PSC 200
Hypotheses and Research Design

So far we’ve looked at
- Concepts $\rightarrow$ variables
- Operationalization and measurement of variables
- Describing variables using various statistics

Now we want to formalize how to evaluate claims, statements, and research; and how we should conduct our own research so that it is less susceptible to criticism.

- How to formulate hypotheses
- Research design
- Threats to validity
Consider statements like

“Students today are all apathetic about the war in Iraq.”

“Gays and lesbians cannot be good parents.”

“Downloading music on the internet is the cause of recent financial losses for the music industry.”

“Bush’s domestic policies led to the current downturn in the economy.”

“Clinton’s domestic policies led to the current downturn in the economy.”

“Gun control doesn’t have any effect on crime.”

“There’s no reason to quit smoking. My uncle smoked from the time he was 13 and he lived to be 82.”

“Those orientals are smart.”

How do we evaluate these claims?
Two important aspects of political science research:

- Characteristics of people, institutions, and political phenomena:
  - Demographic characteristics of Americans
  - Political opinions of Americans
  - Political opinions of Iraqis
  - Political and economic institutions in European countries
  - Frequency, intensity, and duration of war

- Relationships among people, institutions, and political phenomena
  - Why do people vote the way they do?
    - Are wealthier people more likely to vote Republican? Why?
  - Why do wars occur?
    - Are democracies more or less “peaceful”? Why?
“Why?” questions have two elements

1. Cite two (or more) variables

   - Even when explaining a single event or concept, they usually lead to exploration of relationship between two (or more) variables

   Ex: Why did WW I occur?

     → How did the system structure affect likelihood of war?

     → How did the organizational structure of the militaries influence the likelihood of war?

     → How did the domestic politics of the various nations influence the likelihood of war?

   Ex: Why do people vote the way they do?

     → How is income related to a person’s vote?
     → How is race related to a person’s vote?
2. Interested in **causation** -- the specific linkages between the variables

**Ex 1:** When I play a cd, why do I hear music?

- The cd is encoded with 0’s and 1’s.
- A laser pickup in the cd player reads the 0’s and 1’s off the cd.
- The stream of 0’s and 1’s are sent to a digital-to-analog converter, where they are converted into an analog signal.
- The analog signal is passed through an output stage to a set of connectors on the back of the cd player. Cables carry that signal to inputs of my integrated amp.
- In my integrated amp, the analog signal is amplified and sent to the speaker outputs, where cables pass the signal to the speakers.
- In the speaker, the high and low frequencies are split and sent to different drivers, which vibrate the air in accordance with the voltage they see. This is music.
Ex 2: Why does war occur?

??????????

No “schematic” for war yet.

The goal of most political science research is to provide causal explanations to “Why?” questions.

Relationships are difficult enough to find.

Causality is even tougher to “prove.”

-- even the “schematic” for the cd example was not complete

A lot of empirical political science research is really an attempt to find a relationship in the first place – hopefully one that will stand up to repeated examination and will ultimately lead to a satisfactory causal explanation.
**Dependent and Independent Variables**

**Dependent** variable – what we are trying to explain

**Independent** variable – what we think causes (or is causally related to) the dependent variable

or

$$\text{Dependent Variable} = f(\text{Independent Variable})$$

**Hypothesis**
**Hypothesis** – an explicit statement to be “tested” or examined

- usually about the relationship between a dependent variable and an independent variable
- sometimes about a single variable

**Characteristics of hypotheses**

- Generally (but not always), specifies a relationship between two variables
  - The students in this class are indifferent concerning Bush’s handling of the war in Iraq.
  - American students are indifferent concerning Bush’s handling of the war in Iraq.
  - Political leaders having domestic problems will tend to start wars to divert attention away from the economy.
• Should be **as specific as possible**, especially concerning the “tendency” between two variables

  o Ex: A person’s vote is related to their annual income.

    Better: People with higher income are more likely to vote Republican.

  o Ex: Democracies are more peaceful.

    Better: Democracies are less likely to go to war with each other, but go to war with non-democracies just as often as non-democracies fight each other.
o Pollock’s “Template”:

In comparing [units of analysis], those having [one value on of the indep variable] will be more likely to have [one value of the dependent variable] than will those having [a different value of the indep variable].

Ex: In comparing states, those having weak inter-party competition will be more likely to have lower voter turnout than will those having strong inter-party competition.

o However, the relationship does not always have to be monotonic – i.e., always increasing or always decreasing.

Ex: Non-democratic nations and nations with high levels of democracy are less likely to enter into war than are nations with moderate levels of democracy.
• **Must be falsifiable.** Must not be tautological.
  
  o (bad) Ex: Individuals will either vote or not vote.
  
  o (bad) Ex: People will favor a ban because they favor gun control.
  People oppose a ban because they do not favor gun control. (Pollock)

• **Must be empirically testable.** In principle, we must be able to collect and examine data to see if the hypothesized relationship holds.
Examples:
Are these valid hypotheses? Can you think of better ones?

- Murderers are crazy.

- Pepsi tastes better.

- Party leaders in Congress are generally more extreme than the rest of the party members.
  
  - The modal Republican party leader will be to the right of the modal Republican representative and the modal Democratic party leader will be to the left of the modal Democrat representative.

- Americans generally vote the way they want to.

- People who regularly smoke at least one pack of cigarettes each week are more likely to develop lung cancer than those who do not smoke at all.

- State leaders are more likely to start wars if they are possessed by demons.
Similarly…

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