

# 1

## Visualizing Social Science Research

### CHAPTER OVERVIEW AND OBJECTIVES

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Visualizing social science research refers to the techniques, processes, and tools that allow students, instructors, and investigators to understand, present, and frame research. This includes a variety of maps, graphs, and diagrams used to illuminate processes that may otherwise appear complex and daunting. Visualizing research need not be limited to the presentation of findings. In this book, we explore the potential of graphic illustrations to demystify and clarify designs, collect data, present methods, and explore measurement.

This chapter introduces the research process including major theoretical perspectives, epistemological concerns, and methodological and data-collection choices. A central theme in this chapter is that the assumptions made by different researchers and the resultant approaches inform and influence the research process. By graphically presenting examples of deductive, inductive, and abductive approaches in quantitative, qualitative, and mixed-measures research, this chapter uses visual examples to present an overview of major theoretical approaches to social science research. Finally, this chapter shows how maps can help frame a research project and how they can assist novice researchers when considering the various steps involved in conducting a research project. Through a sample research problem, readers will be encouraged to use maps, graphs, or diagrams to plan a research project. By the end of this chapter, readers should be able to

## 2 VISUALIZING SOCIAL SCIENCE RESEARCH

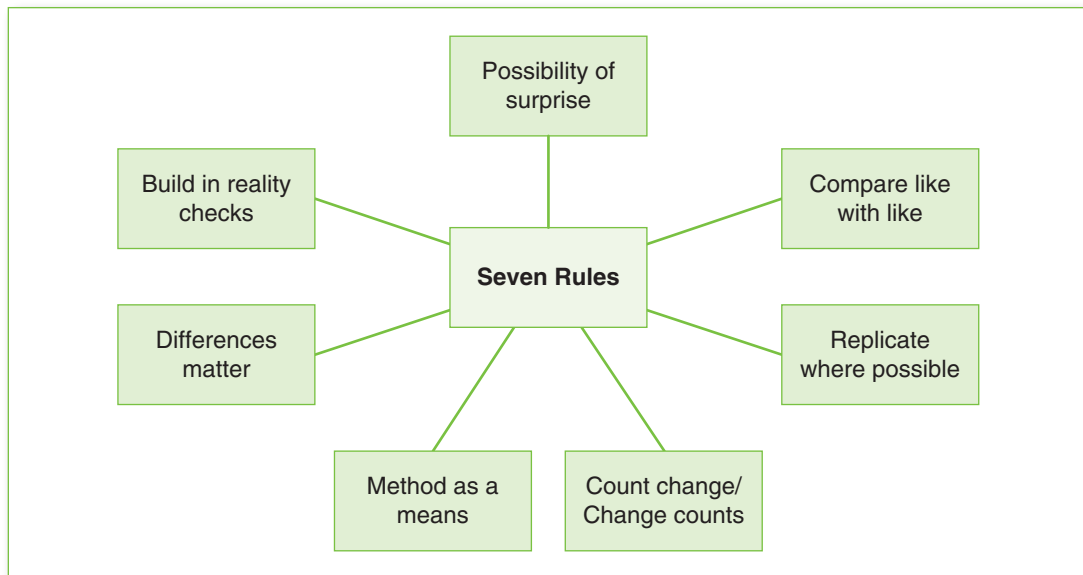
- define social science research and explain why visualizing the processes involved can be useful;
- understand the steps involved in completing a research project;
- consider how visualizing research can assist students, instructors, and researchers;
- describe how different theoretical starting points influence the research approach taken; and
- explain why it is useful to acknowledge that all research is a series of decisions.

### WHY VISUALIZE SOCIAL SCIENCE RESEARCH?

Social science research seeks to understand, explain, and predict human behavior by observing, reflecting, and/or measuring social phenomena. As a branch of science, it focuses on the study of society and the relationships of individuals by exploring meaning from a human perspective and testing and/or constructing theories based on these investigations. Glenn Firebaugh (2008) summarized seven principles for good social science research (see Figure 1.1). The first six are the possibility of surprise, the need to explore differences within your research, the need to compare findings from one group with findings from another, and the need to focus on how, why, and to what extent things change.

Firebaugh (2008) concluded his discussion with an important final rule. Methods must always be the means—never the end—of social science research. Methods serve the

**Figure 1.1** Seven Rules for Social Science Research



needs of the research, the sample to be studied, and the question(s) to be explored. This may be because all research can be seen as a series of “research decisions” (Palys, 1992). Seeing research as a series of decisions acknowledges that different research problems, data-collection strategies, and methods of analysis shape research findings. All decisions have consequences; it is important to remain humble about the fact that no matter how good the research is, all honest research acknowledges its limitations. Whereas for some, the notion that research cannot provide *the* answer may be disconcerting, when properly planned, conducted, and presented, social science research nevertheless offers us the best means with which to make sense of the world.

This book begins with the assumption that new approaches to research methods are needed to attract students and young researchers into the social sciences in the first place. The tools we explore throughout the book provide a means to channel creativity and investigate how research can assist people to better understand both our world and ourselves (Mintzes, Wandersee, & Novak, 1998). Although images increasingly play an important role in our daily lives, their potential to teach students and to assess learning outcomes have not yet been fully integrated into the social sciences. This may be because we are emerging from an era in which standardized tests were seen as the only means to assess learning, based on a well-intentioned but incomplete one-size-fits-all approach to education. Emergent approaches seek to build teacher education, learning assessments, and measurements of student outcomes by focusing on responsibility and accountability (Shavelson, 2010); however, questions remain about how new integrated assessment systems can be operationalized and incorporated into existing curricula.

One strategy is to view developing social science research pedagogy as not only a means to an end but an end in and of itself. By reading and doing the exercises in this book, the student will become part of a new way of learning through visual and graphic means. Expanding on cognitive approaches to education, in this text we take seriously the need for students to know, understand, integrate, and reflect on what they are learning. In this book we attempt to do this by offering overviews, contemplating debates, and providing examples in ways designed to build critical thinking, research, and reasoning skills among a new generation of college students. To succeed, we think it is time to revisit how research has traditionally been taught. There is evidence that traditional education models have been more successful at ensuring students can recite facts from the past than facilitating the kind of practical skill development and higher order thinking that can enable them to both discover and use knowledge in the future (Blagg, 1991). As Richard LeGates (2004) has noted, undergraduate students who are beginning majors in the social sciences feel inadequate when undertaking rigorous empirical social science research. Unlike their peers in the natural sciences, social science students all too often fear and rarely enjoy research methods courses. Subjecting students to research methods courses they do not enjoy poses motivation and retention problems. It also poses a significant challenge for a new generation of instructors who seek to combine standards with accessibility.

In this text we hope to build on other attempts to demystify the research process (Alvarez & Gowin, 2009) and expand emergent discussions about the use and utility of visual methods (Banks, 2001). Our approach is based on the promotion of practical social science research by making the college classroom a laboratory—a place where research is discussed, conducted, and visualized by instructors and students working together. The notion that visualizing social science research can assist students, instructors, and researchers to see patterns is by no means new (Kaplan, 1964). Yet despite promising developments since the 1970s, visual depictions of exploratory data analysis are only now reemerging, driven in some ways by the wealth of data available to all online. Yet this remains an area of scholarship in which chaos reigns (Åhlberg, 2008) and too few authors acknowledge the shoulders of those on whom they stand. Although we too have likely missed some past visual approaches, we believe there is value in providing a variety of examples. Some predecessors to current mapping efforts include “spider diagrams” (Hanf, 1971), “mind maps” (Buzan, 1974), “box and whisker” charts and “stem-and-leaf” diagrams (Tukey, 1977), “knowledge mapping” (Dansereau, Sells, & Simpson, 1979), “Vee diagrams” (Gowin, 1981), “concept maps” (Novak, 1981), and “clustering” (Rico, 1983).

Despite the wide variety of depictions, visual representations in research are too often limited to the presentation of data and the explanation of findings. A leading expert on the visual display of quantitative information is Edward Tufte. He has written a number of books in his distinguished career, but Tufte is perhaps best known for his detailed analysis of how to display data for precise, effective, quick analysis presented in his seminal book *The Visual Display of Quantitative Research*, first published in 1983. He argued that graphics play an important role in the understanding and interpretation of statistical findings. In the most recent edition of his famous text he wrote the following:

What is to be sought in designs for the display of information is the clear portrayal of complexity. Not the complication of the simple; rather the task of the designer is to give visual access to the subtle and difficult—that is, the revelation of the complex. (Tufte, 2001, p. 191).

As visualization has been used as part of scientific reasoning, it is often seen as merely another analytical tool for sense making (Viégas & Wattenberg, 2009). In recent years, the availability of online data sources has led to a number of new means to engage in information visualization. These include free online programs such as Many Eyes, Phrase Nets, and Wordle (Feinberg, 2010)—which we have used in this book (van Ham, Wattenberg, & Viégas, 2009; Viégas & Wattenberg, 2009; Viégas, Wattenberg, van Ham, Kriss, & McKeon, 2007). Providing a more accessible means to visualize quantified online data is laudable, but there may be other ways, approaches, and purposes that should be considered. As Johanna Drucker (2009) has noted, for some researchers it is imperative to develop models of knowledge for the digital age

that provide a means to capture data that are freely “given” by participants rather than focus solely on presenting data “taken” by researchers.

Although differences among approaches exist, a good starting place is the idea that the bulk of what a researcher does is an attempt to derive meaning from data, requiring the recognition of patterns (Miles & Huberman, 1994). Graphic knowledge representation tools can be especially useful in illuminating this process. This book focuses on concept maps, mind maps, and Vee heuristic diagrams to provide a “window on the mind” (Shavelson, Ruiz-Primo, & Wiley, 2005). We present maps as a distinctive means with which to gather data and facilitate a deeper appreciation of the research process, with the goal of improving teaching, learning, and overall understanding (Entwistle, 2009). To understand the value and potential of maps in social science research, it is important to first appreciate the different aspects of the research process itself.

## UNDERSTANDING THE RESEARCH PROCESS

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Unlike natural science research, social science research attempts to measure what some consider intangibles. These include perceptions, behaviors, emotions, and/or personalities. It is important to understand that whereas approaches to social science research vary by discipline and approach, all consider in one way or another to what extent we truly are capturing what we say we are capturing. Discussed in detail in later chapters, *reliability* considers the consistency of one’s approach to measurement, whereas *validity* involves assessing its accuracy and the conclusions we can draw as a result. These apply in different ways to quantitative and qualitative approaches to research and have traditionally been seen as separate and distinct elements of a research project. It may be useful to see them as integral parts of the research process as a whole (Teddle & Tashakkori, 2009). For now, let’s concentrate on understanding the research process by breaking it into key decisions or elements that inform and affect all research. These include the theoretical perspective, epistemology, methodology, and data collection (Crotty, 1998, pp. 2–3) (see Figure 1.2).

The four elements below are at the heart of the underlying assumptions and differences among researchers from different disciplines. In general, the *theoretical perspective* is the philosophical stance that provides the research context and informs the rest of the process. *Epistemology* refers to the theory of knowledge embedded in the theoretical perspective and attempts to answer questions such as, What is knowledge? How is knowledge acquired? and How do we know what we know? Discussed below, these two concepts might usefully be considered together. Of further practical concern for researchers is the *methodology*—the design, strategy, or plan of action—required to gather and analyze data. This in turn directly affects *data collection*, which refers to the specific methods, techniques, or procedures that you will use to collect or gather data related to a research area, question, or hypothesis. Methodology and data collection can also be usefully discussed together.

Figure 1.2 Thinking About Research Decisions



### Common Theoretical and Epistemological Starting Points

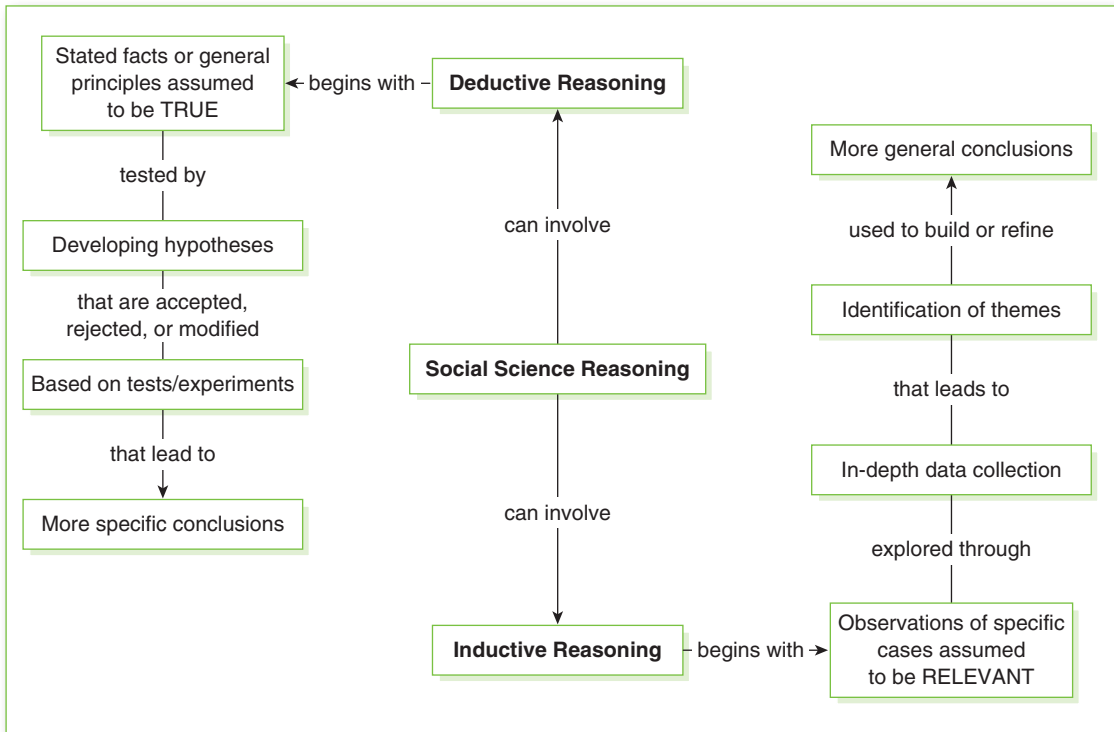
Different approaches to research are based on disparate theories about how people understand reality and develop knowledge about it. Historically, science has relied on the *positivist tradition*. This view held that to establish the truth about the world, knowledge could be quantified and empirically studied through the scientific method. In this view, reality is the same for you as it is for me, and the only research of value focuses on what can be directly observed and measured. In more recent years, many of these assumptions have been revisited through the emergence of *postpositivism* (Slife & Williams, 1995). Unlike positivists, postpositivists see human knowledge as speculative and not based, therefore, on unchallengeable, rock-solid foundations. Influenced by Karl Popper (1968), postpositivists argue that the external world exists independently of an individual's experience of it, and thus human knowledge is always part of a theory, based on general foundations. Although this description is useful to understand how positivism has been updated and revised, some prefer to identify themselves as *critical realists* (Miles & Huberman, 1994). This term refers to the belief that whereas some of our observations of the world are correct, others are not. Regardless of which label is used, however, and in contrast to early assumptions about research, those who value the measurement of social phenomena acknowledge that all research is incomplete in one way or another. For these researchers, the fact that limitations exist should not exclude testing and revising tentative, preliminary, and working theories about the world using the scientific method.

The *constructivist* or *interpretive tradition* is skeptical of the idea of one universalistic notion of truth and instead views meaningful realities as contingent on human practices. Thus, reality is socially constructed and can be different for different people, influenced to varying degrees by the cultural, historical, political, and social norms that operate within a specific context (Crotty, 1998). An emergent tradition based on

a more *pragmatic approach* rejects either/or approaches to understanding reality and developing knowledge. Through multiple stages and methods of data collection and/or analysis, researchers can arrive at a better understanding of a phenomenon by combining the reliability of empirical counts with the validity of lived experience.

These approaches in turn influence how researchers view the process of reasoning. *Deductive reasoning* is sometimes described as a top-down process that tests general premises through a series of steps to reach specific conclusions. Associated with positivism or postpositivism, quantitative research seeks generalizability through controlled, value-free (or value-neutral) processes. *Inductive reasoning* is a process that develops general conclusions based on a series of steps that explore specific premises. Sometimes described as a bottom-up approach to research, qualitative research is associated with constructivism or interpretivism and seeks to understand or make sense of the world based on how individuals experience and perceive it. Figure 1.3 provides one way to think about the differences between deductive and inductive reasoning.

**Figure 1.3** Comparing Deductive and Inductive Reasoning



An emergent approach to research is based on *abductive reasoning*. This can be understood as a process that values both deductive and inductive approaches but relies principally on the expertise, experience, and intuition of researchers. Tentative explanations and hypotheses emerge through the research process, and these must be tested theoretically and empirically. Associated with mixed-methods research, through the *intersubjectivity* of researchers and their understanding based on shared meaning, this approach to reasoning encourages the use of both inductive and deductive approaches to research. Mixed methods is perhaps of most interest to a new generation of scholars because it can produce stronger measures of association while allowing that multiple paths to meaning exist. Table 1.1 explores the key issues in social science research.

**Table 1.1** Key Issues in Social Science Research

	Quantitative Approach	Qualitative Approach	Pragmatic Approach
Connection of Theory and Data	Deductive	Inductive	Abductive
Relationship to Research Process	Objectivity	Subjectivity	Intersubjectivity
Inference From Data	Generality	Context	Transferability

Source: Morgan (2007, p. 71).

## Methodology and Data Collection

One way to think about the difference between deductive, inductive, and abductive approaches to research is based on their relationship to theory. The deductive approach assumes that researchers are objective and/or value-neutral actors who attempt to draw generalizable conclusions based on cause and effect, the reduction and selection of key variables, and detailed observations and measurement (Creswell & Plano Clark, 2007). *Quantitative methods* can be described as the techniques associated with the gathering, analysis, interpretation, and presentation of numerical information (Teddlie & Tashakkori, 2009, p. 5). Through clearly defined dependent and independent variables, quantitative research relies on *hypothesis testing* to test and validate theories through *falsification*, which requires that one modify or reject certain beliefs based on the integrity and consistency of research findings through a logical investigation. Using deductive approaches to analysis, quantitative studies often begin with a related hypothesis, collect defined categories of data, and



objectively analyze the data based on existing assumptions about knowledge. Figure 1.4 provides an example of how these steps are related.

*Qualitative methods* can be best understood as the gathering, analysis, interpretation, and presentation of narrative information (Teddlie & Tashakkori, 2009, p. 6). Qualitative analysis through inductive reasoning is an approach to analysis that aims to build theory by focusing in more depth on individual cases and context-specific realities. Researchers who use qualitative methods are often dubious about generalization and the neutrality of researchers. Data are collected with the assumption that all knowledge is contextualized and that relationships will become apparent through the subjective analysis of the researchers. Through inductive approaches, qualitative researchers use observational research to observe and record phenomena while acknowledging their own role in the way their analysis unfolded. These studies may include surveys, interviews, or other more detailed ethnographic approaches.

This sort of approach to theory building can be divided into two types. *Classical theory building* is similar to deductive reasoning because it establishes a concept or proposition and then conducts analysis to explore it through the research, as Figure 1.5 presents.

In contrast, *grounded theory building* is a process by which one first collects and analyzes data and, based on the concepts of themes that emerge from those data, attempts to formulate concepts about these relationships. The chief difference between these approaches is how and at what stage researchers identify themes. In traditional approaches, the identification of themes often occurs before data collection. In grounded approaches, themes are identified only after data collection to ensure the researcher keeps an open mind and does not seek to “fit” data into past findings. A visual representation of this approach is presented in Figure 1.6.

**Figure 1.4** Testing Theories in Quantitative Research

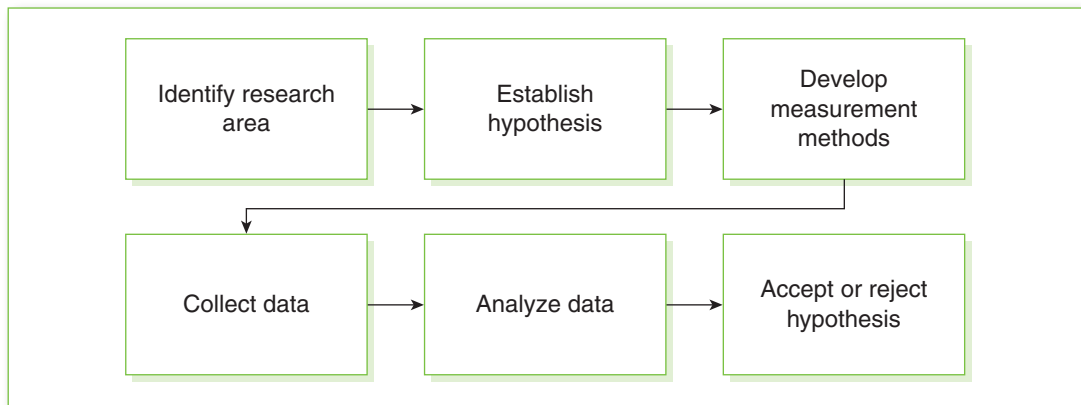


Figure 1.5 Classical Theory Building in Qualitative Research

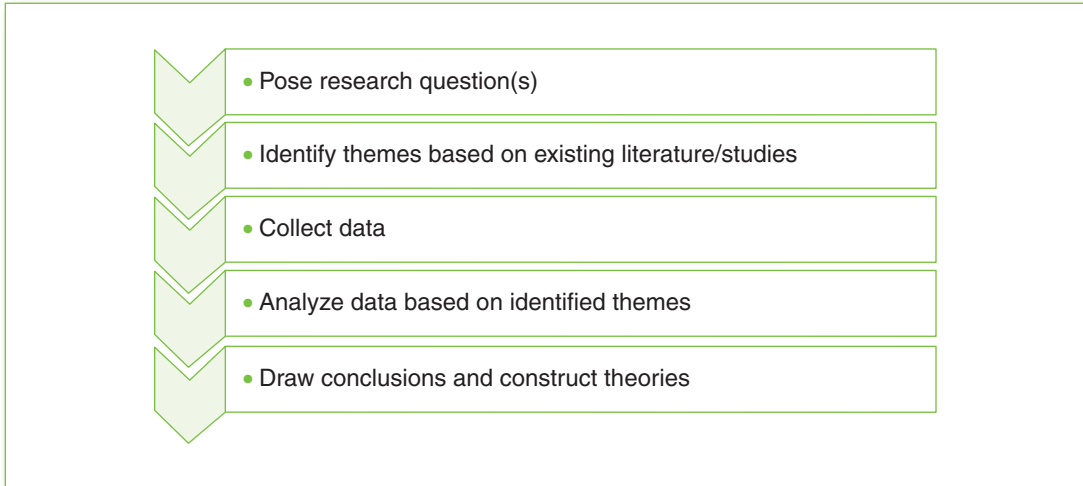
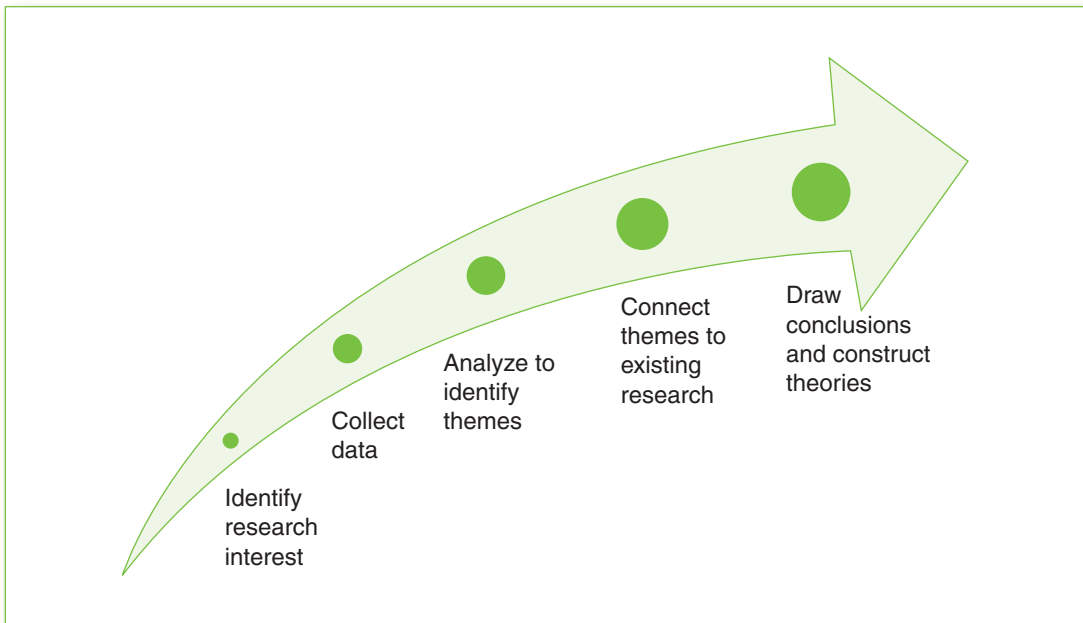


Figure 1.6 Grounded Theory Building in Qualitative Research



A final methodology is associated with *mixed-methods research*. A central premise is that the use of quantitative and qualitative approaches together can provide a better understanding of a research problem. A variety of types and approaches of mixed-methods research have been defined (Creswell & Plano Clark, 2007). One approach is to use qualitative techniques to develop a theory that can then be tested by establishing a conceptually connected hypothesis and quantitative means with which to test it. Another is to develop a quantifiable means that can test a generated hypothesis and then explore these findings using more qualitative techniques. By using these mixed approaches, research problems can benefit from both qualitative and quantitative approaches to data analysis and the measurement of meaning. Figures 1.7 and 1.8 provide examples of two approaches to mixed-methods research.

Although Figures 1.7 and 1.8 provide examples of how mixed-methods research can be attempted, both conceptual and practical challenges remain. Indeed, no matter which approach to research one takes, each has associated strengths and weaknesses. The question is not which kind of research is better but instead which type of approach is best suited to the kind of research problem under investigation. A key element in this initial stage of research is planning. Maps can be a useful way to see which steps may be involved to complete a research project. This is discussed in more detail in Chapter 5.

**Figure 1.7** Quantitatively Testing Qualitative Findings

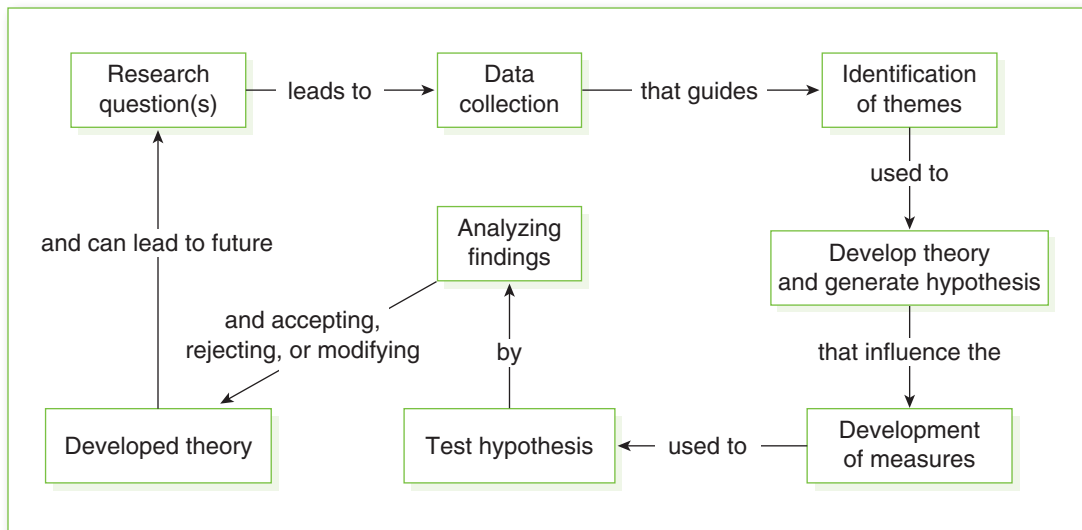
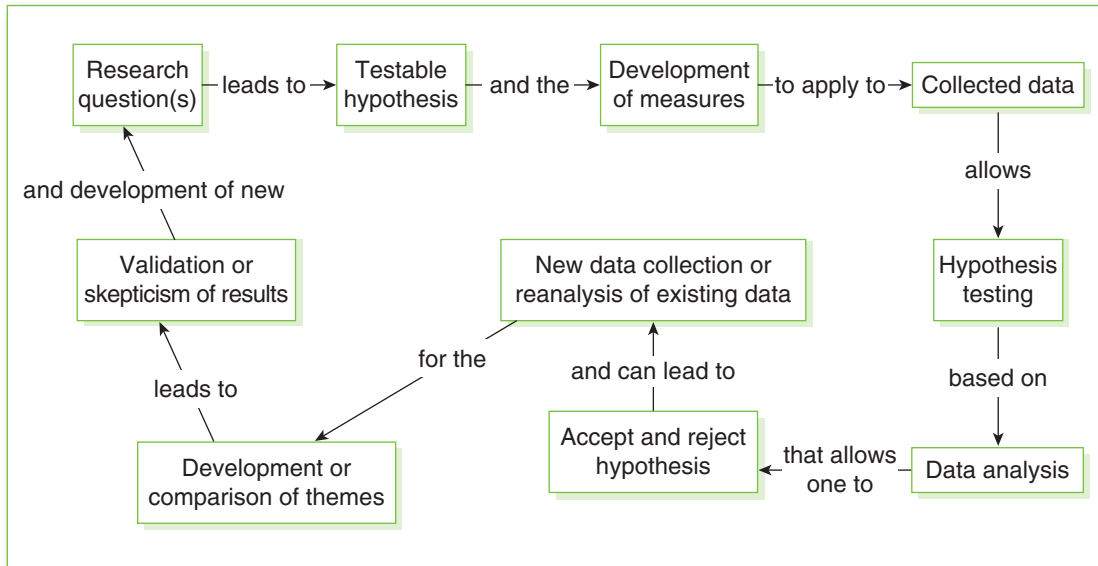


Figure 1.8 Qualitatively Validating Quantitative Findings



## A RESEARCH EXAMPLE

*Throughout this book, we will offer research examples to assist you to see the steps involved in research and present practical examples about how maps can be used. In our first example, we consider the question of how one's approach to a research question shapes subsequent decisions. Based on work by Darlaston-Jones (2007), this research example provides an accessible and practical topic about research itself. Its specific value is based on how it demonstrates different ways one might study this topic.*

Suppose one wanted to know why some university students complete their undergraduate degrees and others do not. There are a variety of approaches one could take to investigate this phenomenon. Starting from a postpositivist epistemological basis, one might assume that reality is the same for all of us. Thus, students with similar backgrounds or features (age, gender, ethnicity, financial resources) would be equally motivated to complete their degrees. Using a quantitative approach, a researcher might look to existing literature about university retention, develop a hypothesis based on the literature, and set about testing it. For example, by tracking all students over the course of their degrees, one could compare university status (graduated, enrolled, withdrawn) with various demographic data (age, ethnicity,

gender, financial resources) to draw general conclusions as to which demographic factors are relevant in explaining and predicting undergraduate degree completion.

On the other hand, starting from an interpretive or constructionist epistemological basis, one might assume that how we perceive reality is contingent on our prior experiences. Thus, depending on how we have been socialized, “university” as a concept may mean very different things to students who otherwise share common demographic features. Consider the student being pressured into a course of study by her university professor parents. She may resent the university and, despite having financial support, may prefer meeting new friends at the local watering hole rather than wrestling with her Introduction to Psychology textbook. On the other hand, consider the student who is the first in her family to attend postsecondary school. She may have fewer means than her bar-hopping colleague but have free reign to find a degree program that is meaningful to her. For qualitative researchers, it is stories and dynamics like these that can lead to deeper meaning about why some students complete degrees and others do not. Although two students of identical age and gender might have completed high school the year before university, their desire to complete their degrees may be completely different. Through in-depth interviews with some students about their university experience and their motivations for completing their degrees, one can understand in a personal way the *how* or *why* around retention rates among undergraduate students.

Because each approach starts from different assumptions about the world, it values and thus seeks different types of data and approaches to investigating this research problem. As a result, neither is a complete account, and thus both are limited. On the one hand, quantitative approaches may miss the nuance of real people’s lived experience, their motivations, and their desires, whereas on the other hand, qualitative approaches can tell us about the experiences of only the few individuals interviewed and, by failing to account for larger trends, may miss the forest for the trees. The most compelling strategy may well be a mixed approach. For example, in this scenario, quantitative analysis might show us that men from low-income backgrounds are dropping out of their majors at much higher rates than other subgroups of students. Through qualitative interviews with students in this subgroup, challenges and constraints might usefully be identified. In this way, researchers can get a sense of the *what* along with an understanding of the *why*.

### EXERCISE 1.1

#### Mapping Issues Around College Completion

Based on Figures 1.4- through 1.8, develop two maps that demonstrate how you could approach this research example using a step-by-step approach.

## VISUALIZING HOW TO PLAN A RESEARCH PROJECT

Although the above discussion provides a useful conceptual means to understanding the steps one might take to investigate research questions, it may be helpful to link these elements to an actual research project in your field. Organizing your research visually provides a means with which to plan the various aspects of a research project and contemplate which steps are required to conduct a research project. As this chapter has demonstrated, how we plan and conduct research depends to a large extent on the assumptions people make about knowledge, research, and the role of the researcher. Maps, graphs, and diagrams can play a very useful role in assisting researchers to plan their research. Figure 1.9 provides an example of how a mind map can be used to see the elements required to complete a research project. A *mind map* (Buzan, 1974) is a flexible means to show the connections between different ideas within a singular topic.

As another example, Figure 1.10 presents a more complex example of how concept maps can be used to describe the process used in a research project on adult students in higher education (Daley, 2004). A *concept map* (Novak, 1981) is a formal, structured diagram showing relationships among a number of unique concepts. This example clearly demonstrates how the researcher sought to connect existing theory and studies to a research process that involved concept maps.

**Figure 1.9** Eight Elements to Consider in a Research Project

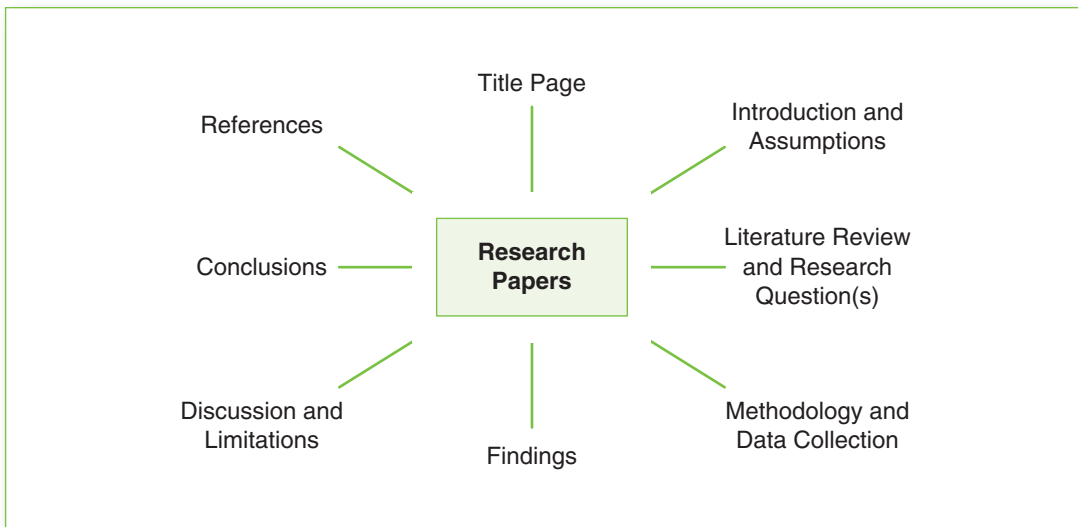
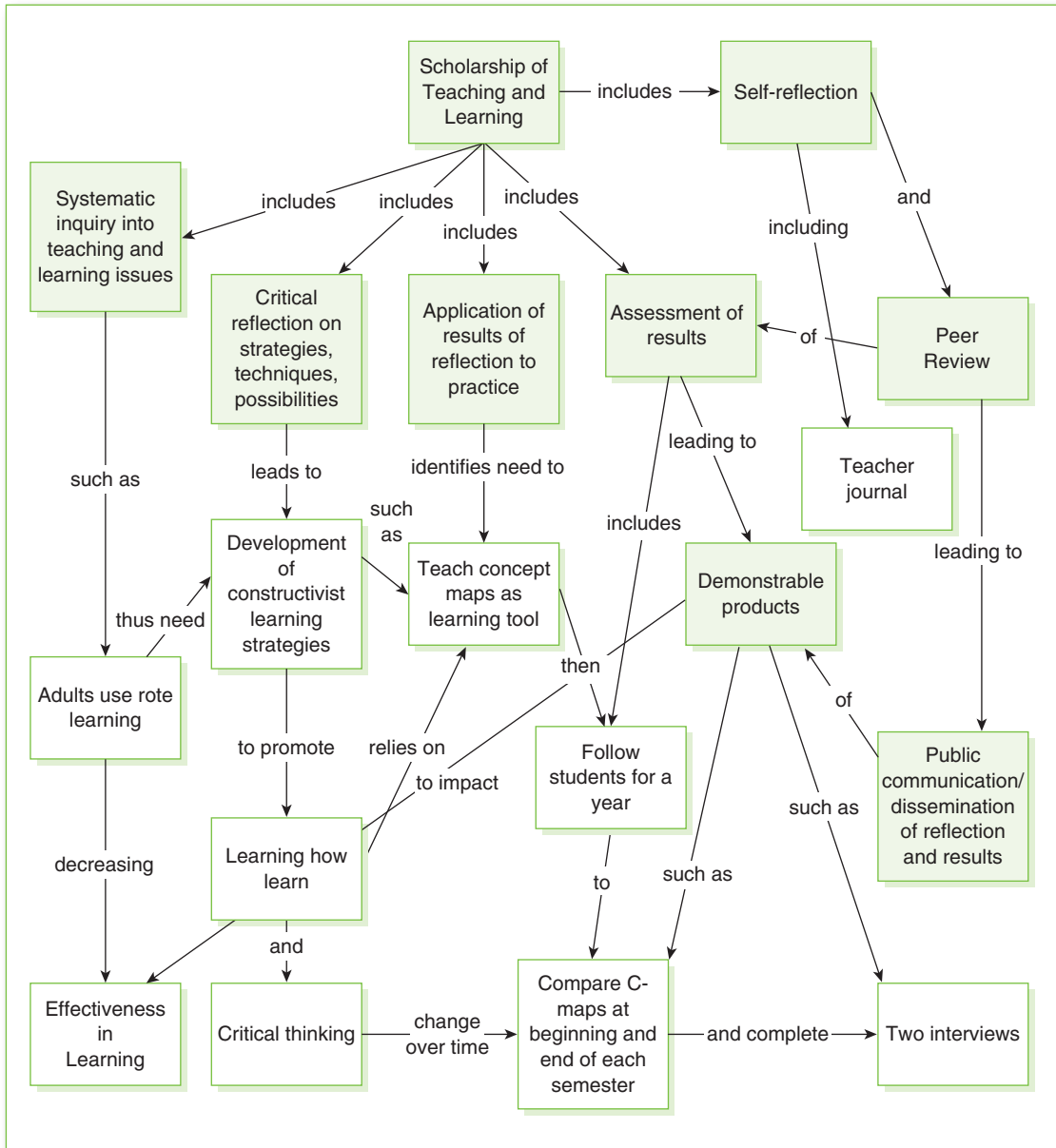


Figure 1.10 Mapping the Scholarship: Understanding Adult Students in Higher Education



Source: Daley (2004).

Note: C-maps = concept maps.

## THE ORGANIZATION OF THIS BOOK

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The approach taken in the remainder of this book is to provide both a theoretical justification and practical examples for the use of maps, graphs, and diagrams in social science research. Sometimes the description of a book's organization is placed within the preface and is not used to its full potential. We believe understanding how a book is organized will make it more accessible for readers and have included an overview below. As you have seen, Chapter 1 considers the complexity and numerous choices researchers face when conducting research. We have presented visualizing the research approach as a useful strategy to plan, better understand, and demonstrate the choices you might make.

In the second chapter, the two main varieties of maps used in this book are presented. Through a definition of concept maps and mind maps alongside a discussion of their theoretical bases, these approaches are presented as useful means of data collection in social science research. The third chapter presents more traditional uses of concept maps (Novak, 1981) and evaluates more deeply the assumptions made by quantitative researchers and the value placed on theory testing, generalizability, and repeatability. Used for decades, concept maps can provide data that allow for the measurement and analysis of levels, hierarchies, and relationships. Researchers can use quantitative techniques to count concepts and propositions and can score concept maps based on existing models, scales, and methods.

The fourth chapter explores the utility of mind maps (Buzan, 1974) to the value placed on theory creation, depth of understanding, and the role of the researcher in qualitative research. As mind maps are user generated and more flexible than concept maps, they may be better suited to qualitative research. Maps can provide useful data about how individuals perceive, understand, or remember certain experiences. They can prime the pump of participant reflection and be used alongside other, more traditional, qualitative data-collection techniques. Finally, based on data within the maps, researchers can create more detailed and relevant interview questions relating to how participants created their maps.

The fifth chapter considers the limitations of quantitative or qualitative research and considers how (and indeed, whether) mixed-methods approaches can address these limitations. By relying on the strengths of each method together, mixed methods can provide a more detailed understanding of what research data are suggesting. Using research examples involving concept maps and mind maps, mixed-methods approaches to research are presented and considered. By providing a flexible means both to count concepts generated through more unsolicited data-collection means and to understand how individuals constructed and presented their experience through maps, they offer a logical tool to be used along with other approaches in multimethod, multistage data collection.



The sixth chapter presents how maps can be used to help you write up your research project based on key headings and subheadings, including Research Focus, Literature Review, Methodology, Data Collection, Data Analysis, Results and Discussion, Limitations, and Conclusions. Although approaches will vary by your discipline, class, and research project, most research papers address the above elements. In this chapter, approaches, tips, and strategies to writing up your research project are presented.

Finally, Chapter 7 explores some of the limitations associated with concept maps and mind maps, including both conceptual and practical difficulties encountered. In this chapter we consider questions of reliability and validity as well as new approaches to understanding research inferences. In addition, this chapter outlines two new directions in social science research, including evidence-based research through systematic review and participatory action research models. Applied to criminal justice policy and education, maps offer new ways to capture data and validate existing findings. By suggesting ways that maps can be used in each of these emergent research areas, this chapter presents a tentative integrated action research model that combines the strengths of quantitative systematic review with qualitative participatory action models. This chapter concludes by suggesting that the best way for the use of maps to continue to grow in the social sciences is through their increased use by students, researchers, and community members.

## STUDENT ACTIVITY

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With the assistance of your instructor, find a recent study in your field. Using the approach used in either Figure 1.8 or Figure 1.9, create a similar map based on how the researcher(s) approached the study. As you read the study, map out the relevant sections based on the elements provided. These might include the research area, literature review, methodology, and so on. Consider how the structure of the paper helps the author to present his or her ideas.

## CONCLUSION

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Social science research can seem daunting and complex. One way to break it down is to visualize the concepts, processes, and requirements of conducting research. In many ways, research might best be seen as a series of choices researchers face. Visualizing the approach you wish to take to investigate a phenomenon or issue can be a useful strategy, and mapping your research plan can assist your readers

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to understand the choices you have made. Through this acknowledgment, you demonstrate your understanding of the complexities of research and remain humble.

This chapter has provided an overview of the research process and has presented some examples of how visualizing research may be useful to see the connections between theory and practice, epistemology and methodology. It has also provided some concrete examples of how mapping your research can help when planning and conducting research.

### REVIEW

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1. Define social science research. Why is it useful to describe research as a series of decisions? What are the consequences of these decisions, and why do they require an acknowledgment of research limitations?
2. How can visualizing social science research be useful for students, instructors, and researchers?
3. Present and define the four major components of social science research.
4. Explain how the research processes vary between quantitative, qualitative, and mixed-methods research.
5. What are the eight major elements of a social science research paper?

### SUGGESTED ADDITIONAL READINGS

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