

ASIA SUMMER INSTITUTE IN BEHAVIORAL ECONOMICS

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Introduction to Lectures on Behavioral Game Theory

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Behavioral game theory combines theory and empirical (necessarily in games, mainly experimental) evidence to develop the understanding of strategic behavior needed to analyze economic, political, and social interactions.

Any aspect of behavior that is relevant in behavioral decision theory—reference-dependent preferences, present-biased preferences, heuristics and biases in judgment, social preferences—is equally relevant in behavioral game theory.

But so far behavioral game theory, following the “divide-and-conquer” strategy that is common and helpful in economics research, has considered mainly issues that are unique to games and therefore different from “behavioral decision theory in games”.

What is unique to games (aside from social preferences, which despite the need for more than one person has mostly been grouped with decisions rather than games)?

Games differ from individual decisions in that good decisions in games normally depend on predicting other people's decisions.

Behavioral game theory has focused on what seem like the most empirically relevant aspects of this prediction process, usually taking individual behavior as self-interested and rational in the traditional decision-theoretic sense.

My lectures will continue this focus, with the hope that what we learn from it will combine usefully with what we learn from behavioral decision theory—that models from behavioral decision theory will be “plug and play” in behavioral game theory.

What aspects of strategic behavior are not already well enough accounted for by traditional game theory, in particular traditional equilibrium analysis?

Most of these aspects can be distilled into two stylized facts, one about settings where people lack sufficient experience with analogous games to have learned how their partners are likely to play in the current game, and one about settings where people have enough such experience to have learned how others are likely to play:

- When learning isn't possible, people's decisions must rely on strategic thinking rather than learning; their mental models of others' decision processes tend to be simpler than others' actual decision processes; and as a result, depending on the game, people's decisions *may* differ systematically from equilibrium decisions.
- When learning from experience with analogous games *is* possible, learning has a very strong tendency to override strategic thinking, replacing models of others' decision processes with simpler models of decisions by which "others are likely to make the decisions that others made in games like this that I have seen before".

Economists have mostly assumed that such learning from experience is possible, because this provides an easy justification for equilibrium assumptions that often seem to (but might not really) make the analyst's life easier.

Even when such learning clearly isn't possible, economists tend to assume equilibrium anyway, probably out of the hope that doing so won't cause systematic bias, and the fear that without assuming equilibrium, no analysis will be possible.

But I will argue that:

- there are many economically interesting settings where the learning required to justify equilibrium assumptions is not really possible
- even when such learning is really possible, assuming that people have already converged to some equilibrium often does not yield the most useful model
- assuming equilibrium when learning does not justify it often does cause bias
- but nonequilibrium analysis is possible and tractable in such settings

(Thus neither the hope nor the fear is justified.)

My first five lectures will focus on identifying better models of strategic thinking.

Because theories of strategic thinking are “information hogs”, field settings usually lack the control and observability of the rules that govern people’s interactions and the information they have that are needed to discriminate sharply among theories.

(There are some important exceptions, which will be illustrated below.)

Most empirical studies of strategic thinking therefore use laboratory experiments, which with good design can yield the control needed to compare strategic theories.

Moreover, strategic thinking is usually revealed in its purest form by experiments that elicit subjects’ initial responses to series of different games, each played as if in isolation (by designs that disable rote learning and repeated-game strategies).

(I stress that it is *not* the case that models of strategic thinking are useful only in analyzing experimental data, or that in field applications it’s unimportant to have the best such model: A recurring theme will be how having better theories of strategic thinking can help us understand interactions in the field as well as the lab.)

As we will see, experimental subjects' initial responses (and presumably those of people in field environments) often deviate systematically from equilibrium.

But there are common patterns in their deviations that allow certain kinds of non-equilibrium models to consistently out-predict equilibrium.

Moreover, these patterns often involve strategic issues one might have thought game theorists had long since solved, but which resist equilibrium analysis.

I illustrate these issues and the need for nonequilibrium models via quotations from “folk game theory”, which reinforce the lessons from experimental data.

Almost all readings (plus some on topics not covered here) can be found linked at

<http://dss.ucsd.edu/~vcrawfor/SecondYearAdvancedMicroBehaviouralEconSyllabus10.htm>

The first five lectures are organized as follows:

1. Introduction: Why Study Strategic Thinking?
2. Alternative Models of Strategic Thinking
3. Keynes' Beauty Contest: Experimental Evidence from Guessing and Other Normal-Form Games

The lectures then discuss a series of topics, organized by strategic issues and ordered to facilitate learning how the models work.

The first few topics involve normal-form games with neutral framing (for simplicity, and with apologies, the topics mostly avoid extensive-form games).

4. M. M. Kaye's Far Pavilions: Responding to Payoff Asymmetries in Outguessing Games

5. Groucho's Curse: Zero-Sum Betting and Auctions with Incomplete Information

6. Kahneman's Entry Magic: Coordination via Symmetry-Breaking

7. Bank Runs: Coordination via Assurance

8. Non-Equilibrium Econometrics: Structural Alternatives to Incomplete Models

The next two topics involve normal-form games, but with non-neutral framing:

9. Yushchenko and Lake Wobegon: Non-neutral Framing in Outguessing Games

10. Mr. Schelling Goes to Chicago: Coordination via Payoff Asymmetries and Non-neutral Framing

The last three topics on strategic thinking involve extensive-form communication games:

11. Huarangdao and D-Day: Communication of Intentions in Outguessing Games

12. Alphonse and Gaston: Communication of Intentions in Coordination Games

13. October Surprise: Communication of Private Information in Outguessing Games

The last two lectures (approximately) focus on learning, mainly adaptive learning.

(Time permitting, we may touch briefly on more sophisticated learning models.)

The learning lectures will begin with a couple of laboratory case studies of how thinking and learning interact to determine limiting (equilibrium) outcomes.

The learning lectures will conclude with a discussion of what experimental evidence has to say about the structure of people's learning rules.