

A Course in Experimental Game Theory

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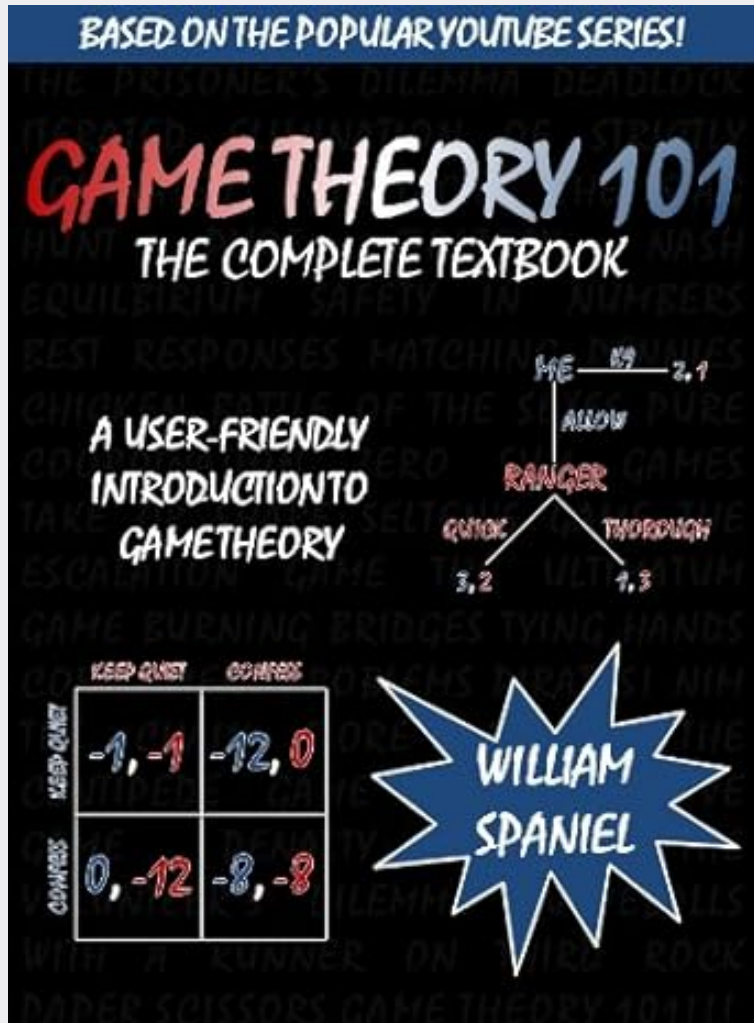
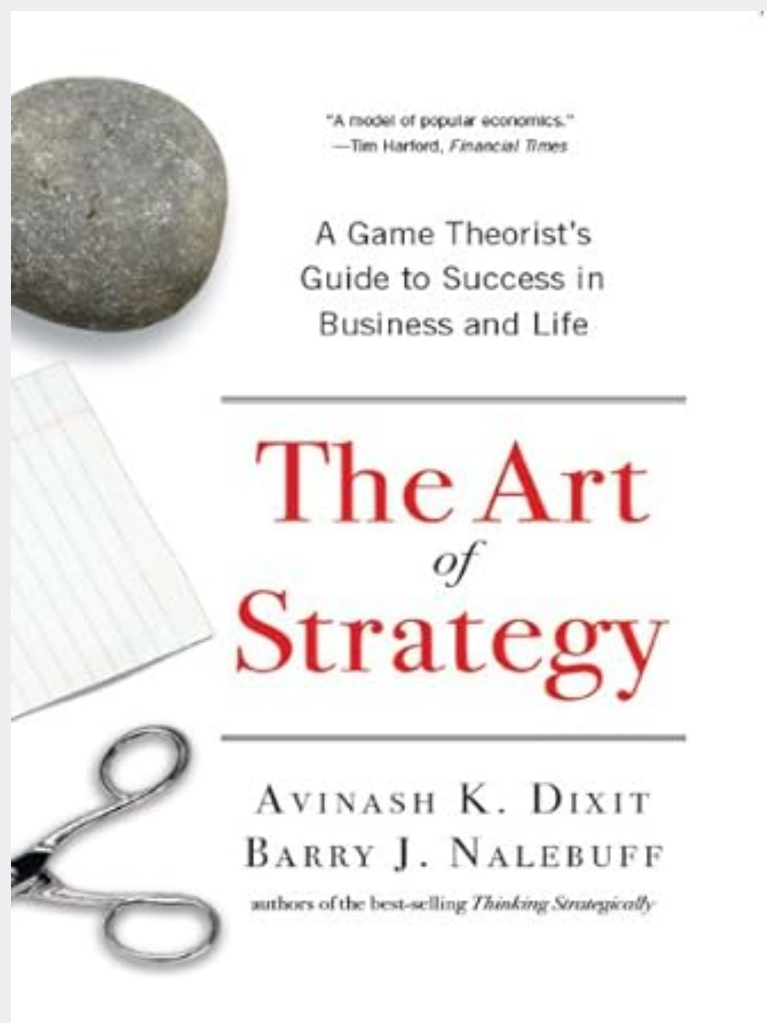


Overview

- This poster describes a junior/senior-level honors seminar combining game theory with experimental economics methodology, with students from all across the university.
- The first half of the course focuses on learning the basics of game theory, with algebra but no calculus. The second half of the course shifts to student presentations on experimental game theory research papers and design and implementation of experimental projects.
- Throughout the course, students participate in experiments earning lottery tickets (“Coyote Bucks”) for a drawing for cash prizes at the end of the semester.

Readings

Readings assigned from *The Art of Strategy* by Dixit and Nalebuff and *Game Theory 101* by William Spaniel.



Other readings included Smith (1962), Smith (1994), Levitt & List (2007), and Akerlof (1970).

List of Topics

Game Theory topics covered:

- Prisoners’ Dilemmas
- Nash Equilibrium
- Mixed Strategies
- Backward Induction
- Commitment
- Repeated Games
- Information and Uncertainty
- Auctions and Contests
- Voting

Experiments done in class:

- Public Goods Game
- Beauty Contest
- Colonel Blotto Game
- Ultimatum Game
- Repeated Prisoners’ Dilemma
- Tullock Contest
- Coin Flipping Simulation
- Two Envelope Problem

Syllabus

Syllabus published by the National Collegiate Honors Council. Download with the QR code:



Student Presentation Topics

During the second half of the course, each student selected a published research paper (subject to instructor approval) and presents it to the class. This resulted in a wide range of topics that would otherwise not have been covered. presentation topics included:

- Chimpanzee choice rates in competitive games match equilibrium game theory predictions
- Putting Behavioral Economics to Work: Testing for Gift Exchange in Labor Markets Using Field Experiments
- Heads or Tails: The Impact of a Coin Toss on Major Life Decisions and Subsequent Happiness
- Academic constraints on alcohol consumption in college students: a behavioral economic analysis
- Donors change both their level and pattern of giving in response to contests among charities

Student feedback: “I was nervous to complete the paper presentation and review assignment, but it ended being very beneficial. It was interesting to look at an economics paper very in depth and to hear about different papers from other people in the class.”

Student Projects

Instead of a final exam, students completed group projects in three stages:

- *Proposal* identifying the main research question and an outline of the game
- *Design Document* explaining the experimental setup, the expected “budget,” and experiment instructions
- *Final Report* including a full literature review and discussion of the experimental results

Students ran the experiments using the rest of the class as subjects, contributing toward the end of semester lottery. Successful projects included:

- “One-Sided Communication in Rock, Paper, Scissors Games.” Students ran repeated rock, paper, scissors games in which one player was allowed to give a non-binding signal ahead of each round. They found that signal givers are usually truthful, but receivers do not trust the signal. This results in a substantive advantage to the signal giver.
- Experiment comparing a basic stag hunt game with one where the “stag” payoff is randomized with the same expected payoff. All pairs who ended up in the randomized payoff were assigned payoffs using a public “wheel of fortune” on the classroom projector. The fun factor led to most of the class overcoming any risk aversion.
- Experiment testing the effects of an emotion induction task prior to doing a stag hunt-style game. This experiment did not work out as planned because almost everyone chose stag regardless of the treatment, but the idea was interesting.
- “Reverse public goods” game where players pull from a public pot each round. The game ends if the pot is depleted but otherwise the remaining amount doubles. There is also a 25% chance of ending each round. Some students played aggressively and others altruistically. Much of the discussion centered around one group which went on for a statistically unlikely 13 rounds.

Student feedback: “It was a fun project. As the designer of the experiment you get to engage with the literature and have to think of how to make the project work well, within a budget, which is good practice for the real world. As a participant in the experiments, it is fun too, and you get to engage with the material/concept learned in class to try to maximize your profits.”

Concluding Remarks

A few tips for instructors:

- Use physical means of randomization (rather than random number generators) to emphasize probability concepts, such as decks of playing cards and polyhedral D&D dice.
- Clarity of experiment instructions is paramount, both for instructor-led experiments and student projects.
- Consider incorporating a few experiments into a principles or intermediate course.
- Break up students into small groups to discuss textbook chapters or research papers.
- Make some time to review basic hypothesis testing before students begin reading papers and designing projects.
- Paper presentations can be a great way to diversify the topics in a course, but must be approached carefully and may not work in all classrooms.

Student feedback: “This course was unlike anything I’ve ever taken before. Although math was a component, I never felt too overwhelmed by it which I was nervous about. Overall, I think I learned a lot and my friends are sure sick of me telling them about the games we played as well as lecturing them about why that is not the dominant strategy.”

“I daresay this class may be the first that I would say I actually had fun learning, which is very scary.”