

Psy/Ec 101 Special topics: The psychology of strategic thinking

MW 130-3, Baxter 25

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(revised Wed 4/8/03)

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Sun 8-9 pm Page House

In social science, mathematical models of situations in which the behavior or knowledge of other people affects a person's outcomes are called "games". Examples include: Bargaining; choosing contracts; trying to coordinate behavior so people are all doing the same thing (synchronizing projects, pulling a rope in tug of war, speaking comprehensible language); constant-sum games in which one person loses if another wins; taking actions which signal special information you have, to induce another person to trust or fear you; and so forth. A large body of game theory characterizes what rational people should do in games, if they are trying to get the best outcome for themselves. An emerging body of research, sometimes called "behavioral game theory", characterizes how people are likely to actually behave in games. Behavioral game theory mixes elements of standard theory with empirical observation and psychological intuition. A common theme in behavioral game theory is that standard game theory is on the right track but usually does not account for cognitive procedures people are likely to use, and for the nature of social preferences people have towards the outcome of others.

This course is about behavioral game theory. The basic approach is to review bodies of experimental research which have documented regularities in behavior. Psychological concepts are used to interpret results and suggest a next generation of theorizing. Frankly, this course could be taught as a psychology course *or* an economics course, and in the eclectic spirit of Caltech I will teach it as both (although it is listed as Psy 101). As such, it is *not* a traditional course in psychology, and will use psychological ideas only in service of understanding how people behave in games. Students who want a more traditional introduction to psychology should take Psy 20 (cognitive psychology), or CNS 176 (similar to Psy 20) or students who want more focussed discussion should take advanced electives (e.g. other Psy 101 sections). In the first part of the course I will cover some basic game theory (noncooperative games in normal and extensive form, Nash equilibrium and subgame perfection, mixed strategies) which is necessary to make sense of everything that follows (it is a whirlwind tour of what is usually covered in PS/Ec 172. Then we will proceed through classes of games.

Grades will be based on three homeworks (20% each), two reports on specific games that interest you (15% each), and in-class contribution (10%). Contribution means that you have useful things to say in class, or critique arguments of others (including the professor, the reading, or other students) in a constructive and insightful way. Generally I will award 1 or 2 contribution points per class for students who volunteered answers or said something insightful.

The game reports work like so: Choose one game (or more than one if they are closely related) described in my book. Find the original article and read it (if you cannot obtain it easily check with Karen Kerbs who will have access to my "archives" which are not well-organized but which have many hardcopies of the articles). Write a short 2-3 page report (12 point font)

answering the following questions: Why is this game interesting? What was discovered in the experiment? Did the Camerer book summary leave out something interesting, or perhaps even misreport what was learned? Given the results of the experiment, what kind of experiment should be done next? You can choose to present your report briefly (15-20 minutes including questioning) and receive 3 contribution points. If you want to do this, please let me know at least one class ahead of time (before the class, or week, in which the material will be discussed).

All scores in the three categories will be divided by standard deviation and given the weights in parentheses.

All homework should be done on your own. Do not consult with others while doing the homework, and both A and B are responsible for being sure that if A has finished the homework but B has not, A's knowledge of it does not influence B. You can use any notes, the text, and the TA during the homework. Do not consult with others, and do not use any outside "game calculators" which permit rapid calculation of equilibria. The game reports **can** be done in pairs but a pair will receive only 75% as much credit (per person) as a single person-report. Also if a pair chooses to present their report, the 3 contribution points will be split between them depending on who does the talking.

The readings for the class my brand new book, Behavioral Game Theory and some handouts in class; extras are always available from Karen Kerbs in Baxter 332 (x4089, kkerbs@hss.caltech.edu).

Syllabus:

weeks 1-2: (3/31, 4/1,7)

Introduction: What this course is about; and Basics of game theory

noncooperative games, normal and extensive-form, zero-sum games and minimax dominance-solvability, Nash equilibrium, refinements (perfection, Bayesian-Nash) selection principles (payoff-dominance, risk-dominance)

read Chapter 1, BGT

Homework #1 due Friday 11 Apr at noon. EXTENDED TO MON APR 14, AT THE START OF CLASS 130 PM.

week 2-3: (4/9,14) Social preferences in dictator, ultimatum and trust games

read chapter 2, BGT

CLASS CANCELLED WED APR 16

week 4: (4/21,23): Simple bargaining games

unstructured and sequential bargaining
structured games, shrinking-pies, cognition

read chapter 4, BGT

week 5: (4/28,30) Coordination games

matching (focal points), stag hunt, battle-of-the-sexes, culture
read chapter 7, BGT

weeks 6-7 (5/5,7,12): Iterated thinking

simple dominance-solvable games
centipede game, e-mail game, p-beauty contests
read chapter 5, BGT; Camerer, Ho, Chong, "A cognitive hierarchy theory of one-shot games",
<http://hss.caltech.edu/~camerer/QJE1202a.pdf>

week 8 (5/14,19,21): Signaling
read chapter 8 BGT

week 9 (5/28): Learning & teaching
fictitious play, Cournot, reinforcement, EWA
read chapter 6 BGT
Note: Memorial Day 26 May is an Institute holiday