SI 710: Designing Social Networks
Experiments
Tanya Rosenblat

Syllabus

Instructor: Tanya Rosenblat, 4322 North Quad, Phone: (734) 764-5103, Email: trosenbl@umich.edu

Office Hours: by appointment

Prerequisites: SI students should have completed at least one doctoral course in an area of specialization, e.g. one graduate course in economics, cognitive psychology, HCI, CSCW or IEM, so that they know enough theory to come up with hypotheses to test. Students from other departments and schools should discuss their background with the instructor.

1. Course Overview

This course provides an introduction to using experimental methods to study behavior in social networks. Social network provide multiple functions. They are conduits of information; they provide crucial support in times of need and access to financial and other resources. The extent of an agents social network is a measure of her social capital. Estimating the effects of social networks poses special statistical problems which are hard to overcome when using only observational data. This is where carefully designed experiments can be very helpful. This course explores experimental methodology and social networks applications by concentrating on series of experiments, to see how experiments build on one another.

In this class we first learn how to map relevant social networks and then discuss several major themes in the social network literature that have been studied using laboratory and field experiments including: (1) social learning, (2) trust in networks,
(3) coordination in networks and (4) the relationship between networks and markets. Within each theme, we study the relevant theory literature and existing experimental research. In the process, we revisit classic experimental topics such as individual choice, market experiments, bargaining, social preferences to see how they can be enriched by social networks. Students are expected to expand one of these assignments as a term paper. Students are encouraged to work in groups.

Students are introduced to social network theories and experimental methodology through lectures, by participating in interactive in-class experiments and demonstrations, critically reading and discussing related research papers and eventually designing and implementing their own economic experiment. At the end of the course, students will be able to understand how general principles of experimental design can be applied to study of social networks. Students will be able to design and implement their own experiments and critically evaluate published work in the field. Interested students will have an opportunity to complete their research projects and write up results for publication and conference presentations.

2. Why Experiments?

Experiments are conducted in controlled laboratory or semi-controlled field environments for three main reasons: (1) in order to look for behavioral regularities and document unanticipated regularities in decision-making, (2) formulate new theories to explain newly observed regularities, and (3) make policy recommendations by testing new policies and fine-tuning existing ones. Experiments are particularly useful in social networks research. In a seminal paper, Manski (1993) pointed out the difficulties in identifying social interaction effects using observational data. First of all, social networks tend to be highly homophilic as people seek out friends who are like them. This can generate correlation in unobserved characteristics including friends information sets. For example, a news hound might be more likely to become friends with a fellow news hound. This makes it difficult to identify whether their extensive knowledge about news events is due to social learning or simply a selection effect of finding a kindred spirit and becoming friends. Second, close geographic proximity is an important determinant for friendship (Marmaros and Sacerdote (2006)): this makes friends subject to common shocks such as getting joint invitations to a retirement planning seminar. Hence, financially prudent decisions by friends might be due to such geographically concentrated shocks rather than peer influence.

3. FAQ

3.1. How to do readings for this course?

In this course, a lot of the material will be first presented from the perspective of a participant in the experiments. Afterwards you will learn about underlying theories and interpretations. This means that reading assignments are often back-loaded. On
occasion, you will have to do some of the readings in advance because you will be assigned to prepare a short presentation on a specific topic or assist me in running an experiment.

3.2. Where can I find the readings?

All the readings you need to do will be either available electronically or distributed to you in class. There is no required textbook to purchase. However, you might want to consider adding the following books to your library:

**Reference Books:** “Social and Economic Networks (2010),” Matthew O. Jackson (recommended)
“Markets, Games, & Strategic Behavior (2007),” Charlie Holt
“Networks, Crowds and Markets: Reasoning about a Highly Connected World (2010),” David Easley and Joe Kleinberg
“Handbook of Experimental Economics Results (2009),” Charlie Plott and Vernon Smith
“Economics Lab (2004),” Dan Friedman and Alessandra Cassar
“Handbook of Experimental Economics (1995),” John Kagel and Al Roth
“Experimental Methods: A Primer for Economists (1994),” Dan Friedman and Shyam Sunder
“Experimental Economics (1993),” Douglas Davis and Charlie Holt

**General Interest Books:**
“Predictably Irrational: The Hidden Forces that Shape Our Decisions (2008),” Dan Ariely
“Six Degrees: The Science of a Connected Age (2003),” Duncan Watts
“Bowling Alone (2000),” Robert Putnam
3.3. How to take notes in this class?

In order to organize your thoughts, you should divide your notes into three distinct sections: Theory, Experimental Evidence, and Experimental Methodology. Each class session is going to touch on some aspects of these three broad topics. You should look for connections between them. For example, economic theory assumes that economic agents are rational expected utility maximizers (write down the formulation and predictions of this theory in the theory section of your notes); whether people in fact do maximize expected utility has been tested using economic experiments (write down evidence for or against this theory in your section on experimental evidence); while examining experimental evidence either through participation in experiments or by looking at experiments conducted by others, you learn something about experimental design (write down these rules and tips in the methodology section). In addition, you are required to keep a Journal of Classroom of Experiments to record all of the experiments that you do in class. Each entry should include the date the experiment was done, the title of the experiment, the structure of the experiment, what it was designed to test and a summary of results. Your journal will be collected at the end of the semester and will count in your participation and assignment grade.

3.4. How will my grade be determined?

In this course you are required to participate in in-class experiments and help conduct experiments on selected dates and present critical summaries of experimental findings (30% of the grade); complete written take-home assignments (30% of the grade); undertake a research project (40% of the grade). There will be no final exam.

3.5. What constitutes a research project?

There are two possibilities:

(1) (preferred) Design and (optionally) conduct your own experiment, collect and analyze experimental data, and report on your results.

(2) Do an extensive literature review of a specific topic (to be approved by the instructor first). Option number two is a risk-averse choice. We will discuss why in class.

If you choose option 1, you will be expected to design an experiment. This involves, among other things, answering the following questions:

- Which research question do you want to answer with your experiment?
- What are potential answers to your question?
- What are the advantages and disadvantages of an experiment for answering your question?
- What are the chances that the result of your experiment will surprise others? Will anybody change his/her opinion?
4. Reading List

- How do you conduct the experiment? (Describe the design and write down the instructions)
- Is your design the simplest possible design to answer your question?

3.6. PEERRS Certification and IRB

You must be PEERRS certified before you can recruit subjects for your research experiments that you intend to publish.

The URL for PEERRS certification is http://my.research.umich.edu/peerrs/.

You will be requested to complete Human Subject training as a course assignment (if you haven’t already done so).

4. Reading List

4.1. Markets, Bargaining and Social Networks

Markets. Economists often think of markets as describing the interaction between a large number of agents and networks describing interactions between a small number of agents. However, markets can often describe the interactions of even small groups of agents as long as they can freely interact with each other (this corresponds to a complete social network).


Bargaining in Networks. In local networks where every agent only interacts with a small subset of other agents the network structure provides more central agents with greater bargaining power. Markets are no longer adequate in these situations.

Interaction between Markets and Networks. How do markets and networks interact? If many transactions occur through social networks, markets become less efficient. On the other hand, the rise of markets can destroy network transactions by providing agents in long-term relationships with better outside options.


4.2. Classifying and Mapping Social Networks

We develop a language for describing important properties of social networks such as degree, degree distribution, clustering coefficients and average path length. We discuss that real-world social networks look like small worlds with a high degree of cliquishness and low average path length. We introduce techniques to map social networks and contrast surveys with incentivized economic experiments.


4.3. Social Network Formation

We discuss statistical models of network formation which generate social networks with similar characteristics as real-world social networks. This helps us understand why social networks tend to have characteristics such as power-law degree distributions, high clustering and low path length. We take these properties into account when designing social network formation experiments.

**Evolutionary Models of Network Formation**


**Homophily**

4. Reading List


**Influence of Geography**

4.4. Technological Diffusion and Social Networks

New technologies such as the internet and the telephone were believed to rewire social networks and generate “small worlds”. Vice versa, social networks affect the diffusion of technologies: due to their particular statistical properties, new technologies spread differently in social networks compared to random graphs.

**Influence of Technology on Social Networks**

**Influence of Social Networks on Technological Diffusion**
- Mobius (2001): *Death through Success: The Rise and Fall of Local Service Competition at the Turn of the Century*, working paper

4.5. Manski’s Reflection Bias: Why Empirical Social Network Research Requires Experiments

Manski (1993) showed that estimating the effects of social networks poses special econometric problems which are hard to overcome when using only observational
data: it is difficult to distinguish causal effects from reflection bias, selection bias and common shocks. Experiments can help overcome these problems.

**Theory**


**Observational Data: Excess Variance Approach**


**Experimental Approach: Examples**


**4.6. Social Learning and Social Influence**

Social learning has received the most attention in the social networks literature. There is a rich theory literature as well as an extensive empirical and experimental literature.

**De Groot Model of Social Learning**


**Streams Model of Social Learning**


**Observational Learning**
4. Reading List


**Empirical Papers: Agriculture, 401k Plans and Health**


**Labor Markets**

- *Calvo-Armengol and Jackson (2004): The Effects of Social Networks on Employment and Inequality, American Economic Review, 94 (3), pp. 426-454*

**Labor Markets (empirical)**


4.7. Social Preferences and Beliefs

We usually feel greater attachment to friends compared to strangers. *Directed altruism* can have positive effects: for example, it can be easier for an entrepreneur to raise capital with friends and family members rather than applying for a formal bank
loan. However, directed altruism can also generate favoritism and “insider/outside” effects which lead to the misallocation of resources.

Directed Altruism


Directed Altruism and Workplace Incentives


4.8. Trust and Social Collateral

Agents in a social network typically interact with a fixed set of neighbors repeatedly. We know that even in simple two-player games, repeated interaction allows for new cooperative equilibria. These equilibria are harder to analyze in social networks because of the presence of many agents and many relationships. The social collateral approach provides a simple framework to study trust and risk-sharing in social networks.

Trust (observational data)

4. Reading List


**Trust (theory and experiments)**

  (web program to illustrate trust flow)
• *Mobius and Rosenblat (2016):* *Informal transfers in social networks*, Oxford Handbook of Network Economics
• *Karlan, Mobius, Rosenblat and Szeidl (2015):* *Measuring Trust in Peruvian Shantytowns*, working paper
• *Mobius and Gentzkow (2002):* *Trading Favors*, working paper

**Risk-sharing**


4.9. Collective Action

Governments that try to suppress opposition often try to make collective action more difficult by imposing restrictions on how many people can meet at certain locations. Collective actions is an important but mostly understudied topic in social networks.

• *Chwe (2000):* *Communication and Coordination in Social Networks*, The Review of Economic Studies, 67 (1), pp. 1-16