

GAME THEORY: COMMUNICATION AND INFORMATION

Class Description

Most of economics consider an agent's behavior to be driven by preferences and information. If we wish to influence the agent's choice, then there are two ways of doing so. The first one is to affect incentives by using contingent rewards and punishments (contract or mechanism design). The second one is to provide information (persuasion or information design). This course mainly surveys the recent developments in the growing literature about Bayesian persuasion and information design, but we will also cover some classic results from information theory as well as a variety of applications in finance, industrial organization, labor and personnel economics, law and economics, and political economy. If time permits, we will review some seminal papers in the literature of cheap talk and disclosure. The course is designed for PhD students who are interested in either doing theoretical research in related topics or receiving formal training to develop modeling skills for applied work.

Class Requirements

There will be 3 problem sets. The course is therefore reading-intensive. Grades for the class will be based on:

- class participation
- two problem sets
- a class presentation
- a referee report

Class Logistics

The class meets on TBA at TBA.

Contacting Us

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Background Reading

- A. Kamenica, Emir. "Bayesian persuasion and information design." *Annual Review of Economics* 11 (2018)
- B. Bergemann, Dirk, and Stephen Morris. "Information design: A unified perspective." *Journal of Economic Literature* 57, no. 1 (2019): 44-95.

Tentative Schedule ¹

1. Information Theory

- A. Blackwell, David. "Equivalent comparisons of experiments." *The annals of mathematical statistics* (1953): 265-272.
- B. Marschak, Jacob, and Koichi Miyasawa. "Economic comparability of information systems." *International Economic Review* 9, no. 2 (1968): 137-174.
- C. *de Oliveira, Henrique. "Blackwell's informativeness theorem using diagrams." *Games and Economic Behavior* 109 (2018): 126-131.
- D. *Green, Jerry Richard, and Nancy Stokey. *Two representations of information structures and their comparisons*. Institute for Mathematical Studies in the Social Sciences, (1978).
- E. *Rothschild, Michael, and Joseph E. Stiglitz. "Increasing risk: I. A definition." *Journal of Economic theory* 2, no. 3 (1970): 225-243.
- F. Leshno, Moshe, Haim Levy, and Yishay Spector. "A Comment on Rothschild and Stiglitz's "Increasing Risk: I. A Definition". " *Journal of Economic Theory* 77, no. 1 (1997): 223-228.

2. Concavification Approach

- A. *Kamenica, Emir, and Matthew Gentzkow. "Bayesian persuasion." *American Economic Review* 101, no. 6 (2011): 2590-2615.
- B. Rayo, Luis, and Ilya Segal. "Optimal information disclosure." *Journal of Political Economy* 118, no. 5 (2010): 949-987.
- C. Alonso, Ricardo, and Odilon Camara. "Bayesian persuasion with heterogeneous priors." *Journal of Economic Theory* 165 (2016): 672-706.

3. Multiple Senders Persuasion

- A. Gentzkow, Matthew, and Emir Kamenica. "Competition in persuasion." *The Review of Economic Studies* 84, no. 1 (2016): 300-322.
- B. *Gentzkow, Matthew, and Emir Kamenica. "Bayesian persuasion with multiple senders and rich signal spaces." *Games and Economic Behavior* 104 (2017): 411-429.
- C. Li, Fei, and Peter Norman. "On Bayesian persuasion with multiple senders." *Economics Letters* 170 (2018): 66-70.
- D. *Li, Fei, and Peter Norman. "Sequential persuasion." *Available at SSRN 2952606* (2018).
- E. Board, Simon, and Jay Lu. "Competitive information disclosure in search markets." *Journal of Political Economy* 126, no. 5 (2018): 1965-2010.
- F. Boleslavsky, Raphael, and Christopher Cotton. "Grading standards and education quality." *American Economic Journal: Microeconomics* 7, no. 2 (2015): 248-79.
- G. Au, Pak Hung, and Keiichi Kawai. "Competitive information disclosure by multiple senders." *Games and Economic Behavior* 119 (2020): 56-78.

¹ Papers marked with (*) will be covered in lectures.

4. On the Commitment Assumption

- A. *Lipnowski, Elliot, and Doron Ravid. "Cheap talk with transparent motives." (2020). *Econometrica*
- B. Perez-Richet, Eduardo, and Vasiliki Skreta. *Test design under falsification*. Working paper, (2019).
- C. Mathevet, Laurent, David Pearce, and Ennio Stacchetti. "Reputation and information design." (2019).
- D. Best, James, and Daniel Quigley. "Persuasion for the long run." *Available at SSRN 2908115* (2017).
- E. Lipnowski, Elliot, Doron Ravid, and Denis Shishkin. "Persuasion via weak institutions." (2020)
- F. Guo, Yingni, and Eran Shmaya. *Costly miscalibration*. Working paper, (2018).

5. Posterior-Mean Approach

- A. Kolotilin, Anton. "Optimal information disclosure: A linear programming approach." *Theoretical Economics* 13, no. 2 (2018): 607-635.
- B. *Gentzkow, Matthew, and Emir Kamenica. "A Rothschild-Stiglitz approach to Bayesian persuasion." *American Economic Review* 106, no. 5 (2016): 597-601.
- C. *Dworczak, Piotr, and Giorgio Martini. "The simple economics of optimal persuasion." *Journal of Political Economy* 127, no. 5 (2019): 1993-2048.

6. Information and Pricing

- A. Lewis, Tracy R., and David EM Sappington. "Supplying information to facilitate price discrimination." *International Economic Review* (1994): 309-327.
- B. Anderson, Simon P., and Régis Renault. "Advertising content." *American Economic Review* 96, no. 1 (2006): 93-113.
- C. *Roesler, Anne-Katrin, and Balázs Szentes. "Buyer-optimal learning and monopoly pricing." *American Economic Review* 107, no. 7 (2017): 2072-80.
- D. Ravid, Doron, Anne-Katrin Roesler, and Balázs Szentes. "Learning before trading: on the inefficiency of ignoring free information." *Available at SSRN 3317917* (2019).
- E. *Armstrong, Mark, and Jidong Zhou. "Consumer information and the limits to competition." Working Paper (2019).
- F. Hwang, Ilwoo, Kyungmin Kim, and Raphael Boleslavsky. "Competitive Advertising and Pricing." Working Paper (2019).

7. Persuasion with Private Information

- A. *Kolotilin, Anton, Tymofiy Mylovanov, Andriy Zapechelnyuk, and Ming Li. "Persuasion of a privately informed receiver." *Econometrica* 85, no. 6 (2017): 1949-1964.
- B. *Kolotilin, Anton, and Andriy Zapechelnyuk. "Persuasion meets delegation." *arXiv preprint arXiv:1902.02628* (2019).

- C. Guo, Yingni, and Eran Shmaya. "The interval structure of optimal disclosure." *Econometrica* 87, no. 2 (2019): 653-675.
- D. Hedlund, Jonas. "Bayesian persuasion by a privately informed sender." *Journal of Economic Theory* 167 (2017): 229-268.

8. Information Design Approach

- A. Bergemann, Dirk, and Stephen Morris. "Bayes correlated equilibrium and the comparison of information structures in games." *Theoretical Economics* 11, no. 2 (2016): 487-522.
- B. *Taneva, Ina. "Information design." *American Economic Journal: Microeconomics* 11, no. 4 (2019): 151-85.
- C. Mathevet, Laurent, Jacopo Peregó, and Ina Taneva. "On Information Design in Games." (2019). *Journal of Political Economy*.
- D. *Morris, Oyama and Takahashi. "Adversarial Information Design in Binary-Action Supermodular Games" working paper (2019)

9. Information Design and Political Economy

- A. *Alonso, Ricardo, and Odilon Câmara. "Persuading voters." *American Economic Review* 106, no. 11 (2016): 3590-3605.
- B. *Chan, Jimmy, Seher Gupta, Fei Li, and Yun Wang. "Pivotal persuasion." *Journal of Economic Theory* 180 (2019): 178-202.
- C. Bardhi, Arjada, and Yingni Guo. "Modes of persuasion toward unanimous consent." *Theoretical Economics* 13, no. 3 (2018): 1111-1149.
- D. *Inostroza, Nicolas, and Alessandro Pavan. "Persuasion in global games with application to stress testing." (2019).
- E. *Li, Fei, Yangbo Song, and Mofei Zhao. "Global Manipulation by Local Obfuscation." (2019).

10. Dynamic Information Design

- A. *Hörner, Johannes, and Andrzej Skrzypacz. "Selling information." *Journal of Political Economy* 124, no. 6 (2016): 1515-1562.
- B. *Ely, Jeffrey C. "Beeps." *American Economic Review* 107, no. 1 (2017): 31-53.
- C. *Ely, Jeffrey C., and Martin Szydlowski. "Moving the goalposts." *Journal of Political Economy* 128, no. 2 (2020).
- D. Brocas, Isabelle, and Juan D. Carrillo. "Influence through ignorance." *The RAND Journal of Economics* 38, no. 4 (2007): 931-947.
- E. *Henry, Emeric, and Marco Ottaviani. "Research and the approval process: the organization of persuasion." *American Economic Review* 109, no. 3 (2019): 911-55.
- F. Doval, Laura, and Jeffrey Ely. *Sequential information design*. Working paper, 2019.

Papers for Student Presentation

- A. Galperti, Simone. "Persuasion: The art of changing world views." *American Economic Review* 109, no. 3 (2019): 996-1031.
- B. Georgiadis, George, and Balazs Szentes. *Optimal monitoring design*. 2020, Econometrica
- C. Yoder, Nathan. "Designing incentives for heterogeneous researchers." *Available at SSRN 3154143* (2019).
- D. Ostrizek, Franz. "Vague by Design: Performance Evaluation and Learning from Wages." 2019
- E. Halac, Marina, Elliot Lipnowski, and Daniel Rappoport. "Rank Uncertainty in Organizations." 2019
- F. Bergemann, Dirk, Benjamin Brooks, and Stephen Morris. "The limits of price discrimination." *American Economic Review* 105, no. 3 (2015): 921-57.
- G. Yang, Kai Hao. "Selling Consumer Data for Profit: Optimal Market-Segmentation Design and its Consequences." 2019
- H. Smolin, Alex. "Disclosure and pricing of attributes." *Available at SSRN 3318957* (2019).
- I. Ichihashi, Shota. 2020. "Online Privacy and Information Disclosure by Consumers." *American Economic Review*, 110 (2): 569-95.
- J. Basak, Deepal, and Zhen Zhou. "Diffusing coordination risk." *American Economic Review* 110, no. 1 (2020): 271-97.
- K. Shishkin, Denis. "Evidence Acquisition and Voluntary Disclosure." (2019).
- L. Lipnowski, Elliot, and Laurent Mathevet. "Disclosure to a psychological audience." *American Economic Journal: Microeconomics* 10, no. 4 (2018): 67-93.
- M. Gentzkow, Matthew, and Emir Kamenica. "Costly persuasion." *American Economic Review* 104, no. 5 (2014): 457-62.
- N. Lipnowski, Elliot, Laurent Mathevet, and Dong Wei. "Attention Management." *American Economic Journal: Microeconomics*.
- O. Le Treust, Maël, and Tristan Tomala. "Persuasion with limited communication capacity." *Journal of Economic Theory* 184 (2019): 104940.
- P. Tsakas, Elias, and Nikolas Tsakas. "Noisy persuasion." *Available at SSRN 2940681* (2018).