

"Research Design"

*Micah Altman, Senior Research Scientist
Institute of Quantitative Social Science, Harvard University*

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Research design is the process of creating a scientific plan for answering research questions through sampling, measurement, and analysis. Research design is both a formal and creative process which involves comparing competing theories, enables one to make inferences, and yields discoveries about the world. The hallmark of social-scientific research design is a rigorous attention to inference, sampling, and measurement.

Political science research aims to make *inferences* regarding subjects of political interest, based on empirical observation. These inferences may be a mixture of the descriptive (e.g., what is the rate of voting among all U.S. adults in poverty?), predictive (e.g., will the turnout rate increase if the government institutes an election-day holiday?) and explanatory (what are the fundamental determinants of turnout in the U.S.?). In each case, an correct and effective research design requires careful attention to issues of controls, sampling, and measurement.

In the classic *experimental* research design, a sample is drawn from a population; an attribute is measured for each individual in that sample a treatment is then applied to a randomly selected subgroup of that sample; and the attribute is re-measured and compared to the attribute level of those not treated (the "control" group). Experimental design provides insurance against numerous threats to inference, such as confounding variables, endogeneity, and self-selection.

In fact, political science research designs are rarely true experiments, because political events and political behavior is often impossible to fit into this mold. (For a concise and practical guide to research design in political science, see Shively 2002.) Although some political science theories can be tested through laboratory or field experiments, most political science research is quasi-experimental or observational. In quasi-experiments (also known as "natural" experiments) the researcher measures the attributes of a sample, some of which have received a "treatment" and some of which have not. The control group is not randomly assigned, and in many cases, no pre-measurement of those "treated". Observational studies examine attributes of a single sample, before and after a test, without any control group. For example, a natural experiment might be to analyze the changes in voter turnout in cities after changes in registration requirements. Unfortunately, a relationship between treatment and attribute change in such designs is not a strong basis for inferring causality: The relationship could be created by a confounding variable, not included in the model (perhaps a separate attribute, like scandal, determined both turnout and whether a political subdivision adopted the law), by selection biases (those cities that chose to adopt reform could be systematically different from those which did not with respect to peoples' voting behavior), or could even have the opposite direction (perhaps those cities in which voters are already mobilizing, and ready to turn out, were also driven to change the registration requirement).

Sampling is an important aspect of all research designs. Good research design draws from a sampling frame that is good match with the population of interest, aims to obtain a sample that is sufficiently variable in the levels of treatments that effects could be detected, and avoids selecting cases based on values of the explanatory variable bias (unless the intent in process tracing or disconfirmation of a covering theory)

In social science, we are rarely able to measure directly the properties in which we are most interested. Instead we are forced to measure concepts of interest, such as "poverty", through indirect measures, like per-capita income. An indirect measure is judged by its reliability and

validity. Reliability is simply stability over repeated measures. Validity is how well the measure equates with the underlying concept.

Choosing the size of the sample is a critical part of the research design, and there is often a tradeoff between small and large samples. Small sample designs (sometimes known as 'case studies') in which one examines a single case or a small number of cases in great detail make it difficult to apply formal statistical inference. Although it is usually impossible to draw broad inferences from individual cases, it may be possible, through examining the case history and tracing the causal processes that run through a case, to disconfirm explanatory or predictive theories that were hypothesized to have applied. The thick descriptions that can emerge from case studies can also be useful in generating other hypotheses. Large samples allow the use of strong methods of statistical inference, but can make it more difficult for the research to construct valid measurements (since these need to be applied across a wider domain of cases) and to maintain causal homogeneity.

A good research design attempts to answer a research question that is both important in the world, and which offers some purchase for current social scientific methods and theory to yield insight. These are fundamentally grey areas. Clearly, 'interesting' is value-laden, especially in the social sciences. An interesting question may shed light on an important policy issue, test a widely contested (or widely accepted) theory, or posit an explanation of an anomaly— something that is not explained by current theory, or even seems inexplicable. Tractability is determined by a variety of factors, including the availability of data, one's research resources, physical law, and the state of statistical methods. Still, there remains a core of questions and methods generally considered interesting and tractable.

In practice, the process of research design in political science is both iterative and creative. It is rare that one starts with a crisply defined theoretical question, develops measures of the variables of interest from first principles, goes into the world and collects data in one fell swoop, and emerges with compelling results. Instead, one may start with a vague question, immerse oneself in the details of the cases relevant to this question, and use these details to generate new theories and new questions. One might start with one set of measures, and find, when one attempts to apply them to the world that these are unreliable, or flawed. And one may attempt one method of sampling, and on examination of the sample find that it is unbalanced or non-random. (For thoughtful discussions of these issues, see Brady & Collier 2004)

Nevertheless, problem selection, and research design in general, occur within a scientific framework. This framework emphasizes testing competing theories based on evidence gathered from the world, is always open to the possibility that new data will require us to update our theories and conclusions, insist on transparency on how data is collected, and analyzed.

Shively, W. Phillips, 2002. *The Craft of Political Research*, (5th Edition). Upper Saddle River, N.J.: Prentice Hall.

Brady, Henry E. and David Collier (eds.), 2004. *Rethinking Social Inquiry*, Oxford: Rowman & Littlefield.