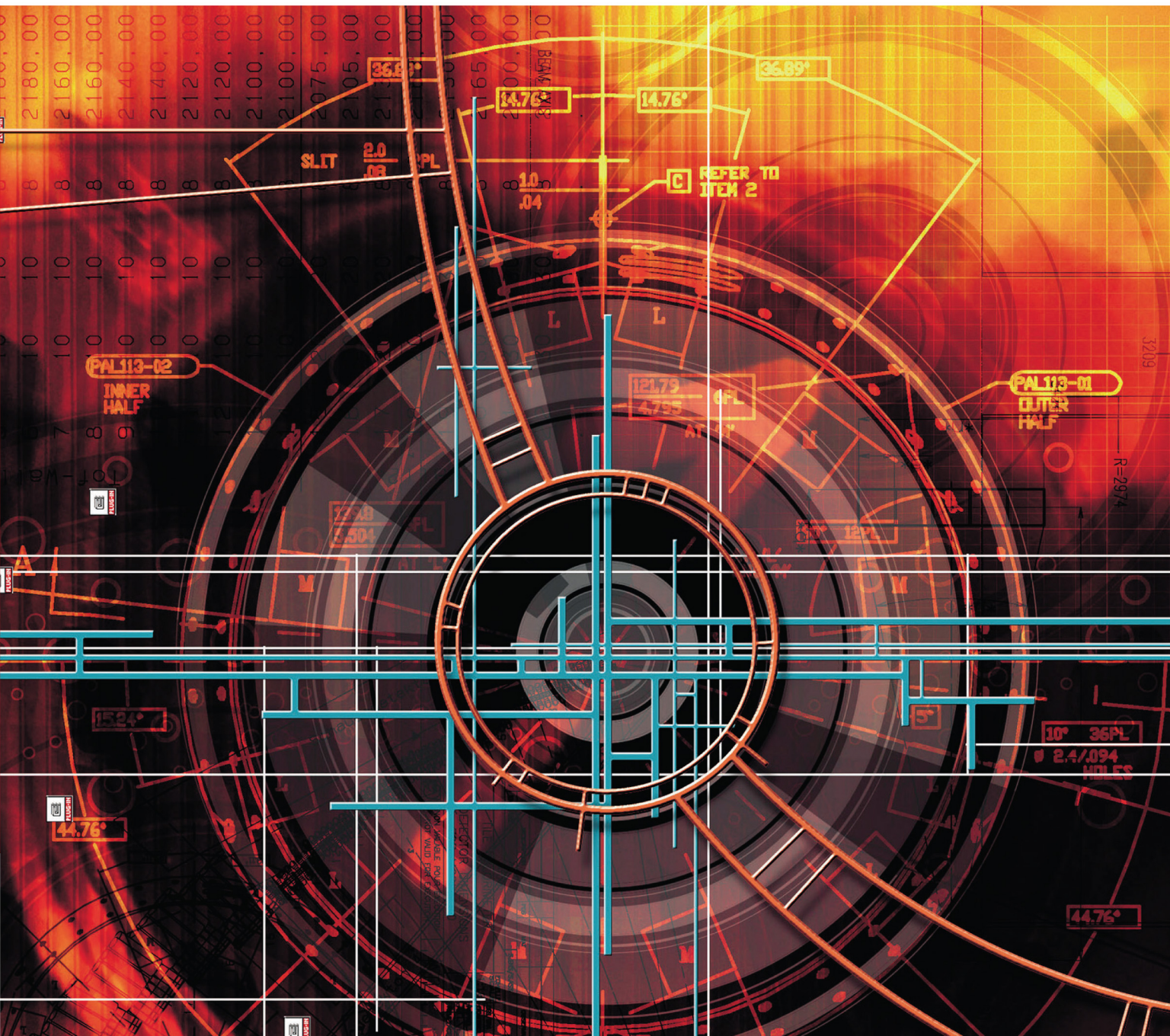


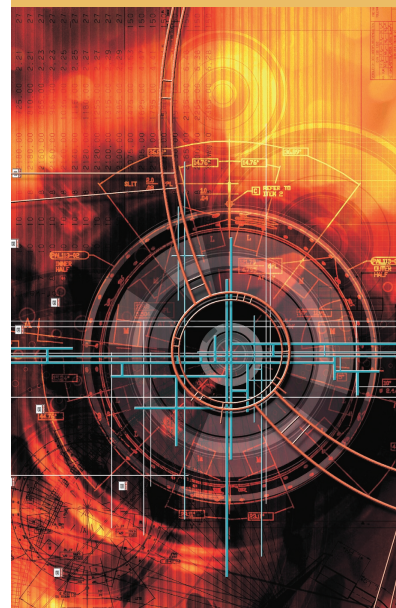
Research Methods

THE ESSENTIAL KNOWLEDGE BASE

WILLIAM M. TROCHIM • JAMES P. DONNELLY • KANIKA ARORA



Research Methods



Research Methods

T H E E S S E N T I A L
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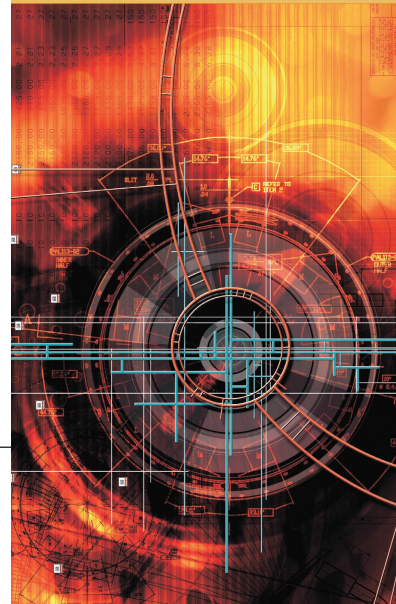
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Preface

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.
—*T. S. Eliot*

How is it that we can look at the familiar things that are around us and see them in a new way? The three of us who have co-authored this text have certainly been dealing in familiar territory for us. Together we have decades of experience in research methods, as students, teachers, and practitioners. Every Monday morning at 9 a.m. for the past several years we have gotten on the phone to talk over how the text was coming, to discuss some arcane aspect of research methods, to divvy up responsibilities for next steps and, okay, we'll admit it, to have some fun just playing with ideas and coming up with new ways to present this material. For us this has been an exploration of very familiar territory. But, as T. S. Eliot suggests, the end is that we have arrived here, at this preface, at the beginning of this text, writing the last few lines that will finish our journey, and we feel like we know the place for the first time.

Throughout, we've imagined you, the reader, and have tried to put ourselves in your place. We've tried to think about what it must be like to experience this unfamiliar territory of research methods for the first time. We've tried to sense the panic, the feeling of being overwhelmed, and your desperation as a test approaches. We tried to be there with you in spirit as you hit the college town bars last Saturday night knowing you had a whole chapter on measurement to digest before the quiz at 8 a.m. on Monday morning. In order to feel what you went through, we even went so far as to simulate the experience ourselves a few times—the bars, that is. And in the end, we tried to write this text with one overarching principle in mind—you have to get a grip! We know that if this is really your first time in a course like this, the material can be daunting. We know you probably put this course off until the last possible semester (even though it would have been much better if you had taken this stuff earlier so you could have understood the research in your other courses). We can sense that many of you will feel disoriented by the strangeness of research thinking. And so we have done our best to try to calm you down.

Learning about research methods is a lot like learning about a new culture. You're going to meet a lot of strange people along the way. You're not going to understand the language. You're going to have a hard time communicating. You're going to have trouble even reading the menu. You're going to feel foolish at times and, yes, maybe you'll actually say some foolish things. You will make mistakes. But like all new cultural experiences, once you immerse yourself in the context you'll begin to get your bearings. You'll pick up a useful phrase here and there and actually use it properly in a sentence. You'll get the lay of the land and begin to move around more comfortably. And one day you'll suddenly find yourself feeling that sense of mastery that comes from having stayed with it. All right, maybe not everyone who reads this text will feel that way. But we're confident that you will come away from this a better person for having experienced this new culture. So, let's set out on this exploration and come to "know the place for the first time."

The Road to Research

When you come to a fork in the road—take it.
—Yogi Berra

Remember when you were a little kid, piling into the family car and setting off on a trip? It might have been to Grandma's house, or it might have been a cross-country vacation, but there was the thrill of the journey to come, the unexpected, perhaps even something exciting. Or maybe you didn't do the family-car thing. Perhaps for you it was setting off on the subway for the museum on a Saturday afternoon. Or getting on a plane to fly off to new places. Never traveled when you were a kid? Okay, this metaphor won't work—skip down to the next section, and we'll try again. But if you did any traveling, you know how exciting and mysterious setting out can be. Research is a lot like setting out on a new trip. No, really. You're going to have fun. Honest.

When you start out on a trip it's useful to take a map. We're not talking about Google maps on an iPhone, we're talking about a real map, crinkled at the edges, a marked-up and well-worn map that shows the terrain you'll move through on your journey. You're going to take your trip via this map, following a path. We and your instructor will guide you in moving down the road—let's call it the Road to Research. Figure 1 shows what this road might look like and, not incidentally, depicts the high-level contents of this text in a way that suggests that the research process is a practical sequence of events, a type of trip down the road. As with all maps, the actual trip down the research road is a little more exciting than Figure 1 suggests! The map shows a territory that looks a lot like Middle Earth in the Tolkien's *Hobbit* and the *Lord of the Rings* trilogy. And, even though the map itself looks relatively benign, you know that as you and your friends move down this road, stopping off at the major research methods destinations, you can't anticipate all of the challenges along the way, how you will be constantly avoiding dangers and defying death while trying to get the ring into the fiery volcano. Okay, maybe it's not that exciting. Maybe we're overstating the metaphor a bit.

But research is like a journey in that it typically involves a set of steps. Every research project needs to start with a clear problem formulation. As you develop your project, you will find critical junctions where you will make choices about how to proceed, where you will consider issues of sampling, measurement, design, and analysis, as well as the theories of validity that underlie each step. In the end, you will need to think about the whole picture and write up your findings. You might even find yourself backtracking from time to time and reassessing your previous decisions. You might get waylaid by dwarves in the land of measurement or be set upon by strange orcs and trolls when doing statistics in the land of analysis. Really, it's been known to happen. Especially the orcs and trolls who seem especially prone to hanging around statistics. And it's important to know that this is a two-way road; planning and reflection—looking forward and backward—are critical and interdependent. You can take a step back on the way to making two steps forward. You might spend time in the Northern Waste before finally making it to Eriador. Think of the hard surface of the road as the foundation of research philosophy and practice. Without consideration of the basics in research, you'll find yourself bogged down in the mud of Dunland! And if you really want to go nuts, you might think of your teacher as the kids in the back seat of the car (Okay, perhaps to keep the metaphor straight, it should be a cart), constantly needling

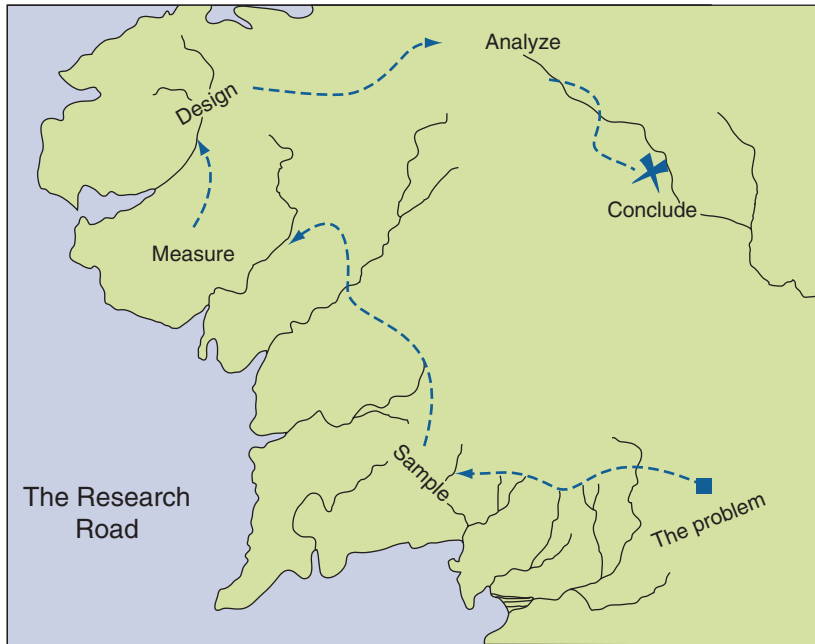


Figure 1 The Research Road Map.

you with, “Are we there yet?” But with all of the twists and turns, the map is useful because it reminds us of the general course we are on. It reminds us that research follows well-known paths, and that even if sometimes you feel like you are lost, the map is always there to guide you.

The Yin and the Yang of Research

For this second metaphor of the research process, imagine that you’re a Buddhist. You might want to sit cross-legged on the floor, burn some incense, and turn up your sitar music. To the Buddhist, everything in the universe is connected to everything else. To the Buddhist researcher, if you can imagine such a person, all parts of the research process are interconnected. The Buddhist view of research might be something like that shown in Figure 2. The left side of the figure refers to the theory of research. The right side of the figure refers to the practice of research. The yin-yang figure (okay, so that’s more Daoist than Buddhist) in the center shows you that

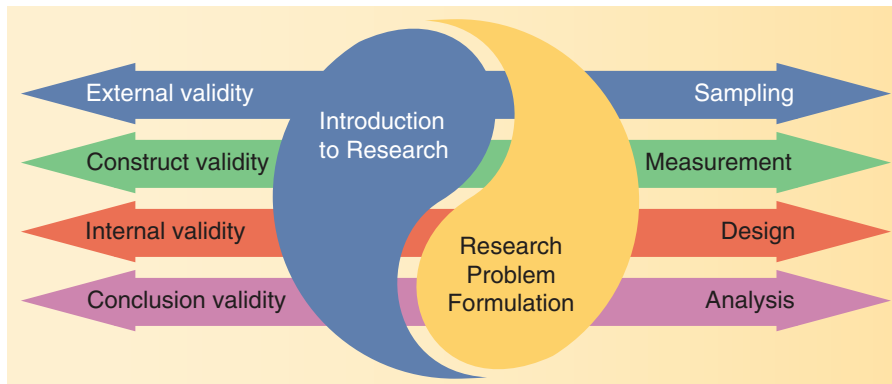


Figure 2 The Yin and Yang of Research

theory and practice are always interconnected. For every area of practice on the right, there is a way to think about its corresponding theoretical foundation on the left. The figure shows a critically important structure, one that underlies research methods, and to which we will refer throughout this text. The four arrow links on the left describe the four types of validity in research. The idea of validity provides a unifying theory for understanding the criteria for good research. The four arrow links on the right summarize the core of research practice, the four topics of sampling, measurement, design, and analysis; these topics run through every research project. The key to the figure is that each theoretical validity topic on the left has a corresponding practical research methods activity on the right. For instance, external validity is related to the theory of how to generalize—to other people, places, and times—research results from the specific study you are conducting. Its corresponding practice area is sampling methodology, which is concerned with how to draw representative samples so that good generalizations are possible. At the center of the figure is the yin and yang symbol. It shows the interdependence of the conceptual issues that underlie all research, with the fundamental or introductory concepts (like the research enterprise and the language of research) on the left, and the approaches we follow in formulating or conceptualizing the research problem on the right.

The figure as a whole illustrates the yin and yang of research—the inherent complementarities of theory and practice—that we try to convey throughout this book. If you can come to an understanding of this deeper relationship, you will be a better researcher, one who is able to create research processes, rather than to simply use them.

Okay, it's time for you to sit cross-legged and meditate on the yin and yang of it all, as we start down the road to research.

What's New in This Text

This volume is the latest in a long line of writing about research methodology that began in the late 1990s with the Research Methods Knowledge Base website (<http://www.socialresearchmethods.net/kb/>), which was essentially the translation of the first author's class lectures to the Internet. This was followed by the publication of revised content in several significant prior textbook publications, including *The Research Methods Knowledge Base* and *Research Methods: The Concise Knowledge Base*. The current text constitutes the next step forward in this decades-long tradition. It was designed for a broad, applied social research readership, a text that could be used in any standard research methods courses in a wide range of fields. It is written in a style that is designed to be accessible to a student who is new to research methods. The style is deliberately informal and is a conscious attempt to make the often-daunting material more approachable to many readers. And this text provides significant updates of the prior texts, including discussions of the most important changes in research methods over the past few years. Here we attempt to summarize some of the major changes that this text introduces to this tradition.

Overall, the text has been reorganized and streamlined so that content is more tightly knit and flows seamlessly from “broad” to “specific” topics. Each chapter has “Introduction” and “Summary” sections so that linkages can be made to preceding and following chapters, respectively. In addition to numerous new sections of text, we have added an entirely new chapter on Ethics in Research. In addition, numerous new and updated research examples, graphics, and pictures have been included. In spite of all these changes, the core of the tradition of the

original Research Methods Knowledge Base remains intact. Readers of earlier texts will recognize the fundamentals of research methods that have not changed in several decades.

The text begins with an introductory chapter that describes the growing awareness of the field of research methods—an awareness that there is a large and complex research enterprise in contemporary society. This is evident in some of the most important movements in contemporary research: the idea of translational research; the notion of evidence-based practice; the growing importance of research syntheses (such as systematic reviews and meta-analysis) and practice guidelines; and the continuing reverberation of the implications of the theory of evolution in our views of how research evolves.

Chapter 2 introduces the increasingly important topic of ethics in research. We placed this chapter immediately after the introduction to signal to the reader that ethical issues permeate the entire research endeavor. This is the first edition of “The Knowledge Base” series that has a separate chapter on ethics. The topic now receives a complete treatment that includes a detailed history as well as the key principles and practices that all researchers need to know. The discussion is framed in terms of defining the meaning of “good” in research. We suggest that a thorough understanding of the historic and current context of research ethics is essential to good research—every bit as important as the technical or methodological aspects. The review of key events in the history of research ethics includes both world events outside the normal boundaries of research (e.g., the Nazi crimes conducted under the guise of experimentation) and legitimate but ethically problematic research programs (e.g., Stanley Milgram’s obedience studies). Our discussion then moves to the key events that occurred in response to the ethical issues that became known in the problematic studies. This includes the National Research Act and the *Belmont Report*, which established the key principles for our modern research ethics system: Respect for Persons, Beneficence, and Justice. We also discuss the rights of research participants, the responsibilities of investigators, and the role of Institutional Review Boards (IRBs) in the oversight of research. The chapter then discusses the integrity of the research enterprise itself. In particular, we focus on the matter of research ethics in the production and publication of scholarly work. We cite key principles such as honesty in reporting, as well as several cases of scientific misconduct that have undermined the integrity of research. We conclude by emphasizing that research ethics is now defined by formal principles and practices, but will always depend on the ethical compass that resides in each member of the research community.

The third chapter on Qualitative Approaches to research is now included earlier in the book as part of the Foundations section. This was done, as with the chapter on ethics, to signal to the reader that these approaches are in some way foundational to all research. Unobtrusive measures relating to the qualitative tradition are integrated within the discussion of Qualitative Measures—they are no longer treated as separate from Qualitative Measures, as they were in previous editions. Unobtrusive measures relating to “Secondary Analysis of Data” are discussed in later chapters of the book. The chapter now begins more generally by introducing Qualitative Research. The section on “When are qualitative research methods most appropriate to use” has been expanded and the section on Qualitative Traditions is discussed earlier in the chapter, in order to provide context for the subsequent discussion on qualitative measures. Research examples are now integrated in the discussion of each qualitative tradition. The section on “Qualitative Methods” is expanded to include “focus groups,” and the section on “Indirect

Measures” now discusses technological innovation in such measures. The discussion on “Qualitative Data” has also been expanded, and the discussion on differences between qualitative and quantitative data is now integrated within this section. The “Summary” emphasizes the appropriateness of qualitative research methods in the context of specific research questions.

The next section of the book, Chapters 4 through 12, constitutes the heart of the steps in research methodology—sampling, measurement, design, and analysis. While much of the discussion remains true to the Knowledge Base tradition, each chapter has been significantly revised and updated. Chapter 4 on Sampling has more detail and includes research-based examples for each type of sampling method. The organization of the chapter is more intuitive and logical, with added sections summarizing probability and nonprobability sampling methods, and the subsection on “How big should the sample be?” was also included. Chapter 5 on Measurement has been reorganized to begin more generally with “Theory of Measurement” and “Levels of Measurement.” In an effort to provide context, the concepts of “Reliability” and “Validity” are discussed under the larger topic of “Quality of Measurement.” For consistency purposes, we conclude the chapter with a big-picture discussion about integrating “Validity” and “Reliability.” The previously disparate sections on construct validity throughout the chapter are better integrated. We also include a new subsection on “Construct Validity of What?” A discussion on Cohen’s kappa is included under the subsection on “Inter-Rater Reliability,” and the section on “Discriminant Validity” has an entirely new example. Chapter 6 on Scales, Tests and Indices now comes ahead of Survey Research. The section on “Scales” now leads off the chapter and there is an entirely new section on “Tests” that includes: Validity, Reliability and Test Construction, Standardized Tests, Test Fairness, and Finding Good Tests. Chapter 7 on Survey Research begins broadly by defining surveys, the different ways in which surveys are administered, and what factors to consider when selecting a particular survey method. There is an expanded discussion on different types of questionnaires and interviews, and the topic of “Point of Experience Surveys” is now included. The chapter also has an expanded discussion on “Selecting the Survey Method” and “Survey Construction” and updated examples in the subsection on “Structured Response Formats.”

Chapter 8 introduces the critically important topic of research design. It begins with the tricky issue of how to establish causality, using the new example of the Aurora, Colorado, shooting and the issue of whether movie violence causes real violence. The discussion then shifts to the topic of internal validity and the different threats to internal validity, especially in two-group comparative designs. A considerable amount of the discussion is devoted to the issue of selection threats. The chapter concludes with a discussion of the logic of how to design a design. Chapter 9 introduces the idea of experimental designs, particularly the randomized experiment. The chapter begins with a new introduction that provides a history of the evolution of the randomized experiment. Throughout the chapter there is a consistent effort to provide a balanced view of both the strengths and weaknesses of randomized experiments, especially considering their importance in the evidence-based practice debate. The chapter covers the basic two-group experimental design, introduces the design notation, and discusses two ways to address the signal-noise problem in experiments: factorial designs and blocking strategies. The chapter concludes with some important variations on experimental designs and a discussion of the limitations of the randomized experiment. Chapter 10 introduces quasi-experimental designs and begins with the basic two-group, pre-post nonequivalent groups design,

including how to interpret the major outcomes and the major threats to internal validity that might result. It then moves on to a design that has taken on increasing importance in the evidence-based practice debate as an alternative to the randomized experiment—the regression-discontinuity design. The chapter concludes with several important quasi-experimental designs that illustrate critical principles for addressing threats to internal validity. Chapters 8, 9, and 10 incorporate numerous changes and updates that reflect the evolving nature of research design.

The next two chapters of the book, Chapters 11 and 12, deal with the topic of data analysis. Chapter 11 is an introduction to the topic, and it covers everything from data preparation to descriptive statistics. The discussion of conclusion validity, a central idea in this chapter, has been expanded. We attempt to connect every step in the management and analysis of data to the credibility and confidence we can obtain in our analysis. For example, we added encouragement to consider research context in the interpretation of data. This discussion also introduces effect sizes as an important part of conclusion validity. The discussion of p values has been revised to present a tighter and more restrictive conceptualization of what p values are and what they are not. Chapter 12 addresses inferential statistics. The chapter now adds to the conceptual and procedural understanding of conclusion validity with a discussion of the correct interpretation of p values, effect sizes, confidence intervals, and practical significance and their relationship to conclusion validity. And we have added a data-based example of signal to noise ratio in the section on “What does difference mean?”

The final chapter of the book deals with the general topic of research communication. It revisits the idea of the research–practice continuum introduced in Chapter 1 and shows the critical role that research write-ups have in translational research and evidence-based practice. A new section on oral presentation has been added. This includes guidelines for giving a talk as well as a sample conference poster. The poster is based on the sample paper. The presentation is simple and straightforward but compliant with current reporting recommendations. The sample paper is new to the book and is consistent with current standards of analysis and reporting, including the APA 6th Edition and the recently announced requirements of the American Psychological Society (Cumming, 2013). These include a statement regarding IRB review, statistical power, a CONSORT-type flow diagram, effect sizes, and confidence intervals.

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1 Foundations

chapter 1

Foundations of Research Methods

chapter 2

Ethics

chapter 3

Qualitative Approaches to Research



1

Foundations of Research Methods

chapter outline

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The Greek philosopher Aristotle reportedly said: “Well begun is half done.” This chapter is designed to get you “well begun” on the often-daunting topic of research methods. The good news—if you believe this saying—is that when you’re done with this chapter you will be “half done.” The bad news of course is that it’s not literally true. You have an entire text yet to complete. But, we were looking for something you might find consoling as you start out on this journey into research methods.

This chapter begins with consideration of the big picture, what we term the “research enterprise.” It describes how the tens of thousands of research projects conducted around the world over time are increasingly being integrated to provide a more empirical knowledge base for humanity. Some of the most exciting and important developments in research are occurring at this more macro level as we collectively get a more global view of how we have evolved into a research-based society. Next, we explore where research ideas come from, the task of conceptualizing a research project. We consider both the inspirational and insightful aspects of conceptualizing and the ways we attempt to build new ideas on the research literatures that preceded our work. Following that, we begin to provide you with the basic tools you will need to navigate the research terrain, the beginnings of a vocabulary that will enable you to understand and speak the language of research. Here we consider some of the most basic terms and concepts that you will need throughout the text as you acquire vocabulary that is even more advanced. Then, we consider the idea that every research project has a structure: a beginning, a middle, and an end. We introduce the basic components that make up the typical research project and describe how they fit together. Finally, since research is concerned with learning about the world around and within us, we end by introducing the basic idea of validity in research, how we judge the degree to which the research we conduct is an accurate depiction of our world.

That ought to be enough to get you started. At least it ought to be enough to get you thoroughly confused. But don’t worry, there’s stuff that’s far more confusing than this yet to come!

1.1 The Research Enterprise

It is amazing, when you think about it, how much our modern society relies upon research. Virtually everything we do, see or come into contact with is the subject of research. Humans carry out research that takes us into the universe, that explores our environment, that leads to all of the technologies that we use, that investigates what we eat and drink and how to produce these things better, that looks at our cities and towns, that assesses our interactions and relationships, and that explores our physical and mental selves. There is almost no aspect of our world that is not the subject of considerable research. Sometimes it is difficult to believe that all of this human activity is a relatively recent invention. Prior to the 1600s there was virtually nothing that resembled what we would today call research. In the space of less than 400 years, humanity has created the idea of research and has seen it permeate into almost every aspect of our lives.

1.1a What Is Research?

So, let’s begin with a few simple definitions. The obvious place to start is with the term research itself. Virtually every field of study involves some form of research. But

the term means many different things across different fields. Research in the field of history doesn't look much like research in medicine. Research in costume design typically won't resemble research in meteorology. So what is it that is common to all of these definitions? Perhaps the most important thing that holds all definitions together is that research is *systematic investigation*. In our everyday life we think about the world around us. We consider options and make choices. But much of this thinking is done dynamically, changing and adapting to the circumstances as they unfold. Research is different. It is a conscious effort to concentrate our thinking, to do it in a rational, careful manner. This is the key to the systematic nature of research.

Research also involves collecting data. It is an *empirical* endeavor. When you go to the store or to a market to buy something and you just browse through the aisles seeing what catches your eye, you may be gathering information, but you are not doing so systematically. On the other hand, when you systematically compare products, collecting comparable information about their features, quality, service history, and so on, you are engaged in an empirical effort, an effort that is based upon systematic observation that yields data that you can use in your decision making.

Research is also typically a *public* effort. While you might collect lots of information systematically so that you can make a better decision, researchers typically conduct research so that it can contribute to a broader base of knowledge than just their own. Consequently, it is important that research procedures are described in a way that enables other people to understand them, duplicate them and make judgments about their quality.

So, we might put this together into a simple definition:

Research is a type of systematic investigation that is empirical in nature and is designed to contribute to public knowledge.

In this volume, we focus on a particular subclass of research known as *social* research. The topics that are investigated in social research have to do with our societies, the things we do, how we interact, how we live, how we feel, and how we see ourselves. It encompasses much of the research that is done in fields like sociology, education, public health, criminology, housing, public welfare, applied and social psychology, and many more. While much of what this text talks about is relevant to other fields like biomedical research or engineering, our focus here is on the social aspects of phenomena.

Typically, when we conduct research, we do a research *project* or study that addresses one or more specific questions, collects specific data, involves conducting specific analyses, and so on. We virtually never do a research project in a vacuum. Every research project is undertaken with the realization that there was prior research that addressed some aspect of what we are looking at. Even if no one has previously looked at exactly the question we are investigating in a project, it's still likely that someone has previously looked at something similar, used similar data, or done similar analyses. We also know that every research project will have flaws and that no research project on its own is likely to provide a definitive answer to any truly important question. In every field, we conduct multiple research projects, addressing important issues, each project fallible and imperfect, and each one contributing to the broader accumulating knowledge base.

This text concentrates most on how you learn to conduct a research project, a specific investigation of a question of interest. But it is important that you understand the broader effort that each research project contributes to. We refer to that broader effort as the research enterprise. The **research enterprise** is the macro-level effort to accumulate knowledge across multiple empirical systematic public research

research A type of systematic investigation that is empirical in nature and is designed to contribute to public knowledge.

research enterprise The macro-level effort to accumulate knowledge across multiple empirical systematic public research projects.

projects (Sung et al., 2003). In the past few decades, as more research projects and studies have been done, we have become much more aware of this cross-project endeavor. This makes sense. After hundreds of years of conducting individual research studies and then series of studies, we are now finally turning our attention to the broader environment within which all this activity takes place. In the next few sections, we consider some of the most important aspects of this larger research enterprise, in order to provide a foundation for understanding how to conduct individual research projects—the central focus of the remainder of this text.

1.1b Translational Research

So, what are we doing all these research projects for? The traditional answer has been that we do research studies in order to contribute to our knowledge. This, of course, leads to the next obvious question: What are we accumulating knowledge for? Some would argue that we accumulate knowledge for its own sake. They would claim that not all knowledge has to be useful or lead to something. Sometimes when we learn something we cannot possibly anticipate how that knowledge could be used. A classic example is of the Post-It notes that are in almost every office. The creators of the Post-It note did not set out to create such objects. They were discovered at the 3M research laboratories in the 1970s when chemists were trying to create a new glue. The glue they created, however, didn't work as they had hoped. It stuck things like two pieces of paper together, but they could be pulled apart again, with the glue remaining only on the original sheet. It seemed like a totally useless type of glue until one of the researchers hit upon the idea that there are times when you want to be able to unstick two pieces of paper without doing any damage to either. The result was the Post-It note. Many of the major discoveries in research—penicillin, the telephone, Velcro—happened by accident. The research that led to them contributed to knowledge that was subsequently used in unanticipated ways. So, we accumulate knowledge with the idea that it may contribute some day to something we can use. In this sense, we are the toolmakers. Our research contributes to instrumental knowledge that we hope can make our lives or our world better. That is, knowledge gained from research may at some point be able to be put into practice.

When we move research from discovery to practice (and to the effects of that practice on our lives) we can say we are translating research into practice. **Translational research** is the systematic effort to move research from initial discovery to practice and ultimately to impacts on our lives. There are a wide variety of clever phrases that are used in various fields to convey the idea of translational research concisely, such as: from “bench to bedside”; from “bench to behavior”; from “the mind to the marketplace”; from “brain to vein”; and from “bench-to-practice-to-community,” to name but a few. There are lots of different models of translational research that divide the process into stages in different ways (Dougherty & Conway, 2008; Houry et al., 2007; Sung et al., 2003; Trochim, Kane, Graham, & Pincus, 2011; Westfall, Mold, & Fagnan, 2007), but all of them convey the central agenda of translational research: to move research from discovery to impact in the research enterprise.

We can think of the research enterprise as encompassing a **research-practice continuum** within which translation occurs. In the course of moving through this continuum it is likely that many individual research projects will be conducted. Some of these are what might be called **basic research** and are designed to generate discoveries and to understand their mechanisms better. For discoveries that relate to humans, this is usually followed by a series of **applied research** projects where the discovery is tested under increasingly controlled conditions with humans. If a

translational

research The systematic effort to move research from initial discovery to practice and ultimately to impacts on our lives.

research-practice

continuum The process of moving from an initial research idea or discovery to practice, and the potential for the idea to influence our lives or world.

basic research Research that is designed to generate discoveries and to understand how the discoveries work.

applied research Research where a discovery is tested under increasingly controlled conditions in real-world contexts.



Figure 1.1 Translational Research.

discovery survives this applied research testing, there is usually a process of seeing how well it can be implemented in and disseminated to a broad range of contexts that extend beyond the original controlled studies. This is sometimes referred to as **implementation and dissemination research**. Ultimately, many such discoveries are assessed for the impacts they have broadly on society, what might be termed **impact research**. Sometimes discoveries lead to the development of new policies that are investigated with **policy research** in the broader population. The research-practice continuum might be depicted as shown in **Figure 1.1**. It is assumed that different discoveries take different pathways through this continuum. Some take longer to go through one stage or another. The bidirectional arrow in the figure is meant to convey that the translational process works in both directions. Sometimes insights from practitioners and policy makers can inform basic and applied researchers and improve their ability to transform their discoveries to better anticipate the real-world contexts that they will eventually need to be implemented in.

1.1c Research Syntheses and Guidelines

Typically, during the testing of a new discovery during the basic and applied research period a number of separate research projects are likely to be conducted. In the past, it was assumed that implementers and practitioners of new discoveries would read the research journals to find new things that they could do to address their problem or issue of interest. But the research literature has become voluminous and is often very technical, making it a barrier for practitioners that reduces the rate of adoption of new discoveries.

To address this challenge over the past several decades the research enterprise has evolved a system for synthesizing the large numbers of research studies in different topical areas. In the next several decades, we expect that this system will increasingly become the normative way that research about new discoveries moves from the basic-applied stage to implementation and dissemination in broader contexts. For example, a recent Institute of Medicine report calls for the U.S. government to develop a national system for managing systematic reviews of research in health and biomedicine (Institute of Medicine, 2008).

A **research synthesis** is a systematic study of multiple prior research projects that address the same research question or topic and summarize the results in a manner that can be used by practitioners. There are two major types of research syntheses. A **meta-analysis** uses statistical methods to combine the results of similar studies quantitatively in order to allow general conclusions to be made. A **systematic review** is a research synthesis approach that focuses on a specific question or issue and uses specific preplanned methods to identify, select, assess, and summarize the findings of multiple research studies. It may or may not include a meta-analysis (a quantitative synthesis of results). Often, a systematic review involves a panel of experts who discuss the research literature and reach conclusions about how well a discovery works to address a problem or issue. So, while

implementation and dissemination research Research that assesses how well an innovation or discovery can be distributed in and carried out in a broad range of contexts that extend beyond the original controlled studies.

impact research Research that assesses the broader effects of a discovery or innovation on society.

policy research Research that is designed to investigate existing policies or develop and test new ones.

research synthesis A systematic study of multiple prior research projects that address the same research question or topic and that summarizes the results in a manner that can be used by practitioners.

meta-analysis A type of research synthesis that uses statistical methods to combine the results of similar studies quantitatively in order to allow general conclusions to be made.

systematic review A type of research synthesis that focuses on a specific question or issue and uses preplanned methods to identify, select, assess, and summarize the findings of multiple research studies.

a meta-analysis is always a quantitative synthesis, a systematic review may be a judgmental expert-driven synthesis, a meta-analysis, or both.

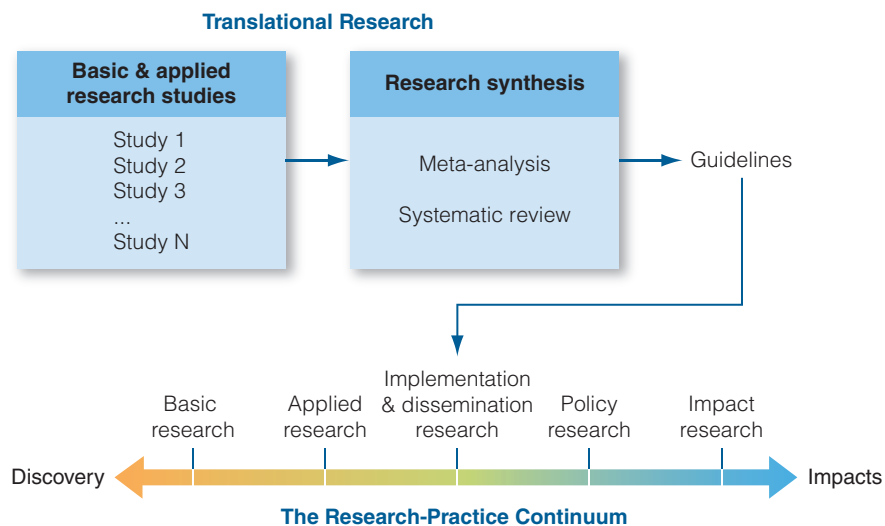
It turns out that even meta-analyses and systematic reviews are sometimes not by themselves sufficient to be used by practitioners as guides for how they might change what they implement. Both of these types of reviews can be somewhat technical and are written in a scientific style that typically is cautious about making formal recommendations for action. To help address this problem, the research enterprise has increasingly developed a mechanism called a practice guideline. A **guideline** is the result of a systematic process that leads to a specific set of research-based recommendations for practice that usually includes some estimates of how strong the evidence is for each recommendation.

It's important to recognize what a major shift this move to research syntheses and guidelines represents. Throughout the several hundred years of the evolution of research in our societies, the primary unit of a research project's results was the scientific publication. But this system has become unwieldy and has not been as useful as desired to those who might implement the results of research. Practitioners are flooded with new research studies and find it hard to keep up with the technical literature. So, research syntheses and guidelines represent a major effort of the research enterprise to deal with the results of research at a macro or systems level. This involves a major shift in the unit of what we are considering when moving from discovery to impact. During the basic and applied research phases, we are still focusing on the individual research project (this text is designed to introduce you to how to conduct such a project). But, the research synthesis stage introduces a major phase transition. After conducting a research synthesis, the unit of what practitioners will look at is the multi-study synthesis result, rather than the results of individual research projects. It is as if the research synthesis stage on the research-practice continuum acts like a sieve or strainer that combines previous multiple research projects and distills the core results that are needed to guide practice, as reflected in guidelines. We can add this idea into the earlier figure on translational research, as shown in

guideline A systematic process that leads to a specific set of research-based recommendations for practice that usually includes some estimates of how strong the evidence is for each recommendation.

Figure 1.2.

Figure 1.2 Translational research and the research-practice continuum with a system of research syntheses and guidelines included.



The figure shows the overarching idea of translational research across the research-practice continuum with the addition of a system for research synthesis and the development of practice guidelines interposed between basic and applied research and its subsequent implementation and dissemination. This represents a major change in the research enterprise in the first part of the twenty-first century.

1.1d Evidence-Based Practice

The interpositioning of a synthesis and guideline process in the middle of the research-practice continuum has transformed virtually every area of applied social research practice in our society. The term that is most associated with this change is evidence-based practice. It originated first in medicine as evidence-based medicine (Sackett, 1997) and then rapidly moved into other fields (Gibbs, 2003). Virtually every area of social practice today has an effort to integrate research and practice in this type of way. **Evidence-based practice (EBP)** is a movement designed to encourage or require practitioners to employ practices that are based on research evidence as reflected in research syntheses or practice guidelines. The EBP movement represents a major attempt of the research enterprise to achieve a better integration of research and practice. Primary examples of EBP efforts based on research syntheses include the Cochrane Collaboration in medicine (<http://www.cochrane.org/>), the Community Guide in public health (<http://www.thecommunityguide.org/index.html>), and the Campbell Collaboration (<http://www.campbellcollaboration.org/>) in education. Good examples of guideline clearinghouses include the National Guidelines Clearinghouse (<http://www.guideline.gov/>) in medicine and the What Works Clearinghouse in education (<http://ies.ed.gov/ncee/wwc/>). You may want to take a look at some of these to see how they are organized and what they address.

The EBP movement has not been without controversy. There are significant debates about what kinds of research projects should be allowed in research syntheses and guidelines, with different researchers and practitioners lining up in favor of or opposed to research studies that use certain types of methods (as described in this text). For instance, there are some who would only allow studies based on randomized experimental or strong quasi-experimental designs into the evidence base, while others would allow a broader range of studies to qualify as evidence. This introductory research methods text will provide you with a basic understanding of the strengths and weaknesses of different research designs, a necessary foundation for understanding these debates. In addition, some practitioners have questioned the primacy of the term “evidence” in EBP. They argue that it should not only be evidence that drives practice; it should also be that practice helps drive the development of evidence (Urban & Trochim, 2009). That is, they are arguing for something like a practice-based evidence movement (McDonald & Viehbeck, 2007). When all of these debates finally work their way through various fields, it is likely that we will have a transformed research enterprise with considerably stronger research-practice integration than in the past.

1.1e An Evolutionary Perspective on the Research Enterprise

As our societies have gradually become more aware of the dominance of research in all aspects of our lives, we have seen a corresponding shift in how we think about the research enterprise. Increasingly we view research as an evolutionary system. This view is based upon the idea of **evolutionary epistemology** which is the

evidence-based practice (EBP)

A movement designed to encourage or require practitioners to employ practices that are based on research evidence as reflected in research syntheses or practice guidelines.

evolutionary epistemology

The branch of philosophy that holds that ideas evolve through the process of natural selection.