

Chapter 2: Framing an Analytic Question

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A. Choosing a Subject

- 1 Distinguishing analyzing a subject from merely writing about it is the heart of what differentiates the research paper from journalistic writing. Research papers revolve around clear analytic topics. Good topics are narrow enough to be “doable” yet broad enough to avoid a “who cares?” reaction from your readers. They are ambitious enough to be challenging but not so overambitious that their scope may prevent realistic completion of the research project. Analytic questions are empirical puzzles that cannot be answered merely by describing the history and present circumstances of the object of investigation. Rather, qualitative or quantitative data about that object must be analyzed. If your paper can be completed merely by giving a history and description, you do not have an analytic topic.
- 2 What does analysis involve? While in other areas purely descriptive or speculative writing is wanted, research papers pose one or more hypotheses, marshal evidence, and come to conclusions. For dissertations, these conclusions should make an original contribution to one’s discipline. A good research topic can be said to be “analytic” when four conditions are met:
 1. A dependent variable is identified. There must be at least one thing which is being explained. Moreover, this one thing must vary, in order that we can investigate what other things (independent variables) vary with it.¹
 2. A plausible explanation is posed. There must be at least one idea of how some independent variables relate to the dependent variable. This is the hypothesis, or a set of hypotheses constituting a theory.
 3. Counter-hypotheses are examined. Analysis can show some explanatory models are consistent with the data, but the same data can be consistent with many alternative models. Analysis must include investigation of leading alternative hypotheses and theories.

1. [Instructor’s note: Use “independent” and “dependent” when referring to variables in a true experiment. Otherwise, use “exogenous” and “endogenous”].

4. Operationalization of all variables makes analysis concrete and specific. All the terms which appear in the hypotheses must have a meaning which is well-defined enough to allow us to gather evidence.
- 5 Note that the analytic questions associated with one's thesis are not usually the same as questions asked of respondents in an opinion survey (Steeves, Kahn, & Cohen, 1996). Rather, the analytic questions associated with the thesis are ones which the researcher poses based on theories in the discipline and/or scientific constructs. For instance, in a study in which the central analytic question is revolves around whether additional years of education lead to greater job satisfaction, controlling for differences in salary level, one would not ask respondents if they felt more satisfied on their jobs as a result of their education, disregarding differences in salary level. Rather, one would have separate items about degree of job satisfaction, level of income, and years of education. The researcher would use statistical inference to assess the validity of the analytic question's central hypothesis.
- 6 Under some circumstances, the researcher may want the respondent in a survey to consider the analytic question itself. This may be useful, for instance, in understanding differences among subjects in their perceptions of key terms. Respondents in the foregoing example might be asked to define "job satisfaction," for instance. While such a question may reveal helpfully intersubjective differences of perception, the researcher should be very aware that respondents' answers may reflect not only their own experience but also popular, cultural, political, social, religious, and other types of influences which affect their views. Moreover, the researcher must consider whether the very act of asking direct items about the analytic question may contaminate the results. For instance, does forcing respondents to clarify in their minds what job satisfaction is, lead to changes in their thinking about something which, in truth, was much more ambiguous or otherwise different prior to being interviewed?

2. Framing an Analytic Question

a. Concepts

- 7 Framing a good analytic topic is the key to success in research writing. The analytic process revolves around four dimensions:
- 8 (1) *Having a clear dependent variable.* Decide what, specifically, it is that you wish to explain. Not only does this involve identifying one or more dependent variables whose variance you wish to explain, but it may also be helpful to be explicit about related phenomena for which you will not try to account. If you are writing about the effectiveness of a crime control program, for instance, you will need to clarify what types of crimes are to be considered and which not. It may be that homicides are very different causally from robberies. It may be that homicides of men differ from homicides of women in their causal basis. Refining the dependent variable is part of the analytic process, but eventually the research must stake out what it is he or she will be explaining, and what is beyond the scope of the research effort. Less can be more. That is, it is best to have a limited scope which involves feasible research.
- 9 (2) *Having clear hypotheses.* Based on literature review and brainstorming, you should develop a list of all variables which may be thought to affect the dependent variable(s) you have selected. Identify causal relationships among sets of your variables. The literature review is essential and must not be skipped. Ideally, one's hypotheses arise from theory. Be specific. It is not enough, for instance, to say that A and B cause X, because this could mean several things: (1) that A causes B, which in turn causes X; (2) that A causes X and B independently also causes X; or (3) that the joint interaction of A and B causes X. Specifying the direct, indirect, and interaction effects in your model can be clarified by diagramming, in which variables become circles, effects become arrows, directions are plus and minus signs, and size of effect is shown by

size of arrow or by a coefficient from 0 to 1.0 attached to the arrow. As the number of variables in your model exceeds three, such diagrams are almost a necessity.

- 10 (3) *Having alternative hypotheses.* The default assumption in research writing is that more than one hypothesis or model will fit any given set of data. It is not enough to demonstrate that the data fit the hypotheses you have advanced. Other theories may fit the data too. Ultimately you will never be able to prove your hypotheses to be “true,” though you may be able to disprove them. The best you can do, and should do, is to compare the fit of the data to your model with the fit of the data to plausible alternative models, particularly other models which appear in or are implied by the professional literature. In doing so, you will develop a list of hypotheses and alternative hypotheses to be investigated in your research.
- 11 (4) *Operationalization.* Make a list of all variables which are mentioned anywhere in any of the hypotheses or alternative hypotheses for models you will be investigating. All the terms on your list must be translated into operational terms. For every term (ex., “effectiveness”) you will have to have at least one and ideally four or more indicators (ex., favorable client response to evaluation items, differential cost of service compared to a reference, objective progress measures). Operationalization of variables is discussed more fully in a later section of this Guide. Operationalization, of course, will feed into later research processes, such as selection and application of appropriate methodological procedures, also discussed in later sections.
- 12 If an analytic question involves hypotheses which cannot be confirmed or disconfirmed by empirical means, then these are metaphysical propositions inappropriate for scientific and social scientific analysis. The philosopher Popper’s “Falsifiability Criterion” must apply: propositions must be falsifiable at least in principle if they are to be investigated empirically. The empirical researcher must be agnostic on metaphysical propositions (the term “agnostic” has a root meaning of “unknown” or “unknowable”). For instance, the explanation that a set of labor riots occurred because of the Marxian process of synthesis and antithesis is not falsifiable and therefore is a metaphysical proposition. As a theory, synthesis/antithesis may give the researcher some insights but ultimately it explains everything and therefore is merely a vocabulary which can be used like other similar vocabularies (ex., systems theory) in the process of explaining something empirically by other means. Those other means must involve empirically falsifiable propositions.
- 13 Of course, difficulty in obtaining evidence is not a reason to consider a proposition metaphysical. For instance, once-untestable propositions in astronomy have become testable with the Hubble Space Telescope, but these were never metaphysical propositions — it was only that measurement technology had not been developed. Still, for practical purposes, while the theorist has more latitude, the empirical researcher must content him or herself with propositions which are testable by today’s available methods and techniques.
- 14 Empirical accuracy of a theory is not enough. The researcher should bear in mind the common observation that for any set of data, there will be two or more competing explanations which explain the data satisfactorily, sometimes to an equal degree. How then to decide among theories?. The scientific method puts forward three additional criteria for “good theory”:
 - (1) deductive fertility (the theory is best which generates the largest number of interesting, testable hypotheses);
 - (2) generality (the theory is best which explains the largest range of phenomena); and
 - (3) parsimony (the theory is best which explains the data using the smallest number of assumptions and axioms). A parsimonious, generalizable, fertile theory is the nirvana of empirical research.
- 15 SUMMARY. In summary, a good analytic topic is one which centers on an empirical puzzle. There are two or more strategies (theories) which may unlock the puzzle. Each strategy (theory) engenders at least one

empirically testable proposition, allowing the researcher to see which better fits the data which may be collected to bear upon the subject. The puzzle is interesting. The solution is non-obvious. Usually the hypotheses involved in proposed solutions grow out of significant strands in the literature of the discipline. When the puzzle is solved, the solution will have many implications for theory and practice. If all this is true, one has selected an analytic topic very wisely.

b. Analytic Topic Checklist

- Have you selected a topic capable of sustaining your interest over the length of time (usually twice as long as you initially expect!) needed to complete your paper, thesis, or dissertation?
- Did you choose a topic early and plan your research and writing in a framework which enables you to meet deadlines, avoiding a last-minute writing crisis?
- Is your topic interesting enough to motivate you for the long run, but resistible enough that it does not consume you to the neglect of obligations in your studies or career?
- Have you selected a topic which your audience will deem to be of substantive interest? For dissertations, have you identified a topic which can be considered to be an original contribution to your field (because it confirms/refutes/amends a theory pertinent to your discipline, fills a gap in your discipline's literature, exemplifies new research methodologies, and/or establishes new baseline or trend data important to questions in your discipline).
- Have you carefully examined your central question, considering each key word for its possibly several conceptual meanings, and the differences between it and various common synonyms for it.
- Have you identified your dependent variable(s)?
- Have you considered if your dependent variable is actually of two or more types, each requiring a separate causal explanation?
- Have you consulted the professional literature to develop an list of relevant independent variables?
- Have you avoided taking notes on everything related to your topic, instead taking notes in a format closely tied to the specific testable propositions you are analyzing?
- In taking notes, have you kept an accurate record of full references so you will not have to go back (ex., page numbers for direct quotations). Are you aware of the exact reference requirements of the format (ex., the APA format from the American Psychological Association is common) you will be using?
- Have you related your dependent and independent variables to each other, possibly in the form of a diagrammatic model?
- For each pair of variables that would be connected by an arrow in a diagrammatic model, have you considered whether there are third variables which might intervene between them or be common antecedent causes of both?
- Have you researched and developed possible alternative models for the same data?
- Have you identified outliers (cases which deviate greatly from what your theories and propositions would lead you to predict) and whether they call for a second (or more) separate theory from the one you are investigating primarily?
- Have you looked at other dissertations or journal articles in this area with a view to refining your model and its alternatives?
- Have you considered interdisciplinary perspectives (ex., economic, psychological, social, cultural, and political)?
- Have you written out a formal research statement which concisely summarizes your research objectives?
- Are you prepared to have your dissertation or paper evaluated in terms of whether you have accomplished the purposes contained in your research statement?

- Are you sure your research statement does not duplicate work already published?
- Have you given particular care to selection of your title, which will play a significant role in what readers expect you to accomplish in your dissertation, thesis, or paper? Could a reader interested in your topic find your work doing an electronic search based on keywords in your title? Does your title refrain from implying a higher level of generalization of your findings than your data warrant?
- Have you avoided subjects in which you have a personal stake or “axe to grind”? These are forms of conflict of interest which are to be avoided for their own sake and because your research must both be and have the appearance of being objective.

c. Analytic Research Examples

- 16 In pursuing an analytic topic, the researcher asks common-sense questions, often arising from his or her review of the literature. The researcher asks questions like, “What relationships are discussed in this article and how do they relate to the propositions I am studying? What are the influences, constraints, and linkages among variables and agents in the model underlying the article, and how does this relate to my model? Which variables or information is left out, either in the article or in the researcher’s model, which would make an important difference? What evidence is presented, and by what methods, and did the method of measurement influence the findings? What alternative theories are mentioned and do they apply to the researcher’s model as well? Is there any discernible bias by the writer of the article, and has the researcher considered such possible biases in his or her own work? What assumptions are made in the article, and would other assumptions be plausible and lead to different conclusions?”
- 17 Example 1: Electing Nixon. In specifying a subject as an analytic topic it is common in undergraduate social science writing to write about something without ever having an analytic topic. For example, a student may select the subject “Why Richard Nixon was elected president,” then present a variety of historical information which is related in one way or another to this topic. The essay may be well-organized, informative, and well-deserving of an “A.” However, when framed this loosely, the reader is very likely to be left without the basis for coming to a well-supported conclusion about more specific topics, such as “Was the margin of Electoral College votes resulting in Nixon’s election primarily accounted for by popular reaction against the Vietnam War under President Johnson, and not due to popular reaction against Johnson’s “Great Society” liberal agenda, civil rights, or his handling of the economy?” This more specific question meets the four necessary conditions of an analytic topic.
- 18 There is a dependent variable: Nixon’s margin of votes.
- 19 There is a plausible explanation: There was a popular reaction against the Vietnam War in the time leading up to Nixon’s election, and it is possible this was a dominant factor.
- 20 There are counter-hypotheses: There are plausible counter-hypotheses dealing with popular reaction against Johnson’s “Great Society” liberal agenda, civil rights, or his handling of the economy.
- 21 The variables can be operationalized. All the terms which appear in the hypotheses are ones which can be given concrete meaning in terms of such indicators as Electoral College votes on the one hand and public opinion poll items on the other.
- 22 Example 2: Environmental Regulation. A second example: environmental regulation. If you read this Guide’s section on “Brainstorming,” you probably encountered the example of writing on the subject of “Environmental Regulation.” Brainstorming resulted in this list of subjects.
- air pollution
 - noise pollution
 - water pollution

chemical pollution/hazardous waste
 endangered species
 is it effective?
 cost/benefit analysis
 EPA agency
 EPA regulations vs. property rights
 conservatives vs. liberals on environmental regulation
 Al Gore
 politician's platforms on environment
 federal funding for environment
 state funding
 private costs/funding
 private sector ads on environmental issues
 public opinion on environment, causes of
 Smokey the Bear
 conservation
 conservation/environment in 1900s vs. 1990s
 etc.

- 23 The next step would be to specify possible analytic topics derived from this list of subjects. This is a creative process and there is no specific “right answer.” However, good answers will meet the four criteria:
- a dependent variable or set of dependent variables’
 - a hypothesis or theory relating one or more independent variables to the dependent variable(s);
 - plausible alternative explanatory models; and
 - variables which can be measured operationally.
- 24 Are corporate issue ads more effective than environmental group issue ads in impacting public opinion? One could create a small group experiment which exposed subjects to corporate and environmental group ads and measured reactions.
- 25 Was the Forest Service’s “Smokey the Bear” campaign effective? Assuming one could get evidence on variations in school systems’ use of “Smokey the Bear” materials (based on Forest Service records for the order of such material) and on trends in forest fires before and since the “Smokey” campaign in the districts selected, one could assess if there seemed to be any effect of the campaign over and beyond district fire trends.
- 26 Is the environmental movement of the 1990s less partisan than the conservation movement of the early 1900s? One could investigate the political party affiliations and activities of board members of leading conservation/environmental groups in the two periods to determine if connections to political parties (Progressive, Democratic, Republican) have the same pattern now as then. Explaining why would be the focus for yet another analytic topic.
- 27 Does federal funding of water quality supplement or displace state funding? One might get data on state funding on municipal sewage treatment, then for selected areas, show historical trends and variations, then see the extent to which federal funding in the same area seems supplementary (raising the total funding trend line but not affecting the state funding trend line), displacing (causing reversals in the state trend line), or combinations of both.
- 28 Example 3: Comparative Research. In a course on comparative politics, an analytic paper would go beyond merely describing chronological facts and events based on information from encyclopedias and

newspaper articles. The typical analytic paper would pick at least two countries which have something in common (this will be the control variable) but which have one other variable which varies (this is the independent variable) and is thought to affect some dependent variable of interest such as regime stability, the status of women, or economic development policy. Typically, the dependent variable(s) vary among the nations being studied. For instance, one might study the impact of high oil prices in the 1970s on the domestic political stability of African nations. To do so, it would be important to include at least one country where the oil crisis had destabilizing effects and one country where it did not. One is then in a position to identify and assess one or more independent variables which explain the difference, with the control being that all countries in the study were similarly impacted by the worldwide oil crisis (this might lead you to exclude a nation with its own internal oil reserves).

- 29 In general, in comparative research one is looking at questions where two countries have similar control factors but differ in outcomes due to some independent variables which the researcher is trying to analyze. For instance two countries like Taiwan and Singapore share the control variable of both having a large middle class, yet in terms of an outcome dependent variable, type of government, the former is more democratic and the latter more autocratic. The analytic question is why, and this question cannot be answered merely by describing the history of each separately. Rather independent variables must be analyzed (ex., differences in economic structure) comparing the nations. Of course, the more nations compared by the same methodology, the more confidence the researcher will have in the generalizability of his or her findings.

d. Bibliography

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Guide to Writing Empirical Papers, Theses, and Dissertations

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