Causal Theory and Research Design

Chapter 6 of The Craft of Political Research

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Introduction

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- The nature of causality
- Research design: how to study social phenomena

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- To put it another way, two variables are related if they vary *together* in a *pattern*.

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- In theory-driven research, we are almost exclusively concerned with causal relationships.
- Examples: changes in party identification *cause* changes in vote choice; changes in military spending *cause* changes in the level of tension between states.

Causal vs. Non-Causal Relationships

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- For example, some argue that the Michigan Model is wrong: that something “else” causes changes in both party identification and vote choice. (This might be “ideology.”)

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- However, determining if a relationship is *causal* is more subjective, and must be driven by the use of theory.
- For example: winter does not "cause" spring.

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For Example…

- For example, just because people who smoked were more likely to get lung cancer didn't mean that smoking *caused* lung cancer. Proving the causal link through research and eliminating other possibilities made it possible for us to change public policy to reduce the incidence of lung cancer.

Interpreting Relationships

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- Causation is involved, *somehow*…

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There are two possibilities, and we need to investigate further to decide which is the case:

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- The covariance we observe is the result of outside factors that drive both phenomena: therefore, one variable does not cause the other, but rather a third variable caused both.
- One phenomenon could actually cause the other, but we still need to decide which causes which: does A cause B, or does B cause A? (Temporal sequence can help here!)

Experimental Designs

The basis for all scientific research comes from the *experiment*. There are two major types of scientific experiment that Shively discusses: a "natural" experiment and a "pure" experiment.

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- A “control” group
- In a natural experiment, the experimental group is exposed to a stimulus or treatment (representing our independent variable), while the control group is not.
- After the experiment, we take a measurement of our dependent variable in both groups.

Natural Experiments (continued)

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- To reduce the possibility of other causal factors, we randomize assignment to the two groups, and try to use as many subjects as possible.

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As in the natural experiment, we have two groups: the control group and experimental group. We also still have two variables, an independent variable and a dependent variable. Unlike the natural experiment, we measure the dependent variable *twice*.

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Why Not Always Use Pure Experimen

There are some drawbacks to the pure experimental approach, however:

- We might have some *instrument reactivity*: the pre-test may affect the respondents in some way. It may “clue” them in to what is going on, drawing attention to things we may not want them to pay close attention to.

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- We might have some *instrument reactivity*: the pre-test may affect the respondents in some way. It may “clue” them in to what is going on, drawing attention to things we may not want them to pay close attention to.
- It could be more expensive (though if you have people in the room already, the expense factor is minimized).

Non-Experimental Designs

Unfortunately, we don't often conduct experiments in political science, for two major reasons:

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Unfortunately, we don't often conduct experiments in political science, for two major reasons:

- We can't control peoples' behavior over a long period of time
- We can't control the introduction of stimuli (people already know something about politics by the time we find them)

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The Cross-Sectional Design

By far the most common design in political science is *cross-sectional*.

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- The researcher has no control over whether a particular respondent has been exposed to the independent variable.

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- The researcher can’t affect the conditions under which people are exposed to the stimulus.
- Instead of experimental controls, the researcher must use data analysis to draw conclusions about the effects of the independent variable.

Advantages

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- We can observe phenomena in a natural setting, instead of a lab situation.
- We can study larger and more representative populations.
- We can test hypotheses that can’t be easily tested through experimentation.

Experiments Don't Always Work…

The final point above is perhaps the most important. For example, say we hypothesize that greater education leads to higher income:

- We can randomly ask adults about their education and income, divide the respondents into groups based on their level of education, and compare the average incomes of the groups.

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The final point above is perhaps the most important. For example, say we hypothesize that greater education leads to higher income:

- We can randomly ask adults about their education and income, divide the respondents into groups based on their level of education, and compare the average incomes of the groups.
- We have no way to control who gets more education and who gets less.

Experiment Problems (continued)

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- Often, experimental research is too unrealistic to study political phenomena. We can't have "fake elections" and "fake wars" in the lab and expect realistic results.

Panel Studies

Another non-experimental design is called a "panel study." Panel studies are like cross-sectional designs, but we introduce a time element.

- The researcher measures the variables of interest *with the same units of analysis* (people, countries, whatever) at multiple points in time.

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- For example, we might want to find out whether exposure to television advertising increases voters' ability to identify relevant issues in a campaign.

An Example Panel Study

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- An experiment would seem ideal, since we could take a pre-test, make the control group not watch the ads, and then do a post-test.
- However, this wouldn’t work because we have no way to ensure that the control group doesn’t see any of the ads unless we lock them away for a while or get their parents to ground them.

Voilà! A solution!

- Solution: a panel design. Test the subjects before the campaign begins, then after the campaign starts, and measure both *awareness of the issues* and (self-reported) *exposure to the ads*.

Time Series Design

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- The more times we measure, the easier it is to rule out other possible causes for change between time points.
- For example, if we measured Bill Clinton's popularity at the beginning and end of 1999, we would observe some change, but literally thousands of factors could have caused it.

What's The Frequency, Bill?

- To get around this problem, we could measure Clinton's popularity monthly, weekly, or even daily. Thus if Clinton's popularity increased by ten percent in a day, we could fairly attribute that change to one or two events.

Other Uses

A time series can also allow us to see if changes affect different groups in different ways; for example, more politically sophisticated voters may have more stable opinions than less sophisticated voters.