

FORMAL MODELING IN POLITICAL SCIENCE

Politics: POL-GA 2105
New York University, Fall 2017
19 West 4th St., Rm. 217
Class: Mon., 6:20 - 8:20

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Office Hrs.: Mon., 3:30 - 6; Wed., 3:30 - 4:30

The application of game theory—and an alternative strategic theory called “theory of moves”—as well as social-choice theory to a wide variety of strategic situations, principally but not exclusively in politics, will be examined. Uses of strategy in voting in committees and elections, in political campaigns, in the defense and deterrence policies of nations, and in bargaining and coalition-building situations will be among the topics discussed. Secrecy and deception as political strategies will also be analyzed.

Although the applications of strategic thinking will be mainly to American and international politics, strategy in everything from the Bible to sports and business today will be studied, too. Social-choice topics that will be analyzed include the manipulability of different voting systems, problems of achieving proportional representation in parliamentary democracies, and conflicts among different apportionment methods. Fair-division procedures for resolving disputes will also be analyzed.

In addition to the required readings, further readings will be recommended throughout the course for those interested in pursuing particular topics in greater depth. No mathematical training beyond high school mathematics is assumed in the course. The written requirements of the course include a midterm and a final examination plus a short paper on a topic—to which game theory is applicable—that is chosen in consultation with the instructor. Each of the three written requirements will count approximately 1/3 percent towards one’s final grade.

Required Books

Brams, Steven J. **RATIONAL POLITICS: DECISIONS, GAMES, AND STRATEGY**. Washington, DC/Boston: CQ Press/Academic Press, 1985/1989 (out of print; used copies and bound reproductions in bookstore). **RP**

Brams, Steven J. **THEORY OF MOVES**. Cambridge, UK: Cambridge University Press, 1994. **TOM**

Brams, Steven J., and Alan D. Taylor. **THE WIN-WIN SOLUTION: GUARANTEEING FAIR SHARES TO EVERYBODY**. New York: W.W. Norton, 1999. **WW**

Dixit, Avinash K., and Barry J. Nalebuff. **THE ART OF STRATEGY: A GAME THEORIST’S GUIDE TO SUCCESS IN BUSINESS AND LIFE**. New York: W.W. Norton, 2008. **AS**

Assignments Due

Sept. 11: **RP**, chs. 1-2; **TOM**, Introduction and ch. 1; **AS**, Introduction and chs. 1-3
Sept. 18: **TOM**, ch. 2; **AS**, chs. 4-5
Sept. 25: **TOM**, chs. 3-4; **AS**, chs. 6-7
Oct. 2: **TOM**, ch. 5-6; **AS**, ch. 8
Oct. 16: **TOM**, chs. 7-8 and Review

Oct. 23: **Midterm Examination**
 Oct. 30: **RP**, ch. 3; **AS**, chs. 9-10
 Nov. 6: **RP**, ch. 4; **AS**, chs. 11-12
 Nov. 13: **RP**, chs. 5 & 7 (skip ch. 6)
 Nov. 20: **RP**, chs. 8-9; **AS**, chs. 13-14
 Nov. 27: **WW**, chs. 1-4
 Dec. 4: **WW**, chs. 5-9
 Dec. 11/12: 8-10 page paper due and oral reports on Dec. 11; review on Dec. 12
 Dec. 18 (?): Final Exam

Game Theory Texts

- Aliprantis, Charalambos D., and Subir K. Chakrabarti. **GAMES AND DECISION MAKING**, 2nd ed. Oxford University Press, 2011.
- Barron, E. N. **GAME THEORY: AN INTRODUCTION**, 2nd ed. Wiley, 2013.
- Binmore, Ken. **PLAYING FOR REAL: A TEXT ON GAME THEORY**. Oxford University Press, 2007.
- Börgers Tilman. **AN INTRODUCTION TO THE THEORY OF MECHANISM DESIGN**. Oxford University Press, 2015.
- Dixit, Avinash K., David H. Reiley, and Susan Skeath. **GAMES OF STRATEGY**, 4th ed. W.W. Norton, 2014.
- Geckil, Ilhan Kubilay, and Partrick L. Anderson. **APPLIED GAME THEORY AND STRATEGIC BEHAVIOR**. CRC Press, 2009.
- Gintis, Herbert. **THE BOUNDS OF REASON: GAME THEORY AND THE UNIFICATION OF THE BEHAVIORAL SCIENCES**. Princeton University Press, 2009.
- Gura, Ein Ya, and Michael B. Maschler. **INSIGHTS INTO GAME THEORY: AN ALTERNATIVE MATHEMATICAL EXPERIENCE**. Cambridge University Press, 2008.
- Hargreaves Heap, Shaun P., and Yanis Varoufakis. **GAME THEORY: A CRITICAL TEXT**, rev. ed. Routledge, 2004.
- Harrington, Joseph E., Jr. **GAMES, STRATEGIES, AND DECISION MAKING**. Worth, 2008.
- Heifetz, Aviad. **GAME THEORY: INTERACTIVE STRATEGIES IN ECONOMICS AND MANAGEMENT**. Cambridge University Press, 2012.
- Keiding, Hans. **GAME THEORY: A COMPREHENSIVE INTRODUCTION**. World Scientific, 2015.
- Lepton-Brown, Kevin, and Yoav Shoham. **ESSENTIALS OF GAME THEORY: A CONCISE, MULTIDISCIPLINARY INTRODUCTION**. Morgan & Claypod, 2008.

- Luce, R. Duncan, and Howard Raiffa. GAMES AND DECISIONS: A CRITICAL SURVEY. Wiley, 1957.
- McCain, Roger A. GAME THEORY: A NONTECHNICAL INTRODUCTION TO THE ANALYSIS OF STRATEGY, 3rd ed. World Scientific, 2014.
- McCarty, Nolan, and Adam Meirowitz. POLITICAL GAME THEORY: AN INTRODUCTION. Cambridge University Press, 2007.
- Maschler, Michael, Eilon Solan, and Schmuel Zamir. GAME THEORY. Cambridge University Press, 2013.
- Nowak, Martin A. EVOLUTIONARY DYNAMICS: EXPLORING THE EQUATIONS OF LIFE. Harvard University Press, 2006.
- Osborne, Martin J. AN INTRODUCTION TO GAME THEORY. Oxford University Press, 2004.
- Petrosyan, Leon A., and Nikolay A. Zenkevitch. GAME THEORY, 2nd ed. World Scientific, 2014.
- Rosenthal, Edward C. THE COMPLETE IDIOT'S GUIDE TO GAME THEORY. Penguin Group, 2011.
- Rothe, Jörg (ed.). AN INTRODUCTION TO ALGORITHMIC GAME THEORY, COMPUTATIONAL SOCIAL CHOICE, AND FAIR DIVISION. Springer, 2016.
- Schecter, Stephen, and Herbert Gintis. GAME THEORY IN ACTION: AN INTRODUCTION TO CLASSICAL AND EVOLUTONARY MODELS. Princeton University Press, 2016.
- Smith, Samuel Bruce. CHANCE, STRATEGY, AND CHOICE: AN INTRODUCTION TO THE MATHEMATICS AND GAMES AND ELECTIONS. Cambridge University Press, 2015.
- Straffin, Philip D. GAME THEORY AND STRATEGY. Mathematical Associaiton of America, 1993.
- Tadelis, Steven. GAME THEORY: AN INTRODUCTION. Princeton University Press, 2013.
- Watson, Joel. STRATEGY: AN INTRODUCTION TO GAME THEORY, 3rd ed. W. W. Norton, 2013.
- Williams, Kenneth C. INTRODUCTION TO GAME THEORY: A BEHAVIORAL APPROACH. Oxford University Press, 2012.

Applications and History of Game Theory and Social-Choice Theory

- Albert, Michael H., and Richard J. Nowakowski (eds.). GAMES OF NO CHANCE 3. Cambridge University Press, 2009.

- Ankeny, Nesmith C. POKER STRATEGY: WINNING WITH GAME THEORY. Basic, 1981.
- Arrow, Kenneth J., Amartya K. Sen, and Kotaro Suzumura (eds.). HANDBOOK OF SOCIAL CHOICE AND WELFARE, vol. 1/2. North Holland, 2002/2011.
- Aumann, Robert J., and Sergiu Hart (eds.). HANDBOOK OF GAME THEORY WITH ECONOMIC APPLICATIONS, vols. 1/2/3. North Holland, 1992/1994/2002.
- Avenhaus, Rudolf, and I. William Zartman (eds.). DIPLOMACY GAMES: FORMAL MODELS AND INTERNATIONAL NEGOTIATIONS. Springer, 2007.
- Axelrod, Robert. THE EVOLUTION OF COOPERATION. Basic, 1984.
- Baird, Douglas G., Robert H. Gertner, and Randal C. Picker. GAME THEORY AND THE LAW. Harvard University Press, 1994.
- Bewerdorff, Jörg. LUCK, LOGIC, AND WHITE LIES: THE MATHEMATICS OF GAMES. A. K. Peters, 2005.
- Boorman, Scott A. THE PROTRACTED GAME: A WEI-CH'I INTREPRETATION OF MAOIST REVOLUTIONARY STRATEGY. Oxford University Press, 1969.
- Börgers Cristoph. MATHEMATICS OF SOCIAL CHOICE: VOTING, COMPENSATION, AND DIVISION. SIAM, 2010.
- Brams, Steven J. GAME THEORY AND POLITICS. Free Press/Dover, 1975/2004.
- Brams, Steven J. PARADOXES IN POLITICS: AN INTRODUCTION TO THE NONOBVIOUS IN POLITICAL SCIENCE. Free Press, 1976.
- Brams, Steven J. THE PRESIDENTIAL ELECTION GAME. Yale University Press, 1978/2007.
- Brams, Steven J. BIBLICAL GAMES: GAME THEORY AND THE HEBREW BIBLE. MIT Press, 1980/2003.
- Brams, Steven J. SUPERIOR BEINGS: IF THEY EXIST, HOW WOULD WE KNOW? GAME-THEORETIC IMPLICATIONS OF OMNISCIENCE, OMNIPOTENCE, IMMORTALITY, AND INCOMPREHENSIBILITY. Springer, 1983/2007.
- Brams, Steven J. SUPERPOWER GAMES: APPLYING GAME THEORY TO SUPERPOWER CONFLICT. Yale University Press, 1985.
- Brams, Steven J. NEGOTIATION GAMES: APPLYING GAME THEORY TO BARGAINING AND ARBITRATION. Routledge, 1990/2003.
- Brams, Steven J. MATHEMATICS AND DEMOCRACY: DESIGNING BETTER VOTING AND FAIR-DIVISION PROCEDURES. Princeton University Press, 2008.
- Brams, Steven J. GAME THEORY AND THE HUMANITIES: BRIDGING TWO WORLDS. MIT Press, 2011.

- Brams, Steven J., and Peter C. Fishburn. APPROVAL VOTING. Birkhäuser Boston, 1983/2007.
- Brams, Steven J., and D. Marc Kilgour. GAME THEORY AND NATIONAL SECURITY. Basil Blackwell, 1988.
- Brams, Steven J., and Alan D. Taylor. FAIR DIVISION: FROM CAKE-CUTTING TO DISPUTE RESOLUTION. Cambridge University Press, 1996.
- Brandenburger, Adam, and Barry J. Nalebuff. CO-OPERATION. New York: Doubleday, 1996.
- Brandt, Felix, et al. (eds.). HANDBOOK OF COMPUTATIONAL SOCIAL CHOICE. Cambridge University Press, 2016.
- Bryant, Jim. ACTING STRATEGICALLY USING DRAMA THEORY. CRC Press, 2016.
- Chwe, Michael Suk-Young. RATIONAL RITUAL: CULTURE, COORDINATION, AND COMMON KNOWLEDGE. Princeton University Press, 2001.
- Chwe, Michael Suk-Young. JANE AUSTEN, GAME THEORIST. Princeton University Press, 2013.
- Erikson, Paul. THE WORLD GAME THEORISTS MADE. University of Chicago Press, 2016.
- Felsenthal, Dan S., and Moshé Machover. THE MEASUREMENT OF VOTING POWER: THEORY AND PRACTICE, PROBLEMS AND PARADOXES. Edward Elgar, 1998.
- Felsenthal, Dan S., and Moshé Machover (eds.). ELECTORAL SYSTEMS: PARADOXES, ASSUMPTIONS, AND PROCEDURES. Springer, 2012.
- Fisher, Len. ROCK, PAPER, SCISSORS: GAME THEORY IN EVERYDAY LIFE. Basic, 2008.
- Gehlback, Scott. FORMAL MODELS OF DOMESTIC POLITICS. Cambridge University Press, 2013.
- Gilboa, Itzhak, and David Schmeidler. A THEORY OF CASE-BASED DECISIONS. Cambridge University Press, 2001.
- Heckelman, Jac C., and Nicholas R. Miller (eds.). HANDBOOK OF SOCIAL CHOICE AND VOTING. Edward Elgar, 2015.
- Howard, Nigel. PARADOXES OF RATIONALITY: THEORY OF METAGAMES AND POLITICAL BEHAVIOR. MIT Press, 1971.
- Humphreys, Macartan. POLITICAL GAMES: MATHEMATICAL INSIGHTS ON FIGHTING, VOTING, LYING & OTHER AFFAIRS OF STATE. W. W. Norton, 2017.

- Israel, Giorgio, and Ana Millán Gasca. *THE WORLD AS A MATHEMATICAL GAME: JOHN VON NEUMANN AND TWENTIETH CENTURY SCIENCE*. Birkhäuser, 2009.
- Kaminski, Marek M. *GAMES PRISONERS PLAY: THE TRAGICOMIC WORLDS OF POLISH PRISON*. Princeton University Press, 2004.
- Konrad, Kai A. *STRATEGY AND DYNAMICS IN CONTESTS*. Oxford University Press, 2009.
- Kuhn, Harold W. (ed.). *CLASSICS IN GAME THEORY*. Princeton University Press, 1997.
- Leonard, Robert. *VON NEUMANN, MORGENSTERN, AND THE CREATION OF GAME THEORY: FROM CHESS TO SOCIAL SCIENCE, 1900-1960*. Cambridge University Press, 2010.
- Levin, Simon A. (ed.). *GAMES, GROUPS, AND THE GLOBAL GOOD*. Springer, 2009.
- McAdams, David. *GAME-CHANGER: GAME THEORY AND THE ART OF TRANSFORMING STRATEGIC SITUATIONS*. W.W. Norton, 2014.
- McDonald, John. *THE GAME OF BUSINESS*. Doubleday, 1975.
- McLean, Iain, and Arnold B. Urken (eds.). *CLASSICS OF SOCIAL CHOICE*. University of Michigan Press, 1995.
- Mailath, George J., and Larry Samuelson. *REPEATED GAMES AND REPUTATIONS: LONG-RUN RELATIONSHIPS*. Oxford University Press, 2006.
- Manlove, David F. *ALGORITHMIC MATCHING UNDER PREFERENCES*. World Scientific, 2013.
- Maskin, Eric, and Amartya Sen. *THE ARROW IMPOSSIBILITY THEOREM*. Columbia University Press, 2014.
- Milgrom, Paul. *PUTTING AUCTION THEORY TO WORK*. Cambridge University Press, 2004.
- Mor, Ben D. *DECISION AND INTERACTION IN CRISIS: A MODEL OF INTERNATIONAL CRISIS BEHAVIOR*. Praeger, 1993.
- Moulin, Hervé J. *FAIR DIVISION AND COLLECTIVE WELFARE*. MIT Press, 2003.
- Muzzio, Douglas. *WATERGATE GAMES: STRATEGIES, CHOICES, OUTCOMES*. New York University Press, 1982.
- Myerson, Michael I. *POLITICAL NUMERACY: MATHEMATICAL PERSPECTIVES ON OUR CHAOTIC CONSTITUTION*. W.W. Norton, 2002.
- Nasar, Sylvia. *A BEAUTIFUL MIND*. Simon and Schuster, 1998.
- Nisan, Noam, et al. (eds.). *ALGORITHMIC GAME THEORY*. Cambridge University

- Press, 2007.
- Novak Stéphanie, and Jon Elster. MAJORITY DECISIONS: PRINCIPLES AND PRACTICES. Cambridge University Press, 2014.
- O'Neill, Barry. HONOR, SYMBOLS, AND WAR. University of Michigan Press, 1999.
- Perea, Andrés. EPISTEMIC GAME THEORY: REASONING AND CHOICE. Cambridge University Press, 2012.
- Poundstone, William. PRISONER'S DILEMMA: JOHN VON NEUMANN, GAME THEORY, AND THE PUZZLE OF THE BOMB. Doubleday, 1992.
- Pukelsheim, Friedrich. PROPORTIONAL REPRESENTATION: APPORTIONMENT METHODS AND THEIR APPLICATIONS. Springer, 2014.
- Regenwetter, Michel, *et al.* BEHAVIORAL SOCIAL CHOICE: PROBABILISTIC MODELS, STATISTICAL INFERENCE, AND APPLICATIONS. Cambridge University Press, 2006.
- Riker, William H. THE THEORY OF POLITICAL COALITIONS. Yale University Press, 1962.
- Riker, William H. LIBERALISM AGAINST POPULISM: A CONFRONTATION BETWEEN THE THEORY OF DEMOCRACY AND THE THEORY OF SOCIAL CHOICE. Freeman, 1982.
- Riker, William H. THE ART OF POLITICAL MANIPULATION. Yale University Press, 1986.
- Riker, William H. THE STRATEGY OF RHETORIC. Yale University Press, 1996.
- Robertson, Jack, and William Webb. CAKE-CUTTING ALGORITHMS: BE FAIR IF YOU CAN. A K Peters, 1998.
- Robinson, David, and David Goforth. THE TOPOLOGY OF THE 2 X 2 GAMES: A NEW PERIODIC TABLE. Routledge, 2005.
- Robinson, E. Arthur, Jr., and Daniel H. Ullman. A MATHEMATICAL LOOK AT POLITICS, 2nd ed. CRC Press, 2017.
- Roth, Alvin E. WHO GETS WHAT—AND WHY: THE NEW ECONOMICS OF MATHEMATICS AND MARKET DESIGN. Houghton, Mifflin, Harcourt, 2015.
- Saari, Donald G. DISPOSING DICTATORS, DEMYSTIFYING VOTING PARADOXES: SOCIAL CHOICE ANALYSIS. Cambridge University Press, 2008.
- Schelling, Thomas C. MICROMOTIVES AND MACROBEHAVIOR. Norton, 1978.
- Schelling, Thomas C. THE STRATEGY OF CONFLICT. Harvard University Press, 1960.
- Shepsle, Kenneth A. ANALYZING POLITICS: RATIONALITY, BEHAVIOR, AND

- INSTITUTIONS, 2nd ed. W. W. Norton, 2010.
- Shapira, Haim. GLADIATORS, PIRATES AND GAMES OF TRUST: HOW GAME THEORY, STRATEGY, AND PROBABILITY RULE OUT LIVES. Watkins, 2017.
- Sigmund, Karl. THE CALCULUS OF SELFISHNESS. Princeton University Press, 2010.
- Sosnick, Stephen H. WHICH ELECTION SYSTEM IS BEST? A COMPREHENSIVE COMPARISON OF WORLD WIDE ELECTION SYSTEMS. Amazon, 2016.
- Szpiro, George G. NUMBERS RULE: THE VEXING MATHEMATICS OF DEMOCRACY, FROM PLATO TO THE PRESENT. Princeton University Press, 2010.
- Taylor, Alan D. SOCIAL CHOICE AND THE MATHEMATICS OF MANIPULATION. Cambridge University Press, 2005.
- Taylor, Alan D., and Allison M. Pacelli. MATHEMATICS AND POLITICS: STRATEGY, VOTING, POWER AND PROOF, 2nd ed. Springer, 2008.
- Tsebelis, George. NESTED GAMES: RATIONAL CHOICE IN COMPARATIVE POLITICS. University of California Press, 1990.
- Vajda, Steven. MATHEMATICAL GAMES AND HOW TO PLAY THEM. Ellis Horwood, 1992.
- Wainwright, Michael. GAME THEORY AND POSTWAR AMERICAN LITERATURE. Palgrave Macmillan, 2016.
- Walker, Stephen C., and Akan Malici. U.S. PRESIDENTS AND FOREIGN POLICY MISTAKES. Stanford University Press, 2011.
- Wallis, W. D. THE MATHEMATICS OF ELECTIONS AND VOTING. Springer, 2014.
- Weintraub, E. Roy (ed.). TOWARD A HISTORY OF GAME THEORY. Duke University Press, 1992.
- Wells David. GAMES AND MATHEMATICS: SUBTLE CONNECTIONS. Cambridge University Press, 2012.
- Winter, Eyal. FEELING SMART: EMOTIONS ARE MORE RATIONAL THAN WE THINK. Public Affairs, 2014.
- Zagare, Frank C. THE GAMES OF JULY: EXPLAINING THE GREAT WAR. University of Michigan Press, 2010.
- Zaluski, Wojciech. GAME THEORY IN JURISPRUDENCE. Copernicus Center Press, 2013.