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Contextuality in strategic games

(joint work with Zheng Joyce Wang)

Does contextuality occur in strategic game situations? First, we present empirical evidence for violations of marginal invariance from our recent experiments using a new design of the centipede game. In the experiments, under a predict-act condition, a player first predicts an opponent's move (defect or cooperate) and then takes his or her own action (defect or cooperate). In comparison, under an act-alone condition, the player simply takes the action without making any explicit prediction about the opponent. Contrary to what is expected by traditional game theory, we observed significant differences between the total probability of defecting obtained from the predict-act condition as compared to that obtained from the act-alone condition. Second, we propose a game of chicken in which two players, A and B , are racing toward each other before they enter a narrow one-lane bridge. If neither player yields, they crash into each other in the narrow one lane bridge (payoff -1 million). If both yield before the bridge, there is no crash, but they both look like chickens (-10 payoff for each player). If B yields first, then A is the winner and B is the chicken ($+10$ for A , -10 for B). Likewise, if A yields first, then B is the winner and A is the chicken (-10 for A , $+10$ for B). There are two equally attractive pure equilibrium in this game (one yields and the other does not). Now suppose we collect predictions by participants made for games involving each of the possible pairs of three players A, B, C . This produces three contingency tables: a 2 by 2 table containing predictions for choice pairs for players A, B ; another for players B, C ; and a third for players A, C . These tables are expected to violate the "context by default" contextually criterion. What do these violations (marginal invariance, context by default criterion) imply for the psychology of strategic decision making? We will discuss these implications.