Lecture 1:

Outline of the course:

Lecture 1: General design principles; introduction to z-tree

Lecture 2: Issues with eliciting beliefs; begin implementing research projects in z-tree

Lecture 3: Evidence for other-regarding preferences

Lecture 4: Separating altruism from social norms and social norms from identity

Lecture 5: (TBD)

The course will consist of two parts. First there will be lectures and related discussions. And the second part will be an introduction to z-Tree, which is a widely used computer program for conducting economics experiments that require real-time interaction between experimental participants.

Today’s lecture will be different. Today I will try to convince you that in spite of all of the obvious critiques and drawbacks, experiments are an indispensable tool for economists. And that every economist can benefit from conducting at least one experiment in their academic life.

The rest of the lectures will focus on specific experiments and highlight specific design and interpretation issues. The particular experiments I
have chosen reflect both my personal research interests and the research proposals submitted in the first half of the class. I will also try as much as possible to talk about series of experiments---an initial experiment, and then subsequent experiments meant to address questions left unanswered by the initial experiment. This will allow us to isolate recurring design issues and give us a feel for how we might improve on current frontier of experiments.

I am also going to try to give you a feel for design issues that may not be clear from the readings, even from reading the original papers. I’m not going to try to simply review as many experiments as possible in class. The individual papers that will be assigned will help us focus on specific design issues.

Surveying the relevant literature is best done on your own time---google scholar is an invaluable resource. To a large extent, surveying the literature was the focus of the first half of this two-part course. If you weren’t here for that, check the EIEF graduate program website for the readings from the first half (Behavioral Economics). Two other invaluable resources are the”handbook of experimental economics” and Colin Camerer’s “Behavioral Game Theory” book that should be available at your library---although these are both a bit outdated by now.

The goal of this class is to allow you to read experimental papers more critically, and to see how to improve on existing research more clearly. This is a key first step toward implementing your own experiments. The only requirement for the course will be to submit a detailed experimental protocol meant to address an important economic issue of your choice. Some of you have already submitted a research
proposal. You should use this class in order to improve your experimental designs.

To begin with, we will need a definition of an experiment. The term experiment probably conjures up images of the clinical lab trials associated with medical experiments and drug companies. We imagine a setup where one group of people is given a pill that contains fat-fighting drug, while another group of people is given a sugar pill—a placebo. We probably imagine that whoever is conducting the experiment is careful enough to randomly assign experimental participants the sugar pills and fat-fighting pills. And even more, we might expect the experiment to be designed so that neither the experimenter nor the experimental participants know who received the placebo and who received the treatment until after the experiment has concluded. Finally, since scientific disciplines rely on a doctrine of replication as a test of “practical” significance and a failsafe against experimenter manipulation of data, we might expect that any “treatment effect” revealed in the initial study would not be taken seriously until the effect had been replicated several times.

While it would be nice if this were a correct image of experimental economics—double blind clinical trials and scientists in white lab coats—the processes we deal with are much messier than the physiological or biological responses investigated in clinical trials. As a result, our methodologies are much more varied.

And what qualifies as belonging to experimental economics comes down to the data being used. There are generally two types of data economists can use.
1. **Happenstance data** are a by-product of on-going uncontrolled processes.

For example, the data collected by the Bureau of Labor Statistics, or present in the Survey of Consumer Finances is happenstance data. These are snapshots of on-going uncontrolled processes within the economy.

Happenstance data allow for testing of correlations. While it is true that econometricians have devised clever ways to infer causation, in many interesting cases the conditions sufficient for these tests to be valid are either unsatisfied or un-testable themselves.

An example borrowed from Friedman and Sunder’s primer on experimental methods illustrates the problem:

> Suppose you notice that the small patches of land lying directly under trees are significantly more productive than similar patches of land not lying under trees. Suppose there are two schools of thought about this: Luminists and Aviophiles. Aviophiles explain the higher crop yield in terms of bird droppings. Luminists explain the same phenomenon by (reduced) light intensity. Their quarrel cannot be resolved with happenstance data on crop yields because the two explanatory variables are completely confounded. Bird droppings and shade are always found together.

This brings up a related drawback with happenstance data. Available observations are on the equilibrium path. However, sometimes off-equilibrium-path behavior matters. Off-equilibrium path behavior
might be of interest, for instance, if we are testing the predictions of competing models. Also, low-probability events might matter (for example, stock market crashes), in which case happenstance data is by definition rare.

2. **Experimental data** are deliberately created for scientific purposes under controlled conditions

Experimental economics uses experimental data. Period. As far as I can tell, this is the defining property of experimental economics. Most of what goes on in experimental economics would not fit into what is classically defined as experiments. For example, there does not always need to be a control group as in clinical trials. To see this, consider the following hypothetical economics experiment:

1) We recruit 100 undergraduates from LUISS via e-mail and bring them into the lab, here.
2) Once here, we randomly and anonymously pair subjects.
3) Then we explain the ultimatum game to everyone (including monetary payoffs). (write the UG on the board; Player 1 given 1 euro, proposes a split to player 2 who can then accept or reject.)
4) Then we randomly assign roles.
5) Within each pair, each subject submits their strategy.
6) We pay subjects and send them on their way.
7) The typical result: low offers are rejected, and relatively rare.
   Proposed splits are generally greater than zero and less than half.
I want you to think about this very standard game that has been used in 100’s of experiments. I want you to think about what we could possibly learn from behavior in this game. And I also want you to think of why this is called an experiment besides the fact that “experimental” data is created.

The answer: the key word is controlled. The goal of an experiment is to plausibly rule out as many alternative explanations as possible. Control is what permits this, even if the treatment group + control group setup is not appropriate. If one has in mind the model

\[ Y = a + b_1 x_1 - b_2 \text{abs}(x_2 - x_1) + b_3z + e \]

Where \( z \) is a vector of “nuisance” parameters, then it is not clear how the treatment group + control group design helps. There is no clear “treatment” to which we can subject one group and not the other. What we can do, however, is exert control over the nuisance parameters directly. For example, if the only nuisance parameter we care about is reputational concern, then we can make the case that the introduction of anonymity into our experimental design is a way to basically “set \( z=0 \).”

In a nutshell, experimental economics is just economics using experimental data. And experimental data is created whenever our research design plausibly allows the researcher control over either an explanatory variable, or a nuisance variable, or both.
Now that we have defined experimental economics, let’s consider the major uses of experiments in economics. There are four primary uses of experiments in economics (borrowed from Al Roth).

1) Testing theory
   a. testing theories under precisely controlled and/or measured conditions that are typically unavailable in field or happenstance data.

   b. The development of game theory gave particular impetus to experimental economics in the 1950’s, as game theory offered testable theories of economic behavior that depended on the fine structure of both the strategic environment and the preferences of the players. These features are hard to isolate in real-world, happenstance, data.

2) Searching for Facts
   a. looking for regularities, and exploring and documenting unanticipated regularities (including those that come from violations of the predictions of existing theories)

3) Searching for Meaning
   a. formulating new theories, to explain newly observed regularities, and devising new experiments to help distinguish among such theories

4) Policy Evaluation
a. Includes policy oriented experiments, market design, etc. Policy field experiments have been popular lately in the development literature.

5) Pedagogy
a. The first recorded use of economics experiments, by Chamberlin in 1948, was for primarily pedagogical purposes.

General Design Features of Economics Experiments:

A word on providing the monetary incentives:

The dividing line between experiments in economics and experiments in other disciplines is the focus by economists on providing participants incentives to reveal their true preferences. In their Primer on Experimental Methods for economists, Friedman and Sunder summarize so-called induced value theory (Vernon Smith, 1976) paradigm as follows:

“The key idea of induced value theory is that proper use of a reward medium allows an experimenter to induce pre-specified characteristics, and the subjects innate characteristics become largely irrelevant.”

They highlight three sufficient conditions

1) Monotonicity: the participant must prefer more of the reward medium to less of the reward medium. Formally, if \( V(m,z) \) represents a participants preferences over the reward medium,
m, given his or her characteristics, z, then the partial of V w.r.t. m is strictly positive.

2) Salience: Changes in m are directly related to a participant’s actions.

3) Dominance: changes in a subject’s utility from participating in the experiment are primarily due to changes in m.

While I would not make so strong a statement as induced value theory seems to make, providing monetary incentives for to act in accordance with one’s true preferences is essential when possible. Sometimes it is not possible, as when you are asking for an opinion. The point is that if you try to infer preferences from behavior when there are no, or only very weak incentives---or even worse, disincentives as with many commonly-used belief-elicitation devices---to act in accordance with one’s preferences is difficult.

For example, I have more than once heard the argument that---even though there were absolutely no monetary incentives to choose action A rather than action B---the fact that many people chose option A instead of option B was evidence that people in fact preferred option A. Otherwise, why would they have chosen it? After all, there was no disincentive to choosing option A. But this misses the point.

Consider the following contrived example. We all know that ice cream stores give out free samples of ice cream. And you can try any flavor you like. This is the case where there is no monetary incentive to choose your favorite flavor. I think we would all agree that there is likely little correlation between a person’s favorite flavor of ice cream and the flavor of ice cream they choose to sample for free. But the immediate objection is that this is a story about preference uncertainty
and experimenting. It is not, however, clear to me that this is so
different from how participants view the lab when there is little relation
between earnings (prices of ice cream) and outcomes (flavor chosen).
And if it is not clear to me, then it is definitely not going to be clear to a
skeptical referee.