Observational Research

Clicker Question

What factors influence what you see in this picture?

- How your visual system works
- What you expect to see
- What features you attend to
- All of the above

Clicker Question

What is the relation between categories and names in a language?

- Languages have names for all the categories we might develop
- Languages only have names for some categories, those deemed important by speakers of the language
- Languages should add names for all possible categories
- Names in a language are irrelevant to how we categorize things

Clicker Question

The categories *farmer*, *business person*, *teacher*, *minister*, when applied to Americans, are

Exhaustive but not exclusive
Exclusive but not exhaustive
Both exclusive and exhaustive
Neither exclusive nor exhaustive

Observational Research

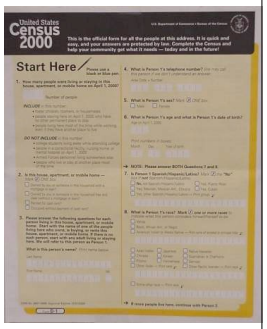
- Involves
  - careful recording of what is observed
  - analysis (qualitative, quantitative, statistical) of the results
- Recording may take the form of written notes, audio or videotaping, etc.
- If the process of recording information is contaminated, any knowledge claims (theories) built upon it are suspect
  - In purely observational research, investigators seek to **avoid manipulating what happens**
    - If the researcher deliberately manipulates features of the situation and then observes what results, the researcher is conducting an **experiment**

Why conduct observational research?

- Although much scientific research involves manipulating variables (experiments), there is an important role for careful observation with little or no intervention on the part of the observer
- Gain a good description
  - Make sure that any subsequent experimentation is ecologically valid
- Explore: search for a hypothesis
- Confirm or falsify a hypothesis
  - Determine whether a predicted relation between variables occurs
    - An observational study can help rule out hypotheses but is not alone sufficient to establish causal hypotheses

Coding Systems

- To invoke observations in research, we must categorize them and then the instances collected under the categories
  - The categories employed in a research project constitute a coding system
- Only what can be captured in the chosen categories is available for later analysis
  - This is one reason there is such controversy around questions on the census



Coding and Recording Daily Life Activities

- On the job (work for pay)
- In transit *
- Get exercise *
- In class
- Off-line study/class assignments
- On-line study/class assignments
- On-line (personal)
- Tasks of daily living *
- Eat
- On the telephone/cellphone
- Relax/socialize *
- Sleep Start_____ Finish_____
- Other * (optional to specify)

Clicker Question

Adding the category *other* to the list makes the list

Exhaustive

Exclusive

Both exhaustive and exclusive

None of the above

Discussion Question

Since the categories are not exclusive (you can eat while in class), what strategy would give the most useful information

- Eliminate categories such as eating until all the categories are exclusive
- Have people record all applicable activities (count the same time for eating and going to class)
- Rank order the categories and record only the highest ranking
- Other (be prepared to say what)

Naturalistic vs. participant observer

For now we focus only on observational studies, studies in which the investigator doesn't try to alter the phenomenon being studied

Two types of observational studies

- Naturalistic observation: the researcher tries to remain unobtrusive, engaging in passive observation
- Participant observation: the researcher becomes a part of the population being studied by engaging in the same activities
  - If studying how an business works, work in the business
  - If studying how a scientific laboratory works, work in the laboratory

Clicker Question

The crucial difference between naturalistic from participant observation is that in participant observation

- The observer is present with those being observed
- The participants can see the observer
- The observer tries to fit into the ongoing activities of those being observed
- The observer tries to categorize what he or she observes

Participant observer with other species

Dian Fossey, in order to study gorillas in Rwanda, Africa, found she had to learn to behave like a gorilla—eating, grooming, and vocalizing

Why?

"One feels like a fool thumping one's chest rhymatically or sitting about pretending to munch on a stalk of celery as though it were the most delectable morsel in the world. But the gorillas have responded favorably" (Fossey, 1972, p. 211)

Risks in observational research

1. **Reactivity**: the mere presence of an observer can alter the situation—people behave differently
2. **Observer bias**: seeing what one expects to see
3. **Anthropomorphizing**: attributing one's own mental states to those studied—including non-human organisms and artifacts—when they are not justified

1. Reactivity Bias

- When being watched, people sometimes behave differently than they would otherwise
  - That is often the point of surveillance cameras—to deter unwanted behavior
  - But when conducting research, that can destroy or alter the phenomenon
- Strategies
  - Try to observe without being detected
  - Allow time for subjects to habituate
    - People tend to *forget* about the observer and return to normal behavior

2. Observer Bias

- Perception is affected by expectations—one is more likely to see what one expects to see
  - Sometimes one even *sees* what one expects when it is not there
- Sometimes the evidence a scientist reports is too perfect, suggesting either cheating or observer bias
  - Mendel's results too close to 3:1 ratio, suggesting observer bias
- Sometimes observations are just not credible
  - Franz Anton Mesmer (1733 - 1815), a Viennese physician, treated people with magnets and proclaimed what he called *animal magnetism*

Mesmer and Mesmerism

- In the center of a large hall with darkened windows, Mesmer placed a large oaken tub filled with water and iron shavings
- Iron rods protruded through the cover of the tub, which patients would hold and apply to their body
- Mesmer himself would enter in brilliant silk robes, pass among the patients, touching them with a long iron wand
- Mesmer claimed many successes of his treatment
  - Moreover, many of his patients claimed they were healed after two or three *treatments*

Mesmer's cures

- According to Mesmer, a patient's health depended upon the distribution of animal magnetism in the patient's body.
  - Ill health was due to an excess or a deficiency of animal magnetism in the patient's entire body, or in specific parts of the patient's body.
  - Cure involved giving, removing or redistributing the animal magnetism within the patient.
- Why did Mesmer believe his patients were cured?
- Why did patients believe Mesmer?
  - In some cases, hypnotism and hypnotic suggestion seems to have been at work (resulting in real cures)
  - People interpreted small changes as cures due to Mesmer's treatments

A Royal Inquiry

- Louis XVI appointed a commission of inquiry as to the efficacy of Mesmerism
  - Headed by Benjamin Franklin
  - Members included Antoine Lavoisier, Jean-Sylvain Bailly and Joseph-Ignace Guillotin
- Were the purported effects of Mesmerism due to any real force, or due to the "illusions of the mind"?
- Blindfolded people were told that they were receiving or not receiving the magnetism treatment when in fact, at times, the reverse was happening
- The people being studied felt the effects of mesmerism only when they were "told" and felt no effects when they were not told, whether or not they were receiving the treatment
- Introduction of blind treatments
  - In a blinded study, the investigator is blinded to prevent observer bias
  - In a double blind study, the subject is also blinded to prevent reactivity

3. Anthropomorphizing

- "After returning its first assault of shock and awe in pictures, *Spirit* went to sleep, but was slated to wake up Sunday morning, January 4, when *Mars Global Surveyor* (*MGS*) flies over Gusev Crater at 7:25 a.m. PST"
- "Spirit briefly awoke from a martian slumber on Sunday to beam more photos of the red planet back to Earth as scientists prepared the rover to search for ancient signs of life-sustaining water"
- "*Spirit* did not go to sleep despite two commands from controllers to do so"
- "Rover's condition upgraded from critical to serious"

Anthropomorphizing risky, but sometimes useful

- In describing animal behavior it is nearly impossible not to attribute intentions, desires, beliefs, etc.
- We know what it is to choose a course of action—to have a goal, consider different options, make a decision
- Nonhuman animals also perform actions, but it is controversial whether they represent goals to themselves, consider options, and select between them
- As long as we are aware that attributions of mental states goes beyond the evidence, the risks of misrepresenting the data may be minimized

Clicker Question

An observer trying to study sex solicitation behavior in campus bathrooms stands in a bathroom corner with a video camera, moving it around to focus on different individuals. This research is likely to produce

- Observer bias because the observer is watching
- Observer bias because the observer is using a video camera
- Reactivity bias because the observer reacts to those present by moving the camera to focus on given individuals
- Reactivity bias because the observed may alter their behavior when they know they are observed

Discussion Question

To minimize as much as possible the risk of reactivity bias in studying sex solicitation behavior in bathrooms, the researcher should

- Use a note pad to write reports of bathroom behavior rather than using a video camera
- Locate the video camera in an unobtrusive location and not have a person present
- Use a cell phone camera to record the individuals in the bathroom rather than a video camera
- Survey people to find out whether they had ever solicited or been solicited for sex in bathrooms

Continuous observing vs. sampling

- Continuous observation: record what is happening at every moment of time
- Time sampling: recording what is happening at predetermined intervals such as every 10 minutes
- Event sampling: recording whenever an event of a specified kind occurs such as recording the gender of the person every time a door opens
- Situation sampling: recording what happens in a variety of different situations (locations) such as recording at several different coffee shops on campus

Clicker Question

To determine how many students carry backpacks, a researcher sits outside this building and records, for every fifth students who comes by, whether they have a backpack. The researcher is performing

- Continuous observation
- Time sampling
- Event sampling
- Situation sampling

Clicker Question

To determine how popular different cafeterias are, a researcher records at a different cafeteria each day how many people enter between Noon and 12:30. The researcher is engaged in

- Continuous observation
- Time sampling
- Event sampling
- Situation sampling

Variables

- A variable is a characteristic or feature of an event that varies—takes on different values.

- Variables of a thrown ball:
  - velocity, momentum, direction, spin, . . .
- Variables of a World Series:
  - winner, number of games, fights, strikeouts, . . .
- Variables of human hair:
  - color, length, texture, . . .
- Variables of human cognition:
  - memory span, speed of reasoning, emotional state, . . .

Types of variables

- Variables differ in the type of measurement of the values of the variable that is possible. Sometimes one refers to types of scales rather than types of variable.
- **Categorical or nominal variables**: items can be assigned to a category (whose members can then be counted, or compared on another variable).
  - Gender: male, female, trans, . . .
  - Major: psychology, political science, economics, . . .
  - Stellar spectra: O, B, A, F, G, K, and M
  - Organisms: Plant, Animal, Bacteria, Virus, . . .

Types of variables - 2

- **Ordinal or rank variables**: There is a rank-order to the values the variable may take.
- Numbers might be assigned to the items, but since there is no metric
  - one cannot compare how much higher or lower one item on the scale is than another

  Movies: *, **, ***, ****
  Class rank: top 10, next 10, etc.
  Patient condition: resting and comfortable, stable, guarded, and critical
  Socio-economic class: low, middle, high

Types of variables - 3

- **Interval variables**: equal differences between numbers assigned to items reflect equal differences between the values being measured.
  - Allows additive comparison—x is three more than y
  - But lacking a natural 0, does not permit multiplicative comparison—x is three times y

  Intelligence: IQ score
  Temperature: in degrees Celsius or Fahrenheit
  Personality: degree of extroversion

Types of variables - 4

- **Ratio variables**: items are rated on a scale with equal intervals and a natural 0-point.
  - Allows for both additive and multiplicative comparison

    Age: in year, months, days, . . .
    Temperature: in degrees Kelvin
    Time: in milliseconds, seconds, years, . . .
    Velocity, acceleration, etc.

- Interval and ratio data often treated similarly and counted as score data

Clicker Question

The variable NUMBER OF CLICKER REPONSES is

A categorical or nominal variable
An ordinal or rank variable
An interval variable
A ratio variable