random to two possible groups, one that plays with the same group of people as in Mao et al. (2017) and the other that plays with a different group of people each session. This needs a third group of people that play the game only once with the second group and changes every session.

To improve the external validity of the experiment, in the exit survey we can ask questions on socioeconomic characteristics. Together with the state, this information helps us to generalize our conclusions reweighting the non-representative Mechanical Turk sample. The expected results of this experiment are not clear, one can expect that cooperation is more difficult to sustain in a setting where people varies, but larger game and session restart effects could offset this effect.

References

Mao, A., Dworkin, L., Suri, S., & Watts, D. J. (2017). Resilient cooperators stabilize long-run cooperation in the finitely repeated Prisoner's Dilemma. *Nature communications*, *8*, 13800.