Strategies of Research Design

Substantive problems must thus be translated into the vocabulary of social inquiry. . . .Working out a way of thinking through the choices and some appropriate sequence of tasks will allow you to answer a research question.
—Robert Alford, *The Craft of Inquiry,* p. 25

In 1995 more than 700 people died in a few days in a Chicago heat wave. News reports and officials lacked answers about why it happened. Public and media discussions of the disaster disappeared shortly after it happened. Klinenberg (2002) conducted a "social autopsy" of this "extreme event" in a study using the tools of sociological inquiry—ethnographic field work, interviews, examination of archival documents (newspapers, statistical reports, various records, maps), and analysis of statistical data. The study was designed to answer a question: why and how so many died so quickly. He used social research to dissect the event and reveal its underlying social, political, and economic causes. The study informs us about why and how the disaster occurred. It shows how to design a social research study that answers a significant question (reasons for the unnecessary deaths of hundreds of people in a few days) but that had remained unanswered or ignored.

This chapter focuses on issues involved in designing a study and developing a strategy to guide you during the research process. Your strategy for designing and conducting a study will vary depending on whether it is primarily quantitative or qualitative. You need to plan a quantitative study in detail before you collect or analyze the data. You may ask how you can best create a logically rigorous design that defines and measures all variables precisely, select a representative sample, collect data, and conduct statistical analysis? For a qualitative study, you try to immerse yourself fully in a range of data while being very alert to new insights throughout the process of gathering data. You may ask how you can best capture the richness, texture, and feeling of dynamic social life. Of course, you can mix the features of quantitative and qualitative studies to build on their complementary strengths. Mixing approaches has advantages but adds complexity and is more time consuming. We can see the advantages in triangulation, which is described in the next section.

TRIANGULATION

Surveyors and sailors measure distances between objects by taking observations from multiple positions. By observing the object from several different angles or viewpoints, the surveyors and sailors can obtain a good fix on an object's true location (see Figure 1). Social researchers employ a similar process of **triangulation**. In social research, we build on the principle that we learn more by observing from multiple perspectives than by looking from only a single perspective.

Social researchers use several types of triangulation (see Expansion Box 1, Example of Four Types of Triangulation). The most common type is *triangulation of measure*, meaning that we take multiple measures of the same phenomena. For example, you want to learn about a person's health. First, you ask the person to complete a questionnaire with multiple-choice answers. Next you conduct an open-ended informal interview. You also ask a live-in partner/caregiver about the person's health. You interview the individual's physician and together examine his or her medical records and lab test results. Your confidence that you have an accurate picture grows from the multiple measures you used compared to relying on just one, especially if each measure offers a similar picture. Differences you see among the measures stimulates questions as well.

Triangulation The idea that looking at something from multiple points of view improves accuracy.

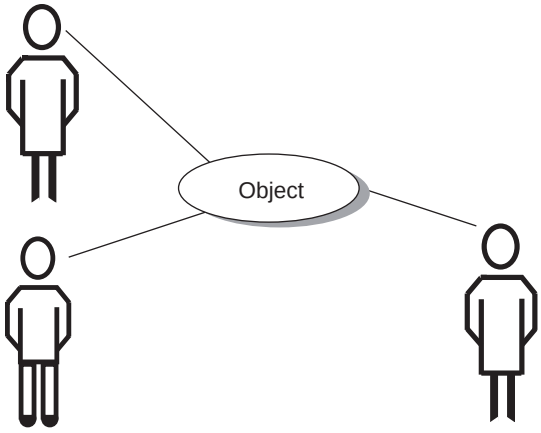


FIGURE 1 Triangulation: Observing from Different Viewpoints

Triangulation of observers is a variation on the first type. In many studies, we conduct interviews or are the lone observer of events and behavior.

EXPANSION BOX 1
Example of Four Types of Triangulation

TOPIC

The amount of violence in popular American films

Measures: Create three quantitative measures of violence: the frequency (e.g., number of killings, punches), intensity (e.g., volume and length of time screaming, amount of pain shown in face or body movement), and level of explicit, graphic display (e.g., showing a corpse with blood flowing, amputated body parts, close-ups of injury) in films.

Observers: Have five different people independently watch, evaluate, and record the forms and degrees of violence in a set of ten highly popular American films.

Theory: Compare how a feminist, a functional, and a symbolic interaction theory explains the forms, causes, and societal results of violence that is in popular films.

Method: Conduct a content analysis of a set of ten popular films, as an experiment to measure the responses of experimental subjects to violence in each film, to survey attitudes toward film violence among the movie-going public, and to make field observations on audience behavior during and immediately after showing the films.

Any limitations of a single observer (e.g., lack of skill in an area, a biased view on an issue, inattention to certain details) become restrictions of the study. Multiple observers bring alternative perspectives, backgrounds, and social characteristics. They thereby reduce the limitations. For example, two people interact with and observe the behavior of ten 5-year-old children at a child care center. One of the observers is a 60-year-old White male pediatrician with 25 years of experience working in a large city hospital. The other is a 31-year-old Hispanic female mother of two children who has 6 years of experience as an elementary school teacher in a small town. Each observer may notice and record different data. Combining what both see and experience will produce a fuller picture than relying on either one alone.

Triangulation of theory requires using multiple theoretical perspectives to plan a study or interpret the data. Each theoretical perspective has assumptions and concepts. They operate as a lens through which to view the social world. For example, a study of work relations in a bank could use conflict theory with its emphasis on power differences and inequality. The study could highlight the pay and working condition inequalities based on positions of authority (e.g., manager versus teller). The study reveals relevant differences in social backgrounds: a middle-aged White male manager with an MBA and a young African American female teller with an associate's degree. Next, rational choice theory is applied to focus on decision-making and rational strategies individuals use to maximize personal benefits. This perspective highlights how the bank manager varies the time/effort he devotes to various customers depending on their loan or savings account size. It also presents a better picture of how the teller invests her time and energy differently with various supervisors, depending on whether she believes they might help her get a promotion. Each perspective guides the study: It identifies relevant data, provides a set of concepts, and helps to interpret the meaning and significance of the data.

Triangulation of method mixes the qualitative and quantitative research approaches and data. Most researchers develop an expertise in one approach, but the approaches have complementary strengths. A study that combines both tends to be richer and more comprehensive. Mixing them occurs in several ways:[1] by using the approaches sequentially, first one and then the other, or by using them in parallel or simultaneously. In the study that opened this chapter, Klinenberg mixed a statistical analysis of quantitative data on deaths with interviews and document analysis. (see Example Box 1, A Multimethod Study).

QUALITATIVE AND QUANTITATIVE ORIENTATIONS TOWARD RESEARCH

In all research, we strive to collect empirical data systematically and to examine data patterns so we can better understand and explain social life, yet differences between research approaches can create miscommunication and misunderstandings. They are mutually intelligible; grasping both approaches and seeing how each complements the other simply takes more time and effort. Next we will look at some sources of differences.

A first difference originates in the nature of the data itself. *Soft data* (i.e., words, sentences, photos, symbols) dictate qualitative research strategies and data collection techniques that differ from *hard data* (in the form of numbers) for which quantitative approaches are used. Such differences may make the tools for a quantitative study inappropriate or irrelevant for a qualitative study and vice versa.

Another difference between qualitative and quantitative research originates in principles about the research process and assumptions about social life. Qualitative and quantitative research principles give rise to different "languages of research" with different emphases. In a quantitative study, we rely more on positivist principles and use a language of variables and hypotheses. Our emphasis is on precisely measuring variables and test hypotheses. In a qualitative study, we rely more on the principles from interpretive or critical social science. We speak a language of "cases and contexts" and of cultural meaning. Our emphasis is on conducting detailed examinations of specific cases that arise in the natural flow of social life. Interestingly, more female

EXAMPLE BOX 1

A Multimethod Study

Lee and Bean (2007) mixed quantitative and qualitative research approaches in a study of multiracial identity in the United States. They observed that social diversity has increased because of growing immigration since 1970, and for the first time in 2000, the United States census offered the option of classifying oneself as multiracial. The new diversity contrasts to the long history of single-race categories and a dominant White-Black dichotomous racial division. Lee and Bean asked whether multiracial people feel free or highly constrained when they pick a single racial-ethnic or multiracial identity. They also asked whether selecting a multiracial category on the census form is a symbolic action or a reflection of a person's multiracial daily existence. In the quantitative part of the study, the authors statistically analyzed 2000 census data on the numbers and mixes of people who classified themselves as multiracial. In the qualitative part of the study, they conducted forty-six in-depth semi-structured interviews with multiracial adults from northern and southern California. In the interviews, Lee and Bean asked how and why a person chose to identify herself or himself as she or he did, whether that identity changed over time or by context, and about language use and other practices associated with race and ethnicity. They interviewed adults of various mixtures of Asian, White, Latino, and Black races. Based on the interviews, Lee and Bean found that multiracial Blacks were less likely to call themselves multiracial than people of other mixed race categories. This restriction is consistent with the U.S. historical pattern of the public identifying a person with only some Black heritage as being Black. Persons of mixed White and Asian or Latino or Latino-Asian heritage had more flexibility. Some mixed Asian-White or Latino-White people self-identified as White because of public perceptions and a narrow stereotypical definition of proper Asian or Latino appearance. Other White-Asian and White-Latino people said that they are proud of their mixed heritage even if it made little difference in their daily encounters. People did not stick with one label but claimed different racial-ethnic backgrounds in different situations. Pulling together the quantitative and qualitative findings, Lee and Bean suggested that racial-ethnic group boundaries are fading faster for Latinos and Asians than for Blacks. They concluded that a new Black versus non-Black divide is emerging to replace the old White-Black division but that Blacks are still in a disadvantaged position relative to all racial categories.

than male social researchers adopt the qualitative approach.[2]

A third difference between qualitative and quantitative research lies in what we try to accomplish in a study. "The heart of good work"—whether it is quantitative or qualitative—"is a puzzle and an idea" (Abbott, 2003:xi). In all studies, we try to solve a puzzle or answer a question, but depending on the approach, we do this in different ways. In the heat wave study that opened this chapter, Klinenberg (2002) asked why so many people died. But he also asked how they died, and why some categories of people were greatly affected but others were not. In a quantitative study, we usually try to verify or falsify a relationship or hypothesis we already have in mind. We focus on an outcome or effect found across numerous cases. The test of a hypothesis may be more than a simple true or false answer; frequently it includes learning that a hypothesis is true for some cases or under certain conditions but not others. In the heat wave study, Klinenberg asked whether a person's social class influenced an outcome: being likely to die during the heat wave. Using quantitative data, he tested the relationship between class and death rate by comparing the social class of the roughly 700 who died with thousands who did not.

In many qualitative studies, we often generate new hypotheses and describe details of the causal mechanism or process for a narrow set of cases. Returning to the heat wave study, Klinenberg (2002) tested existing hypotheses about class and death rates. He also developed several new hypotheses as he looked closely into the mechanism that caused

some to die but not others. He learned that high death rates occurred in poverty- and crime-ridden neighborhoods. More males than females died, and more African Americans died than Latinos or Whites. By walking around in different low-income neighborhoods and interviewing many people firsthand, he identified the mechanisms of urban isolation that accounted for very different heat wave survival rates among people of the same social class. He examined the social situations of older African American men and discovered the local social environment to be the critical causal mechanism. He also looked at larger forces that created the social situations and local environments in Chicago in the mid-1990s.

A fourth difference between quantitative and qualitative studies is that each has a distinct "logic" and path of conducting research. In a quantitative study, we employ a logic that is systematic and follows a linear research path. In a qualitative study, the logic arises from ongoing practice and we follow a nonlinear research path. In the next section, we examine the logics and paths of research.

Reconstructed Logic and Logic in Practice

How we learn and discuss research tends to follow one of two logics.[3] The logics summarize the degree to which our research strategy is explicit, codified, and standardized. In specific studies, we often mix the two logics, but the proportion of each varies widely by study.

A **reconstructed logic** emphasizes using an explicit research process. Reconstructed logic has been "reconstructed" or restated from the many messy details of doing a real-life study into an idealized, formal set of steps with standard practices and consistent principles, terms, and rules. You can think of it as a "cleansed model" of how best to do a high-quality study. Following this logic is like cooking by exactly following a printed recipe. Thus, the way to conduct a simple random sample is straightforward and follows a clear step-by-step procedure.

The **logic in practice** is messy and closer to the concrete practice of doing research. Logic in practice includes advice that comes from the practical activities of doing specific real-life studies more than a set of restated, ideal rules. This logic relies heavily on "judgment calls" and "tricks of the trade" that active, experienced researchers share. We learn it best by reading many studies and being an apprentice researcher and from the folk wisdom that passes informally among experienced researchers. It is like cooking without a written recipe—adding a pinch of an ingredient here, stirring until something "looks right," and adjusting while cooking until we reach a certain smell or taste.

You can see the reconstructed logic in the distinct research methods section of a quantitative research report. In contrast, in qualitative research reports, you may not see the research method (common for historical-comparative research) discussed or find it mixed with a personal autobiographical account of a particular study (common for field research). The absence of a standard method does not make qualitative study less valid; however, it often requires more time and a different style of thinking for the newcomer to master.

Linear and Nonlinear Paths

The path is a metaphor for a sequence of things to do: what you finish first or where you have been and what comes next. You can follow a straight, well-worn, and marked path that has clear signposts and is where many others have trod before. Alternatively, you may follow a path that meanders into unknown territory where few others have gone. The path has few signs, so you move forward, veer off to the side, and sometimes backtrack a little before going forward again.

Reconstructed logic A logic of research based on reorganizing, standardizing, and codifying research knowledge and practices into explicit rules, formal procedures, and techniques; it is characteristic of quantitative research.

Logic in practice A logic of research based on an apprenticeship model and the sharing of implicit knowledge about practical concerns and specific experiences; it is characteristic of qualitative research.

When using the **linear research path**, we follow a fixed sequence of steps that are like a staircase that leads upward in one direction. By following a linear path, we move in a direct, narrow, and straight way toward a conclusion. This pathway toward task completion is the dominant approach in western European and North American cultures. It is most widely used in quantitative research. By contrast, a **nonlinear research path** requires us to make successive passes through the steps. We may move forward, backward, and sideways before advancing again. It is more of a spiral than a straight staircase. We move upward but slowly and indirectly. With each cycle or repetition, we may collect new data and gain new insights.

People who are accustomed to a direct, linear approach often become impatient with a less direct cyclical path. Although a nonlinear path is not disorganized, undefined chaos, the cyclical path appears inefficient and without rigor. People who are used to a nonlinear path often feel stifled and "boxed in" by a linear approach. To them, a linear path feels artificial or rigid. They believe that this approach prevents them from being naturally creative and spontaneous.

Each path has its strengths. The linear path is logical, easy to follow, and efficient. The nonlinear path can be highly effective in creating an authentic feeling for understanding an entire setting, for grasping subtle shades of meaning, for integrating divergent bits of information, and for switching perspectives. Each path has its own discipline and rigor. The linear path borrows from the natural sciences with their emphasis on logic and precision. A nonlinear path borrows devices from the humanities (e.g., metaphor, analogy, theme, motif, and irony) and is suited for tasks such as translating languages, a process in which delicate shades of meaning, subtle connotations, or contextual distinctions can be important (see Figure 2 for a graphic representation of each path).

Linear research path Research that proceeds in a clear, logical, step-by-step straight line; often used in quantitative research.

Nonlinear research path Research that proceeds in a cyclical, iterative, or back-and-forth pattern and is often used in qualitative research.

Objectivity and Integrity

We try to be fair, honest, truthful, and unbiased in our research activity, yet, we also have opportunities to be biased, dishonest, or unethical in all knowledge production including social research. The two major research approaches address the issue of reducing difficulties and ensuring honest, truthful studies in different ways.

In qualitative research, we often try to acquire intimate, firsthand knowledge of the research setting. Thus, we do not want to distance ourselves from the people or events we are studying. Acquiring an intimate understanding of a setting does not mean that we can arbitrarily interject personal opinion, be sloppy about data collection, or use evidence selectively to support our prejudices. Rather, we take maximum advantage of personal insight, inner feelings, and life perspective to understand social life. We "walk a fine line" between intimacy and detachment and place personal integrity and honesty at the forefront. Some techniques may help us walk a fine line. One technique is to become highly sensitive to our own views, preconceptions, and prior assumptions and then "bracket" them, or put them aside, so we can see beyond them better. Instead of trying to bury or deny our assumptions, viewpoints, and values, we find that acknowledging them and being open about them is best. We can then recognize how they might influence us. We try to be forthright and candid in our involvement in the research setting, in dealing with the people in the study, and with any relevant issues that arise. We do this in the way that we conduct the study and report on the findings.

Personal openness and integrity by the individual researcher are central to a qualitative study. By contrast, in a quantitative study, we stress neutrality and objectivity. In a quantitative study, we rely on the principle of replication, adhere to standardized procedures, measure with numbers, and analyze the data with statistics.[4] In a sense, we try to minimize or eliminate the subjective human

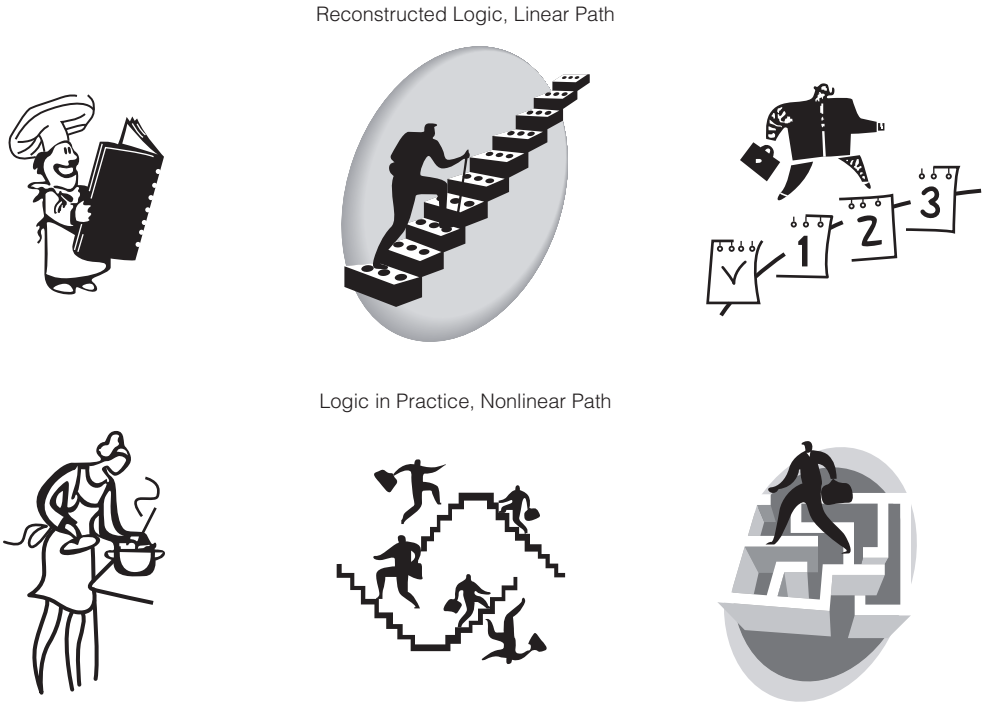


FIGURE 2 Graphic Representation of Linear and Nonlinear Paths

factor in a quantitative study. As Porter (1995:7, 74) has argued,

> *Ideally, expertise should be mechanized and objectified . . . grounded in specific techniques. . . . This ideal of objectivity is a political as well as scientific one. Objectivity means rule of law, not of men. It implies the subordination of personal interests and prejudices to public standards.*

The issue of integrity in quantitative research mirrors the natural science approach. It relies on using an explicit and objective technology, such as making statements in precise neutral terms, using well-documented standard techniques, and making replicable, objective numerical measures.

Quantitative social research shares the hallmarks of natural science validation: explicit, standard procedures; precise numerical measurement; and replication. By contrast, validation in qualitative research relies more on a dependable, credible researcher and her or his personal integrity, self-discipline, and trustworthiness.[5] Four other forms of validation in qualitative research somewhat parallel the objective procedures found in quantitative studies.[6]

The first form indicates that the researcher has carefully evaluated various forms of evidence and checked them for consistency. For example, a field researcher listens to and records a student who says, "Professor Smith threw an eraser at Professor Jones." The researcher must consider the evidence carefully. This includes considering what other people say about the event. The field researcher also looks for confirming evidence and checks for internal consistency. The researcher asks whether the student has firsthand knowledge of the event, that is, directly witnessed it, and asks whether the student's feelings or self-interest might lead him or her to lie (e.g., the student dislikes Professor Smith).

A second form of validation arises from the great volume of detailed written notes in most qualitative studies. In addition to verbatim description of the evidence, other documentation includes references to sources, commentaries by the researcher, and quotes, photographs, videos, maps, diagrams, paraphrasing, and counts. The huge volume of information, its great diversity, and its interlocking and mutually reinforcing presentation help to validate its authenticity.

A third kind of validation comes from other observers. Most qualitative researchers work alone, but many others know about the evidence. For example, we study people in a specific setting who are alive today. Other researchers can visit the same setting and talk to the same people. The people we studied can read study details and verify or raise questions about it. Likewise, historical-comparative researchers cite historical documents, archival sources, or visual material. By leaving a careful "audit trail" with precise citations, others can check the references and verify sources.

A fourth type of truthfulness is created by the way we publicly disclose results. In a quantitative study, we adhere to a standard format for writing a research report. We explain in detail how we followed accepted procedures. We describe each step of the study, display the quantitative data in charts, graphs, or tables, and make data files available to others to reanalyze. We offer to answer any questions about the study. In a qualitative study, we cannot publicly display or share the many mountains of detailed notes, recorded interviews, photos, or original source materials in a research report. They might fill an entire room! Instead, we "spin a web" of interlocking details and use tightly cross-referenced material. Through our writing and presentation, we provide sufficient texture and detail to build an "I-was-there" sense within readers. By providing rich specific descriptions supplemented with maps, photos, and verbatim quotations, we convey an intimate knowledge of a setting. We build a sense of shared familiarity in readers. A skilled qualitative researcher can recreate the visual images, voices, smells, sounds, tensions, and entire atmosphere that existed by referring to the mountains of empirical evidence.

Preplanned and Emergent Research Questions

Studies start in many ways, but the usual first step is to select a topic.[7] We have no formula for how to do this task. Whether we have experience or are just a beginning researcher, the best guide is to pick something that interests us. There are many ways to select topics (see Expansion Box 2, Sources of Topics). We may begin with one topic, but it is too large and is only a starting point. We must narrow it into a focused research question. How we do this varies by whether our study is primarily qualitative or quantitative. Both kinds of studies work well with some topics; we can study poverty by examining official statistics, conducting a survey, doing ethnographic field research, or completing a historical-comparative analysis. Some topics are best suited for a qualitative study (e.g., how do people reshape their self-identity through participating in goth youth subculture) and others for a quantitative study (e.g., how has public opinion on the death penalty shifted over the past 50 years and whether one's opinion on this issue is influenced by views on related issues or by the amount of exposure the news media gives to certain topics).

Most qualitative studies start with a vague or loosely defined topic. The specific topic emerges slowly during the study, and it may change direction based on new evidence. This was the case for Venkatesh's study (2008). He began with an interest in studying poverty in an inner-city housing project but shifted to studying a drug-selling gang. Focusing on a specific research question continues while we gather data. Venkatesh increasingly focused his topic of gang activity into sharper questions: How and why did gangs in a low-income housing project sustain an underground economy and provide housing project residents with protection and aid services?

Flexibility in qualitative research encourages us to continuously focus throughout a study. An emergent research question may become clear only during the research process. We can focus and refine the research question after we gather some data and begin a preliminary analysis. In many qualitative studies, the most important issues and

EXPANSION BOX 2

Sources of Topics

1. *Personal experience.* You can choose a topic based on something that happens to you or those you know. For example, while you work a summer job at a factory, the local union calls a strike. You do not have strong feelings either way, but you are forced to choose sides. You notice that tensions rise. Both management and labor become hostile toward each other. This experience suggests unions or organized labor as a topic.
2. *Curiosity based on something in the media.* Sometimes you read a newspaper or magazine article or see a television program that leaves you with questions. What you read raises questions or suggests replicating what others' research found. For example, you read a *Newsweek* article on people who are homeless, but you do not really know much about who they are, why they are homeless, whether this has always been a problem, and so forth. This suggests homeless people as a topic.
3. *The state of knowledge in a field.* Basic research is driven by new research findings and theories that push at the frontiers of knowledge. As theoretical explanations are elaborated and expanded, certain issues or questions need to be answered for the field to move forward. As such issues are identified and studied, knowledge advances. For example, you read about attitudes toward capital punishment and realize that most research points to an underlying belief in the innate wickedness of criminals among capital punishment supporters. You notice that no one has yet examined whether people who belong to certain religious groups that teach such a belief in wickedness support capital punishment, nor has anyone mapped the geographic location of these religious groups. Your knowledge of the field suggests a topic for a research project: beliefs about capital punishment and religion in different regions.
4. *Solving a problem.* Applied research topics often begin with a problem that needs a solution. For example, as part of your job as a dorm counselor, you want to help college freshmen establish friendships with each other. Your problem suggests friendship formation among new college students as a topic.
5. *Social premiums.* This is a term suggested by Singleton and colleagues (1988:68). It means that some topics are "hot" or offer an opportunity. For example, you read that a lot of money is available to conduct research on nursing homes, but few people are interested in doing so. Your need of a job suggests nursing homes as a topic.
6. *Personal values.* Some people are highly committed to a set of religious, political, or social values. For example, you are strongly committed to racial equality and become morally outraged whenever you hear about racial discrimination. Your strong personal belief suggests racial discrimination as a topic.
7. *Everyday life.* Potential topics can be found throughout everyday life in old sayings, novels, songs, statistics, and what others say (especially those who disagree with you). For example, you hear that the home court advantage is very important in basketball. This statement suggests home court advantage as a topic for research.

most interesting questions become clear only after we become immersed in the data. We need to remain open to unanticipated ideas, data, and issues. We should periodically reevaluate our focus early in a study and be ready to change direction and follow new lines of evidence. At the same time, we must exercise self-restraint and discipline. If we constantly change the focus of our research without end, we will never complete a study. As with most things, a balance is required.

Typical qualitative research questions include these: How did a certain condition or social situation originate? How do people, events, and conditions sustain a situation over time? By what processes does the situation change, develop, or end? Another type of question seeks to confirm existing beliefs or assumptions (e.g., do Southern and Northern Whites act differently around people of other races as those in McDermott's [2006] study of working class neighborhoods in Atlanta and Boston). A last

type of research question tries to discover new ideas.[8]

In a quantitative study, we narrow a topic into a focused question as a discrete planning step before we finalize the study design. Focusing the question is a step in the process of developing a testable hypothesis (to be discussed later). It guides the study design before you collect any data.[9]

In a qualitative study, we can use the data to help narrow the focus. In a quantitative study, we must focus without the benefit of data and use other techniques. After picking a topic, we ask ourselves: What is it about the topic that is of greatest interest? For a topic about which we know little, we must first acquire background knowledge by reading studies about the topic. Reading the research literature can stimulate many ideas for how to focus a research question.

In most quantitative studies, research questions refer to relationships among a small number of variables. This means that we should list variables as we try to focus the topic into a research question (see Expansion Box 3, Techniques for Narrowing a Topic into a Research Question). For example, the question what causes divorce? is not a good research question. A better one is, is age at marriage associated with divorce? The second question has two variables: age of marriage and whether or not a divorce occurred (also see Example Box 2, Examples of Bad and Good Research Questions).

Personal experience can suggest topics. Perhaps personal experience suggests people released from prison as a topic as it did for Pager (2007). We can read about former inmates and their reentry and about probation in dozens of books and hundreds of articles. A focused research question might be whether it is more difficult for someone who has a nonviolent criminal record to get a job offer than someone without a criminal record. This question is more specific in terms of type of criminal record and the specific outcome for a former prisoner. It focuses on two variables, whether a person has a criminal record and whether the person gets a job offer. A common type of research question asks which factor among several had the most significant impact on an outcome. We might ask, as Pager did, how does racial category (Black versus White) and whether a person had a criminal record affect the chances of getting a job? Did race make a difference, did being a former prisoner make a difference, did the two factors operate separately, cancel out one another, or intensify one another in their impact on getting a job offer?

EXPANSION BOX 3

Techniques for Narrowing a Topic into a Research Question

1. *Examine the literature.* Published articles are excellent sources of ideas for research questions. They are usually at an appropriate level of specificity and suggest research questions that focus on the following:
   a. Replicating a previous research project exactly or with slight variations.
   b. Exploring unexpected findings discovered in previous research.
   c. Following suggestions an author gives for future research at the end of an article.
   d. Extending an existing explanation or theory to a new topic or setting.
   e. Challenging the findings or attempting to refute a relationship.
   f. Specifying the intervening process and considering any linking relations.
2. *Talk over ideas with others.*
   a. Ask people who are knowledgeable about the topic for questions about it that they have thought of.
   b. Seek out those who hold opinions that differ from yours on the topic and discuss possible research questions with them.
3. *Apply to a specific context.*
   a. Focus the topic onto a specific historical period or time period.
   b. Narrow the topic to a specific society or geographic unit.
   c. Consider which subgroups or categories of people/units are involved and whether there are differences among them.
4. *Define the aim or desired outcome of the study.*
   a. Will the research question be for an exploratory, explanatory, or descriptive study?
   b. Will the study involve applied or basic research?

EXAMPLE BOX 2

Examples of Bad and Good Research Questions

BAD RESEARCH QUESTIONS

Not Empirically Testable, Nonscientific Questions

- Should abortion be legal?
- Is it right to have capital punishment?

General Topics, Not Research Questions

- Treatment of alcohol and drug abuse
- Sexuality and aging

Set of Variables, Not Questions

- Capital punishment and racial discrimination
- Urban decay and gangs

Too Vague, Ambiguous

- Do police affect delinquency?
- What can be done to prevent child abuse?

Need to Be Still More Specific

- Has the incidence of child abuse risen?
- How does poverty affect children?
- What problems do children who grow up in poverty experience that others do not?

GOOD RESEARCH QUESTIONS

Exploratory Questions

- Has the incidence of new forms of child abuse appeared in Wisconsin in the past 10 years?

Descriptive Questions

- Is child abuse, violent or sexual, more common in families that have experienced a divorce than in intact, never-divorced families?
- Are the children raised in impoverished households more likely to have medical, learning, and social-emotional adjustment difficulties than children who are not living in poverty?

Explanatory Questions

- Does the emotional instability created by experiencing a divorce increase the chances that divorced parents will physically abuse their children?
- Is a lack of sufficent funds for preventive treatment a major cause of more serious medical problems among children raised in families in poverty?

We also want to specify the **universe** to which we generalize answers to a research question. All research questions and studies apply to some category of people, organizations, or other units. The universe is the set of all units that the research question covers or to which we can generalize. For example, in Pager's (2007) study, his units were individuals, specifically young White and Black men. The universe to which we might generalize his findings includes all U.S. males in their twenties of these two racial categories.

As we refine a topic into a research question and design a study, we also need to consider practical limitations. Designing the perfect research project is an interesting academic exercise, but if we expect to carry out a study, practical limitations must shape its design. Major limitations include time, costs, access to resources, approval from authorities, ethical concerns, and expertise. If we have 10 hours a week for 5 weeks to conduct a research project but answering the research question will require 2 years, we must narrow the question to fit the practical limitations.

Time is always a consideration. However, it is very difficult to estimate the time required for a study. A specific research question, the research techniques used, the complexity of the study, and the amount and types of data we plan to collect all affect the amount of time required. Experienced researchers are the best source for getting good estimates of time requirements.

Cost is another limitation, and we cannot answer some research questions because of the great expense involved. For example, our research question asks whether sports fans develop strong positive feelings toward team mascots if the team has a winning season but negative feelings if it has

Universe The entire category or class of units that is covered or explained by a relationship or hypothesis.

TABLE 1 Quantitative Research versus Qualitative Research

QUANTITATIVE RESEARCH	QUALITATIVE RESEARCH
Researchers test hypotheses that are stated at the beginning.	Researchers capture and discover meaning once they become immersed in the data.
Concepts are in the form of distinct variables.	Concepts are in the form of themes, motifs, generalizations, and taxonomies.
Measures are systematically created before data collection and are standardized.	Measures are created in an ad hoc manner and are often specific to the individual setting or researcher.
Data are in the form of numbers from precise measurement.	Data are in the form of words and images from documents, observations, and transcripts.
Theory is largely causal and is deductive.	Theory can be causal or noncausal and is often inductive.
Procedures are standard, and replication is frequent.	Research procedures are particular, and replication is very rare.
Analysis proceeds by using statistics, tables, or charts and discussing how what they show relates to hypotheses.	Analysis proceeds by extracting themes or generalizations from evidence and organizing data to present a coherent, consistent picture.

a losing season. To examine the question for all sports teams across a nation across a decade would require a great investment of time and money. The focus could be narrowed to one sport (football), to sports played in college, and to student fans at just four colleges across three seasons. As with time, experienced researchers can help provide estimates of the cost to conduct a study.

Access to resources is a common limitation. Resources include expertise, special equipment, and information. For example, a research question about burglary rates and family income in many different nations is nearly impossible to answer. Data on burglary and income are not collected or available for many countries. Other questions require the approval of authorities (e.g., to see medical records) or involve violating basic ethical principles (e.g., lying to a person and endangering her or him). Our expertise or background as researchers is also a limitation. Answering some research questions involves the use of data collection techniques, statistical methods, knowledge of a foreign language, or skills we may not have. Unless we acquire the necessary training or can pay for another person's services, the research question may not be practical.

In sum, qualitative and quantitative studies share a great deal, but they differ on several design issues: logic, research path, mode of verification, and way to arrive at a research question (see Table 1). In addition, the research approaches speak different "languages" and emphasize distinct study design features, issues that we consider in the next section.

QUALITATIVE DESIGN ISSUES

The Language of Cases and Contexts

Most qualitative studies involve a language of cases and contexts, employ *bricolage* (discussed later in this chapter), examine social processes and cases in their social context, and study interpretations or meanings in specific socio-cultural settings. We examine social life from multiple points of view and explain how people construct identities. Only rarely do we use variables, test hypotheses, or create precise measures in the form of numbers.

Most qualitative studies build on the assumption that certain areas of social life are intrinsically

qualitative. For this reason, qualitative data are not imprecise or deficient but are very meaningful. Instead of trying to convert fluid, active social life into variables or numbers, we borrow ideas and viewpoints from the people we study and situate them in a fluid natural setting. Instead of variables, we examine motifs, themes, distinctions, and perspectives. Most often, our approach is inductive and relies on a form of *grounded theory*.

Qualitative data may appear to be soft, intangible, and elusive. This does not mean that we cannot capture them. We gather qualitative data by documenting real events, recording what actual people say (with words, gestures, and tone), observing specific behaviors, examining written documents, and studying visual images. These are specific, concrete aspects of the social world. As we closely scrutinize photos or videotapes of people or social events, we are looking at "hard" physical evidence.[10] The evidence is just as "hard" and physical as the numeric measures of attitudes, social pressure, intelligence, and the like found in a quantitative study.

Grounded Theory

In qualitative research, we may develop theory during the data collection process. This largely inductive method means that we are building theory from data or ground the theory in the data. Grounded theory adds flexibility and allows the data and theory to interact. This process also helps us remain open to the unexpected. We can change direction of study and even abandon the original research question in the middle of a project if we discover something new and exciting.[11]

We build theory by making comparisons. For example, we observe an event (e.g., a police officer confronting a speeding motorist who has stopped). We may ponder questions and look for similarities and differences. When watching a police officer, we ask: Does the police officer always radio in the car's license number before proceeding? After radioing the car's location, does the officer ask the motorist to get out of the car or some times casually walk up to the car and talk to the seated driver? When we intersperse data collection and theorizing, new theoretical questions may arise that suggest future observations. In this way, we tailor new data to answer theoretical questions that arose only from thinking about previous data.

In grounded theory, we build from specific observations to broader concepts that organize observational data and then continue to build principles or themes that connect the concepts. Compared to other ways of theorizing, grounded theory tends to be less abstract and closer to concrete observations or specific events. Building inductively from the data to theory creates strong data-theory linkages. However, this can be a weakness as well. It may make connecting concepts and principles across many diverse settings difficult, and it may slow the development of concepts that build toward creating general, abstract knowledge. To counteract this weakness, we become familiar with the concepts and theories developed in other studies to apply shared concepts when appropriate and to note any similarities and differences. In this way, we can establish cross-study interconnections and move toward generalized knowledge.

The Context Is Critical

In qualitative research, we usually emphasize the social context because the meaning of a social action, event, or statement greatly depends on the context in which it appears. If we strip social context from an event, social action, or conversation, it is easy to distort its meaning and alter its social significance.

Social context includes time context (when something occurs), spatial context (where something occurs), emotional context (the feelings regarding how something occurs), and socio-cultural context (the social situation and cultural milieu in which something occurs). For example, a social activity (a card game, sexual act, or disagreement) occurs late at night on the street in a low-income area of a large city, a setting for drug use, fear and anger, violent crime, and prostitution within a cultural milieu of extreme racial-economic inequality. The same activity occurs midday in the backyard of a large house in an affluent suburban neighborhood in a social setting of relaxation and leisure, surrounded by trust and emotional closeness, and within a

cultural milieu of established affluence and privilege. The context will significantly color the activity's meaning. With different contextual meanings, the same activity or behavior may have different consequences.

In a quantitative study, we rarely treat context as important. We often strip it away as being "messy" or just "noise" and instead concentrate on precise counts or numerical measures. Thus, what a qualitative study might treat as essential may be seen as irrelevant noise in a quantitative study. For example, if a quantitative study counts the number of votes across time or cultures, a qualitative researcher might consider what voting means in the context. He or she may treat the same behavior (e.g., voting for a presidential candidate) differently depending on the social context in which it occurs (see Example Box 3, Example of Importance of Context for Meaning).

Context goes beyond social events, behaviors, and statements to include physical objects. One handgun could be an art object, part of a recreational hobby, a key element in committing a violent crime, evidence of an irresponsible parent, a suicide facilitator, or a means of social peace and community protection, each depending on the context. Without including the surrounding context, we cannot assign meaning to an object.

EXAMPLE BOX 3

Example of the Importance of Context for Meaning

"Voting in a national election" has different meanings in different contexts:

1. *A one-party dictatorship with unopposed candidates, where people are required by law to vote.* The names of nonvoters are recorded by the police. Nonvoters are suspected of being antigovernment subversives. They face fines and possible job loss for not voting.
2. *A country in the midst of violent conflict between rebels and those in power.* Voting is dangerous because the armed soldiers on either side may shoot voters they suspect of opposing their side. The outcome of the vote will give power to one or the other group and dramatically restructure the society. Anyone over the age of 16 can vote.
3. *A context in which people choose between a dozen political parties of roughly equal power that represent very different values and policies.* Each party has a sizable organization with its own newspapers, social clubs, and neighborhood organizers. Election days are national holidays when no one has to work. A person votes by showing up with an identification card at any of many local voting locations. Voting itself is by secret ballot, and everyone over age 18 can vote.
4. *A context in which voting is conducted in public by White males over age 21 who have regular jobs.* Family, friends, and neighbors see how one another vote. Political parties do not offer distinct policies; instead, they are tied to ethnic or religious groups and are part of a person's ethnic-religious identity. Ethnic and religious group identities are very strong. They affect where one lives, where one works, whom one marries, and the like. Voting follows massive parades and week-long community events organized by ethnic and religious groups.
5. *A context in which one political party is very powerful and is challenged by one or two very small, weak alternatives.* The one party has held power for the past 60 years through corruption, bribery, and intimidation. It has the support of leaders throughout society (in religious organizations, educational institutions, businesses, unions, and the mass media). The jobs of anyone working in any government job (e.g., every police officer, post office clerk, schoolteacher, and garbage collector) depend on the political party staying in power.
6. *A context in which the choice is between two parties with little difference between them.* People select candidates primarily on the basis of television advertising. Candidates pay for advertising with donations by wealthy people or powerful organizations. Voting is a vague civic obligation that few people take seriously. Elections are held on a workday. In order to vote, a person must meet many requirements and register to vote several weeks in advance. Recent immigrants and anyone arrested for a crime are prohibited from voting.

Bricolage

A *bricoleur* is someone who has learned to be adept in diverse areas, can draw on a variety of sources, and makes do with whatever is at hand.[12] The **bricolage** technique involves working with one's hands and combining odds and ends in a practical, skilled, and inventive way to accomplish a task. A successful *bricoleur* possesses a deep knowledge of materials, a set of esoteric skills, and a capacity to combine or create flexibly. The typical *bricoleur* is often a highly inventive and skilled craftsperson, repairperson, or jack-of-all-trades.

A qualitative study draws on a variety of skills, materials, and approaches as needed. This usually happens when we are unable to anticipate the need for them. The process of mixing diverse source materials, applying disparate approaches, and assembling bits and pieces into a whole is analogous to the bricolage of a skilled craftsperson who is able to create or repair many things by using whatever is available at the time.

The Case and Process

We can divide all empirical social research into two groups: *case study* (with one or a few cases) or *cross-case* (comprising many cases).[13] Most qualitative studies use a "case-oriented approach [that] places cases, not variables, center stage" (Ragin, 1992a:5). Thus, we examine many aspects of a few cases. The intensive, in-depth study a handful of cases replaces the extensive, surface-level study of numerous cases as is typical in quantitative research. Often a case-oriented analysis emphasizes contingencies in "messy" natural settings (i.e., the co-occurrence of many specific factors and events in one place and at one time). Rather than precise measures of a huge number of cases, as is typical of quantitative research, we acquire in-depth of knowledge and an astute insight into a small number of cases.

The study of cases tends to produce complex explanations or interpretations in the form of an unfolding plot or a narrative story about particular people or specific events. This makes the passage of time integral to the explanation. Often the emphasis becomes the sequence of events: what occurred first, second, third, and so on. This focus on process helps to reveal how an issue evolves, a conflict emerges, or a social relationship develops.

Interpretation

To interpret means to assign significance or coherent meaning. In quantitative research, meaning comes from using numbers (e.g., percentages or statistical coefficients), and we explain how the numerical data relate to the hypotheses. Qualitative studies rarely include tables with numbers. The only visual presentations of data may be maps, photographs, or diagrams showing how ideas are related. We instead weave the data into discussions of the ideas' significance. The data are in the form of words, including quotes or descriptions of particular events. Any numerical information is supplementary to the textual evidence.

Qualitative studies give data meaning, translate them, or make them understandable. We begin with the point of view of the people we study and then find out how they see the world and define situations. We learn what events, behaviors, and activities mean for them. To begin qualitative interpretation, we first must learn the meanings of things for the people we are studying.[14]

People who create social activities and behavior have personal reasons or motives for what they do. This is **first-order interpretation**. As we discover and reconstruct this first-order interpretation, it becomes a **second-order interpretation** because we come from the outside to discover what has occurred. In a second-order interpretation, we elicit an underlying coherence or sense of meaning in the

Bricolage Improvisation by drawing on diverse materials that are lying about and using them in creative ways to accomplish a pragmatic task.

First-order interpretation Interpretations from the point of view of the people being studied.

Second-order interpretation Qualitative interpretations from the point of view of the researcher who conducted a study.

data. Meaning develops only in relation to a large set of other meanings, not in a vacuum. In a second-order interpretation, we place the human action being studied into a "stream of behavior" or events to which it is related: its context.

If we were to adopt a very strict interpretive approach, we might stop at a second-order interpretation, that is, once we understand the significance of the action for the people we study. Most qualitative researchers go further. They want to generalize or link the second-order interpretation to a theory or general knowledge. They move to a broad level of interpretation, or **third-order interpretation** by which they assign general theoretical significance to the data.

Because interpreting social meaning in context is often a major purpose and outcome of qualitative studies, keep in mind that the three steps or orders of interpretation help provide a way to organize the research process.

QUANTITATIVE DESIGN ISSUES

The Language of Variables and Hypotheses

Variation and Variables. Simply defined, a **variable** is a concept that varies. In quantitative research, we use a language of variables and relationships among variables.

Previously, we discussed two types of concepts: those that refer to a fixed phenomenon (e.g., the ideal type of bureaucracy) and those that vary in quantity, intensity, or amount (e.g., amount of education). Variables are this second type of concept and measures of the concepts.

A variable must have two or more values. Once we become aware of them, we see variables everywhere. For example, gender is a variable; it can take one of two values: male or female. Marital status is a variable; it can take the value of never married single, married, divorced, or widowed. Type of crime committed is a variable; it can take values of robbery, burglary, theft, murder, and so forth. Family income is a variable; it can take values from zero to billions of dollars. A person's attitude toward abortion is a variable; as a woman's basic right can range from strongly favoring legal abortion to strongly believing in the sanctity of fetal life.

A variable's values or categories are its **attributes**. It is easy to confuse variables with attributes. The confusion arises because one variable's attribute can itself be a separate variable in its own right with only a slight change in definition. This rests on a distinction between concepts that vary and the conditions within concepts that vary. For example, "male" is not a variable; it describes a category of gender. Male is an attribute of the variable gender, yet a related idea, degree of masculinity, is a variable. It describes the intensity or strength of attachment to a set of beliefs, orientations, and behaviors that are associated with the concept of masculine within a culture. Likewise, "married" is not a variable; it is an attribute of the variable marital status. Related ideas such as number of years married or depth of commitment to a marriage are variables. In a third example, "robbery" is not a variable; but an attribute of the variable type of crime. Number of robberies, robbery rate, amount taken during a robbery, and type of robbery are all variables because they vary or take on a range of values.

In quantitative research, we redefine all concepts into the language of variables. As the examples of variables and attributes illustrate, the redefinition often requires only a slight change in definition. Concepts are the building blocks of theory; they organize thinking about the social world. Clear concepts with careful definitions are essential in theory.

Third-order interpretation Qualitative interpretations made by the readers of a research report.

Variable A concept or its empirical measure that can take on multiple values.

Attributes The categories or levels of a variable.

Types of Variables. As we focus on causal relations among variables, we usually begin with an effect and then search for its cause(s). We can classify variables depending on their location in a causal relationship or chain of causality. The cause variable, or the force or condition that acts on something else,

is the **independent variable**. The variable that is the effect, result, or outcome of another variable is the **dependent variable**. The independent variable is "independent of" prior causes that have acted on it whereas the dependent variable depends on the cause.

It is not always easy to determine whether a variable is independent or dependent. Two questions can help to identify the independent variable. First, does it come before other variables in time? Independent variables must come before any other type. Second, if two variables occur at the same time, does one variable have an impact on another variable? Independent variables affect or have an impact on other variables. We often phrase research topics and questions in terms of the dependent variable because dependent variables are the phenomena we want to explain. For example, an examination of the reasons for an increase in the crime rate in Dallas, Texas would have the dependent variable as the crime rate in Dallas.

A simple causal relationship requires only an independent and a dependent variable. A third variable type, the **intervening variable**, appears in more complex causal relations. Coming between the independent and dependent variables, this variable helps to show the link or mechanism between them. Advances in knowledge depend not only on documenting cause-and-effect relationships but also on specifying the mechanisms that account for the causal relation. In a sense, the intervening variable acts as a dependent variable with respect to the independent variable and acts as an independent variable toward the dependent variable.

For example, French sociologist Émile Durkheim developed a theory of suicide that specified a causal relationship between marital status and suicide rate. Durkheim found evidence that married people are less likely to commit suicide than single people. He believed that married people have more social integration (i.e., feelings of belonging to a group or family). He thought that a major cause of one type of suicide was that people lacked a sense of belonging to a group. Thus, his theory can be restated as a three-variable relationship: marital status (independent variable) causes the degree of social integration (intervening variable), which affects suicide (dependent variable). Specifying the chain of causality makes the linkages in a theory clearer and helps a researcher test complex explanations.[15]

Simple theories have one dependent and one independent variable whereas complex ones can contain dozens of variables with multiple independent, intervening, and dependent variables. For example, a theory of criminal behavior (dependent variable) identifies four independent variables: an individual's economic hardship, opportunities to commit crime easily, membership in a deviant subgroup that does not disapprove of crime, and lack of punishment for criminal acts. A multicause explanation usually specifies which independent variable has the most significant causal effect.

A complex theoretical explanation has a string of multiple intervening variables. For example, family disruption causes lower self-esteem among children, which causes depression, which causes poor grades in school, which causes reduced prospects for a good job, which causes a lower adult income. The chain of variables is family disruption (independent), childhood self-esteem (intervening), depression (intervening), grades in school (intervening), job prospects (intervening), adult income (dependent).

Two theories on the same topic can differ as to the number of independent variables. In addition, theories might agree about the independent and dependent variables but differ on the intervening variable or causal mechanism. For example, two theories say that family disruption causes lower adult income, each for different reasons. One theory

Independent variable A type of variable that produces an effect or results on a dependent variable in a causal hypothesis.

Dependent variable The effect or result variable that is caused by an independent variable in a causal hypothesis.

Intervening variable A variable that comes logically or temporally after the independent variable and before the dependent variable and through which their causal relation operates.

holds that disruption encourages children to join deviant peer groups, which are not socialized to the norms of work and thrift. Another theory emphasizes the impact of the disruption on childhood depression and poor academic performance. In the second theory, depression and limited school learning directly cause poor job performance.

In one study, we usually test only one or a few parts of a causal chain. For example, a research project examining six variables may take the six from a large, complex theory with two dozen variables. Explicit links to a larger theory strengthen and clarify a research project.

EXPANSION BOX 4

Five Characteristics of Casual Hypotheses

1. They have at least two variables.
2. They express a causal or cause–effect relationship between the variables.
3. They can be expressed as a prediction or an expected future outcome.
4. They are logically linked to a research question and a theory.
5. They are falsifiable; that is, they are capable of being tested against empirical evidence and shown to be true or false.

Causal Theory and Hypotheses

The Hypothesis and Causality. A **causal hypothesis** is a proposition to be tested or a tentative statement of a relationship between two variables. Hypotheses are guesses about how the social world works; they are stated in a value-neutral form. Kerlinger (1979:35) noted that,

> *Hypotheses are much more important in scientific research than they would appear to be just by knowing what they are and how they are constructed. They have a deep and highly significant purpose of taking man out of himself. . . . Hypotheses are powerful tools for the advancement of knowledge, because, although formulated by man, they can be tested and shown to be correct or incorrect apart from man's values and beliefs.*

A causal hypothesis has five characteristics (see Expansion Box 4, Five Characteristics of Causal Hypotheses). For example, we can restate the hypothesis that attending religious services reduces the probability of divorce as a prediction: Couples who attend religious services frequently have a lower divorce rate than do couples who rarely attend religious services. We can test the prediction against the empirical evidence. We should logically connect the hypothesis to a research question and to a broader theory; after all, we test hypotheses to answer the research question or to find empirical support for a theory. Statements that are logically or necessarily true, or questions that are impossible to answer through empirical observation (e.g., What is the "good life"? Is there a God?) are not scientific hypotheses.

Causal hypothesis A statement of a causal explanation or proposition that has at least one independent and one dependent variable and has yet to be empirically tested.

We can state causal hypotheses in several ways. Sometimes we use the word *cause,* but it is not necessary. For example, we can state a causal hypothesis between religious attendance and a reduced likelihood of divorce in ten different ways (see Example Box 4, Ways to State Causal Relations).

In scientific research, we avoid using the term *proved* when talking about testing hypotheses. Journalism, courts of law, and advertisements use the word *proof,* but a research scientist almost never uses it. A jury says that the evidence "proves" someone guilty, or a television commercial will state, "Studies prove that our aspirin cures headaches the fastest." This is not the language of scientific research. In science, we recognize that knowledge is tentative and that creating knowledge is an ongoing process that avoids premature closure. The word *proof* implies finality, absolute certainty, or something that does not need further investigation. It is too strong a term for the cautious world of science. We might say that the evidence supports or confirms, but does not prove, the hypothesis. Even after hundreds of studies show the same results, such as

EXAMPLE BOX 4

Ways to State Casual Relations

- Religious attendance *causes* reduced divorce.
- Religious attendance *leads to* reduced divorce.
- Religious attendance *is related to* reduced divorce.
- Religious attendance *influences* the reduction of divorce.
- Religious attendance *is associated with* reduced divorce.
- Religious attendance *produces* reduced divorce.
- Religious attendance *results in* reduced divorce.
- *If* people attend religious services, *then* the likelihood of divorce will be reduced.
- *The higher* religious attendance, *the lower* the likelihood of divorce.
- Religious attendance *reduces* the likelihood of divorce.

the link between cigarette smoking and lung cancer, scientists do not say that we have absolute proof. Instead we can say that overwhelming evidence, or all studies to date, support or are consistent with the hypothesis. Scientists never want to close off the possibility of discovering new evidence that might contradict past findings. They do not want to cut off future inquiry or stop exploring intervening mechanisms. History contains many examples of relationships that people once thought to be proved but were later found to be in error. We can use *proof* when referring to logical or mathematical relations, as in a mathematical proof, but not for empirical research.

Testing and Refining a Hypothesis. Knowledge rarely advances on the basis of one test of a single hypothesis. In fact, researchers can get a distorted picture of the research process by focusing on a single study that tests one hypothesis. Knowledge develops over time as many researchers across the scientific community test many hypotheses. It slowly grows from shifting and winnowing through many hypotheses. Each hypothesis represents an explanation of a dependent variable. If the evidence fails to support some hypotheses, they are gradually eliminated from consideration. Those that receive support remain in contention. Theorists and researchers constantly create new hypotheses to challenge those that have received support (see Figure 3). From Figure 3 we see that in 2010, three hypotheses are in contention, but from 1970 to 2010, eleven hypotheses were considered, and over time, eight of them were rejected in one or more tests.

Scientists are a skeptical group. Supporting a hypothesis in one study is not sufficient for them to accept it. The principle of replication says that a hypothesis needs several tests with consistent and repeated support before it can gain broad acceptance. Another way to strengthen confidence in a hypothesis is to test related causal linkages in the theory from which it comes.

As scientists, we accept the strongest contender with the greatest empirical support as the best explanation at the time. The more alternatives we test a hypothesis against, the more confidence we have in it. Some tests are called **crucial experiments** or crucial studies. This is a type of study whereby

> *two or more alternative explanations for some phenomenon are available, each being compatible with the empirically given data; the crucial experiment is designed to yield results that can be accounted for by only one of the alternatives, which is thereby shown to be "the correct explanation." (Kaplan, 1964:151–152)*

Thus, the infrequent crucial experiment is an important test of theory. Hypotheses from two different theories confront each other in crucial experiments, and one is knocked out of the competition. It is rare, but significant, when it occurs.

Types of Hypotheses. Hypotheses are links in a theoretical causal chain and are used to test the direction and strength of a relationship between variables. When a hypothesis defeats its competitors, it supports the researcher's explanation. A curious aspect of hypothesis testing is that researchers treat

Crucial experiment A direct comparison and evaluation of competing explanations of the same phenomenon designed to show that one is superior to the other.

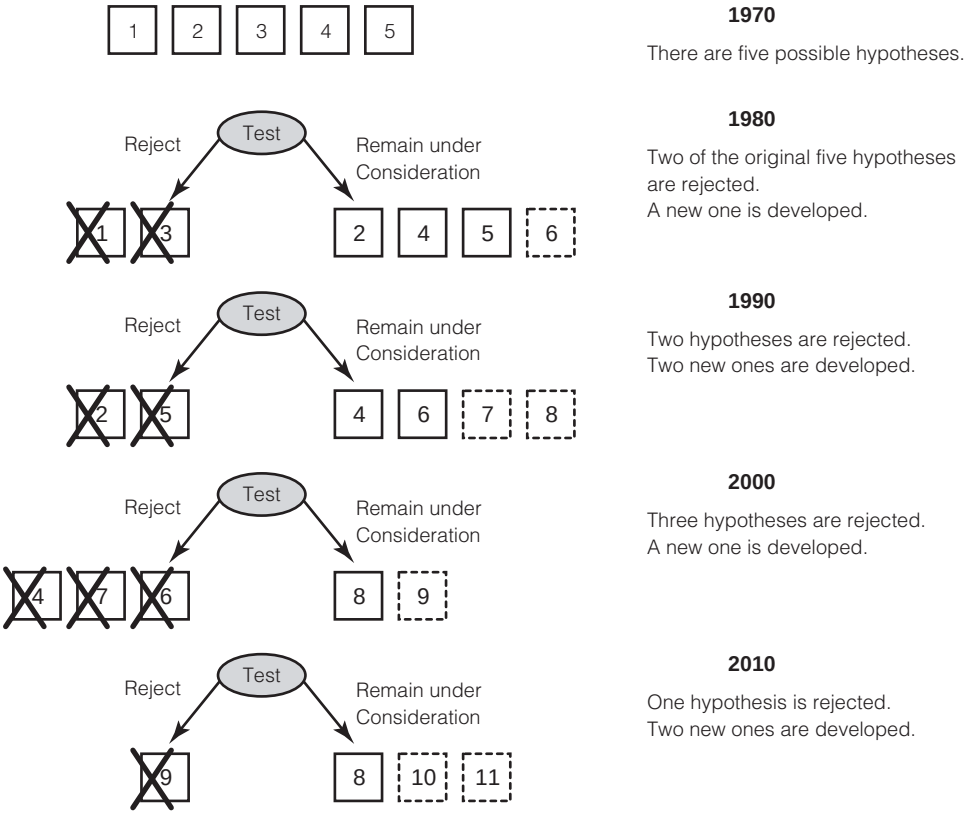


FIGURE 3 How the Process of Hypotheses Testing Operates over Time

evidence that supports a hypothesis differently from evidence that opposes it: They give negative evidence more importance. The idea that negative evidence is critical when evaluating a hypothesis comes from the **logic of disconfirming hypotheses**.[16] It is associated with Karl Popper's idea of falsification and with the use of null hypotheses (see later in this section).

Logic of disconfirming hypothesis The logic for the null hypothesis based on the idea that confirming empirical evidence makes a weak case for the existence of a relationship; instead of gathering supporting evidence, testing that no relationship exists provides more cautious, indirect support for its possible existence.

Recall the preceding discussion of proof. We never prove a hypothesis; however, we can disprove it. With supporting evidence, we can say only that the hypothesis remains a possibility or that it is still being considered. Negative evidence is more significant. With it, the hypothesis becomes "tarnished" or "soiled" because a hypothesis makes predictions. Negative and disconfirming evidence shows that the predictions are wrong. Positive or confirming evidence for a hypothesis is less critical because various alternative hypotheses may make the same prediction. When we find confirm-

ing evidence for a prediction, we may elevate one explanation over its alternatives that could also have confirming evidence.

For example, a man stands on a street corner with an umbrella and claims that his umbrella protects him from falling elephants. He has supporting evidence for his hypothesis that the umbrella provides protection. He has not had a single elephant fall on him in all of the time he has had his umbrella open, yet such supportive evidence is weak; it also is consistent with an alternative hypothesis: elephants do not fall from the sky. Both hypotheses predict that the man will be safe from falling elephants. Negative evidence for the hypothesis—the one elephant that falls on him and his umbrella, crushing both—would destroy the hypothesis for good!

We can test hypotheses in two ways: in a straightforward way and in a null hypothesis way. Many quantitative researchers, especially experimenters, frame hypotheses in terms of a **null hypothesis** based on the logic of the disconfirming hypotheses. These researchers look for evidence that will allow them to accept or reject the null hypothesis. Most people talk about a hypothesis as a way to predict a relationship. The null hypothesis does the opposite. It predicts no relationship. For example, Sarah believes that students who live on campus in dormitories get higher grades than students who live off campus and commute to college. Her null hypothesis is that there is no relationship between residence and grades. Researchers use the null hypothesis with a corresponding **alternative hypothesis** or experimental hypothesis. The alternative hypothesis says that a relationship exists. Sarah's alternative hypothesis is that students' on-campus residence has a positive effect on grades.

For most people, the null hypothesis approach seems like a backward way to think about hypothesis testing. Using a null hypothesis rests on the assumption that we want to discover a relationship. Because of our inner desire to find relationships, we need to design hypothesis testing to make finding relationships very demanding. When we use the null hypothesis approach, we directly test only the null hypothesis. If evidence supports or leads us to accept the null hypothesis, we conclude that the tested relationship does not exist. This implies that the alternative hypothesis is false. On the other hand, if we find evidence to reject the null hypothesis, the alternative hypotheses remain a possibility. We cannot prove the alternative; rather, by testing the null hypotheses, we keep the alternative hypotheses in contention. When we add null hypothesis testing to confirming evidence, the argument for alterative hypotheses can become stronger over time.

If all this discussion of null hypothesis is confusing to you, remember that the scientific community is extremely cautious. After all, it is in the business of creating genuine, verified truth. It would prefer to consider a causal relationship as false until mountains of evidence show it to be true. This is similar to the Anglo-American legal idea of innocent until proved guilty. We assume, or act as though, the null hypothesis is correct until *reasonable doubt* suggests otherwise. When we use null hypotheses, we can also use specific statistical tests (e.g., *t*-test or *F*-test) designed for this way of thinking. Thus, we say there is reasonable doubt in a null hypothesis if a statistical test suggests that the odds of it being false are 99 in 100. This is what we mean when we say that statistical tests allow us to "reject the null hypothesis at the .01 level of significance."

Another type of hypothesis is the **double-barreled hypothesis**.[17] It shows unclear thinking and creates unnecessary confusion and should be avoided. A double-barreled hypothesis puts two

Null hypothesis A hypothesis stating that there is no significant effect of an independent variable on a dependent variable.

Alternative hypothesis A hypothesis paired with the null hypothesis that says an independent variable has a significant effect on a dependent variable.

Double-barreled hypothesis A confusing and poorly designed hypothesis with two independent variables in which it is unclear whether one or the other variable or both in combination produce an effect.

separate relationships into one hypothesis. For example, we say that poverty and a high concentration of teenagers in an area cause property crime to increase. This is double barreled. We might mean either of two things: that poverty *or* a high concentration of teenagers causes property crime or that *only* the combination of poverty with a high concentration of teenagers causes property crime. If "either one" is intended and only one independent variable has an effect, the results of hypothesis testing are unclear. For example, if the evidence shows that poverty causes crime but a concentration of teenagers does not, is the hypothesis supported? If we intend the combination hypothesis, then we really mean that the joint occurrence of poverty with a high concentration of teenagers only, but neither alone, causes property crime. If we intend the combination meaning, it is not double barreled. We need to be very clear and state the combination hypothesis explicitly. The term for a combination hypothesis is the *interaction effect* (interaction effects are discussed later; also see Figure 4).

Potential Errors in Causal Explanation

Developing a good explanation for any theory (i.e., causal, interpretive, or network) requires avoiding some common logical errors. These errors can enter while starting a study, while interpreting and analyzing quantitative data, or while collecting and analyzing qualitative data. Such errors can be referred to as *fallacies* or *false explanations* that may deceptively appear to be legitimate on the surface but have serious problems once they are more deeply investigated.

Tautology An error in explanation in which the causal factor (independent variable) and the result (dependent variable) are actually the same or restatements of one another, making an apparent causal relationship true by definition.

Teleology An error in explanation in which the causal relationship is empirically untestable because the causal factor does not come earlier in time than the result or because the causal factor is a vague, general force that cannot be empirically measured.

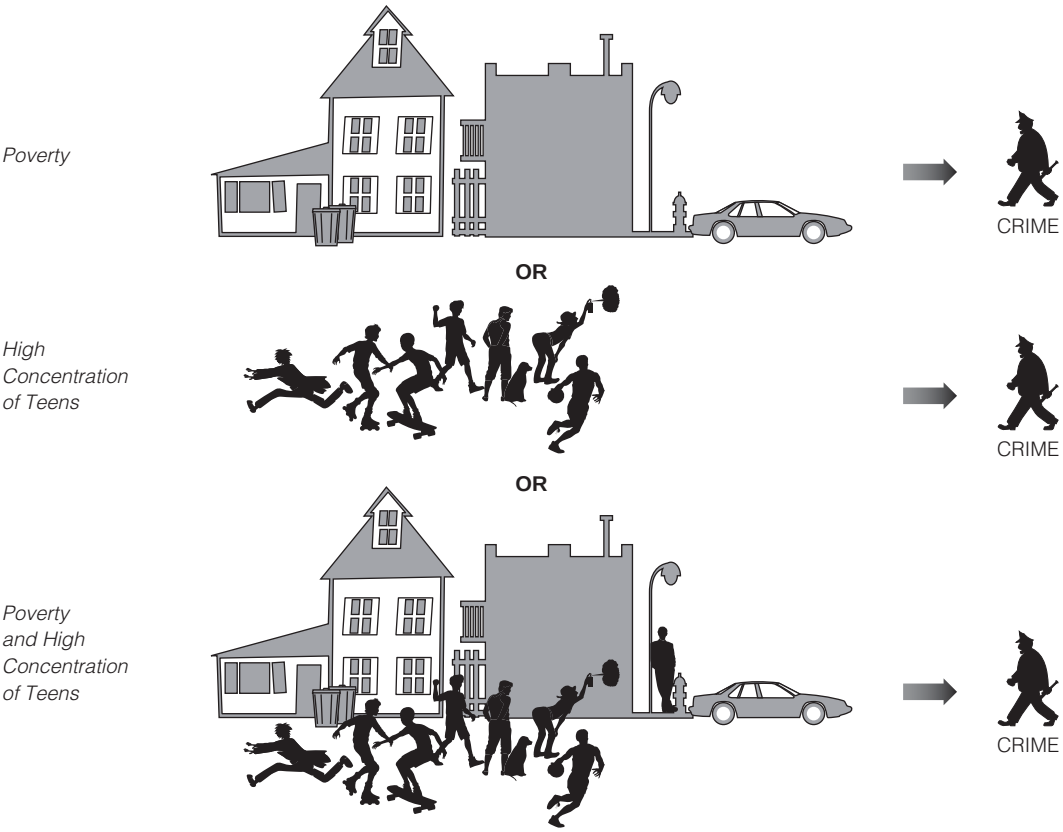
Tautology. A **tautology** is a form of circular reasoning. We appear to say something new but are really talking in circles and making a statement that is *true by definition.* We cannot test tautologies with empirical data. For example, I heard a news report about a representative in the U.S. Congress who argued for a new crime law that would send many more 14- and 15-year-olds to adult courts. When asked why he was interested only in harsh punishment, not prevention, the representative said that offenders would learn that crime does not pay and that would prevent crime. He believed that the only prevention that worked was harsh punishment. This sounded a bit odd when I heard it. So, I reexamined the argument and realized it was tautological (i.e., it contained a logic error). The representative essentially said punishment resulted in prevention because he had redefined *prevention* as being the same as *punishment.* Logically, he said punishment caused prevention because harsh punishment was prevention. Politicians may confuse the public with circular reasoning, but social researchers need to learn how to see through and avoid such garble.

Example. A conservative is a person with certain attitudes, beliefs, and values (desires less government regulation, no taxes on upper income people, a strong military, religion taught in public schools, an end to antidiscrimination laws, etc.). It is a tautology to say that wanting less regulation, a strong military, and so on *causes* conservatism. In sloppy everyday usage, we can say, "Sally is conservative *because* she believes that there should be less regulation." This appears to be a causal statement, but it is not. The set of attitudes is a *reason* to label Sally as a conservative, but those attitudes cannot be the *cause* of Sally's conservatism. Her attitudes *are* conservatism, so the statement is true by definition. It would be impossible ever to obtain evidence showing that those attitudes were not associated with conservatism.

Teleology. A **teleology** is something directed by an ultimate purpose or goal. It can take two forms. First, it is associated with an event that occurs because it is in "God's plan" or in some overarching, mysterious unseen and unknowable force. In other

HYPOTHESIS: Poverty and a high concentration of teenagers in an area cause property crime to increase.

DOUBLE-BARRELED HYPOTHESIS: This can mean one of three things:



INTERACTION EFFECT: This means a combination of things:

FIGURE 4 Double-Barreled Hypothesis versus Interaction Effect

words, an event occurs because God, or an unseen, unknowable master force has predetermined that it must occur. It is a teleology to say that something occurs because it is part of the "natural unfolding" of some all-powerful inner spirit or *Geist* (German for *spirit*). Thus, it is a teleology to say that a society develops in a certain direction because of the "spirit of the nation" or a "manifest destiny." Similar teleogical arguments rely on human nature as a cause, such as "Crime occurs because it is just human nature." Teleology has appeared in theories of history when someone says we are moving toward an "ideal society" or a utopia, and this movement explains events that are occurring today. Teleology has also been found in functional arguments. It is a teleology to say the family takes a certain form (e.g., nuclear) because the nuclear family fulfills social system "needs" for societal continuation. Logically, this says that the functional needs of the social system's survival into the distant future are the cause of the family form we see today. It is impossible to measure the cause and empirically test teleologies.

Teleology violates the temporal order requirement of causality. There is no true independent variable because the "causal factor" is extremely vague, distant, and unseen. Many people confuse goal motivation (i.e., a desire for something yet to occur) with teleology. I might say a goal causes an action. For example, my goal to get an A in a class caused me to get a good grade. My conscious goal or desire could be a legitimate cause and not be teleological. To show this, I need to outline the causal chain. First, we can empirically measure my mental condition (e.g., goals, desires, or aspirations) at some time point. This clarifies both the empirical evidence and temporal order issue. Second, we can compare my mental condition to future events that may or may not occur, such as getting a specific grade in a course. The mental condition can be a motivation that causes me to engage in certain behaviors, such as studying (an intervening variable). The studying behaviors could increase the chances that a future event (a course grade) will occur. Conscious human goals differ from the will of God, a society's *Geist*, or system needs, which we cannot empirically measure, have no fixed existence in time, and always match what occurs.

Ecological fallacy An error in explanation in which empirical data about associations found among large-scale units of analysis are greatly overgeneralized and treated as evidence for statements about relationships among much smaller units.

Example. The statement *The nuclear family is the dominant family form in Western industrial societies* because *it is functional for the survival of the society* is an untestable teleological statement from structural functional theory. It is saying "society's survival" *causes* "development of family form," yet the only way we can observe whether a society survives is after the fact, or as a consequence of its having had a form of the family. Here is another example of a teleological statement: *Because it was the destiny of the United States to become a major world power, we find thousands of immigrants entering the Western frontier during the early nineteenth century.* This says that "becoming a major world power," which occurred from 1920 to 1945, caused "westward migration," which took place between 1850 and 1890. It uses the obscure term *destiny*, which, like other similar terms (e.g., "in God's plan"), cannot be observed in causal relationships.

Ecological Fallacy. The **ecological fallacy** arises from a mismatch of units of analysis. It refers to a poor fit between the units for which we have empirical evidence and the units for which we want to make general statements. Ultimately, it comes down to imprecise reasoning and generalizing well beyond what the evidence warrants. Ecological fallacy occurs when we gather data at a *higher* or an *aggregated* unit of analysis but want to say something about a *lower* or *disaggregated* unit. It is a fallacy because what happens in one unit of analysis does not always hold for a different unit of analysis.[18] Thus, when we gather data for large aggregates (e.g., organizations, entire countries) and draw conclusions about the behavior of individuals from those data, we are creating an ecological fallacy. To

avoid this error, we must ensure that the unit of analysis we use in an explanation is the same as or very close to the unit on which we collect data (see Example Box 5, The Ecological Fallacy).

Example. About 45,000 people live in Tomsville and in Joansville. Tomsville has a high percentage of upper income people. More than half of the households in the town have family incomes of over $160,000. The town also has more motorcycles registered in it than any other town of its size. The town of Joansville has many poor people. Half of its households live below the poverty line. The town also has fewer motorcycles registered in it than any other town of its size. But it is a *fallacy* to say, on the basis of this information alone, that rich people are more likely to own motorcycles or that the evidence shows a relationship between family income and motorcycle ownership. The reason is that we do not know which families in Tomsville or Joansville own motorcycles. We know about only the two variables—average income and number of motorcycles—for the towns as a whole. The unit of analysis for observing variables is each town as a whole. Perhaps all of the low- and middle-income families in Tomsville belong to a motorcycle club, but not a single upper income family belongs to one. Or perhaps one rich family and five poor ones in Joansville own motorcycles. To make a statement about the relationship between family ownership of motorcycles and family income, we have to collect information on families, not on towns as a whole.

Reductionism. Another problem that involves a mismatch of units of analysis and imprecise reasoning about evidence is **reductionism**, also called the *fallacy of nonequivalence* (see Example Box 6, Error of Reductionism). This error occurs in an explanation of macro-level events using evidence about specific individuals. It occurs when a person observes a *lower* or *disaggregated* unit of analysis but makes statements about the operations of *higher* or *aggregated* units. In a way, it is a mirror image of the mismatch error in the ecological fallacy. A

Reductionism An error in explanation in which empirical data about associations found among small-scale units of analysis are greatly overgeneralized and treated as evidence for statements about relationships among much larger units.

EXAMPLE BOX 5

The Ecological Fallacy

Researchers have criticized the famous study *Suicide* ([1897] 1957) by Émile Durkheim for the ecological fallacy of treating group data as though they were individual-level data. In the study, Durkheim compared the suicide rates of Protestant and Catholic districts in nineteenth-century western Europe and explained observed differences as due to dissimilarity between people's beliefs and practices in the two religions. He said that Protestants had a higher suicide rate than Catholics because the Protestants were more individualistic and had lower social integration. Durkheim and early researchers had data only by district. Because people tended to reside with others of the same religion, Durkheim used group-level data (i.e., region) for individuals.

Later researchers (van Poppel and Day, 1996) reexamined nineteenth century suicide rates with only individual-level data that they discovered for some areas. They compared the death records and looked at the official reason of death and religion, but their results differed from Durkheim's. Apparently, local officials at that time recorded deaths differently for people of different religions. They recorded "unspecified" as a reason for death far more often for Catholics because of the religion's strong moral prohibition against suicide. Durkheim's larger theory may be correct, yet the evidence he had to test it was weak because he used data aggregated at the group level while trying to explain the actions of individuals.

EXAMPLE BOX 6

Error of Reductionism

Suppose you pick up a book and read the following:

> *American race relations changed dramatically during the Civil Rights Era of the 1960s. Attitudes among the majority, White population shifted to greater tolerance as laws and court rulings changed across the nation. Opportunities that had been legally and officially closed to all but the White population—in the areas of housing, jobs, schooling, voting rights, and so on—were opened to people of all races. From the* Brown vs. Board of Education *decision in 1955, to the Civil Rights Act of 1964, to the War on Poverty from 1966 to 1968, a new, dramatic outlook swept the country. This was the result of the vision, dedication, and actions of America's foremost civil rights leader, Dr. Martin Luther King, Jr.*

This says: *dependent variable* = major change in U.S. race relations over a 10- to 13-year period; *independent variable* = King's vision and actions.

If you know much about the civil rights era, you see a problem. The entire civil rights movement and its successes are attributed to a single individual. Yes, one individual does make a difference and helps build and guide a movement, but the *movement* is missing. The idea of a social-political movement as a causal force is reduced to its major leader. The distinct social phenomenon—a movement—is obscured. Lost are the actions of hundreds of thousands of people (marches, court cases, speeches, prayer meetings, sit-ins, rioting, petitions, beatings, etc.) involved in advancing a shared goal and the responses to them. The movement's ideology, popular mobilization, politics, organization, and strategy are absent. Related macro-level historical events and trends that may have influenced the movement (e.g., Vietnam War protest, mood shift with the killing of John F. Kennedy, African American separatist politics, African American migration to urban North) are also ignored.

This error is not unique to historical explanations. Many people think in terms of only individual actions and have an individualist bias, sometimes called *methodological individualism*. This is especially true in the extremely individualistic U.S. culture. The error is that it disregards units of analysis or forces beyond the individual. The *error of reductionism* shifts explanation to a much lower unit of analysis. One could continue to reduce from an individual's behavior to biological processes in a person, to micro-level neurochemical activities, to the subatomic level.

Most people live in "social worlds" focused on local, immediate settings and their interactions with a small set of others, so their everyday sense of reality encourages seeing social trends or events as individual actions or psychological processes. Often, they become blind to more abstract, macro-level entities—social forces, processes, organizations, institutions, movements, or structures. The idea that all social actions cannot be reduced to individuals alone is the core of sociology. In his classic work *Suicide,* Émile Durkheim fought methodological individualism and demonstrated that larger, unrecognized social forces explain even highly individual, private actions.

person makes this error when he or she has data on how individuals behave but wants to talk about the dynamics of macro-level units. It occurs because it is often easier to obtain data on individuals. Also, the operation of macro-level units is more abstract and nebulous. Lieberson argued that this error produces inconsistencies, contradictions, and confusion. He (1985:108, 113–114) forcefully stated:

> *Associations on the lower level are irrelevant for determining the validity of a proposition about processes operating on the higher level. As a matter of fact, no useful understanding of the higher-level structure can be obtained from lower-level analysis. . . . If we are interested in the higher-level processes and events, it is because we operate with the understanding that they have distinct qualities that are not simply derived by summing up the subunits.*

As with the ecological fallacy, to avoid the error of reductionism, we must make certain that the unit of analyses in our explanation and for which we have empirical evidence are very close. When we fail to think precisely about the units of

analysis and fail to couple the data closely with the theory, we might commit the ecological fallacy or error of reductionism. These are mistakes about having data that are appropriate for a research question and seriously overgeneralizing from the data.

It is possible to make assumptions about units of analysis other than the ones we study empirically. Thus, research on individuals rests on assumptions that individuals act within a set of social institutions. We base research on social institutions on assumptions about individual behavior. We know that many micro-level units join to form macro-level units. The danger is that it is easy to slide into using the behavior of micro units, such as individuals, to explain the actions of macro units, such as social institutions. What happens among units at one level does not necessarily hold for different units of analysis. Sociology as a field rests on the belief that a distinct level of social reality exists beyond the individual. Explanations of this level require data and theory that go beyond the individual alone. We cannot reduce the causes, forces, structures, or processes that exist among macro units to individual behavior.

Example. Why did World War I occur? You may have heard that it was because a Serbian shot an archduke in the Austro-Hungarian Empire in 1914. This is reductionism. Yes, the assassination was a factor, but the macro-political event between nations—war—cannot be reduced to a specific act of one individual. If it could, we could also say that the war occurred because the assassin's alarm clock worked and woke him up that morning. If it had not worked, there would have been no assassination, so the alarm clock caused the war! The cause of the event, World War I, was much more complex and was due to many social, political, and economic forces that came together at a point in history. The actions of specific individuals had a role, but only a minor one compared to these macro forces. Individuals affect events, which eventually, in combination with large-scale social forces and organizations, affect others and move nations, but individual actions alone are not the cause. Thus, it is likely that a war would have broken out at about that time even if the assassination had not occurred.

Spuriousness. To call a relationship between variables *spurious* means that it is false, a mirage. We often get excited if we think we have found a spurious relationship because we can show the world to be more complex than it appears on the surface. Because any association between two variables might be spurious, we must be cautious when we discover that two variables are associated; upon further investigation, it may not be the basis for a causal relationship. It may be an illusion, just like the mirage that resembles a pool of water on a road during a hot day.

Spuriousness occurs when two variables are associated but are not causally related because an unseen third factor is the real cause (see Example Box 7, Spuriousness and Example Box 8, Night-Lights and Spuriousness). The third variable is the cause of both the apparent independent and the dependent variable. It accounts for the observed association. In terms of conditions for causality, the unseen third factor represents a more powerful alternative explanation.

How can you tell whether a relationship is spurious? How do you find out what the mysterious third factor might be? You will need to use statistical techniques (discussed later in this book) to test whether an association is spurious. To use them, you need a theory or at least a guess about possible third factors. Actually, spuriousness is based on some commonsense logic that you already use. For example, you know that an association exists between the use of air conditioners and ice cream cone consumption. If you measured the number of air conditioners in use and the number of ice cream cones sold each day, you would find a strong

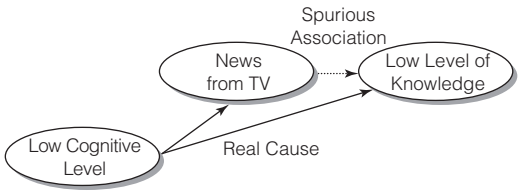
Spuriousness An apparent causal relationship that is illusionary due to the effect of an unseen or initially hidden causal factor; the unseen factor has a causal impact on both an independent and dependent variable, and produces the false impression that a relationship between them exists.

EXAMPLE BOX 7

Spuriousness

In their study of the news media, Neuman and colleagues (1992) found a correlation between type of news source and knowledge. People who prefer to get their news from television are less knowledgeable than those who get it from print sources. This correlation is often interpreted as the "dumbing down" of information. In other words, television news causes people to know little.

The authors found that the relationship was spurious, however. "We were able to show that the entire relationship between television news preference and lower knowledge scores is spurious" (p. 113). They found that a third variable, initially unseen, explained both a preference for television news and a level of knowledge about current events. They said, "We find that what is really causing the television-is-the-problem effect is the preference for people with lower cognitive skill to get their news from television" (p. 98). The missing or hidden variable was "cognitive skill." The authors defined *cognitive skill* as a person's ability to use reason and manipulate abstract ideas. In other words, people who find it difficult to process abstract, complex information turn to television news. Others may also use the high-impact, entertaining television news sources, but they use them less and heavily supplement them with other more demanding, information-rich print sources. People who have weak information skills also tend to be less knowledgeable about current events and about other topics that require abstract thought or deal with complex information.

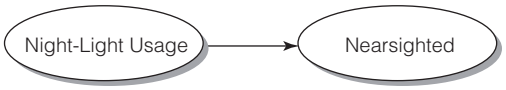


EXAMPLE BOX 8

Night-Lights and Spuriousness

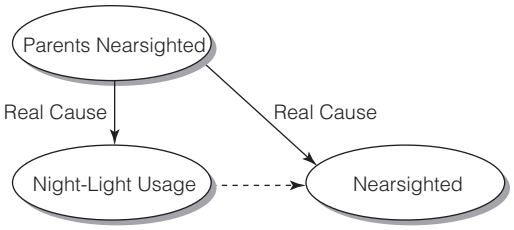
For many years, researchers observed a strong positive association between the use of a night-light and children who were nearsighted. Many thought that the night-light was somehow causing the children to develop vision problems (illustrated below). Other researchers could think of no reason for a causal link between night-light use and developing nearsightedness. A 1999 study provided the answer. It found that nearsighted parents are more likely to use night-lights; they also genetically pass on their vision deficiency to their children. The study found no link between night-light use and nearsightedness once parental vision was added to the explanation (see **b** below). Thus the initial causal link was misleading or spurious (from *New York Times,* May 22, 2001).

a. Initial relationship



POSITIVE ASSOCIATION

b. Addition of the missing true causal factor



SPURIOUS ASSOCIATION

Source: "Vital Signs: Update; New Study Vindicates Night Lights" from *The New York Times,* Health Section, 5/22/2001 Issue, Page(s) 6.

correlation with more cones being sold on the days when more air conditioners are in use. But you know that eating ice cream cones does not cause people to turn on air conditioners. Instead, a third variable, hot days, causes both variables. You could verify this by measuring the daily temperature, ice cream consumption, and air conditioner use. In social research, opposing theories help us figure out which third factors are relevant for many topics (e.g., the causes of crime or the reasons for war or child abuse).

Example. Some people argue that taking illegal drugs causes suicide, school dropouts, and violent acts. Advocates of "drugs-are-the-problem" position point to the positive correlations between

taking drugs and being suicidal, dropping out of school, and engaging in violence. The supporters argue that ending drug use will greatly reduce suicide, dropouts, and violence. Others argue that many people turn to drugs because of their emotional problems or high levels of disorder of their communities (e.g., high unemployment, unstable families, high crime, few community services, lack of civility). The people with emotional problems or who live in disordered communities are also more likely to commit suicide, drop out, and engage in violence. This means that reducing emotional problems and community disorder will cause illegal drug use, dropping out, suicide, and violence to decline greatly. Reducing drug taking alone will have only a limited effect because it ignores the root cause, which is not drugs. The "drugs-are-the-problem" argument is spurious because the initial relationship between taking illegal drugs and the problems that advocates identify is misleading. The emotional problems and community disorder are the true and often unseen causal variables.

We can now turn from the errors in causal explanation to avoid and move to other issues involving hypotheses. Table 2 provides a review of the major errors, and Figure 5 illustrates them.

From the Research Question to Hypotheses

It is difficult to move from a broad topic to hypotheses, but the leap from a well-formulated research question to hypotheses is a short one. A good research question has hypotheses embedded within it. In addition, hypotheses are tentative answers to research questions.

Consider this example of a research question: "Is age at marriage associated with divorce?" The question has two variables: "age at marriage" and "divorce." To develop a hypothesis, we must determine which is the independent variable. The independent variable is age at marriage because marriage must logically precede divorce. We may also ask what the direction of the relationship is. The hypothesis could be the following: "The lower the age at time of marriage, the higher the chances that the marriage will end in divorce." This hypothesis answers the research question and makes a

TABLE 2 Summary of Errors in Explanation

TYPE OF ERROR	SHORT DEFINITION	EXAMPLE
Tautology	The relationship is true by definition and involves circular reasoning.	Poverty is caused by having very little money.
Teleology	The cause is an intention that is inappropriate, or it has misplaced temporal order.	People get married in religious ceremonies because society wants them to.
Ecological fallacy	The empirical observations are at too high a level for the causal relationship that is stated.	New York has a high crime rate. Joan lives in New York. Therefore, she probably stole my watch.
Reductionism	The empirical observations are at too low a level for the causal relationship that is stated.	Because Steven lost his job and did not buy a new car, the country entered a long economic recession.
Spuriousness	An unseen third variable is the actual cause of both the independent and dependent variable.	Hair length is associated with TV programs. People with short hair prefer watching football; people with long hair prefer romance stories. (*Unseen:* Gender)

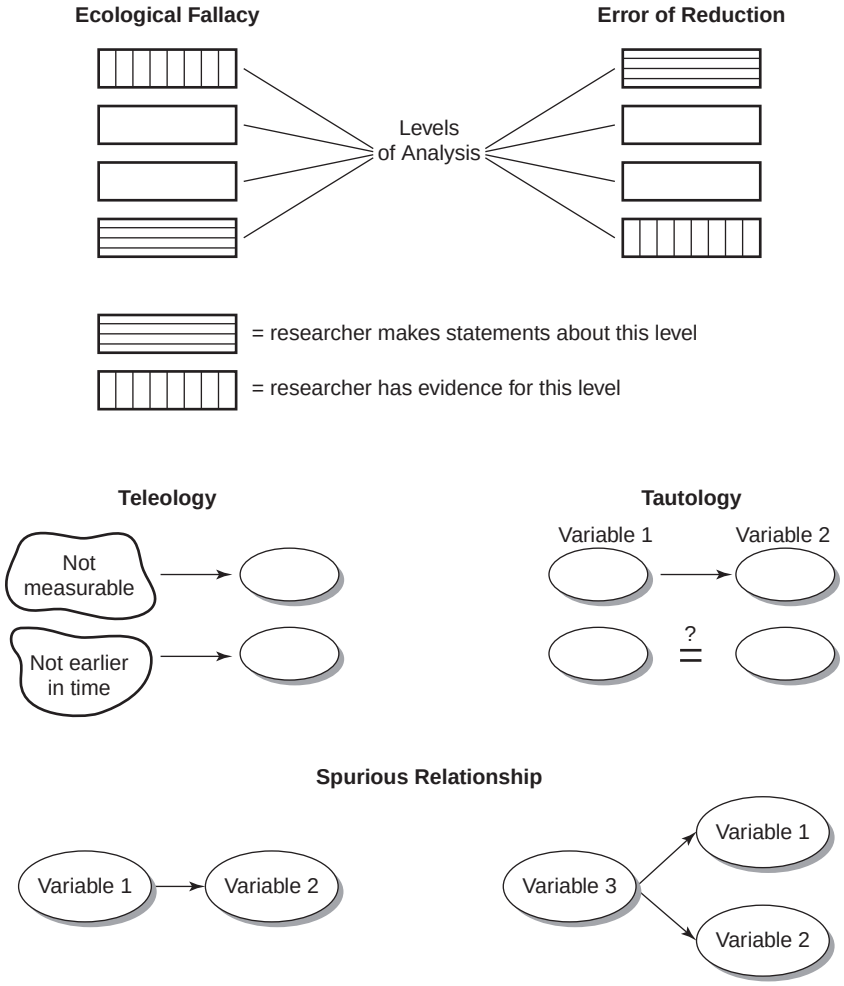


FIGURE 5 Five Errors in Explanation to Avoid

prediction. Notice that we can reformulate and better focus it now into: "Are couples who marry younger more likely to divorce?"

We can create several hypotheses for one research question. Another hypothesis from the same research question is as follows: "The smaller the difference between the ages of the marriage partners at the time of marriage, the less likely that the marriage will end in divorce." In this case, we specify the variable age at marriage differently.

We can have a hypothesis that specifies that a relationship holds under some conditions but not others. As Lieberson (1985:198) remarked, "In order to evaluate the utility of a given causal proposition, it is important that there be a clear-cut statement of the conditions under which it will operate." For example, a hypothesis states: The lower the age of the partners at time of marriage, the higher are the chances that the marriage will end in divorce, unless it is a marriage between

members of a tight-knit traditional religious community in which early marriage is the norm.

Formulating a research question and a hypothesis does not have to proceed in fixed stages. We can formulate a tentative research question and then develop possible hypotheses; the hypotheses will help us to state the research question more precisely. The process is interactive and requires our creativity.

You may be wondering where theory fits into the process of moving from a topic to a testable hypothesis. Recall that theory takes many forms. We use general theoretical issues as a source of topics. Theories provide concepts that we turn into variables as well as the reasoning or mechanism that helps us connect variables together to produce a research question. A hypothesis can both answer a research question and be an untested proposition from a theory. We can express a hypothesis at an abstract, conceptual level or restate it in a more concrete, measurable form. Examples of specific studies may help to illustrate the parts of the research process. For examples of three quantitative studies, see Chart 1; for two qualitative studies, see Chart 2.

CONCLUSION

In this chapter, you encountered the groundwork needed to begin a study. You saw how differences in the qualitative and quantitative styles direct us to prepare for a study differently. In all types of research, you must narrow a topic into a more specific, focused research question. Each of the major approaches to doing research implies a different form and sequence of decisions as well as different answers as to when and how to focus on a research question. The most effective approach will depend on the topic you select, your purpose and intended use of study results, the orientation toward social science you adopt, and the your own assumptions and beliefs.

A quantitative study generally takes a linear path and emphasizes objectivity. In it you will use explicit, standardized procedures and a causal explanation. It uses the language of variables and hypotheses that is found across many areas of science that are based on a positivist tradition. The process is often deductive with a sequence of discrete steps that precede data collection: Narrow the topic to a more focused question, transform nebulous theoretical concepts into more exact variables, and develop one or more hypotheses to test. In actual practice, you will move back and forth, but the general process flows in a single, linear direction. In addition, you should take special care to avoid logical errors in hypothesis development and causal explanation.

In a qualitative study, you will likely follow a nonlinear path and emphasize becoming intimate with the details of a natural setting or a particular cultural-historical context. There are fewer standardized procedures or explicit steps, and you must often devise on-the-spot techniques for one situation or study. The language of cases and contexts directs you to conduct detailed investigations of particular cases or processes in a search for authenticity. Planning and design decisions are rarely separated into a distinct predata collection stage but continue to develop throughout early data collection. In fact, you use a more inductive qualitative style that encourages a slow, flexible evolution toward a specific focus based on what you learn from the data. Grounded theory emerges from your continuous reflections on the data and the context.

The qualitative and quantitative distinction is often overdrawn. Too often, it appears as a rigid dichotomy. Adherents of one approach judge the studies of the other approach on the basis of its own assumptions and standards. The quantitative researcher demands to know the variables used and the hypothesis tested. The qualitative researcher balks at turning humanity into cold numbers. A well-versed, prudent social researcher will understand and appreciate each approach to research on its own terms and recognize the strengths and limitations of each. The ultimate goal of developing a better understanding and explanation of the social world comes from an appreciation of what each has to offer.

CHART 1 Examples of Quantitative Studies

Study citation and title	Ridgeway and Erickson (2000), "Creating and Spreading Status Beliefs"	Musick, Wilson, and Bynum (2000), "Race and Formal Volunteering: The Differential Effects of Class and Religion"	Barlow, Barlow, and Chiricos (1995), "Economic Conditions and Ideologies of Crime in the Media"
Methodological technique used	Experiment	Survey	Content analysis
Topic	Processes by which people develop beliefs about the social status of others	Rates of volunteering by White and Black adults	U.S. mass media portrayals of law-breakers
Research question	As individuals interact, do external, structural factors that affect the interaction mold the beliefs they come to hold about entire categories of people in the future?	What different kinds of resources are available to Blacks and Whites that explain why Blacks are less likely to volunteer?	Do economic conditions affect how the media portray offenders?
Main hypothesis tested	People can be "taught" to make status distinctions among categories of people, who are actually equal, based on limited interaction in which one category exerts more skill.	Social class and religion affect whether Blacks volunteer differently than Whites.	The media distortion of crime shows offenders in a more negative way (blames them) when economic conditions are bad.
Main independent variable(s)	Whether a person's interaction with someone in a category that shows members of the category to have superior or inferior skill at tasks	Social class, religious attendance, race	Unemployment rate in several years, 1953–1982
Main dependent variable	Whether individuals develop and apply a belief of inequality to an entire category of people	Whether a person said he or she volunteered for any of five organizations (religious, education, political or labor, senior citizen, or local)	Whether distortion occurred, measured as a mismatch between media attention (articles in *Time* magazine) and crime statistics for several years
Unit of analysis	Individual undergraduate student	Individual adults	The media report
Universe	All individuals	All adult Whites and Blacks in the United States	All U.S. mass media reports

CHART 2 Examples of Qualitative Studies

Study citation and title	Lu and Fine (1995), "The Presentation of Ethnic Authenticity: Chinese Food as a Social Accomplishment"	Molotch, Freudenburg, and Paulsen (2000), "History Repeats Itself, but How? City Character, Urban Tradition, and the Accomplishment of Place"
Methodological technique used	Field research	Historical-comparative research
Topic	The ways ethnic cultures are displayed within the boundaries of being acceptable in the United States and how they deploy cultural resources	The ways cities develop a distinct urban "character"
Research question	How do Chinese restaurants present food to balance authenticity and to satisfy non-Chinese U.S. customers?	Why did the California cities of Santa Barbara and Ventura, which appear very similar on the surface, develop very different characters?
Grounded theory	Ethnic restaurants Americanize their food to fit local tastes but also construct an impression of authenticity. This is a negotiated process of meeting the customer's expectations/taste conventions and the desire for an exotic and authentic eating experience.	The authors use two concepts, "lash up" (interaction of many factors) and structure (past events create constraints on subsequent ones), to elaborate on character and tradition. Economic, political, cultural, and social factors combine to create distinct cultural-economic places. Similar forces can have opposite results depending on context.
Bricolage	The authors observed and interviewed at four Chinese restaurants but relied on evidence from past studies.	The authors used historical records, maps, photos, official statistical information, and interviews. In addition to economic and social conditions, they examined voluntary associations and physical materials.
Process	Restaurants make modifications to fit available ingredients, their market niche, and the cultural and food tastes of local customers.	Conditions in the two cities contributed to two different economic development responses to oil and highways. Ventura formed an industrial-employment base around oil and allowed new highways. Santa Barbara limited both and instead focused on creating a tourism industry.
Context	Chinese restaurants, especially four in Athens, Georgia	The middle part of California's coast over the past 100 years

KEY TERMS

alternative hypothesis
attributes
bricolage
causal hypothesis
crucial experiment
dependent variable
double-barreled hypothesis
ecological fallacy
first-order interpretation
independent variable
intervening variable
linear research path
logic in practice
logic of disconfirming hypothesis

nonlinear research path
null hypothesis
reconstructed logic
reductionism
second-order interpretation
spuriousness
tautology
teleology
third-order interpretation
triangulation
universe
variable

REVIEW QUESTIONS

1. What are the implications of saying that qualitative research uses more logic in practice than a reconstructed logic?
2. What does it mean to say that qualitative research follows a nonlinear path? In what ways is a nonlinear path valuable?
3. Describe the differences between independent, dependent, and intervening variables.
4. Why don't we *prove* results in social research?
5. Take a topic of interest and develop two research questions for it. For each research question, specify the units of analysis and universe.
6. What two hypotheses are used if a researcher uses the logic of disconfirming hypotheses? Why is negative evidence stronger?
7. Restate the following in terms of a hypothesis with independent and dependent variables: The number of miles a person drives in a year affects the number of visits a person makes to filling stations, and there is a positive unidirectional relationship between the variables.
8. Compare the ways in which quantitative and qualitative researchers deal with personal bias and the issue of trusting the researcher.
9. How do qualitative and quantitative researchers use theory?
10. Explain how qualitative researchers approach the issue of interpreting data. Refer to first-, second-, and third-order interpretations.

NOTES

1. See Tashakkori and Teddlie (1998).
2. Ward and Grant (1985) and Grant and colleagues (1987) analyzed research in sociology journals and suggested that journals with a higher proportion of qualitative research articles address gender topics but that studies of gender are not themselves more likely to be qualitative.
3. See Kaplan (1964:3–11) for a discussion.
4. On the issue of using quantitative, statistical techniques as a substitute for trust, see Collins (1984), Porter (1995), and Smith and Heshusius (2004).
5. For discussion, see Schwandt (1997), Swanborn (1996), and Tashakkori and Teddlie (1998:90–93).
6. For examples of checking, see Agar (1980) and Becker (1970c).
7. Problem choice and topic selection are discussed in Campbell and associates (1982) and Zuckerman (1978).
8. See Flick (1998:51).
9. *Exceptions* are secondary data analysis and existing statistics research. In working with them, a quantitative researcher often focuses the research question and develops a specific hypothesis to test after she or he examines the available data
10. See Ball and Smith (1992) and Harper (1994).
11. For place of theory in qualitative research, see Hammersley (1995).
12. See Harper (1987:9, 74–75) and Schwandt (1997: 10–11).
13. See Gerring (2007:20) and George and Bennett (2005).

14. See Blee and Billings (1986), Ricoeur (1970), and Schneider (1987) on the interpretation of text in qualitative research.
15. See Lieberson (1985:185–187) for a discussion of basic and superficial variables in a set of causal linkages. Davis (1985) and Stinchcombe (1968) provide good general introductions to making linkages among variables in social theory.
16. The logic of disconfirming hypothesis is discussed in Singleton and associates (1988:56–60).
17. See Bailey (1987:43) for a discussion of this term.
18. The general problem of aggregating observation and making causal inferences is discussed in somewhat technical terms in Blalock (1982:237–264) and in Hannan (1985). O'Brien (1992) argues that the ecological fallacy is one of a whole group of logical fallacies in which levels and units of analysis are confused and overgeneralized.