Organizational Behavior and Human Decision Processes 136 (2016) 80–94

Contents lists available at ScienceDirect

Organizational Behavior and Human Decision Processes

journal homepage: www.elsevier.com/locate/obhdp

The social world as an experimental game

J. Keith Murnighan [a,*], Long Wang [b]

[a] Kellogg School of Management, Northwestern University, United States
[b] City University of Hong Kong, Hong Kong

ARTICLE INFO

Article history:
Received 24 September 2015
Revised 30 January 2016
Accepted 14 February 2016

Keywords:
Experimental games
Prisoners dilemmas
Social dilemmas
Trust game
Ultimatum game
Dictator game
Deception game

ABSTRACT

This paper presents a selective review of decades of empirical research on behavioral games, with a particular focus on experimental games. We suggest that games effectively (but imperfectly) model many human social interactions, and we present important findings from six popular experimental games – Prisoner's and Social Dilemmas, and the Trust, Ultimatum, Dictator, and Deception games – to discuss their theoretical and empirical implications as well as their various insights into human nature. We close by asking several fundamental questions about games and suggesting several directions and ideas for future research.

1. Introduction

"*You have to learn the rules of the game. And then you have to play better than anyone else.*"

[Albert Einstein]

"*I've made lots of dumb decisions. That's part of the game.*"

[Warren Buffett]

"*Play the game for more than you can afford to lose... only then will you learn the game.*"

[Winston Churchill]

Games abound in life. People play games all the time, and not just frivolously. The opening quotes suggest that people liberally use the word "game" to describe different interpersonal or social interactions. Rapoport (1960) provided a neat, comparative definition of games: in a fight, people try to beat their opponents; in a debate, they try to persuade their opponents; and in a game, they try to outwit their opponents.

Games can provide simple models of a variety of human (and animal) interactions. For example, countries compete and cooperate with each other for land, resources, power, and influence; organizations constantly compete and cooperate with each other for customers, market share, and profits; and individuals vie with each other, either as individuals or group members, for better scores, money, love, position, and status. All of these common but sophisticated human interactions can be interpreted and modeled as games.

Although matrix games cannot represent the complex totality of humans' interpersonal interactions, they can provide a coherent, substantive model of many actual encounters. In particular, in spite of their reductionistic nature, games provide parsimonious and precise models of otherwise complicated reality (Camerer, 2003). Many games are not only analogous to the real word (Rubinstein, 1991), they also influence and even change how people think about their social worlds. For example, classic games such as Prisoners' and Social dilemmas are not only important academic puzzles (Ostrom, 2003), they provide a close-to-real representation of many interparty interactions in a variety of settings. Their broad applications provide insights into many common social problems and challenges (Ostrom, 1998) that people face all the time, such as public goods, ecological degradation (Hardin, 1968), oligopolistic competition (Shubik, 1955), trade barriers, and arm races (Axelrod, 1980a, 1980b; Axelrod & Keohane, 1985; Richardson, 1960).

This paper focuses on behavioral games that not only encourage players to compete with each other but that also include clear cooperation potential, albeit with structural obstacles that might make cooperation difficult. Regardless of their cooperative potential, games typically include a *strategic* element: they encourage and even expect people to think, plan, and act strategically. As

* Corresponding author.
E-mail address: keithm@kellogg.northwestern.edu (J.K. Murnighan).

http://dx.doi.org/10.1016/j.obhdp.2016.02.003
0749-5978/

mathematical analyses of people's behavior in games, game theory tends to assume that competition is a default action because it also assumes that individuals will try to maximize their outcomes (Von Neumann & Morgenstern, 1944). Behavioral game theory, which addresses what people actually choose in games, however, has shown that players often depart from strict assumptions of economic rationality (Camerer, 2003). In particular, the strategies people choose in real games often suggest that they have mixed motivations, i.e., they are both cooperative and competitive. In this article, we focus on behavioral game theory as we selectively review a series of empirical results, as well as their theoretical and practical implications.

The strategic thrust of behavioral games has several implicit assumptions. Most importantly, individuals' strategies are assumed to reflect their motives, and their motives, in turn, are assumed to reflect their definition of the situation they are facing. Thus, in a simple matrix game in which two parties each have two choices (e.g., defect vs. cooperate) and four possible outcomes can ensue (both defect vs. both cooperate vs. one cooperates while the other defects in two different ways), the four potential payoffs theoretically suggests whether the game is more or less cooperative or competitive structurally. However, how people actually compete or cooperate in the game helps to reveal how they have interpreted the game situation and their social interaction.

The obvious advantages of games, especially experimental games, include but are not limited to the precision and parsimony that depend on a few central variables – people's behaviors, preferences, choices, and outcomes, and the clean and tight control researchers have over endogenous and exogenous factors when they use different games to model people's otherwise complex social interactions. Of course, games have clear disadvantages too. In addition to their inherent simplicity, people often interpret payoff matrices idiosyncratically (Kelley & Thibaut, 1978). Before exploring their advantages and disadvantages, we first present a brief history of behavioral games. Then we discuss the purposes of using games, including their advantages and disadvantages. We selectively review six popular games and some of their important findings, with a particular focus on their theoretical and practical implications. In addition, we attempt to diagnose what games have taught us and what we do not yet know, and suggest and discuss potentially promising avenues for future research.

2. A brief history

Roth (1995) presents an excellent review of the history of experimental economics, drawing from psychological experiments on utility as well as early studies of games. The early history of games goes back at least to Bernoulli (1738); early theory goes back to Von Neumann (1928) and Von Neumann and Morgenstern's (1944) path-breaking *Theory of Games and Economic Behavior*. Nash (1950) then presented his equilibrium model,[1] which was revolutionary in its applicability to a broad range of non-zero sum games with no restrictions on the number of players (Holt & Roth, 2004).

In the late 1940s and 1950s, Melvin Dresher and Merrill Flood conducted some of the first experimental studies of interactive games at the Rand Corporation. Although their early work did not receive enough attention (Rapoport, 1974), Tucker (1950), Nash's thesis advisor, built on their work to create the Prisoners' Dilemma game, which eminent scholars soon popularized (e.g., Luce & Raiffa, 1957; Rapoport, 1960).

The 1960s witnessed a steady growth of games research, in both social psychology and experimental economics. In 1965, for instance, the *Journal of Conflict Resolution* created a special section for experimental game studies, with hopes that "non-zero-sum games will soon become objects of intense study and grow as familiar to students of gaming as chemical compounds are to chemists" (Rapoport, Shubik, & Thrall, 1965; p. 65). Over time, a whole host of interesting games have emerged, developed, and flourished, including but not limited to chicken, stag hunt, assurance, and centipede games, as well as ultimatum and dictator games, *n*-person social dilemmas, public goods games, coalition games, and many more. Each of these games has been studied in its own right, as well as being used to model all sorts of human interactions.

Currently, game theory has become the dominant theoretical approach in micro-economics (Camerer, 2003) and experimental economics has become a distinct, accepted enterprise (Roth, 1995). The increasing popularity of games is also evident by the number of game theorists and experimenters who have received the Nobel Prize, including Robert Aumann, Maurice Allais, Daniel Kahneman, Eric Maskin, Roger Myerson, Elinor Ostrom, Alvin Roth, Thomas Schelling, Reinhard Selten, and Vernon Smith.

3. Why games?

Why study games in the first place? A well-constructed game pits two or more players (one could be nature; the players do not have to be people) who have choices that reflect incentives, motives, values, and underlying strategies. As the archetype of matrix games, the Prisoners' Dilemma pits cooperation against competition in a simple, payoff matrix that, once understood, becomes immediately involving. This ability to involve is the sine qua non of experimental research, and years of experience watching people play experimental games have shown that games truly are involving – lending credence to the conclusion that their results are meaningful (e.g., Dawes, McTavish, & Shaklee, 1977). Whether they are so meaningful that they reveal how countries will interact in wars, or how organisms will evolve over generations, or whether they offer a look into different kinds of social and moral relationships are all debatable issues. But it goes without saying that the behaviors we observe in experimental games result from compelling, strategic thought and that many of the participants care about what happens to them and to the other players.

3.1. Advantages and disadvantages

First and foremost, experimental games generate observations of behavior. Experimental participants do not just indicate how they think or feel; they make real decisions with potent consequences, both to themselves and others. Experimental economics often requires that the consequences be monetary and substantial; psychology does not have a monetary payoff requirement, but does depend on respondents actually caring about their choices. Most experimental games are involving enough to satisfy this criterion.

Other important features of games are the preciseness and parsimony of their measurements of people's preferences, choices, and outcomes: "what distinguishes games from nongames ... is whether certain choices of actions and certain outcomes can be unambiguously defined, whether the consequences of joint choices can be precisely specified, and whether the choosers have distinct preferences among the outcomes" (Rapoport, 1973; p. 17).

Last but not least, experimental games can be carefully designed with both precision and tight control to include a well-specified set of incentives and other exogenous variables to model people's behavior (Ostrom, 2003). The standard structures of behavioral games not only make different experimental studies

[1] The Nash equilibrium is based on the idea that each player's strategy is an optimal response to the strategies of all other players.