



RESEARCH  
METHODS

FOR THE

Behavioral  
Sciences

FREDERICK J

**Gravetter**

LORI-ANN B.

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# Research Methods

FOR THE

# Behavioral Sciences

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For years, we have watched students come into the psychology research methods course with a fundamental fear of science. Somewhere, these students seem to have developed the idea that psychology is interesting and fun, but science is tedious and difficult. Many students even resent the fact that they have to take a research methods course: “After all, I want to be a psychologist, not a scientist.”

As the semester progresses, however, most of these students begin to lose their fears, and many of them actually begin to enjoy the course. Much of this change in attitude is based on a realization that science is simply the technique that psychologists use to gather information and to answer questions. As long as the questions are interesting, then the task of answering them should also be interesting.

When people watch a magician do an amazing trick, the common response is to ask, “How was that done?” In the same way, when you learn something interesting about human behavior, you ought to ask, “How do they know that?” The answer is that most of the existing knowledge in the behavioral sciences was gathered using scientific research methods. If you are really curious about human behavior, then you should also be curious about the process of studying human behavior.

This textbook is developed from years of teaching research methods. During that time, we tried various examples or explanations in the classroom and observed student response. Over the years, the course evolved into a less intimidating and more interesting approach that is highly effective in getting students interested in research. Our students have been very helpful in this evolutionary process. Their feedback has directed our progress through the development of the research methods course and the writing of this book. In many respects, they have been our teachers.

## OVERVIEW OF TEXT

*Research Methods for the Behavioral Sciences*, fifth edition, is intended for an undergraduate Research Methods course in psychology or any of the behavioral sciences. We have organized the text according to the research process, making it appropriate for use in a lecture-only class or a class with a lab component. The

text discusses in detail both experimental and nonexperimental research strategies. We use a rather informal writing style that emphasizes discussion and explanation of topics. For each chapter, pedagogical aids include: chapter overview, a list of chapter sections, chapter preview, learning objectives at the beginning of each section, Learning Check questions at the end of each section, a running glossary, a chapter summary and a list of Key Words, and a set of end-of-chapter exercises and engagement activities that are identified by learning objectives.

## ORGANIZATION OF TEXT

Overall, the book is organized around the framework of the research process—from start to finish. This step-by-step approach emphasizes the decisions researchers must make at each stage of the process. The chapters of the text have been organized into five sections. Chapters 1 and 2 focus on the earliest considerations in the research process, presenting an overview of the scientific method and including tips for finding a new idea for research and developing a research hypothesis. Chapters 3 through 6 focus on the preliminary decisions in the research process, and include information on how to measure variables, maintaining ethical responsibility throughout the research process, selecting participants, and choosing a valid research strategy. Chapters 7 through 9 introduce the experimental research strategy and provide the details of between-subjects and within-subjects experimental designs. Chapters 10 through 14 present other (nonexperimental) research strategies and their associated research designs. Chapters 15 and 16 focus on the ending decisions in the research process, and include information on how to evaluate, interpret, and communicate the results of the research process.

Although the chapters are organized in a series that we view as appropriate for a one-semester research methods course, the order of chapters can be varied to meet the requirements of different course instructors. For example, the chapters on statistics and APA style can easily be presented much earlier in the course.

## WRITING STYLE

We have attempted to use a rather informal, conversational style of writing that emphasizes discussion and explanation of topics rather than a simple “cookbook” presentation of facts. We have found this style to be very successful in our own classes and in Frederick Gravetter’s coauthored textbook, *Statistics for the Behavioral Sciences*. Students find this style very readable and unintimidating. This style is particularly useful for material that students perceive as being difficult, including the topic of this text, research methodology.

## PEDAGOGICAL AIDS

One item that has received particular attention as we developed this text is the use of a variety of pedagogical aids. Each chapter includes many opportunities for students to interact with the material, rather than simply be passively exposed to the material. In addition, the Learning Checks, end-of-chapter exercises, and engagement activities may be used by the instructor as prepackaged assignments.

Each chapter contains the following pedagogical elements:

1. *Chapter Overview*: Each chapter starts with a brief summary of the contents of the chapter to alert students to the material to come.
2. *Chapter Outline*: To help students see the organization of the material in the chapter, a list of the section titles is presented at the beginning of each chapter.
3. *Chapter Preview*: At the beginning of each chapter students are presented with an engaging research example that piques students' curiosity and prepares students for learning the content of the chapter.
4. *Multiple sections*: Each chapter is divided into multiple sections and subsections that are clearly defined with headings to help break the material down into smaller, more manageable chunks.
5. *Learning Objectives*: At the beginning of each section, learning objectives are identified to assist students in recognizing what they should be able to do by the end of that section.
6. *Definitions*: Each Key Word used in the text is first highlighted. At the end of the paragraph that contains a new Key Word, a clearly identified, concise definition is provided.
7. *Examples*: Numerous examples are used to illustrate concepts presented in the text. Some examples are hypothetical, but most are selected from current or classic studies in psychology.
8. *Boxes*: Boxed material, separate from the regular text, is used to offer additional, interesting information to help demonstrate a point.
9. *Figures*: When appropriate, diagrams or graphs are included to illustrate a point made in the text.
10. *Tables*: Occasionally, tables are used to present information that may best be communicated in a list.
11. *Margin Notes*: Where appropriate, brief notes are presented in the text margins. These notes are used to offer reminders or cautions to the students.
12. *Learning Checks*: At the end of major sections within each chapter, we provide a set of multiple-choice questions to help students test how well they have learned the material. Each Learning Check contains at least one question corresponding to each of the learning objectives for that section. Answers are provided.
13. *Chapter Summaries*: At the end of each chapter, a general summary is presented to help students review the main points of the chapter.
14. *Key Words*: At the end of each chapter, a list of the Key Words used in the chapter is presented. We list the Key Words in their order of appearance in the chapter so that related terms are grouped together and so that students can spot parts of the chapter that they may need to review.
15. *Exercises*: At the end of each chapter are questions and activities for students to answer and apply. Each exercise is identified with a specific learning objective. The intent of the exercises is to help students assess how well they have mastered the objectives by having them apply what they have learned. Additionally, the instructor can use the exercises as assignments.
16. *Engagement Activities*: At the end of each chapter are one or two suggested activities that provide students with an additional learning opportunity to apply information presented in the text. Each

engagement activity is identified with a learning objective and is intended to assess students' mastery of the objectives.

17. *MindTap*: *MindTap for Research Methods for the Behavioral Sciences*, fifth edition, engages and empowers students to produce their best work—consistently. By seamlessly integrating course material with videos, activities, apps, and much more, *MindTap* creates a unique learning path that fosters increased comprehension and efficiency.

For students:

- *MindTap* delivers real-world relevance with activities and assignments that help students build critical thinking and analytic skills that will transfer to other courses and their professional lives.
- *MindTap* helps students stay organized and efficient with a single destination that reflects what's important to the instructor, along with the tools students need to master the content.
- *MindTap* empowers and motivates students with information that shows where they stand at all times—both individually and compared to the highest performers in class.

Additionally, for instructors, *MindTap* allows you to:

- Control what content students see and when they see it with a learning path that can be used as-is or matched to your syllabus exactly.
- Create a unique learning path of relevant readings and multimedia and activities that move students up the learning taxonomy from basic knowledge and comprehension to analysis, application, and critical thinking.
- Integrate your own content into the *MindTap* Reader using your own documents or pulling from sources like RSS feeds, YouTube videos, websites, GoogleDocs, and more.
- Use powerful analytics and reports that provide a snapshot of class progress, time in course, engagement, and completion.
- In addition to the benefits of the platform, *MindTap for Research Methods for the Behavioral Sciences*:
  - includes *Research Tutor*, a project management tool that helps students stay on task with the research proposal assignment that is often included in the behavioral sciences research methods course. *Research Tutor* breaks the process down into 10 assignable modules that help manage timelines and turn research ideas into well-constructed research proposals, research papers, or presentations. It's the only interactive tool that helps students evaluate and choose an appropriate topic early in the course and stay on task as they move through their study.

## NEW TO THIS EDITION

- To put students into the “mind-set” in preparation for the major content of a chapter, we have added a Chapter Preview to the beginning of each chapter. The Chapter Preview contains an inherently interesting research example that raises the major issue of the chapter and is intended to capture students' attention. These engaging research examples pique students' curiosity and prepare them for chapter content.

- To be consistent with contemporary educational reforms in assessment, Learning Objectives are now identified for students at the beginning of each section in a chapter, and each section has been edited and revised to focus on the learning objectives. In addition, to assist students in the mastery of these objectives, each end-of-chapter exercise and engagement activity is identified with its objective.
- At the end of each section in each chapter, all previously essay-style Learning Checks have now been replaced with objective multiple-choice questions with a minimum of one question for each learning objective. Answers are provided to help students identify which content they have mastered.
- Almost all end-of-chapter exercises and engagement activities have been revised or replaced with higher-level learning items.
- Throughout the book, research examples have been updated, and hypothetical results have been replaced with real research examples. Where necessary, tables and figures have been revised for these examples.
- Chapter 1. The discussion of why students take a research methods course has been streamlined. Information regarding hypotheses has been refined and now clarifies the idea that a single hypothesis can lead to several different predictions and that each prediction refers to a specific situation or an event that can be observed and measured. We have added a new section that distinguishes between quantitative and qualitative research and that notes that, throughout this book, we focus on quantitative research. Step 2 of the research process, refocused on the basics of forming a hypothesis and the detailed characteristics of a good hypothesis is now moved to chapter 2. New information has been added to clarify how steps 3 and 4 are essential in transforming the hypothesis (step 2 of the research process) into an empirically testable study. The focus of step 4 of the research process now includes not only identification of participants or subjects but also decisions for selection and planning for their ethical treatment. Figure 1.5, showing the steps of the research process, has been revised to reflect the changes made to the text.
- Chapter 2. The chapter has been retitled *Research Ideas and Hypotheses* and includes both steps 1 and 2 of the research process. The section on sources of research ideas has been streamlined, and the subsection on common mistakes has been removed. Recognizing students' increased technological skill, the sections on finding background literature and conducting a literature search using PsycINFO have been combined and reduced. Figures containing screenshots from PsycINFO are now replaced with links to short videos maintained by APA that show samples from PsycINFO. To help students through the difficult task of finding ideas for new studies, a new subsection on critically reading a journal article has been added. A new section has been added on converting a research idea into a hypothesis, including detailed characteristics of a good hypothesis, plus a more explicit description of how a hypothesis is used to create a research study (assisted by steps 3 and 4 of the research process).
- Chapter 3. A discussion of the consistency of a relationship has been moved to the beginning of the section on validity and reliability of

measurement because validity *and reliability* are often established by a consistent relationship between two different measurements. The distinction between concurrent and convergent validity has been clarified. Revised terminology now distinguishes situations in which researchers are “blind” and where participants are “blind” or “naïve.”

- Chapter 4. The sections on ethical guidelines for research with humans and nonhumans were updated in accordance with the APA 2010 amendments to Ethics Code. Citations and website locations for updated guidelines throughout this chapter are now included.
- Chapter 6. To facilitate the flow from the chapter preview to the introduction of research strategies, the section on quantitative and qualitative research was moved to chapter 1. A new section discusses the similarities and differences between nonexperimental and correlational research strategies. The section distinguishing research strategies, research designs, and research procedures was placed earlier in the chapter, and the detailed discussion of time-related threats to internal validity was moved to chapter 9 (within-subjects experiments).
- Chapter 7. The material related to dealing with extraneous variables and the material on control groups and manipulation underwent minor reorganization.
- Chapter 8. We added a detailed introduction to the problems that individual difference can cause.
- Chapter 9. We moved the discussion of advantages and disadvantage of within-subjects designs to the section comparing within-subjects and between-subjects designs. Additionally we added a section detailing time-related threats to internal validity (information previously appeared in chapter 6). We also reframed the comparison of between- and within-subjects designs in terms of making a decision about choosing which design to use based on the relative advantages and disadvantages of the two designs.
- Chapter 10. We edited this chapter to focus on nonexperimental designs and to introduce some of the modifications that produce closely related quasi-experimental designs. In each case, we discuss the aspect of the design that prevents it from being a true experiment. A new box was added comparing and contrasting differential and correlational research. A new table presents an overview of the nonexperimental and quasi-experimental research designs that are discussed in the following sections. Added a new section on applications and statistical analyses for nonexperimental and quasi-experimental research designs.
- Chapter 11. A new research example comparing the effectiveness of studying text printed on paper compared to text presented on a computer screen is used to introduce factorial designs, and the corresponding tables and figures were revised. We added a new section describing the statistical evaluation of the results from a factorial design.
- Chapter 12. The section comparing correlational, experimental, and differential research was placed earlier in the chapter as a more effective way to introduce the correlational strategy. In addition, we clarified the



section on evaluating relationships for numerical scores and ranks and added a new section on interpreting and statistically evaluating results from correlational research.

- Chapter 13. We use updated examples to introduce descriptive research in the Chapter Preview. The discussion of using the Internet to administer surveys is updated and featured more prominently.
- Chapter 15. We organized this chapter's material to integrate research design and statistical analyses. A new section integrates research design with statistical analysis to help students determine which statistical analysis is appropriate based on the research design and the data. New tables present examples of data in different categories of designs, and new flowcharts identify the appropriate statistical procedures for data in each category.
- Chapter 16. A new sample research report provides examples of manuscript pages and is completely reproduced in Appendix D. A new table demonstrates a wide variety of citation styles, and another new table updates reference formats, emphasizing formats for referencing electronic sources.
- Appendix B. When appropriate, a reference to the corresponding SPSS demonstration in Appendix C is provided for each statistical calculation. New examples demonstrate how to write the results of each statistical test using APA style.
- Appendix C. This appendix updates examples demonstrating the current version of SPSS.
- Appendix D. We use a new example of a research report to demonstrate the revised APA-style guidelines.

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# 1

## Introduction, Acquiring Knowledge, and the Scientific Method

- 1.1**  
Introduction to Research Methodology
- 1.2**  
Methods of Knowing and Acquiring Knowledge
- 1.3**  
The Scientific Method
- 1.4**  
The Research Process

### CHAPTER OVERVIEW

In this chapter, we introduce the topic of this textbook: research methodology. To help you see the relevance of this material to your life, we begin with some comments about the usefulness of understanding research methodology. Then we discuss the many ways of acquiring knowledge or finding answers to questions, including the scientific method. Next, we provide a thorough discussion of the scientific method. The chapter ends with an outline of the research process, or the way the scientific method is applied to answer a particular question. The research process provides the framework for the rest of the textbook.

### ■ Learning Objectives

- LO 1** Describe tenacity and intuition as methods of knowing or acquiring knowledge. Identify an example and explain the limitations of each method.
- LO 2** Describe and identify an example of the method of authority and explain its limitations.
- LO 3** Describe and identify an example of the rational method of acquiring knowledge and explain its limitations.
- LO 4** Describe and identify an example of the empirical method of acquiring knowledge and explain its limitations.
- LO 5** Identify and describe the steps of the scientific method.
- LO 6** Define induction and deduction and explain the role of each in the scientific method.
- LO 7** Explain the distinction between a hypothesis and a prediction.
- LO 8** Explain what it means to say that the scientific method is empirical, public, and objective.

**LO 9** Explain the distinction between science and pseudoscience.

**LO 10** Describe the difference between qualitative and quantitative research and recognize examples of each.

**LO 11** Identify and describe the steps in the research process.

## CHAPTER PREVIEW

Swearing is a common, almost reflexive, response to pain. Whether you knock your shin into the edge of a coffee table or smash your thumb with a hammer, most of us respond with a streak of obscenities. One question, however, is what is the effect of swearing? Perhaps it focuses attention on the pain, therefore increasing its intensity. Perhaps swearing, which normally is prohibited in public, serves as a distraction that reduces the pain. This question was addressed in a recent study (Stephens, Atkins, & Kingston, 2009). The three scientists wanted to answer the question with a public demonstration that could be reviewed and repeated by other scientists all over the world. Specifically, they chose to use the scientific method.

The purpose of this chapter is to introduce the scientific method and the research process that is used by scientists to seek answers to questions like the one posed in the opening paragraph. Among other things, the scientific method requires that each step in the process of answering a question be clearly defined and publically visible so that others can see and understand exactly what was done and how the answer was obtained. For example, Stephens et al. (2009) had to decide how “pain” would be defined and measured. They had to consider the ethical question of exposing people to pain. They had to determine whether any benefits from swearing were actually caused by the swear words and not simply the act of yelling in response to a painful stimulus. They had to describe and document each step in the process so that other people could repeat the same procedure to determine whether the same answer would be obtained. As you will see, much of this book involves presenting the decisions that must be made and the options that are available in each step of the research process. The decisions, the options, and the results obtained by Stephens et al. (2009) are discussed in the following paragraph.

The three researchers conducted an experiment comparing swearing with other responses to pain. In the study, adult participants were asked to place one hand in ice-cold water for as long as they could bear the pain. Half of the participants were told to repeat their favorite swear word over and over for as long as their hands were in the water. The other half repeated a neutral word. The researchers recorded how long each participant was able to tolerate the ice-cold water. After a brief rest, the two groups switched word types and repeated the ice-water plunge. Thus, all the participants experienced both conditions (swearing and neutral), with half swearing on their first plunge and half on their second. The results clearly showed that swearing significantly increased the average amount of time that participants could tolerate the pain.

You should be aware that the exact procedure used by Stephens et al. (2009) is not the only possibility for addressing the original question. For example, the researchers could have conducted a public opinion survey or held a panel discussion with a group of doctors and researchers who specialize in pain management. More

importantly, however, you should realize that the method they chose produced a relatively clear and unambiguous answer. In particular, can you find any flaw in their reasoning, any grounds for criticizing what they did, or any basis for questioning their answer to the question? This is one of the fundamental goals of the scientific method: to produce clear, justified answers to the questions that researchers encounter.

## 1.1 | INTRODUCTION TO RESEARCH METHODOLOGY

We promise that learning about research methodology will be useful for you. You may be thinking, “Yeah, right!” “No way!” “You have to be kidding me!” But consider the following questions.

Does multitasking make you more efficient with your time?

Does having more friends make you less vulnerable to depression?

Are children of divorced parents less likely to be satisfied with their romantic relationships?

Are girls more likely to cyberbully than boys are?

Does eating cake for breakfast make dieters more likely to stick to their diets later in the day?

Are adolescents who play violent video games more aggressive than adolescents who do not play violent video games?

Does playing brain games in adulthood make it less likely you will develop Alzheimer’s?

If you find the questions interesting, then you may also be interested in learning how to find the answers. Although there are many different ways to find answers to questions like these, in this book we focus on the method used by behavioral scientists: the scientific method. The scientific method is considered basic, standard practice in the world of science. Students in the behavioral sciences (for example, psychology, sociology, or criminal justice) should understand how this process works and have some appreciation of its strengths and weaknesses.

Before we launch into our discussion of the specifics of the methods used in scientific research, we make a few preliminary comments about why an understanding of research methodology could be important to you. We hope these remarks pique your interest and, at minimum, open your mind to the idea that learning about research methodology will be useful to you.

### Why Take a Research Methods Course?

Why are you taking this course and reading this textbook? The most straightforward answer is probably, “Because it’s required.” Nationwide, students take research methods courses because they have to. In addition, most students view the research methods course as largely irrelevant to their education and career goals. For years, we have watched students enter our psychology research methods class resenting the fact that they have to take the course. They chose to become psychology majors because they wanted to learn about people. However, Research Methods is not about people, and it is not really about psychology. It is about science.

So why is Research Methods a required course? The simple answer is that professionals in the behavioral sciences rely on the methods of science to answer questions about human behavior. If you are really curious about human behavior, then you should also be curious about the process of studying it.

The most direct application of what you learn in this book will come for those of you who actually become involved in a research study. Students who go on for graduate study or who work as undergraduate research assistant for a faculty member are likely to participate in designing and conducting research studies. Most of you, however, will probably just be reading research articles or summaries of research as part of your schoolwork or to stay familiar with current developments in your future occupation. In this case, an understanding of research methods will help you understand and interpret the research of others.

Probably the most pervasive use for the material in this course is to evaluate the claims that appear routinely in all forms of media. Every day, you are inundated with information from YouTube videos, Web pages, magazines, television, and radio.

“Sexually abused children grow up to become sexual abusers as parents.”

“Drinking a glass of wine each day decreases a person’s risk of heart disease.”

What do we do with this information? Is any of it even true? An understanding of research methodology will enable you to find the original source and tease apart the truth so you are not dependent on someone else who may have a vested interest in swaying your opinion or having you buy a particular product.

Finally, we should note that scientific research is simply a well-defined procedure for gathering information and answering questions. An understanding of the scientific method should help you to acquire knowledge and make decisions in your everyday life. Our point is that science provides a carefully developed system for answering questions so that the answers we get are as accurate and complete as possible.

## 1.2 | METHODS OF KNOWING AND ACQUIRING KNOWLEDGE

### ■ Learning Objectives

- L01** Describe tenacity and intuition as methods of knowing or acquiring knowledge. Identify an example and explain the limitations of each method.
- L02** Describe and identify an example of the method of authority and explain its limitations.
- L03** Describe and identify an example of the rational method of acquiring knowledge and explain its limitations.
- L04** Describe and identify an example of the empirical method of acquiring knowledge and explain its limitations.

As we indicated at the beginning of this chapter, this textbook focuses on the use of the scientific method to answer questions. However, the methods used in scientific research are not the only ones available for answering questions,

Terms printed in boldface are defined in the glossary. Some terms, identified as key words, are also defined in the text.

and they are not necessarily the most efficient. There are many different ways of knowing or finding answers to questions. In general, the different ways that people know, or the methods that people use to discover answers, are referred to as **methods of acquiring knowledge**. In this chapter, we examine several ways of knowing. Eventually, we describe the scientific method, the general approach used by the scientific community to obtain answers.

## DEFINITION

**Methods of acquiring knowledge** are ways in which a person can know things or discover answers to questions.

The rest of this chapter examines several established methods of knowing and acquiring knowledge. To appreciate the scientific method, we begin with five nonscientific approaches: the method of tenacity, the method of intuition, the method of authority, the rational method, and the method of empiricism. We conclude with a more detailed discussion of the scientific method. As you will see, the scientific method combines elements from each of the other methods to produce a general question-answering technique that avoids some of the limitations or pitfalls of other methods. Although the scientific method tends to be more complicated and more time consuming than the other methods, the goal is to obtain better-quality answers, or at least a higher level of confidence in the answers. Finally, we warn that the scientific method outlines a general strategy for answering questions; the specific details of applying the scientific method to particular problems form the content of the remainder of the book.

## The Method of Tenacity

The **method of tenacity** involves holding on to ideas and beliefs simply because they have been accepted as facts for a long time or because of superstition. Therefore, the method of tenacity is based on habit or superstition. Habit leads us to continue believing something we have always believed. Often this is referred to as belief perseverance. For example, you've probably heard the clichés, "You cannot teach an old dog new tricks" and "Opposites attract." These statements have been presented over and over again, and they have been accepted as true. In general, the more frequently we are exposed to statements, the more we tend to believe them. Advertisers successfully use the method of tenacity, repeating their slogans over and over, hoping consumers will accept them as true (and subsequently buy their products). An advertiser's catchy fast-food jingle exclaiming, "I'm lovin' it" hopes we do just that and buy more burgers from them.

## DEFINITION

In the **method of tenacity**, information is accepted as true because it has always been believed or because superstition supports it.

The method of tenacity also involves the persistence of superstitions, which represent beliefs reacted to as fact. For example, everyone "knows" that breaking a mirror will result in 7 years of bad luck, and that you should never walk under a ladder or let a black cat cross your path. Many sports figures will only



play a game when wearing their lucky socks or jersey, and many students will not take an exam without their lucky pencil or hat.

One problem with the method of tenacity is that the information acquired might not be accurate. With regard to the statement about old dogs not being able to learn new tricks, the elderly can and do learn (O’Hara, Brooks, Friedman, Schroder, Morgan, & Kraemer, 2007). With regard to the statement that opposites attract, research shows that people are attracted to people who are like them (Klohn & Luo, 2003). Another pitfall of the method of tenacity is that there is no method for correcting erroneous ideas. Even in the face of evidence to the contrary, a belief that is widely accepted solely on the basis of tenacity is very difficult to change.

### The Method of Intuition

In the **method of intuition**, information is accepted as true because it “feels right.” With intuition, a person relies on hunches and “instinct” to answer questions. Whenever we say we know something because we have a “gut feeling” about it, we are using the method of intuition. For example, at a casino, if someone puts his money on the number 23 at a roulette table because he “feels” that number is going to come up, then that person would be using the method of intuition to answer the question of which number to play. For many questions, this method is the quickest way to obtain answers. When we have no information at all and cannot refer to supporting data or use rational justification, we often resort to intuition. For example, intuition provides answers when we are making personal choices between equally attractive alternatives such as: What should I have for dinner? Should I go out tonight or stay in? The ultimate decision is often determined by what I “feel like” doing. Many ethical decisions or moral questions are resolved by the method of intuition. For example, we know that it is wrong to do something because it does not “feel” right. Part of intuition is probably based on the subtle cues that we pick up from the people around us. Although we can’t explain exactly how we know that a friend is having a bad day, something about the way she moves or speaks tells us that it is true. The predictions and descriptions given by psychics are thought to be intuitive. The problem with the method of intuition is that it has no mechanism for separating accurate from inaccurate knowledge.

#### DEFINITION

In the **method of intuition**, information is accepted on the basis of a hunch or “gut feeling.”

### The Method of Authority

In the **method of authority**, a person finds answers by seeking out an authority on the subject. This can mean consulting an expert directly or going to a library or a website to read the works of an expert. In either case, you are relying on the assumed expertise of another person. Whenever you “Google it” or consult books, people, television, the Internet, or the newspaper to find



answers, you use the method of authority. Some examples of experts are physicians, scientists, psychologists, professors, stockbrokers, and lawyers.

**DEFINITION**

In the **method of authority**, a person relies on information or answers from an expert in the subject area.

For many questions, the method of authority is an excellent starting point; often, it is the quickest and easiest way to obtain answers. Much of your formal education is based on the notion that answers can be obtained from experts (teachers and textbooks). However, the method of authority has some pitfalls. It does not always provide accurate information. For example, authorities can be biased. We have all seen examples of conflicting testimony by “expert witnesses” in criminal trials. Sources are often biased in favor of a particular point of view or orientation. For example, parents who are having a problem with their child’s temper tantrums could seek help from an expert. If they were to ask a psychodynamic psychologist why their child was displaying this behavior, they would probably hear an explanation that involved a failure to meet the child’s oral needs. In contrast, if the parents were to consult a behavioral psychologist, the child’s tantrums might be explained as the result of the parents’ reinforcing of the behavior by giving in to the demands of the child.

Another limitation of the method of authority is that the answers obtained from an expert could represent subjective, personal opinion rather than true expert knowledge. For example, one “expert” reviewer gives a movie a rating of “thumbs up,” whereas another expert gives the same movie “thumbs down.” Box 1.1 discusses a historical example of conflict between “expert” authorities.

An additional limitation of this method is that we assume, by virtue of the person’s status as an authority, that expertise can be generalized to include the question we are asking. For example, advertisers often use the endorsements of well-known personalities to sell their products. When a famous athlete appears on television telling you what soup is more nutritious, should you assume that being an outstanding football player makes him an expert on nutrition? The advertisers would like you to accept his recommendation on authority. Similarly, when Linus Pauling, a chemist who won the Nobel Prize for his work on the chemical bond, claimed that vitamin C could cure the common cold, many people accepted his word on authority. His claim is still widely believed, even though numerous scientific studies have failed to find such an effect.

Another pitfall of the method of authority is that people often accept an expert’s statement without question. This acceptance can mean that people do not check the accuracy of their sources or even consider looking for a second opinion. As a result, false information is sometimes taken as truth. In some situations, the authority is accepted without question because the information appears to make sense, so there is no obvious reason to question it. We would all like to believe it when the doctor says, “That mole doesn’t look cancerous,” but you might be better protected by getting a second opinion.

## BOX 1.1

**Conflict Between Science and Authority**

The method of authority has a long and, at times, colorful history in defining truth and disseminating knowledge. History is filled with instances of clashes between official authorities and scientists. Sometimes, theological authorities were involved and scientific pursuit was viewed as a threat to religious doctrine. Scientists were branded as heretics. For example, religious doctrine once held that Earth was at the center of the universe—that all heavenly bodies revolved around Earth. On the other hand, the seventeenth-century astronomer Galileo supported the view of his predecessor Copernicus that Earth revolved around the Sun (the heliocentric view). When Galileo discovered, with the aid of a new telescope, that Jupiter has its own moons that revolve around it, he knew that the religious doctrine was faulty. That is, not all objects revolve around Earth and, therefore, Earth was not the center of the universe. Needless to say, he continued to support the view of Copernicus. Consequently, in 1616, Galileo was condemned by the authorities of the

Catholic Church and threatened with imprisonment if he ever espoused the heliocentric view again. Galileo's viewpoint was so opposed to the religious dogma of the time that many of his peers would not even look through his telescope. Lest you worry about Galileo's reputation, the Pope vindicated Galileo in an official statement—in 1992, more than 300 years after his condemnation. Although this is not a commentary on religious doctrine, it is an example of how differing values and differing views of truth and knowledge can clash. Resistance to scientific inquiry often results when science ventures into areas traditionally explained by other methods (authority, intuition, logic, and so on). It is also important to note that different methods of acquiring knowledge can lead to vastly different conclusions about the nature of the universe. Furthermore, conflict between science and authority is not limited to events that occurred 300 years ago. For example, today, there is considerable debate in science and society about the possible applications of cloning.

People sometimes accept the word of an authority because they have complete trust in the authority figure. In this situation, the method of authority is often called the **method of faith** because people accept on faith any information that is given. For instance, young children tend to have absolute faith in the answers they get from their parents. Another example of faith exists within religions. A religion typically has a sacred text and/or individuals (pastors, imams, priests, rabbis) who present answers that are considered the final word. The problem with the method of faith is that it allows no mechanism to test the accuracy of the information. The method of faith involves accepting another's view of the truth without verification.

**DEFINITION**

The **method of faith** is a variant of the method of authority in which people have unquestioning trust in the authority figure and, therefore, accept information from the authority without doubt or challenge.

As a final pitfall of the method of authority, realize that not all “experts” are experts. There are a lot of supposed “experts” out there. Turn on the television to any daytime talk show. During the first 45 minutes of the show, in front of millions of viewers, people haggle with one another: Women complain about their husbands, estranged parents and teenagers reunite, or two women fight over the same boyfriend. Then, in the final 15 minutes, the “expert”

comes out to discuss the situations and everyone's feelings. These "experts" are often people who lack the credentials, the experience, or the training to make the claims they are making. Being called an expert does not make someone an expert.

In conclusion, we should point out that there are ways to increase confidence in the information you obtain by the method of authority. First, you can evaluate the source of the information. Is the authority really an expert, and is the information really within the authority's area of expertise? Also, is the information an objective fact, or is it simply a subjective opinion? Second, you can evaluate the information itself. Does the information seem reasonable? Does it agree with other information that you already know? If you have any reason to doubt the information obtained from an authority, the best move is to get a second opinion. If two independent authorities provide the same answer, you can be more confident that the answer is correct. For example, when you obtain information from an Internet site, you should be cautious about accepting the information at face value. Do you have previous experience with the site? Is it known to be reputable? If there is any doubt, it pays to check to see that other sites are providing the same information.

The methods of tenacity, intuition, and authority are satisfactory for answering some questions, especially if you need an answer quickly and there are no serious consequences for accepting a wrong answer. For example, these techniques are usually fine for answering questions about which shoes to wear or what vegetable to have with dinner. However, it should be clear that there are situations for which these uncritical techniques are not going to be sufficient. In particular, if the question concerns a major financial decision, or if the answer could significantly change your life, you should not accept information as true unless it passes some critical test or meets some minimum standard of accuracy. The next two methods of acquiring knowledge (and the scientific method) are designed to place more demands on the information and answers they produce.

### The Rational Method

The **rational method**, also known as **rationalism**, involves seeking answers by logical reasoning. We begin with a set of known facts or assumptions and use logic to reach a conclusion or get an answer to a question. Suppose a clinical psychologist wants to know whether a client, Amy, has a fear of darkness. A simple example of reasoning that might be used is as follows:

All 3-year-old children are afraid of the dark.

Amy is a 3-year-old girl.

Therefore, Amy is afraid of the dark.

In this **argument**, the first two sentences are **premise statements**. That is, they are facts or assumptions that are known (or assumed) to be true. The final sentence is a logical conclusion based on the premises. If the premise statements are, in fact, true and the logic is sound, then the conclusion is guaranteed to be correct. Thus, the answers obtained by the rational method must satisfy the standards established by the rules of logic before they are accepted as true.