PS0700
Nuts and Bolts of Political 'Science': Theories, Hypotheses, Variables

Political Science Research Methods

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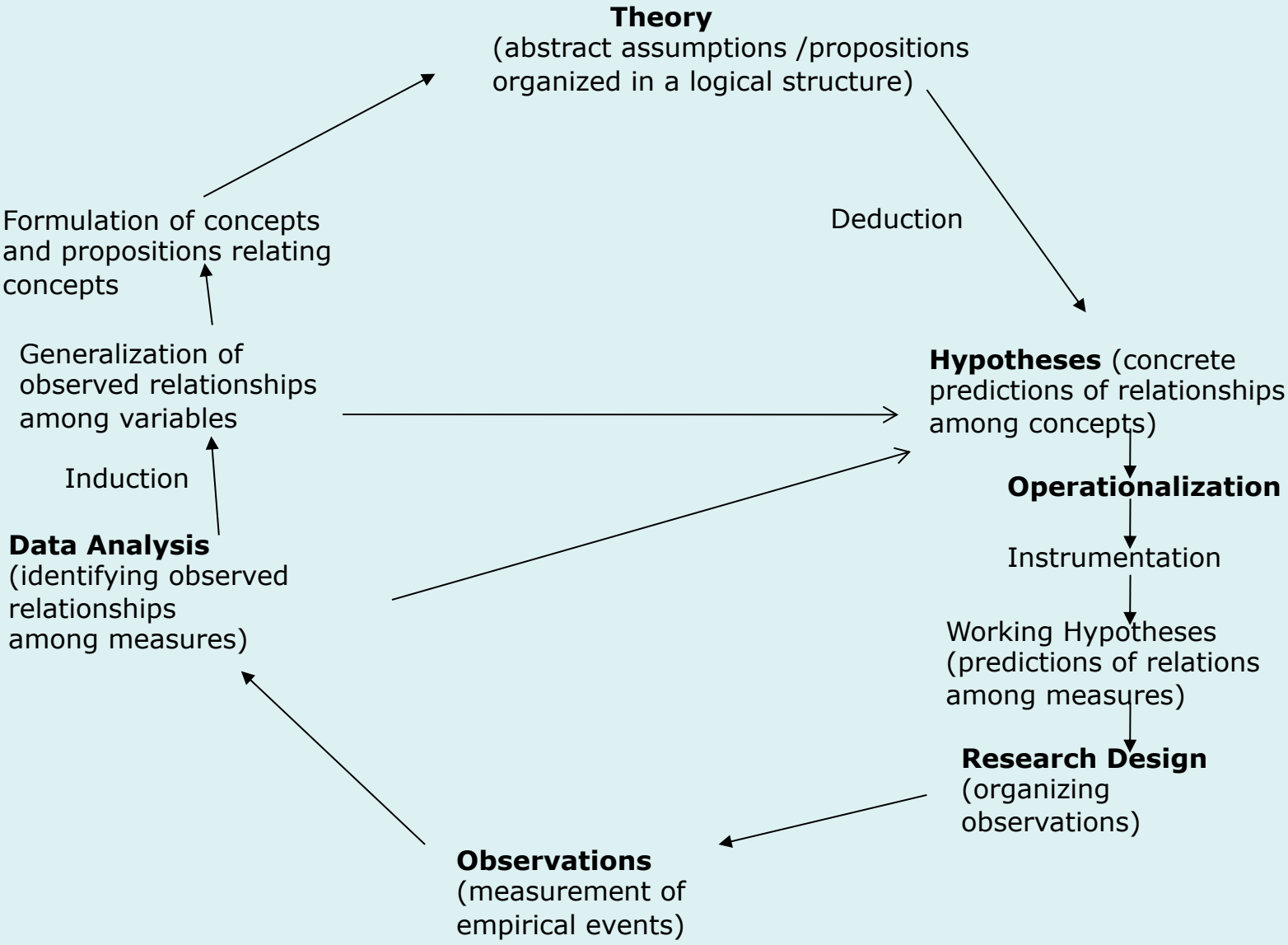
Fall Semester 2022

Week 2

Goals for the Session

- Provide overall model of the social scientific research process
- Discuss the steps involved in the generation of good empirical hypotheses
- Discuss relationship between hypotheses and theories, and their respective roles in the social scientific process

A Model of the Research Process



A Simplified Model of the Research Process: Phipps Conservatory, 2009 Exhibit Celebrating 150th anniversary publication of Darwin's *Origin of the Species* and 200th Anniversary of his Birth

The Essence of Empirical Political Science: Formulating and Testing Hypotheses

- What is a *Hypothesis*? Definition: An assertion that two or more *variables* are related to each other in some specified manner

- What is a *Variable*? Definition: A quality on which a *unit* (e.g., an individual, organization, neighborhood, state, country, international system) may vary, or take on different values

- A hypothesis is a *proposed empirical regularity* that, if (repeatedly) verified, can serve as the *foundation for a causal explanation* of some observable phenomenon or phenomena

- Most of the rest of the course will outline procedures for the proper testing and verification of hypotheses using observations, data, and (where possible and meaningful) statistical reasoning and analysis
- If causal explanations are repeatedly verified across time and space, we might even have a "law" of political science (VERY RARE!!!!)

An Example

- **Hypothesis #1**: "States with a corporate income tax have higher levels of unemployment than states without a corporate income tax"
- **Variables**
  - Presence of a corporate income tax
  - Unemployment rate
- **Units**: U.S. States
- **Potential Causal Explanation** (if hypothesis is (repeatedly) verified **and additional criteria for causality are satisfied**):

Among US states, if X (corporate income tax), then Y (high unemployment). If X (no corporate income tax), then Y (low unemployment).

Some additional useful definitions

- A *category* is a value of a variable
  - Possible values of the variable "presence of corporate income tax": "yes" or "no"
  - Possible values of the variable "unemployment rate": 0, .5, 1.2, 7.35, etc.
  - Possible values of the variable "religious affiliation": "Catholic," "Jewish", "Protestant", "Muslim", "Hindu", etc.
- The *dependent variable* (Y) is the variable that we attempt to "explain"; the *independent variable* (X) is the variable that (potentially) "explains" or (potentially) "causes" the dependent variable
- Variables are the more precise referents of *concepts*, which are abstract representations of social phenomena or ideas
  - Concept: Economic Performance Variable: Unemployment Rate
  - Concept: Political Pluralism Variable: Extent of Organized Interest Groups in Society

Additional Examples of Hypotheses

- Hypothesis #2: "Countries with higher levels of social trust will have more democratic political systems than countries with lower levels of social trust"
  - Dependent Variable: ?????
  - Independent Variable: ?????
  - Units: ?????
- Hypothesis #3: "Individuals whose financial situation declined over the past year will be more likely to vote against the incumbent party in presidential elections than individuals whose financial situation increased or remained the same"
  - Dependent Variable: ?????
  - Independent Variable: ?????
  - Units: ?????

Some Characteristics of A Good Hypothesis

- It should be *empirical*, not *normative*
  - "Social Trust is good for a society to have" (normative)
  - "It is important to punish Presidents for poor performance in office" (normative)
- It should have *two* or more variables, not only one
  - "More people in the U.S. are Democrats than Republicans" is a *descriptive* statement about the variable "partisanship"; it is not a hypothesis linking an independent and a dependent variable together
- It should not be a tautology, or true by definition
  - "Paranoid people are more likely to believe that other people are out to get them than non-paranoid people"
  - "More tolerant people are less prejudiced than less tolerant people"
  - Some hypothesis are "near-tautologies" and you should consider how useful they are: "Individuals vote for the candidate they like the best"

Good Hypotheses (continued)

- It should be *general, not specific*
  - "In 2012, The U.S. electorate rewarded Barack Obama for good US economic performance while he was President"
  - "North Korea violates human rights on a large-scale basis"
- It should be clear regarding how the variables are related, i.e., it should be *directional*
  - "A Country's Social Trust and Extent of Democracy are Related"

Good Hypotheses (continued)

- The *units* to which the hypothesis will apply should be clear; this will determine the *level of analysis* at the which the data will be gathered and subsequent tests conducted
  - Alternative Expression of Hypothesis #2: *Individuals* with higher levels of social trust will have higher support for democratic political institutions than *individuals* with lower levels of social trust
    - Units: "Individuals" here versus "Countries" in original version
- Relationships that hold at one level of analysis ***may or may not*** hold at another level of analysis!!!! Failure to recognize this may result in committing the ***"ecological fallacy"*** – inferring individual relationships from aggregate-level data. (Or the reverse ***"individualistic fallacy"*** that aggregate relationships are the same as what is found among individuals)
  - This is generally a big no-can-do!!!!

Where do Hypotheses Come From?

- Principal Way: "Deductively" from a "Theory"
- What is a "Theory"?
  - Definition: An *empirical theory* is a set of interconnected abstract statements of assumptions, definitions, and propositions which purport to describe and explain the occurrence of a given phenomenon or set of phenomena
  - Alternative Definition: A body of statements that help organize, systematize and coordinate existing knowledge into a unified explanatory framework
- Theories link together definitional statements, assumptions, prior regularities, and propositions relating general concepts into an overarching framework that leads to specific, testable hypothesis through a "deductive" process that states: If the theory is valid, then the hypothesis should hold
- Our ultimate goal in behavioral political science is to test hypotheses that are relevant for existing empirical theories, to use the results of those tests to shed light on the usefulness of the theories themselves, and to use the theories to generate new predictions and new causal explanations of political phenomena

Example of Theory and Deduction

- Suicide and Social Cohesion
  - Emile Durkheim (late 19th century French sociologist) theory of suicide and social cohesion
  - Theoretical Propositions and Assumptions:
    - Social Cohesion Provides Psychic Support to Individuals
    - Religion and Family Life are Sources of Social Cohesion
    - Suicide Rates are result of unrelieved psychic distress
    - Catholics have more structured religious experiences than Protestants
  - Hypotheses Deduced by Durkheim from Theory:
    - Catholics have lower suicide rates than Protestants
    - Married persons have lower suicide rates than non-married persons
  - Additional Possible Hypothesis
    - Individuals belonging to more secondary associations will have lower suicide rates than socially-isolated individuals
  - All of these testable hypotheses follow from the principles/propositions/assumptions of the overall theory

Additional Example

- A "Political" Theory of State Economic Outcomes
  - Theoretical propositions, definitions, assumptions:
    - State-level economic outcomes are determined by governmental behavior (theoretical proposition linking concepts "economic outcome" and "governmental behavior" at state level).
    - State-induced taxes impose costs on businesses (definitional statement).
    - Businesses make hiring decisions based on profits, costs and benefits (assumption)
  - Hypothesis: States with corporate income taxes have higher unemployment rates than states without corporate income taxes (our hypothesis #1 from earlier slide!!)
  - Possible additional hypothesis: State legislators representing areas with high unemployment will be more likely to vote for lowering corporate taxes than state legislators in areas with low unemployment

Characteristics of Good Theories

- They generate falsifiable empirical hypotheses
  - The theory of "intelligent design": life is so complex that it *had* to be designed by a super-human creator. The existence of a super-human creator is possibly true, but what are the falsifiable hypotheses or predictions that can be deduced from this "theory"?
  - Internally inconsistent theories have similar problems – can they be falsified?
- They generate *lots* of falsifiable empirical hypotheses
  - "Social Capital" theory of democracy: democracy is furthered by high levels of "social capital," i.e., social networks, group associations, and trust in others. Leads to hypotheses at multiple levels of analysis (individuals and countries), multiple settings (established and new democracies), multiple contexts
- They provide explanations of *general* political phenomena
  - A theory of legislative institutions is better than a theory of the German *Bundestag* or the U.S. Congress
- They are "parsimonious", using as few variables, concepts, assumptions as possible

The "Inductive" Approach to Formulating Hypotheses

- Hypotheses may arise from the process of "induction" as well as from the process of "deduction" from theory
- Induction is the process of generalizing from what we have already observed to what we have not yet observed
  - We observe that the incumbent President's party lost more seats in the U.S. House of Representatives in 2006 and 2014 and 2018 than in 2004 and 2012 and 2016
  - We propose a hypothesis: "The incumbent President's party is more likely to lose seats in off-year than in presidential-year elections"
  - We go from a few cases or observations to a proposed regularity involving many cases or observations
- Induction is only a first step in the scientific process, because (as noted) there is no guarantee that future observations will follow the regularity, and there is (as yet) no theory to explain the regularity

- However, induction is a crucial part of scientific inquiry:
  - It provides one basis for making successful predictions, even without a theory to explain why the predictions hold
  - It provides the raw material for developing subsequent theories
    - See YouTube video: "Semmelweiss and the Germ Theory of Disease". A classic case of induction in the natural (medical) sciences from the 19th century

https://www.youtube.com/watch?v=U6-FjtpdePA&feature=email

- Induction provides information that may be useful in *revising* existing theories
  - Example: People who report a *higher* likelihood of being arrested if they were to engage in protest are *more likely* to protest than people who report a low likelihood of being arrested
  - Why should this be? It is inconsistent with the rational choice theory of protest, which predicts that individuals will avoid costly behaviors when deciding whether and how to act
  - Inductive reasoning: individuals may believe that others will respect them more if they take risks or bear costs for the good of the group
  - So rational choice theory may need to be modified: Objective costs may not equal "subjective" costs perceived by individuals, individuals may derive psychic benefits from "martrying" themselves, and the inclusion of *reputational* costs and benefits may result in better explanatory power of the theory

Summary and Implications

- Political science research proceeds via both inductive and deductive processes that result in the generation of testable hypotheses and theories
- We move from what we have observed in devising a theory to what we have not observed, in order to discover whether or not the theory provides us with an accurate set of expectations about the world
- We can never be sure that a theory is "true" or "false" because we cannot observe all cases, nor be sure how the empirical relationships might change with time, nor be sure that our tests and measurements were conducted completely properly
- But we can acquire more or less confidence in the *utility* of a theory by comparing the predictions derived from it with more and more observations. If it allows us to accurately predict things about politics we have not previously observed, then it is "useful"; if not, then it is not "useful", especially if other theories do so more accurately