

EXPERIMENTAL ECONOMICS INTRODUCTION

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WHAT IS EXPERIMENTAL ECONOMICS?



The Google logo, consisting of the word "Google" in its characteristic multi-colored font (blue, red, yellow, blue, green, red).

experimental economics



Google Search

I'm Feeling Lucky

WHAT IS AN ECONOMICS EXPERIMENT?



- A method of collecting data in controlled environments with the purpose of furthering our knowledge of economics



WHAT IS AN ECONOMICS EXPERIMENT?

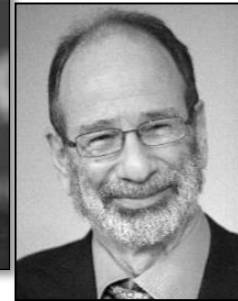
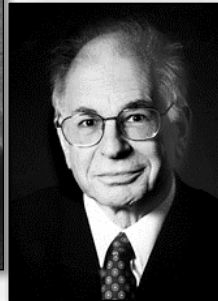
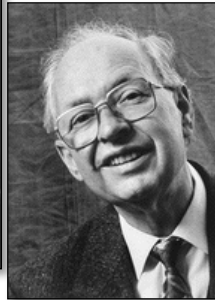


Experiments in economics?

“Unfortunately, we can seldom test particular predictions in the social sciences by experiments explicitly designed to eliminate what are judged to be the most important disturbing influences. Generally, we must rely on evidence cast up by the “experiments” that happen to occur.”

Milton Friedman (1953)

since
then ...



ADVANTAGES OF THE EXPERIMENTAL METHOD



■ Control

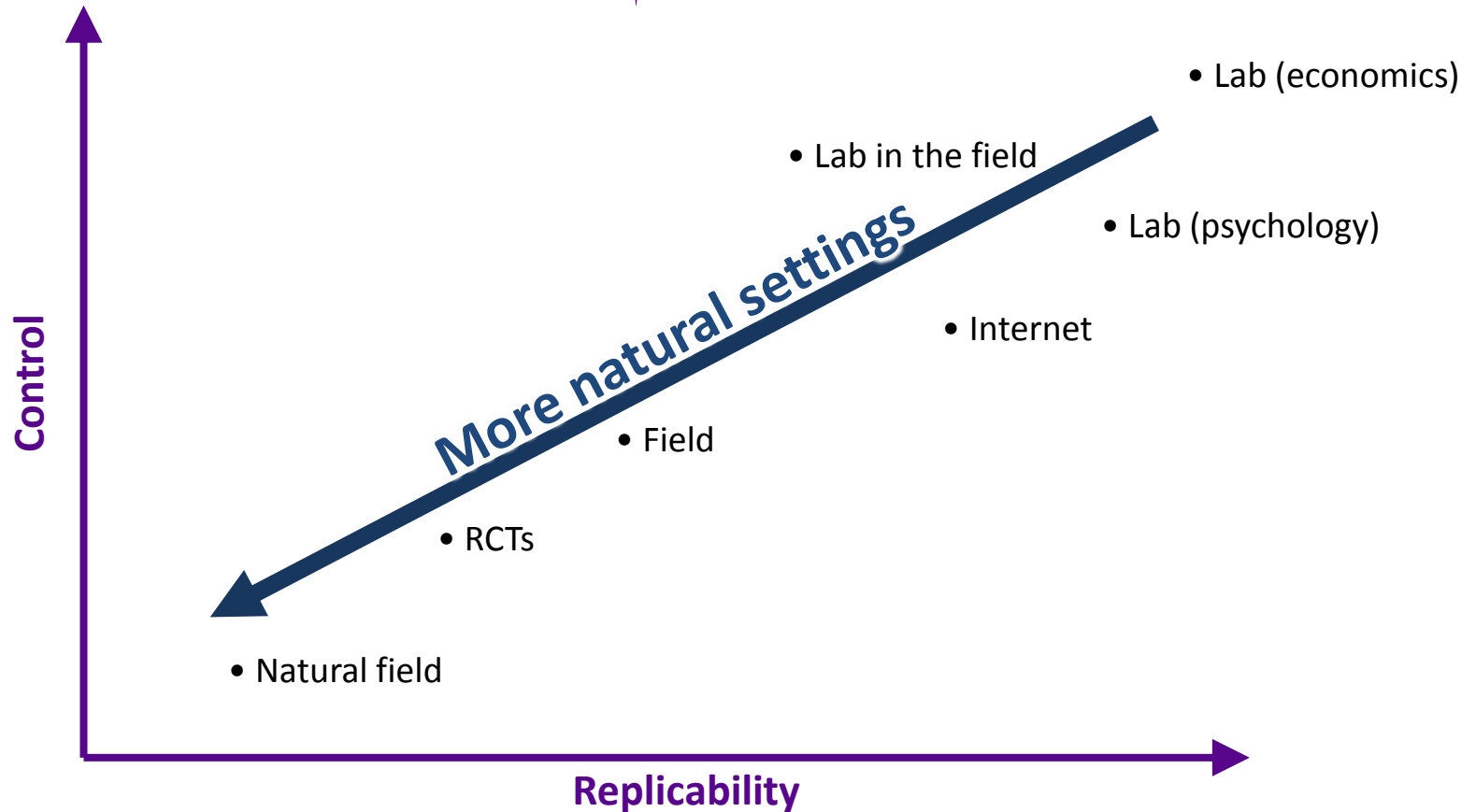
- Control of institutions (e.g. voting rules, group composition) and incentives (e.g. earning schemes)
- Measure confounding variables (e.g. social norms, beliefs)
- Randomization (avoids self-selection problems)



■ Replication

- Checks for robustness and false positives
- It gives an incentive to do it right (reduce p -hacking)
- Norm to make available: data, instructions, program, and procedures

ADVANTAGES OF THE EXPERIMENTAL METHOD



WHY RUN AN EXPERIMENT?



Test the predictions of particular theories

- Example
 - Choice 1: A (\$4000 with $p = 0.20$) or B (\$3000 with $p = 0.25$)
 - Choice 2: C (\$4000 with $p = 0.80$) or D (\$3000 with certainty)
 - EUT predicts either A-C or B-D but many choose A-D or B-C (Allais Paradox)

What is a fair test of a theory?

- Should a theory be judged only within the domain in which it is intended to apply (**Friedman 1953**)
- **Duhem-Quine problem:** Theories must be applied to be tested → if the predictions of the theory fail, is it a problem of the theory or of the application?

WHY RUN AN EXPERIMENT?



Equilibrium selection and establishing empirical regularities

- Observe behavior in cases where theory makes unclear predictions or no prediction at all
 - Examples
 - **Equilibrium selection:** if players are sufficiently patient then any amount of cooperation is sustainable in an infinitely repeated prisoner's dilemma → run an experiment to know how much occurs
 - **Empirical regularities:** subjects do not use backward induction in the beauty contest game → lead to the development of the theory of cognitive hierarchy

WHY RUN AN EXPERIMENT?



Advise policy makers

- Use experiments as a substitute to theory to determine the effect of different forces in complex situations where theory is impractical or nonexistent
 - Examples
 - Test the performance of different auctions in order to sell spectrum rights
 - Test different ways of regulating a privatized electricity market

Accurate measurement of variables of interest

- Example
 - Use experiments to measure risk and time preferences and test whether these measures explain saving decisions in the field

SOME EXPERIMENTAL JARGON



Treatment variables

- The variables of interest that are (randomly) assigned by the experimenter

Between-subject variation

- Different people experience different treatments
 - Pros: avoids ‘contamination’ between treatments
 - Cons: you must trust that randomization worked

Within-subject variation

- Same people experience different treatments
 - Pros: Controls for individual characteristics
 - Cons: order effects and it doesn’t work for some treatment variations (e.g. framing)

SOME EXPERIMENTAL JARGON



Common procedures

- *Anonymity*: participants do not know the identity of other participants
- *Double-blind*: the experimenter does not know who did what
- *Matching in repeated games*: partners (always the same people), strangers (interact with randomly selected people), or perfect strangers (interact only once with another subject)
- *Incentive compatibility*: monetary incentives are aligned with the variable of interest (lying is costly)

Independent observation

- No interaction between data points

SOME EXPERIMENTAL JARGON



Elicitation methods

- **Direct response:** decisions are made when it is time to do so
 - Pros: decisions approximate decisions outside the lab?
 - Cons: you might require a lot of observations
- **Strategy method:** contingent decisions are made for all relevant nodes
 - Pros: you observe all counterfactual decisions
 - Cons: potential differences in behavior (hot vs. cold), demand effects
- By and large, there is evidence that behavior varies between the direct response and strategy method, but it is far less common for treatment effects to vary (**Brandts & Charness, 2011**)

HOW TO CONDUCT AN EXPERIMENT?



- **Formulate a research question**
- **Choose a design that answers the research question**
 - Treatment variable(s)
 - Within vs. between variations
 - Estimate the required number of independent observations
- **Prepare the experiment**
 - Write the instructions of each treatment and debriefing questionnaire
 - Prepare a 'script' for the session
 - Prepare the computer program/materials
- **Get money and IRB authorization**
- **Run pilot experiment**
 - Improve the design/instructions
- **Run the experiment**
 - Recruit subjects
 - Run the experiment
- **Analyze the data, write the paper, submit, desk-rejection, submit again, rejection, rewrite, submit again, another rejection, cry, submit yet again, R&R!, reanalyze, rewrite and resubmit, R&R again, add silly footnotes, resubmit, publish, and sleep**

COMMON CRITICISMS



External validity due to lack of realism

- The **gift exchange game (Fehr et al. 1993)**

- “Firm” chooses a wage and earns $\pi_F = (100 - w) \times e$
- “Worker” chooses an amount of effort and earns $\pi_W = w - c(e)$, where the cost of effort is given by the function below

e	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
c(e)	0	1	2	4	6	8	10	12	15	18

- Common finding: firms choose $w > 0$ and workers reciprocate with $e > 0$
- Is choosing an effort level the same as exerting effort in a real job?

This is a valid point but, in defense of experiments, they use real people making real money, theories are even more abstract, and realism can be studied by adding it in controlled steps

COMMON CRITICISMS



External validity due to representativeness of the subject pool

- **Roth et al. (1991)** find that the willingness of students to accept unfair offers in ultimatum games is Israel (Jerusalem) < United states (Pittsburgh) = Yugoslavia (Ljubljana) < Japan (Tokyo), and conclude “We conjecture that the observed subject-pool differences are *cultural* in character”
- Most experiments are run with a very unrepresentative sample
 - Self-selected university undergraduates in rich countries
 - Residents of small rural villages in poor countries
 - Although in many cases it does not matter, examples where the subject pool can have a significant effects on behavior are easy to find

Again, a valid point but, in defense of experiments, this is plausibly less important for treatment comparisons, and subject pools effects can be systematically studied

The problem of external validity is arguably a problem of **lack of theory**

COMMON CRITICISMS



Experimenter demand effects (the Hawthorne effect)

- *Weak form*: People behave differently when they know they are being observed
- *Strong form*: People desire to please the experimenter by conforming to the hypothesis they perceive the experimenter prefers

“It is a minor problem in many experiments, especially if the decision environment is interactive and rich, such as in sequential bargaining or market experiments. Moreover, being observed is not an exclusive feature of the laboratory.” **Falk & Heckman (2009)**

METHODOLOGICAL NORMS



Monetary incentives (performance pay)

▪ *Advantages*

- Subjects make more effort / pay more attention → less noise and more consistent choices
- Equalizes marginal gains across subjects

▪ *Disadvantages*

- Its expensive and limits stakes
- Clear evidence that monetary incentives leads to differences in behavior
 - e.g., more risk aversion and less generous behavior with monetary gains

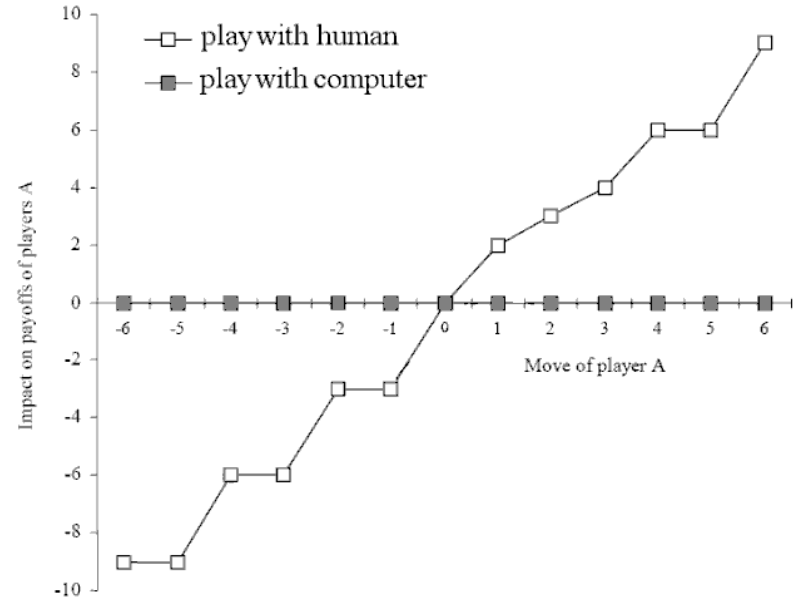


METHODOLOGICAL NORMS



No deception

- *Advantages*
 - Subjects believe the instructions and do not try to outguess the experimenter
 - Does not impose an externality on other researchers
- *Disadvantages*
 - Makes it harder (more expensive) to study rare situations
 - Makes it harder to design some experiments

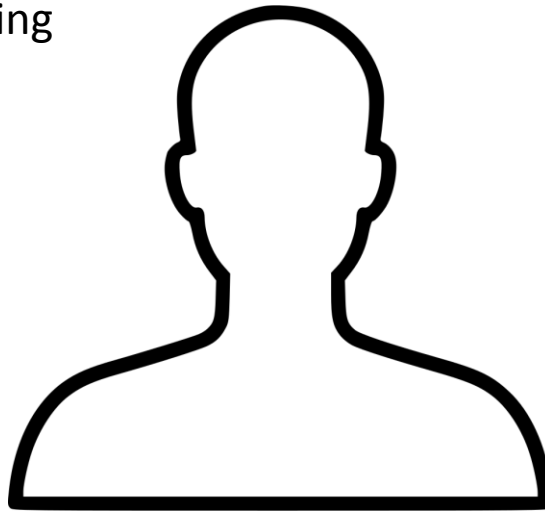


METHODOLOGICAL NORMS



Abstract instead of concrete wording in most cases

- *Advantages of abstract wording*
 - You do not lose control because subjects are not “role-playing” (e.g. subjects might role-play a manager’s behavior)
- *Disadvantages of abstract wording*
 - Can hinder subjects’ understanding the experiment



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