Research Design

‘Positivist’ versus
‘Interpretive’ methods

Methods of data collection

- **Positivist methods**: theory drives data collection and analysis techniques

  "Theory-driven" research; theory testing

- **Interpretive methods**: observation (data) drives analysis; new theory is created

  "Data-driven" research; theory building

Positivist methods

- Start with a theory
- Gather data to support or reject (test) the theory
- Associated with deductive reasoning*
- Usually use quantitative methods (measurement, coding, statistical tests), but can also use qualitative methods

*But may include induction or generalization

Example: Positivist method

- **Experimental study**. Drug testing
  - Begins with a hypothesis about cause and effect. "Drug A prevents disease X"
  - Select subjects **randomly** & assign randomly to treatment or control group to reduce chances of accidental or **spurious correlation**.
  - Measure the presence or absence of disease.
  - Compare **statistical** correlation of drug, disease.

Interpretive methods

- Start with data or observation
- Builds a theory which can account for the data observed
- Primarily use inductive reasoning*
- Often use qualitative methods (observation, open interviews, case studies), but can also use quantitative methods

Example: Interpretive method

- **Semi-structured interviews**
  - Starts with a general area of interest, but no specific theory
  - Selection need not be random; subjects may be interested in or connected to the topic being researched.
  - Interviewer asks some questions s/he wants answered, but also allows subjects to speak freely.
  - After data is collected, researcher builds an interpretation to make sense of subjects' ideas.

Theory building, theory testing

- Data-driven observations can build new theory.
- Theory can be tested using new data.

Design a study

- Imagine you are a Mei-Dai graduate student in agriculture.
  - You want the best way to start maple tree seedlings.
  - Your professor suggests that either soil or vermiculite might be the best growth medium.
  - *Formulate a research question.*
  - *What kind of data do you need to investigate your research question?*
  - *What kind of analysis can you do with the data?*

Design a study

- Imagine you are a Mei-Dai graduate student in education.
  - You want to know what type of teachers are most popular with junior high school students.

  - *Formulate a research question.*
  - *What kind of data do you need to investigate your research question?*
  - *What kind of analysis can you do with the data?*

Validity

- **Internal validity**: Is the dependent variable actually *caused* by the independent variables?
  - Co-variation. A change in the "cause" variable should show the same change in "effect".
  - Temporal precedence. The "cause" must happen before the "effect".
  - Beware: Sometimes two variables seem to co-vary but it is an accident (spurious correlation) or is caused by a third variable (confounding variable).

Validity

- **External validity**: Can the results be generalized beyond the current research?
  - Laboratory studies tend to have better internal validity, because they have more control.
  - BUT, field studies or surveys tend to have better external validity, because results don't rely on such control.
  - Ideally, try to balance internal and external validity.

Validity

- **Construct validity**: Are you actually measuring what you think you are measuring?
  - Define your terms carefully.
- **Statistical validity**: If you use statistical methods, are they appropriate?
  - Are the tests appropriate to the research question? Is the sample size appropriate for the test?

Threats to validity

- Choose one of the research projects your group designed.
- What type of threats to internal validity do you need to watch for?
- What type of threats to external validity do you need to watch for?

Positivist or Interpretive?

- Some methods are more common in certain fields.
  - Experiments in medical testing (positivist)
  - Ethnography in social anthropology (interpretive)
- BUT that does not mean other methods should be ruled out of the field completely.
  - Case studies in clinical testing (interpretive)
  - Typology in linguistic anthropology (positivist)

Positivist or Interpretive?

- Ideally, the choice of methods should reflect the nature of what is being studied.

- In practice, researchers tend to choose the methods (and therefore the kind of questions) they are most comfortable with and best able to use.

Positivist or Interpretive?

- Questions to ask yourself:
  - Does my *research question* suggest a testable hypothesis or theory?
  - Do I have the skills to turn observations into convincing explanation or theory?
  - What is the best way to approach my question? What is the most practical way for *me* to approach it?
  - Does my field have a strong preference for certain methods or theories? (That doesn't mean you must choose that approach, but you must justify your choice.)

Positivist or Interpretive?

- Some scholars claim that interpretive research is “not science” because it lacks theory.
- Some scholars claim that positivism is “bad science” because theory harms data collection.
- This is, in my opinion, the least interesting argument in academia.

Positivist or Interpretive?

- Both sides are correct.
  - Good science needs good theory.
  - Good science needs good data.
- Both sides are wrong.
  - Theory does not come from nowhere. Good theory must respond to real phenomena.
  - Though bad data collection is possible (in any research paradigm), it is not inevitable.

(Not necessarily) associated

Theory-driven, positivist	Data-driven, interpretive
Quantitative data	Qualitative data
Deductive reasoning	Inductive reasoning

(Not necessarily) associated

Theory-driven, positivist

Macfarlane & O'Reilly (2012) started with a theory, tested it against nurses' opinions of a service

Qualitative data

Deductive reasoning

Medicine (Clinical)

(Not necessarily) associated

Wassman & Dasen (1994) observed people whose language has no numbers; found they have ways to count.

Data-driven, interpretive

Quantitative data

Deductive reasoning

Psychology; ethnology

(Not necessarily) associated

Theory-driven, positivist

Reimers & Johnson (2008) interviewed company workers, then coded their responses to test their theory of information evolution

Quantitative data

Qualitative data

Inductive reasoning

Information Systems

(Not necessarily) associated

- Can you combine methods, data, and reasoning in other ways?