Solodovnikov Mikhail,
MiFIT 2013

Review of: "Collective rationality in interactive decisions: Evidence for team reasoning" by Andrew M. Colman, Briony D. Pulford, Jo Rose

Introduction

Approach of decision theory and game theory based on assumption, that each player try to maximize his utility function. But for some interactive cases it seems reasonable to maximize utility function of whole group of players.

Fundamental assumptions of expected utility theory and subjective expected utility theory are *rationality* of a player and attemption to maximize self *utility* by player in all circumstances. We can measure individual preferences of each player with utility, and in game it is payoff. Russel's interpretation of rationality is "the choise of the right means to an end that you wish to achive".

Research into judgment and decision making for interactive decisions or games shows that humans often deviate from full rationality in practice, because they are limited by bounded rationality that constrains them, in difficult decisions, to use rough–and–ready judgmental heuristics that are faster but that sometimes generate biased judgments and decisions.

In such games persons often try to increase *collective* utility instead of individual one. *Team reasoning* — based on collective preferences decision making approach. Theories of team resoning assume that players motivate to maximize either collective or individual utilities depending on circumstances.

Payoff dominance

In two-player game, a *Nash equilibrium* (is an outcome from which neither player could profit by deviating unilaterally and that therefore gives neither player retrospective grounds to regret the chosen strategy) is a pair of strategies that maximaize paoyoff of player choosing it, given to strategy choosen by co-player. If game has only one Nash equilibrium, rational player should choose it, according the game theory, because it's only one variant to maximaize payoff in this case for both players. For game with multiple equilibrium, where one better than any other for both players, it natural to assume for rational player to choose *payoff–dominant* strategy. But such choice can't be justified by game theory fundamental assumption.

Team reasoning offers the solution for payoff-dominance problem. Players identify profile of strategies that maximize collective payoff. If it is unique, they choose it.

Rationale and hypotheses

Team reasoning solves the payoff–dominance problem. The question is: "Do decision makers from collective preference on practice?" We can't observe directly preferences or modes of reasoning. Predictions can be made about choices that would result from collective utility maximization and team reasoning, and that behavior can be observed directly. For these aim where constructed two experiments. Games with unique Nash equilibria and disunique *Pareto–dominant* disequilibrial outcomes — outcomes that were not Nash equilibria, but offered higher payoffs for both player, were used in experiments.

Experiment 1

Participants

The 81 participants were choosen as decision makers at this experiment (36 men and 45 women). Mostly undergraduatre students, aged 16—45. Each participant earned between £4.00 and £13.00 according to the payoffs in a single game selected randomly from among those used in the experiment.

Materials

Experiment 2

Conclusions

Fund-raising

You and other students collect funds for charity. In the first hour, you and your best friend each raise some money. Here is a list of the possible options:

	You raise	Your friend raises
Option A	£1	£7
Option B	£3	£3
Option C	£5	£6
Option D	£6	£4
Option E	£4	£1

Which option do you prefer?
A B C D E (circle one)

What do you expect the other person to choose?
A B C D E (circle one)

GM site

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend half an hour in the local town collecting money for publicity opposing the new test site. Here is a list of the possible options:

	You collect	Other person collects
Option A	£1	£7
Option B	£4	£5
Option C	£4	£6
Option D	£6	£3
Option E	£4	£0

Which option do you prefer?
A B C D E (circle one)

What do you expect the other person to choose?
A B C D E (circle one)

Figure 1