

LEARNING OBJECTIVES

Performance Objective

Demonstrate your ability to apply a scientific approach in conjunction with the principles of reasoning and types of argument to investigate phenomena, obtain new knowledge, integrate previous knowledge, and acquire systematically the language and mindset needed to *communicate* your research and justify its results.

Enabling Objectives

1. Defend and criticize why the method of science distinguishes itself from other ways of knowing, but the doing of research is a frame of mind and not just a recipe or series of steps.
2. Understand how deduction, induction, abduction, and the Toulmin Model are tools the researcher uses to build cases, reason, and derive conclusions.
3. Practice the Toulmin Model to develop informal and research arguments in preparation for constructing your research report later in the term.
4. Become familiar with the new jargon of research and understand that practice masters its nuances.
5. Define by example concepts, constructs, definitions, hypotheses, propositions, and theories.

Several years ago, I was consulting for a multinational technology company whose European headquarters was on the 28th floor of Tour Pascal (Pascal Tower). With a spectacular view of Paris' Grande Arche, the Paris-La Défense business district was an exciting place to work. As I got off the elevator one morning, a half dozen staffers were scurrying about assembling a research presentation for a group of executives. From their conversation (all spoke English as a second language), it was apparent that their research vocabulary was limited. They were throwing around words like novice martial arts students would throw stars. The wall absorbed most of the impact, not their colleagues with whom they were desperately trying to communicate. A debate ensued about whether to use the word "theory" or "model" on a slide. Other disagreements arose. What was the difference between the research problem and a hypothesis? Are the conclusions obtained by induction or deduction? Realizing that time was getting away from them, I stepped in to help.

This chapter's title is rather odd. People do not usually equate research with the martial arts. But the parallels are interesting. Many students are uncomfortable with their research knowledge and skills. They lack practice and discipline, and they can't wade through the impenetrable jargon. This chapter builds your confidence by discussing the researcher's essential tools and their influence on research practice. As Confucius



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Student interns assemble a research presentation for a group of executives.

said, “A workman bent on good work will first sharpen his tools.”¹

As used in this book, the phrase *scientific inquiry* applies a body of techniques in conjunction with principles of reasoning to investigate phenomena, acquire new knowledge, or correct and integrate previous knowledge.² Scientific inquiry requires preparation and practice. Like the martial arts, research requires new skills, focus, persistence, and situational awareness.

Sound reasoning is a hallmark of outstanding research. How you reason improves the way you make research decisions and also influences

your daily communication. How well do you defend your positions on important issues? Understanding reasoning results in improved mental conditioning and the self-discipline required for success. In the *Laus*, Plato addresses self-discipline: “to conquer yourself is the first and best victory of all. . . .”³ In this chapter, I cover the use of reasoning to obtain reliable conclusions with four essential types of argument: deduction, induction, abduction, and the Toulmin Model.

Finally, the chapter concludes with definitions of *research terminology*. The unknown vocabulary of any field is intimidating and makes you feel like an outsider. It may sound kitschy, but students who are anxious about learning a new language can transform their worries through a different optic. Fighting through uncertainty means “I’m not merely surviving this, I am conquering it. And in doing so, I’m increasing my skills.” I help you decipher the technical jargon and the mindset needed to *communicate* what you are doing and your results with examples of concepts, constructs, definitions, variables, hypotheses, and theory.

SCIENTIFIC INQUIRY

The **scientific method** is a system for originating and developing knowledge. The scientific method is considered the dominant method for making useful and valuable contributions to human knowledge. The tenets of the scientific method are comprehensive:

- Direct observation of phenomena
- Clear definition of variables, methods, and procedures
- Empirical tests of hypotheses

- Exclusion of rival hypotheses
- Statistical rather than linguistic justification of conclusions
- Self-correcting processes

An indispensable term in this list is *empirical*. **Empirical testing** of hypotheses means that we make “observations and propositions based on sensory experience and/or derived from such experience by methods . . . including mathematics and statistics.”⁴ These tenets are reflected in what many books call the steps of the scientific method.

In antiquity, Aristotle, in his introduction to the *Metaphysics*, said that all men by nature desire to know. In Athens, Aristotle’s lectures continued that theme when he articulated a system that is likely a precursor to the scientific method. It included stating the idea or problem, defining the terms, examining the thinking of others, and using arguments based on the correspondence of ideas with observations to derive conclusions.

American philosophers Charles Sanders Peirce (1839–1914) and John Dewey (1859–1952) influenced the elaboration of the scientific method. Almost any research textbook will discuss the role and scope of science in conjunction with Dewey’s work on reflective thinking and his concept of inquiry (*How We Think*, 1910, 1933). Occasionally, you run across Peirce’s work on the four methods of settling opinion; the most prominent is the method of science (*The Fixation of Belief*, 1877). Dewey’s contribution to formulating the scientific method is better characterized as understanding the process of inquiry, yet he liked to refer to it as “the scientific method.”

In this chapter, you should not conclude that the scientific method is a superior way of knowing or that “doing” research is only accomplished through a series of steps. To the contrary, it is a way of thinking about the study of phenomena. We could equally look to the writings of Gottfried Wilhelm Leibniz, Immanuel Kant, or Georg Wilhelm Friedrich Hegel or even the principles of Sun Tzu as applied to business strategy. There are alternative systems of inquiry when the scientific method is ill suited to tackle specific problems.

From distinguished scientists, we see a more skeptical view of “science as method.” For example, Joel H. Hildebrand, a prize-winning chemist said:

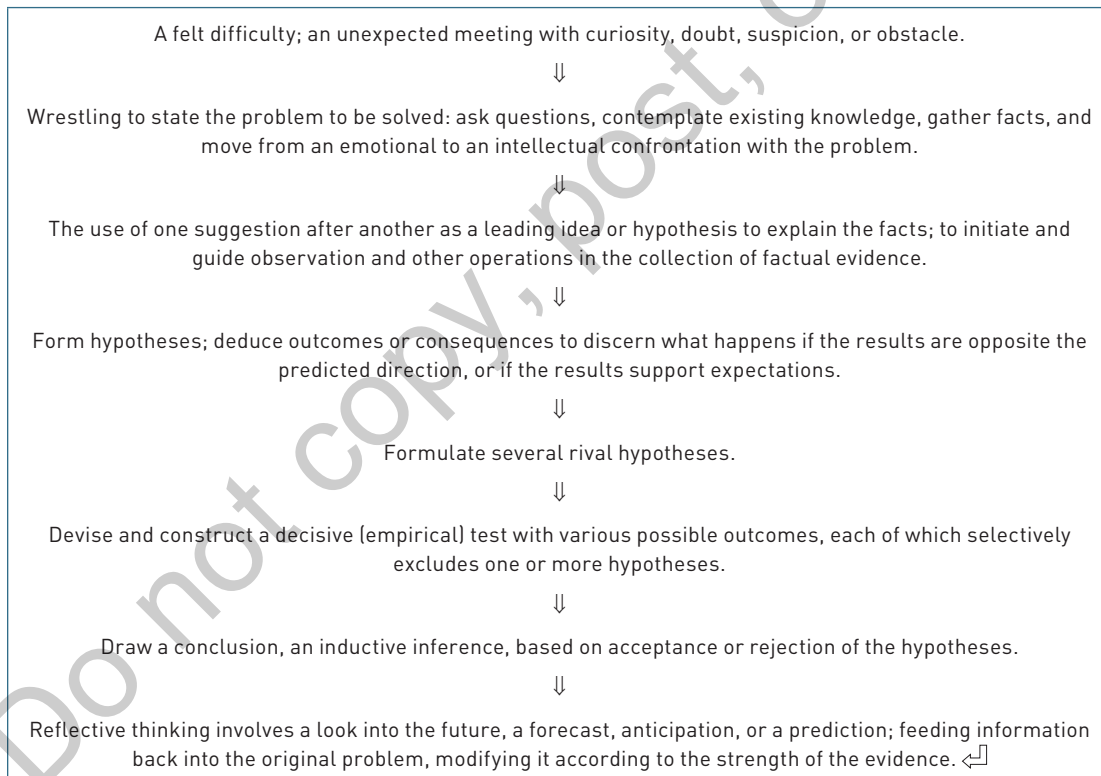
Scientific method is often defined as if it were a set procedure, to be learned, like a recipe, as if anyone could like a recipe, as if anyone could become a scientist simply by learning the method. This is absurd . . . [so I shall not] discuss scientific method, but rather the methods of scientists. We proceed by common sense and ingenuity. There are no rules, only the principles of integrity and objectivity, with a complete rejection of all authority except that of fact.⁵

The Nobel Laureate, Steven Weinberg, a legend of 20th-century physics, declared:

The fact that the standards of scientific success shift with time does not only make the philosophy of science difficult; it also raises problems for the public understanding of science. We do not have a fixed scientific method to rally around and defend.⁶

Exhibit 2.1 shows scientific inquiry as a process. It is a viable way of knowing, but the words “sequence” and “steps” distort how it is done. Researchers who resist template-like approaches know this. The unique qualities of the research problem determine if the ideas presented in Exhibit 2.1 are expanded or eliminated. We must also oppose the notion that the scientific method is only useful for the natural or physical sciences and has limited application in business. As Karl Pearson cautioned, “The scientific method of examining

EXHIBIT 2.1 ■ Reflective Inquiry: The Systematic Reasoning Process



Source: See Dewey, John, *How We Think* (Lexington MA: D. C. Heath, 1910), 72; and Dewey, John, *The Collected Works of John Dewey, 1852–1953*, ed. Jo Ann Boydston, citation published in the *Later Works, 1925–1953*, vol. 8 (Carbondale: Southern Illinois University Press, 1991), 200, 208.

facts is not peculiar to one class of phenomena and to one class of workers; it is applicable to social as well as to physical problems, and we must carefully guard ourselves against supposing that the scientific frame of mind is a peculiarity of the professional scientist.”⁷⁷

Although the method of science may distinguish it from other ways of knowing and understanding, the doing of research is more than a recipe—it is a frame of mind. Whereas a method implies an algorithm for answering questions, curiosity leads to asking questions. Curiosity and suspicion characterize the nature of scientists. The researcher is observant, always on the lookout for discrepancies, unusual occurrences, or oddities, which suggest new possibilities. Suspicion is the uneasiness with the answers that current paradigms provide us. Many of these aspects will be apparent in Exhibit 2.1.

REASONING TO SOUND CONCLUSIONS

Many of us are familiar with the TV series *Elementary*, which presents a contemporary update of Sherlock Holmes, Sir Arthur Conan Doyle’s character, leaving London for present-day Manhattan. In the opening scene of the book, *The Sign of the Four*, Doyle uses a conversation between Sherlock Holmes and Dr. Watson to demonstrate the importance of precise reasoning and careful observation to solve problems and unravel mysteries. Watson provides the test by handing Holmes a watch and asking for an opinion on the character or habits of the late owner. After a few moments of examination, Holmes’s observations lead to facts from which he correctly infers that Watson’s careless and untidy elder brother was the owner of the watch, a man who had inherited wealth, treated his prospects foolishly, and died a drunkard. The speed of the conclusion is startling, but the trail of his reasoning from small facts to conclusions, which Watson subsequently confirms, is a standard thought process for detectives and researchers alike.

Let’s expand on the events from Holmes’s observations. Initials on the watch back suggest Watson’s last name. The date of the watch was 50 years back—thus made for the last generation. Jewelry of the time descended to the eldest son, Watson’s brother. The lower part of the watch was dented and marked by keeping other hard objects in the same pocket, thus carelessness. He was well provided for in other respects, as evidenced by inheriting the watch, yet there were a pawnbroker’s pinpoints scratched in four places. We can infer that the brother had pawned the watch four times, yet he had occasional bursts of prosperity so



ELEMENTARY



A conversation between Sherlock Holmes and Dr. Watson reveals the importance of precise reasoning and careful observation to solve problems and unravel mysteries.

CBS Photo Archive/Contributor/Getty Images

he could reclaim it. The inner plate containing the keyhole had thousands of scratches around the hole, thus revealing that the brother, a drunkard, wound the watch at night, leaving traces of his unsteady hand.⁸

The next sections describe types of argument such as deduction, induction, abduction, and the Toulmin Model. Sherlock Holmes rarely uses deduction, in the proper sense of the word. Occasionally he will apply induction, using specifics (facts) from the past to predict future behavior or make a generalization. But he is best at abduction, moving from accepted facts to infer the most probable or “best explanation.” Notice that reasoning from factual descriptions of the watch (e.g., its date, dents and marks, pawnbroker’s scratches, and the inner plate) could all have led to different conclusions, but connecting those facts to Watson’s brother was the most obvious and basic hypothesis.

Exposition and argument are essential tools of the researcher. Deduction, induction, abduction, and the Toulmin Model are the types of argument used to build cases, reason, and derive conclusions. You will find the latter to be a very intuitive and practical approach to logical writing and speaking.

Deduction

Deduction is a form of reasoning that claims to be conclusive—the conclusions must necessarily follow from the reasons given. Deduction is an argument in which the reasons (premises) are said to imply the conclusion and if those reasons are successful in “warranting the conclusion” (i.e., they are true premises, the argument is deductively valid and represents a proof). The premises are assumptions that the researcher takes tentatively to be true. For a deduction to be correct, it must be both true and valid. The premises given for the conclusion must agree with the real world (be true). In addition, the arrangement of premises follows such a form that the conclusion must “necessarily follow from the premises”: There are many valid forms. One deductive argument is called *modus ponens*, with which you are familiar: (1) If P, then Q. (2) P. (3) Therefore, Q.

Because deductive arguments are those in which the truth of the conclusion is thought to be completely *guaranteed* and not just *made probable* by the truth of the premises, if the argument is a sound one, then the truth of the conclusion is said to be “contained within” the truth of the premises; that is, the conclusion does not go beyond what the truth of the premises implicitly required.⁹

For example, consider this simple deduction of **premises** and conclusion from years of inner-city health research designed to improve health care and care delivery among disadvantaged urban populations:

- Premise 1: Cooperation of inner-city participants in follow-up studies is challenging because of their mobility and the use of pseudonyms.¹⁰

- Premise 2: This study requires re-contacting the study's original inner-city participants.
- Conclusion: Participant cooperation in this study will be challenging.

If we know that the sample requirement of this follow-up study involves substantial re-contact of the original study's participants, we might think this is a sound deduction. But the conclusion cannot be accepted unless the argument form is valid and the premises are both true. The form is valid, and in this case, you can confirm both premises. The deductive approach begins with a theory, develops hypotheses from that theory, and gathers and analyzes data to test those hypotheses.¹¹

Induction

Induction is different. The relationship between premises and conclusions is not the same. **Induction**, as classically defined, draws a conclusion from one or more particulars (specific facts or pieces of evidence). The premises are intended to be strong enough that if they were true, it would be *improbable* that you would produce a false conclusion. In short, induction needs to increase the probability of a correct conclusion. The conclusion explains the facts and the facts support the conclusion.

Induction begins with observations. For example, you are working on a time-sensitive project when you meet with your boss and other managers for updates on the team's progress. After the meeting, you ask your boss about the absolute deadline, and your boss says 3 weeks. From colleagues who are also managers, you know authoritatively that the time limit is 5 weeks away. Your boss was untruthful.¹² This is a fact—you ask the critical timing question and get an answer that is false. Why is that? One likely answer is that your boss is under pressure from his manager to perform well. This conclusion is an induction. We know from experience that this organization places such undue pressure on managers that they will risk the loyalty of their staff to save themselves.

The nature of induction, however, is that the conclusion is a hypothesis. It is one explanation, but there are others that fit the fact equally well. Perhaps your boss answered quickly, without thinking, that completion ahead of the deadline would make him look good, that the team had a reputation for slowness in delivering on time-sensitive projects, or that he wanted to boost the department's reputation; on the other hand, he might have a pathological disorder. Deviant and destructive behaviors are not uncommon in organizations.¹³

The essential nature of induction in this example is that the inductive conclusion is an inferential jump beyond the evidence presented. While one conclusion explains the fact of the lie and has a chance of being true, we might have more confidence in others that can also explain the fact. It may also be that none explain the manager's response. The researcher's task is to determine the nature of the evidence needed and to find methods

that discover and measure it. This strategy, in turn, rules out hypotheses that do not explain the phenomenon. The inductive approach begins with a set of empirical observations, attempts to find patterns in those observations, and then theorizes about them.¹⁴

The complementary nature of these methods of reasoning is beneficial to researchers who design research with the idea of using induction and deduction together for a more comprehensive picture of the study. Often, a researcher plans to focus on an inductive or deductive approach and then discovers during the study that new questions emerge that the other approach helps to clarify.

Abduction

Abductive reasoning is one of the three types of inference. **Abduction**, referred to as inference to the “best explanation,” is a form of logical inference in which one chooses the hypothesis that would best explain the relevant evidence if that evidence were true. Abduction starts from accepted facts and infers the simplest, most probable, explanation. Whereas true premises and a valid form guarantee a true conclusion in deduction, abductive premises do not. Without practice, it is sometimes difficult to distinguish between induction and abduction:

The mere fact that an inference is based on statistical data is not enough to classify it as an inductive one. You may have observed many gray elephants and no non-gray ones, and infer from this that all elephants are gray, *because that would provide the best explanation for why you have observed so many gray elephants and no non-gray ones*. This would be an instance of an abductive inference. It suggests that the best way to distinguish between induction and abduction is . . . [that in both forms] the conclusion goes beyond what is (logically) contained in the premises . . . but in abduction there is an implicit or explicit appeal to explanatory considerations, whereas in induction there is not.¹⁵

Peirce, mentioned earlier, introduced abduction. According to Peirce, “abduction consists in studying the facts and devising a theory to explain them.”¹⁶ Abduction may take different forms. It can postulate the existence of previously unknown objects, such as a new planet, or it may rely on past hypotheses to produce new ones.¹⁷ It is thus a form of hypothetical reasoning that leads to adopting a tentative explanatory hypothesis on the basis of observations.¹⁸ Although Peirce says that abduction is reasoning, he also questions how close it comes to *intuition*, insight, sensations, emotions, guessing, instinct, and perceptual judgment.¹⁹

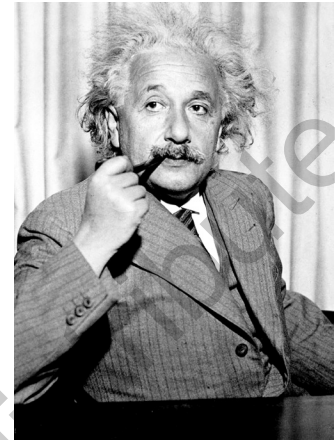
In scientific reasoning, one of the first tasks is to state the facts that explain a curiosity, doubt, or problem (Exhibit 2.1). This involves an explanatory hypothesis or abduction. Then, there is a crucial test using inductive and deductive processes. The initial abductive

hypothesis is often the equivalent of an educated guess, but it is a guess that must be tested and subsequently corrected. Although Aristotle and philosophers who came after him abandoned abduction,

Peirce, however, for whom abduction is the only *ars inveniendi* [art of invention that], integrates it again among effective scholarly procedures and thus allows for a moment of *creativity and mere guessing* in the process of controlled scientific reasoning.²⁰

Albert Einstein was convinced that insight was not the product of logic or mathematics, but rather it arises from intuition and inspiration, similar to artists.

“When I examine myself and my methods of thought, I come close to the conclusion that the gift of imagination has meant more to me than any talent for absorbing absolute knowledge.” Explaining his assertion, he said, “All great achievements of science must start from intuitive knowledge. I believe in intuition and inspiration. . . . At times I feel certain I am right while not knowing the reason.” Thus, his famous statement that, for creative work in science, “Imagination is more important than knowledge.”²¹



Wikimedia Commons/Light show

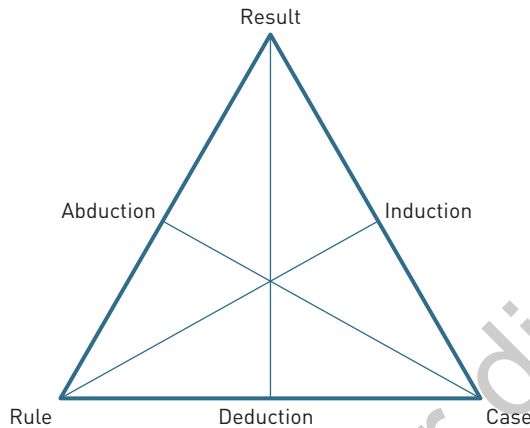
“When I examine myself and my methods of thought, I come close to the conclusion that the gift of imagination has meant more to me than any talent for absorbing absolute knowledge.”—Albert Einstein

Exhibit 2.2 presents a diagram of the three logical processes and describes Peirce’s famous bean example.

These three forms of reasoning are complementary operations of the human mind: “Deduction infers a *result* (conclusion) that is certain; induction produces a *rule* (conclusion) that is valid until a contrary instance is found; abduction produces a *case* (conclusion) that is always uncertain (i.e., merely plausible).”²²

You might find a stock market scenario interesting. The NASDAQ Stock Exchange consists of approximately 4,000 companies.²³ Its primary index is the Nasdaq Composite. Nasdaq movements sometimes signal broader market activity in the overall U.S. stock market. The Nasdaq-100 Index is a weighted, market-capitalization index that tracks the 100 most valuable large-cap growth, nonfinancial stocks. Their weights give some companies a disproportionate influence on the Nasdaq-100’s value. Thus, when the Nasdaq loses value, it may be because all markets are under pressure or significant selling is occurring in leading companies of an important sector of the Nasdaq-100, such as technology. (Technology accounts for over 50% of the market-cap weight.) When the Nasdaq-100 peaked, 11 stocks were down between 40% and 54%.²⁴ I will take a representative subset for our example, which I will call *S*; it is a subset of the 11 losing stocks. See Exhibit 2.3.

EXHIBIT 2.2 ■ Peirce's Triangle and Three Forms of Argument



Peirce proposes the following:

Suppose I enter a room and there find a number of bags, containing different kinds of beans. On the table there is a handful of white beans, and, after some searching, I find one of the bags contains white beans only. I at once infer as a probability, or as a fair guess, that this handful was taken out of that bag. This sort of inference is called *making a hypothesis*. It is the inference of a *case* from a *rule* and a *result*. We have, then²:

Deduction	Induction	Abduction
Rule: All the beans from this bag are white.	Case: These beans are from this bag.	Rule: All the beans from this bag are white.
Case: These beans are from this bag.	Result: These beans are white.	Result: These beans are white.
Result: These beans are white.	Rule: All the beans from this bag are white.	Case: These beans are from this bag.

Source: Peirce's triangle adapted from "Reasoning Patterns," The Pennsylvania State University, Eberly College of Science, Forensic Statistics, 2016, https://online.science.psu.edu/frnsc297a_sandbox_2391/node/2402, as cited in Sebeok, Thomas A., "One, Two Three Spells UBERTY," *The Sign of Three: Dupin, Holmes, Peirce*, ed. Umberto Eco and Thomas A. Sebeok (Bloomington: Indiana University Press, 1983), 1–10. Also see Kim, Joohoan, "From Commodity Production to Sign Production: A Triple Triangle Model for Marx's Semiotics and Peirce's Economics" (Presentation at the 79th Annual Convention of the Speech Communication Association, Miami, FL, November 18–21, 1993), Figure 2.

Note: ²Peirce, C. S., *Collected Papers (1931–1958)*, vols. 1–8, ed. C. Hartshorne, P. Weiss, and A. Burks (Cambridge, MA: Harvard University Press: 1934), vol. 2, § 623.

EXHIBIT 2.3 ■ Forms of Reasoning Illustrated With the NASDAQ Example**Deduction**

When *S* is selling off, the Nasdaq loses value. *S* is selling off. Thus, the Nasdaq is losing value.

(If the premises are true—agree with the real world—and the form of the syllogism is correct, the conclusion must be *necessarily* true.)

Induction

The Nasdaq has lost value every time *S* has sold off. Thus when *S* is selling off, the Nasdaq is losing value.

(With induction, the conclusion is a hypothesis—an inferential jump. It is one explanation, but there are others that explain a loss of value equally well: the Federal Reserve warned of a tech bubble, the media are hyping rate hikes, other sections in the Nasdaq are experiencing severe selling, or the characteristics of the subset may have changed.)

Abduction

When *S* sells off, the Nasdaq loses value. The Nasdaq has lost value; it must be that *S* is selling off.

(According to abduction, this is the best explanation. But some other reasons could have caused the Nasdaq to lose value, e.g., the beginning of a bear market or releases of earning reports for *S* showing poor performance. Abduction can lead to false conclusions but is often a path to a good explanation, if not a good preliminary hypothesis.)

As a business major, you may have noticed that successful entrepreneurs are risk-takers. They take measured risks in launching a business that could result in the loss of money and possible failure; you have not, however, observed entrepreneurs that are risk averse. You infer, abductively, that *all* entrepreneurs are risk-takers because that is the “best explanation” for your observations. This explanation is contrary to one of the principles of general semantics, the problem with “allness” statements. Despite its seemingly viable trail toward a good explanation, if you intend to claim the correctness of an abductive inference that includes the word “all,” you would be wise to test it empirically.

Exhibit 2.4 compares three characteristics (purpose, procedures, and outcomes) to differentiate the reasoning approaches used in problem-solving.

The Toulmin Model

The late Stephen Toulmin was an influential British philosopher known for his interests in ethics, science, and moral reasoning. He was best known for his 1958 book, *The Uses of Argument*, in which a new approach to analyzing arguments became known as the Toulmin

EXHIBIT 2.4 ■ Different Logical Approaches to Problem-Solving

Deduction	Induction	Abduction
Purpose		
Test theories and hypotheses through observations that fit general rules.	Start with specific, dependable observations to find patterns, generate hypotheses, or create theory.	Develop theory starting with an incomplete set of facts (observations) to find those most likely for reasoning to the best explanation (theory).
Tests of causal relationships are paramount.	Identify, diagnose, and explore for discovery and clarification.	Reasoning is like using imperfect but available evidence in a creative or intuitive way.
Procedures		
Designs are selected for theory testing, and the protocol is followed rigorously.		Facts, literature, and observations are the starting point for the most obvious and simple hypothesis.
Data collection and analysis are sequential, and their relationship is separate.	Data collection and recollection are iterative in looking for patterns.	Data shape the meaning of categories and themes in "thematic" qualitative research and grounded theory.
Correct and true premises guarantee the conclusions.	Conclusions are likely or probable.	Conclusions are a "best guess," i.e., they are "possibly," not probably, correct.
Outcomes		
Testing or confirming hypotheses. Accurate predictions are assumed to be one confirmation of the theory in question.	Developing and justifying generalizations or theory simultaneously; thereby reducing the need for subsequent empirical testing.	Explaining surprising facts or puzzles using numerical and cognitive reasoning. It "informs" the process of the scientific method by developing the construction of explanatory theory.

Source: Inspired by Morgan, David L., *Integrating Qualitative and Quantitative Methods: A Pragmatic Approach*, Kindle ed. (Thousand Oaks: SAGE, 2013), 47–49; and Haig, Brian D., "An Abductive Theory of Scientific Method," *Psychological Methods* 10, no. 4 (2005): 371–388.

Model. “He proposed, instead of formal logic’s three-part syllogism, a model of persuasive argument consisting of six components. Some, he maintained, apply universally but others did not. ‘Arguments, in other words, do not unfold in a Platonic ether, but in particular contexts.’”²⁵

When students think about argumentation and debate, Harvard, Georgetown, or the University of California, Berkeley’s prestigious intercollegiate debate teams or the Oxford-Cambridge competition come to mind. But Toulmin’s application extends to the interpretation of literature, computer science, and artificial intelligence. As Toulmin says, it has universal application to *practical* or *substantial* arguments spoken in plain language. If you do a search for the Toulmin Model in business, you will find it in advertising (including the analysis of negative advertising), business writing, public relations, marketing, consumer studies, accounting reports, management communication, business law, and training for corporate attorneys.

For students of research methods, this model of reasoning has particular importance in structuring the arguments in your paper. In fact, it may be one of the most important reasons for obtaining this book because it may enlarge your understanding of how to support arguments.

In your term project, the research problem is the objective around which everything revolves. It must be stated precisely, unambiguously, and authoritatively. Its rationale for selection, importance to the field, and the benefits to be derived are all arguments. Collectively, they convince the reader that your work is a worthwhile endeavor. Your review of the literature assembles the argument that leads the reader from broadly related studies to those that are directly related to your problem and pertinently bear on its resolution. The connection of the literature to the problem also requires an argument (i.e., building a case that links them). Your selection of design, method, procedures, and sample demand arguments that lead the reader to conclude that your decisions were the most appropriate and sensible for the research purpose. Again, arguments that writers must make convincingly include the interpretation of the findings, the degree to which they answer the research question, and the implications suggested by the findings. It is hard to do this smoothly with a deductive syllogism or clearly with the inductive process, although both are theoretical bases. Like the other two forms of reasoning, abduction presents literary challenges because of its openness to expedient conclusions. However, when you see how Toulmin’s model works, you will immediately recognize applications for your work now and in the future.



Al Seib/Contributor/Getty Images

Professor Stephen Toulmin, the late influential British philosopher, proposed a new model for reasoning and analyzing arguments. Its main components are data—warrant—claim. Three additional modules strengthen its utility.

The **Toulmin Model** is a structure for constructing decisive arguments containing six components that evaluate the pros and cons and the effectiveness of rebuttals and “is more reliable, credible, and in general more efficient and effective . . .” as a modern reasoning structure.²⁶ The structure is based on the legal system, in which the litigant (1) makes a **claim**, (2) gives **data** to support that claim, and (3) backs the data or evidence with a **warrant** (i.e., shows *why* the evidence supports the claim).²⁷ These three elements — claim, data, and warrant— are present in every argument. Three additional elements of Toulmin’s model may be added as necessary: a **backing** (for the warrant), **rebuttals**, and **qualifier(s)**.

To explain this process, I will first define the elements represented (Exhibit 2.5) and then provide a diagram of the process (Exhibit 2.6) and subsequently connect it to an example from the scandal at Wells Fargo. This should reveal the utility of this reasoning process.

A case study using the Toulmin Model entitled “Women Make Superior Managers” is provided at the end of this chapter.

EXHIBIT 2.5 ■ Definitions of the Elements in the Toulmin Model

Primary Components			Secondary Components		
Data	Warrant	Claim	Qualifier	Backing	Rebuttal
The data are the grounds, facts, or evidence on which the claim is based. They are used to prove or support the claim.	The warrant demonstrates the connection between data and claim by creating a bridge that shows <i>why</i> the evidence supports the claim and makes it true.	The statement, thesis, or assertion being argued. May be fact-based, value-based, or policy-based.	Adds limits, nuances, or specificity to the claim, providing a context under which the argument is true. Helps to counter rebuttals.	(For warrants) Additional support to bring credibility to the warrant’s reliability or relevance. Also, explains the connections between the data, warrant, and claim.	Mitigates likely objections and counter-arguments to the claim by suggesting reasons why a counter-claim is flawed, lacks credibility, or is not reasonable or realistic.

Sources: Please refer to the citations at the end of the case “Women Make Superior Managers” later in this chapter for definitions of the Toulmin Model’s components. The “Definitions of Components in the Toulmin Model” section of the case presents a more elaborate version of the definitions with citations for their sources. The definitions shown in this chapter’s Exhibit 2.6 are summaries. Primary definitional references include the following: Toulmin, Stephen E., *The Uses of Argument*, updated ed. (Cambridge, UK: Cambridge University Press, 2003), 89–100; Wheeler, L. Kip., “Toulmin Model of Argument,” Carson-Newman University English Department, <https://web.cn.edu/kwheeler/documents/Toulmin.pdf>; Karback, Joan, “Using Toulmin’s Model of Argumentation,” *Journal of Teaching Writing* 6, no. 1 (1987): 81–91; and Wilson, G. Peter, and Carolyn R. Wilson, “The Toulmin Model of Argumentation,” *NavigatingAccounting.com*, November 2016, Creative Commons BY-NC-SA.

(Continued)

engineers the theft of billions of dollars, then the promise of equal justice under the law has turned into a lie. The failure to prosecute big, visible crimes has a corrosive effect on the fabric of democracy and our shared belief that we are all equal in the eyes of the law.”^a

Backing: In cases of flagrant corporate lawbreaking, “federal law enforcement agencies—and particularly the Department of Justice (DOJ)—rarely seek prosecution of individuals.” Not only does the Securities and Exchange Commission (SEC) “fail to demand accountability, the SEC frequently uses its prosecutorial discretion to grant waivers to big companies so that those companies can continue to enjoy special privileges despite often-repeated misconduct that legally disqualifies them from receiving such benefits.”^b Congress must override inappropriate or illegal application of agency discretion.

Data: Documentation of the Data Timeline—September 8, 2016, to December 13, 2016^c

- From May 2011 to July 2015, Wells Fargo (WF) employees opened 1.5 million fraudulent bank accounts and 565,000 credit cards not authorized by customers. These accounts were complete with forged signatures, phony email addresses, and fake personal identification numbers (PINs).
- WF CEO John Stumpf blamed, and WF fired, 5,300 “rogue” employees when the scandal broke. To meet daily sales quotas, supervisors hounded the employees, most of them low-ranking staff. Only later did Stumpf recant his blame under pressure from House and Senate investigating committees. According to Stumpf’s U.S. Senate testimony, the bank fired only one executive, an area president, for improper sales over a decade.
- WF employees, trying to meet intolerable sales goals and avoid being terminated, targeted Mexican immigrants who spoke little English, older adults with memory problems, college students opening their first accounts, and small business owners. A former WF employee said, “It was like lions hunting zebras.” His colleagues would “look for the weakest, the ones that would put up the least resistance.”
- At the same time as the scandal, WF repossessed more than 400 cars of military members without first obtaining a court order as required by the Servicemembers Civil Relief Act (SCRA).
- WF lost Better Business Bureau (BBB) accreditation in many jurisdictions and will not be eligible for reinstatement for 3 years.
- California, Ohio, Illinois, and Massachusetts banned state business with WF as large municipalities across the country followed.
- The Financial Industry Regulatory Authority (FINRA) received U5 forms (a report card) for 600 of the 5,300 fired WF employees, with only 207 detailing the reason for firing as practices that led to bogus accounts.
- WF used U5s to threaten employees to meet quotas. When WF followed through with threats, it amounted to a “scarlet letter” that damaged employees’ careers and prohibited another financial firm from rehiring them without WF’s retraction.
- WF issued 15,000 low-cost MyTerm life insurance policies through Prudential without customers’ knowledge or permission. Often, employees arranged for monthly premium fees to be withdrawn from their customers’ accounts. Credit records were tarnished when payments were not made because the customers did not realize they owned the policy. Michael Barborek, a former WF banker in Orange, Texas said, “We were like insurance salespeople without the license. They wanted us to offer it to everybody who came in.”

- The life insurance scam bolstered WF's overall sales figures, eventually presented to investors to boost the stock price.
- Under the Dodd–Frank financial-overhaul law, Federal Deposit Insurance Corporation (FDIC) regulators concluded that WF had failed to devise an adequate blueprint for avoiding a taxpayer bailout if it were on the brink of bankruptcy. The rebuke over the bank's so-called "living will" (or too-big-to-fail) submission surprised executives. But they had already failed the initial test in April 2016.
- WF put "rip-off" clauses into its account agreements. Such clauses "deny customers their day in court should their bank wrong them." The legalese requires forced arbitration, which removes customers' disputes from courts, judges, and juries and puts them into an arbitration process. A private firm selected and paid for by the corporation decides claims. "When Wells charged them for accounts they never opened, multiple customers sued. But the bank claimed—successfully—that because customers had these clauses in their *real* accounts, they could thwart customers bringing lawsuits against them for the *fake accounts* [that] Wells Fargo opened up."^d
- New rules articulated in a memo to federal prosecutors were the first major policy announcement by then–Attorney General Loretta E. Lynch since taking office. "The memo is a tacit acknowledgment of criticism that despite securing record fines from major corporations, the Justice Department under President Obama punished few executives involved in the housing crisis, the financial meltdown, and corporate scandals."^e
- To date, no financial institution executive has faced prosecution for the widespread mortgage fraud that fueled the crisis

leading to the Great Recession, which still lingers over the economy and has cost the country over \$30 trillion and climbing. In that crisis, "The Office of Thrift Supervision, which was supposed to regulate, among others, Countrywide, Washington Mutual, and IndyMac—all of which collectively made hundreds of thousands of fraudulent mortgage loans—made zero criminal referrals. The Office of the Comptroller of the Currency, which is supposed to regulate the largest national banks, made zero criminal referrals. The Federal Reserve appears to have made zero criminal referrals; it made three about discrimination. And the FDIC was smart enough to refuse to answer the question, but nobody thinks they made any material number of criminal referrals [either]."^f

Counter-Arguments

Opposition to the claim suggests that WF and its executives have suffered enough considering:

1. WF paid \$185 million in fines, including a \$100 million penalty from the Consumer Financial Protection Bureau. WF paid \$35 million to the Office of the Comptroller of the Currency and \$50 million to the City and County of Los Angeles. WF agreed to refund about \$2.6 million in fees that may have been inappropriately charged.
2. WF agreed to pay \$4.1 million to resolve allegations of improperly repossessing more than 400 military members' cars. The Office of the Comptroller of the Currency assessed a \$20 million civil penalty and consumer restitution for allegedly violating the SCRA.
3. The FDIC imposed penalties on WF under the too-big-to-fail testing process that prevents WF from creating new international banking units or acquiring any nonbank subsidiaries. If the March 2017 submission

(Continued)

(Continued)

to the FDIC is not acceptable, WF could have its growth capped and, in 2 years, be forced to divest itself of certain assets under the Dodd–Frank Act.

4. CEO Stumpf forfeited unvested equity awards worth about \$41 million and did not get a salary while the company's board investigated the bank's sales practices. He received no 2016 bonuses. He subsequently retired.
5. Carrie Tolstedt, former senior executive vice president of community banking and the presumed instigator of the scheme, left the bank before her planned retirement date. She got no severance, forfeited unvested equity awards of \$19 million, and did not get a 2016 bonus.

Rebuttal (to the Counter-Argument)

- "Corporate criminals routinely escape meaningful prosecution for their misconduct. The law is unambiguous: if a corporation has violated the law, individuals within the corporation must also have violated the law. If the corporation is subject to charges of wrongdoing, so are those in the corporation who planned, authorized or took the actions."⁹

- Carrie Tolstedt left WF with a \$125 million retirement package.
- John Stumpf took a retirement of \$133 million. He would be eligible for administrative perks if he stayed on as a consultant to WF for the next 2 years.
- The so-called record-breaking fines are a rounding error and serve only as a minor deterrent to criminal wrongdoing compared to WF's second-quarter profits of \$5.6 billion. The financial community was apathetic to the corruption and fines as investors traded the stock up, which moved in a stable range throughout the crisis.
- Managers who were enablers of the sales quota system and encouraged criminally fraudulent activities were unaffected (months later) by penalties or sanctions. Yet 5,300 employees paid the price for their bosses; whistleblowers on ethics violations were evicted from the firm. Despite ample signs of the scandal, executives failed to stop misconduct for years as their personal careers advanced. For executives, the organization's fines were inconsequential because there were no penalties for them personally.

Notes:

⁹Office of Senator Elizabeth Warren, "Rigged Justice: 2016—How Weak Enforcement Lets Corporate Offenders Off Easy," Executive Summary, U.S. Senate, January 20, 2016, https://www.warren.senate.gov/files/documents/Rigged_Justice_2016.pdf.

¹⁰Ibid.

¹¹References for data/evidence in the Toulmin Model example are from the following sources, approximating the timeline shown in the text: Corkery, Michael, "Wells Fargo Fined \$185 Million for Fraudulently Opening Accounts," *New York Times*, September 8, 2016, <http://www.nytimes.com/2016/09/09/business/dealbook/wells-fargo-fined-for-years-of-harm-to-customers.html>; Smith, Yves, "Wells Fargo Fined \$185 Million for Opening Phony Customer Accounts, Charging Fees Without Consent; Executives Go Scot Free," *Naked Capitalism* (blog), September 9, 2016, <http://www.nakedcapitalism.com/2016/09/wells-fargo-fined-185-million-for-opening-phony-customer-accounts-charging-fees-without-consent-executives-go-scot-free.html>; Reuters, "Wells Fargo CEO to Forfeit \$41 Million Amid Independent Investigation," *Fortune*, September 28, 2016, <http://fortune.com/2016/09/28/wells-fargo-ceo-forfeit-investigation/>; Shen, Lucinda, "How Wells Fargo's Scandal Could Change the Way We Bank," *Fortune*, September 30, 2016, <http://fortune.com/2016/09/30/wells-fargo-banking/>; Shen, Lucinda, "Here's How Much Wells Fargo CEO John Stumpf Is Getting to Leave the Bank," *Fortune*, October 13, 2016, <http://fortune.com/2016/10/13/wells-fargo-ceo-john-stumpfs-career-ends-with-133-million-payday/>; Cowley, Stacy, "'Lions Hunting Zebras': Ex-Wells Fargo Bankers Describe Abuses," *New York Times*, October 20, 2016, <http://www.nytimes.com/2016/10/21/business/dealbook/lions-hunting-zebras-ex-wells-fargo-bankers-describe-abuses.html>; Henry, Jim, "Wells Fargo Troubles Go Beyond Fake Account

Scandal," *Forbes*, October 30, 2016, <http://www.forbes.com/sites/jimhenry/2016/10/30/wells-fargo-troubles-go-beyond-fake-account-scandal/#15e9e6b72f16>; Brown, Rachel, "Wells Fargo Loses BBB Accreditation," *WCNC*, October 20, 2016, <http://www.wcnc.com/money/business/wells-fargo-loses-bbb-accreditation/337609202>; Reuters, "U5s: Wells Fargo's Sales Scandal Just Got Bigger," *Fortune*, November 3, 2016, <http://fortune.com/2016/11/03/wells-fargo-sales-scandal-employees/>; Keller, Laura J., Dakin Campbell, and Kartikay Mehrotra, "Wells Fargo's Stars Thrived While 5,000 Workers Got Fired," *Bloomberg*, November 3, 2016, <https://www.bloomberg.com/news/articles/2016-11-03/wells-fargo-s-stars-climbed-while-abuses-flourished-beneath-them>; Arnold, Chris, "Senators Investigate Reports Wells Fargo Punished Workers," *NPR* (All Things Considered), November 4, 2016, <http://www.npr.org/2016/11/04/500728907/senators-investigate-reports-wells-fargo-punished-workers>; Cowley, Stacy, and Mathew Goldstein, "Accusations of Fraud at Wells Fargo Spread to Sham Insurance Policies," *New York Times*, December 9, 2016, http://www.nytimes.com/2016/12/09/business/dealbook/wells-fargo-accusations-sham-insurance-policies.html?_r=0; Reuters, "Wells Fargo Scandal: Prudential Investigating Reports of Fraudulent Life Insurance Sales," *Newsweek*, December 10, 2016, <http://www.newsweek.com/prudential-life-insurance-wells-fargo-customer-accounts-scandal-530604>; Dayen, David, "Another Wells Fargo Scandal Proves Our Financial System Is Still Broken," *The Fiscal Times*, December 12, 2016, <http://www.thefiscaltimes.com/Columns/2016/12/12/Another-Wells-Fargo-Scam-Proves-Our-Financial-System-Still-Broken>; and Tracy, Ryan, and Emily Glazer, "Wells Fargo Sanctioned by U.S. Regulators for 'Living Will' Deficiencies," *Wall Street Journal*, December 13, 2016, <http://www.wsj.com/articles/u-s-regulators-sanction-wells-fargo-declaring-living-will-deficiencies-1481664744>.

⁴Lardner, Jim, "What Should Be Done to Stop Banks Like Wells Fargo from Scamming US?," *Americans for Financial Reform* (blog), September 26, 2016, <http://blog.ourfinancialsecurity.org/2016/09/1069/>.

⁵Apuzzo, Matt, and Ben Protess, "Justice Department Sets Sights on Wall Street Executives," *The New York Times*, September 9, 2015, <http://www.nytimes.com/2015/09/10/us/politics/new-justice-dept-rules-aimed-at-prosecuting-corporate-executives.html>.

⁶Holland, Joshua, "Hundreds of Wall Street Execs Went to Prison During the Last Fraud-Fueled Bank Crisis," *Moyers & Company*, September 17, 2013, <http://billmoyers.com/2013/09/17/hundreds-of-wall-street-execs-went-to-prison-during-the-last-fraud-fueled-bank-crisis/>.

⁷Warren, *Ibid.*

DECIPHERING THE RESEARCH LINGO

When we do research, we seek principally to describe, explain, or predict phenomena. Our research question might be "How accurate are various models of sales forecasting in the electronics industry?" Definitions are crucial to answering this question, and we must agree on their meaning. Which forecasting models? What is meant by "accurate?" Do we mean consumer electronics or commercial instruments? What is the range of products included? These questions require the use of concepts, constructs, definitions, variables, hypotheses, and a theory about forecasting.

Concepts

A **concept** is a generalized meaning associated with particular events, objects, conditions, and situations. A concept aggregates objects or events that have common characteristics beyond a single observation. When you think of a laptop or mobile phone, you do not think of a single one but rather collected memories of all laptops or phones abstracted to a set of distinct and definable characteristics. We can all agree on the meanings of concepts such as cat, table, lamp, coin, and employee.



Wiesław Smetek/Science Source

A concept is a generalized meaning associated with particular events, objects, conditions, and situations. A concept aggregates objects or events that have common characteristics beyond a single observation. A table, for example, has agreed-on properties such as support devices (i.e., legs) and a horizontal surface. It is relatively concrete. "Safety" is more abstract with many characteristics and applications; it is much harder to define and visualize with a uniform meaning.

It is much harder to pinpoint concepts such as household, retail transaction, dwelling unit, and regular customer. Even more challenging are familiar but not well-understood concepts such as personality, leadership, social class, and fiscal policy. For example, the research literature defines personality in more than 400 ways.²⁸

The concepts described above represent progressive levels of abstraction. As the concept becomes more abstract, it loses the concrete aspects of the person or thing to which the linguistic expression refers. While the actual properties of a table include support devices (i.e., legs) and a horizontal surface, a high-level abstraction like personality is much harder to visualize. Such abstract concepts are often called constructs. They are not directly observable and may contain multiple parts.

Constructs

A **construct** is an image or idea invented explicitly for a given research or theory-building purpose. We build constructs by combining simpler concepts when the meaning we want to communicate is not directly subject to observa-

tion. Doing so provides a shared meaning allowing us to communicate precisely with the research audience. We frequently describe constructs as mental abstractions because seldom are constructs directly observable. For example, we cannot directly observe organizational culture, even though we may associate it with (1) stories and legends about the legacy of early leaders, (2) informal/formal communications or symbols that reveal the visual importance of people and objects, (3) rewards and recognition that signal what matters to the organization, (4) spoken and unspoken rule-oriented behaviors, (5) skills demonstrated by senior leaders, and (6) traits and characteristics of senior leaders.²⁹ In other words, organizational culture is composed of multiple underlying concepts. Confusion about the meaning of constructs can destroy a research study without the awareness of the researcher, manager, or client. If words have different meanings to individuals, then the intended message communicated about the problem differs markedly from what is perceived.

Definitions

Definitions reduce the danger of miscommunication. There are various kinds of definitions, the most familiar being dictionary definitions. Dictionary definitions define a concept with an explanatory phrase or synonyms. Although dictionary definitions are adequate for general communication, they are often not precise enough for research. Let's take the example of a co-worker who is always happy. What does this mean?



Andrew Ostrovsky/Alamy Stock Photo

Dictionary definition: Dictionary definitions for happiness are as follows: (a) a state of well-being and contentment or (b) a pleasurable or satisfying experience.

The associated synonyms are pleasure, contentment, satisfaction, cheerfulness, merriment, gaiety, joy, joyfulness, joviality, jollity, glee, delight, good spirits, lightheartedness, well-being, enjoyment, exuberance, exhilaration, elation, ecstasy, jubilation, rapture, bliss, blissfulness, euphoria, or transports of delight. The number of connotations associated with “happiness” show that it has many nuances of meaning. Would you use this definition in your research?

More abstract concepts are called constructs. Constructs are built by combining simpler concepts when the meaning we want to communicate is not observable and may contain multiple parts. Although constructs are not directly observable, they can be tested and measured using a number of instruments.

Quasi-research definition: As we try to narrow our definition and to become more specific, we look for ways of measuring “happiness.” This is the first step toward creating an *operational definition* but “happiness” is a fuzzy concept. An easy technique might be to *count smiles*. By counting the number of smiles a person reveals during a timed observation, we have a more specific definition. But it is not yet an *operational definition*. In fact, it is a bad one. Researchers analyzed video recordings of bowlers and fans at a hockey game and discovered that when people were happy (their team scored), they seldom smiled but did smile for social reasons like accidentally bumping into someone.³⁰

Operational definition: In the previous study, the components of happiness were not considered, only a facial gesture. Happiness, or subjective well-being, consists of three parts: positive affect, negative affect, and life satisfaction. Widely used and respected questionnaires approach happiness differently. For example, the Positive and Negative Affect Schedule (PANAS by Watson, Clark,



Definitions in research are tricky. Dictionary definitions define a concept with an explanatory phrase or synonyms. Operational definitions state specific operational, measurement, and testing criteria. Operational definitions use terms that have empirical referents—that is, we must be able to count, measure, or in another way gather information through our senses.

and Tellegen) and the OECD Subjective Well-Being scale both measure positive and negative affect. The Satisfaction With Life Scale (Deiner, Emmons, Larsen, and Griffin) measures life satisfaction. Then there is the Oxford Happiness Questionnaire (Argyle and Hills) and the Subjective Happiness Scale (a.k.a., the General Happiness Scale) created by Lyubomirsky and Lepper. An entirely different measurement deals with neural receptors in the brain. The “rapid progress of neurobiology also enables neurobiologists to analyse the neural underpinning of happiness and might well offer new technologies to achieve ‘artificial happiness’ in the future.”³¹ This brings us to a more formal explanation of operational definitions.

Operational definitions state specific operational, measurement, and testing criteria. These terms must have empirical referents—that is, we must be able to count, measure, or in another way gather information through our senses. Whether the construct to be defined is physical (e.g., a tool) or highly abstract (e.g., self-esteem), the definition must specify the characteristics to be studied and how to observe them.

A researcher might be studying self-esteem and define high self-esteem as a high score on Rosenberg’s Self-Esteem Scale.³² Rosenberg’s scale is a 10-item scale that claims to measure global self-worth by capturing both positive and negative feelings about the self. The measurement uses 4-point Likert scales ranging from strongly agree to strongly disagree. It contains items such as “I feel that I have a number of good qualities” and “All-in-all, I am inclined to feel that I am a failure.” Similarly, a researcher

might define the price multiple or price-to-earnings (P/E) ratio as the ratio for valuing a company that measures current share price relative to its per-share earnings. If a company is trading at \$50 a share and its earnings over the last 12 months were \$1.75 per share, the P/E ratio for the stock would be $50/1.75$, or 28. A P/E ratio of 28 can be compared with the historical P/E ratio average of 16.7. Thus, operational definitions transform definitions of concepts and constructs into measurement. **Measurement** occurs when a number is assigned to a characteristic of a person, object, or event, in a reliable and valid way.

Measurement attempts to quantify *properties*, or characteristics. Some properties can be measured directly such as a person's height or weight. Other properties may refer to context-specific characteristics such as rank in an organization. A vice president in a local bank is not the same as a vice president at Google, thereby making comparisons difficult. Still other properties, such as attitudes toward brand image, can only be ascertained by measuring *indicants*. In most situations, the precise relationship between the indicant and the property is unknown and all that is known is that the indicant is an effect or correlate of the property. Thus, the consumer price index and the gross national product are indicants of the state of the nation's economy. The most important point is that the property being studied must be clearly and accurately defined. Indeed, the definition of the property is the first step, and the property must be defined specifically as it relates to the research at hand. It is only after the property has been defined operationally that the appropriate indicants can be determined.

Variables Defined

A **variable** is anything that can vary (i.e., that can assume multiple values and can change or be changed). Variables can be counted or scaled. In manufacturing, a variable might be the time to perform an assembly task or the maximum number of dust particles per cubic meter in the paint department. In demographics, a variable could be age, education, income, family size, participants' characteristics, and so forth. Students observe distance between classes, exam scores, number of students in a class, or the instructor's level of educational attainment as variables. Researchers refer to the property being studied as "varying" when the property takes on different values or numerals. One finds the variability or dispersion in a variable through numerical differences in a *continuous* variable or a symbol classifying membership in a category (*discrete* variable). Once the research process has started, you operationalize concepts and constructs used in the study with a measuring instrument or testing criteria. At this point, concepts/constructs and variables are the same, and the term *variable* commonly prevails.

Variables in Measurement

Variables have different quantitative characteristics depending on the scale they are measured on as shown in Exhibit 2.7.³³ The variable's properties determine the numerical value assigned to the variable.

For example, some variables are **dichotomous**, meaning they have only two values reflecting the presence or absence of a property. Variables such as employment status (employed or unemployed) or political affiliation (Republican or Democrat) have two values measured as 0 and 1 or 1 and 2. When variables take on additional values representing added categories of group membership (e.g., the demographic variables of race or religion), they are called **polytomous (multicategory) variables**. Both dichotomous and polytomous variables are **discrete** because only certain finite values (categories) are possible. A race-ethnicity variable in which "American Indian" is assigned a 5 and "other" is assigned a 6 provides no option for a 5.5. **Categorical or classificatory variables** are discrete variables. There is no inherent ranking, and analysts make measurements on a **nominal scale** (see Exhibit 2.7). A nominal scale does not imply order, distance, or origin; its measurement power is limited to naming. The prime characteristic is that the observations assigned to one category are equivalent within that category and using an assignment criterion, those observations can be said to differ from those assigned to all other categories.

When a variable takes on any value in an ordered set of values within a range, it is called a **continuous variable**. Theoretically, a continuous variable can take on an infinite set of values, but in practice, they are finite. It is arguable that the values of a continuous

EXHIBIT 2.7 ■ Operationalizing Variables by Measurement Level

Scale	Characteristics	Allowed Operations	Descriptive Statistics
Nominal	Used to name, categorize, or classify	=, ≠	Category frequency, category percentage, mode
Ordinal	Used to order (rank) objects or individuals	=, ≠, <, >	Median, range, percentile ranking
Interval	Used to order, and has equal distance (intervals) between adjacent points but an arbitrary zero point	=, ≠, <, >, +, -	Mean, standard deviation, variance
Ratio	Fully quantitative (all arithmetic operations), ordering, equal intervals, and an absolute zero point	=, ≠, <, >, +, -, *, /	Geometric/harmonic mean, coefficient of variation

variable possess at least some intrinsic ranking, but the larger point is that continuous variables are treated as inherently interval or ratio.

An **ordinal (ranking) variable** is a variable that is rank ordered. For instance, you may rank levels of service satisfaction from highly satisfied to highly dissatisfied with an ordinal scale, but there is no way to discern the distance between points (or satisfaction levels). Many preference and opinion scales are ordinal. Recall judgments you make every day that involve relational comparisons. Take the sugar content of a serving size of cereal as an example. In sugar per serving, Kellogg's Raisin Bran is greater than Kellogg's Frosted Flakes, which is greater than regular Cheerios. Similarly, in the hybrid luxury car segment, the Lexus ES 300h gets greater combined (city/highway) miles per gallon than the Infiniti Q70, which in turn has better mileage than the Lexus 500h AWD. These examples satisfy the transitivity postulate, which states that $a > b$ and $b > c$; therefore, $a > c$. In data analysis, nominal and ordinal (ranking) variables are treated with nonparametric statistics. Parenthetically, if we knew that the grams per serving of the compared cereals was 18, 12, 1, respectively, and the miles per gallon of the hybrid cars was 40, 30, 26, respectively, the ordinal variable would be ratio because there is equal distance between points and, in measuring grams and miles per gallon, both variables have a 0 in the set. Zero in weight means it does not exist. Therefore, as shown in Exhibit 2.7, all mathematic operations are allowed with ratio data.

When continuous variables are measured as **interval variables**, they have both order and equal distance between points (the distance between 12 and 1 PM is the same as the distance between 3 and 4 AM). Fahrenheit temperature scales have an *arbitrary* zero point but not a unique origin; they are also an example. A zero on a Fahrenheit temperature scale does not indicate the absence of temperature. In addition, IQ, GRE, and SAT scores are interval because they are standardized test scores rescaled to an arbitrary scale. Rating scales that can be empirically demonstrated to have equal distance between points are interval scales.

Finally, continuous variables that meet the requirements for **ratio** scales have all of the powers previously mentioned plus an absolute zero or point of origin. The zero in ratio data (0, 1, 2, 3, . . . n) permits the formation of ratios, whereas its absence in interval data obviates the formation of ratios. Both interval and ratio scales are quantitative and use parametric statistics. In business research, we find currency, sales figures, return rates, income earned per year, and population counts as examples.

Variables in Causal and Correlational Relationships

One finds independent and dependent variables in causal (explanatory) studies. Business researchers are typically interested in discovering relationships between these variables. Informally the relationship is sometimes referred to as stimulus-response or antecedent-measured. However, researchers more precisely describe an **independent variable** (IV)

as the presumed cause or treatment variable in an experimental study. The IV is the variable that the researcher manipulates to explain variance in the dependent variable. A **dependent variable** (DV) is the presumed effect in an experimental study. In correlational nonexperimental studies (including statistical modeling, multiple regression, and canonical correlation), the X variable is called the **predictor variable**, and the Y variable is known as the **criterion variable**. In relational and predictive studies, this helps to avoid the assumption of a direct cause-effect relationship. This question shows the relationship between the IV and DV with regard to employees who perform their jobs remotely:

Will telecommuting (IV) lead to increased job satisfaction (DV)?

The next two questions illustrate correlational relationships and those analyzed with multiple regression:

What is the relationship between supervisors' modeling of ethical behavior (predictor) and the ethical behaviors of subordinates (criterion)? (correlation or bivariate regression)

What is the relationship between supervisors' modeling of ethical behavior (predictor₁), strong supervisory working alliance (predictor₂), and the ethical behaviors of subordinates (criterion)? (multiple regression)

The variables used in the following examples are part of a current controversy in workplace practices stated in the IV-DV example above. This scenario may prompt you to apply the Toulmin Model to evaluate the arguments.

After several decades of allowing their employees to perform their jobs remotely, companies such as Yahoo, Bank of America, Aetna, Honeywell, Best Buy, Hewlett-Packard, and IBM have called their remote workers back into the office, thereby reducing or eliminating their work-from-home or telecommuting programs. At IBM, for example, 5,000 people in marketing, IT, procurement, and Watson-related departments were told to co-locate in one of six U.S. cities or find a new job. Telework is still an option for some IBM workers. Honeywell's decision affected 129,000 workers. The debate centers on the claim that face-to-face teams are more creative and synergistic; they make decisions faster and are more nimble, leading to greater productivity. Ironically, IBM saved 5 million gallons of staff fuel and avoided 450,000 tons of CO₂ emissions in the United States alone in 2007. Teleworking also allowed the company to reduce millions of square feet of office space and increase income by \$1 billion from subleasing.³⁴ Findings from a Global Workplace Analytics report, which looked at the results of more than 4,000 telecommuting studies, revealed twice the number of advantages than disadvantages in telecommuting.³⁵

When companies scale back on telecommuting, it may indicate problems in the market and revenues (recall Yahoo and Hewlett-Packard, and consider IBM's 21 consecutive quarters of declining revenues). Eventually, companies will be compelled to get the telecommuting problem right, particularly as the percentage of millennials continues to increase in "flexible location" positions. Millennials, who are projected to change jobs up to 15 times in their careers, won't have a problem moving to a company where flexibility is valued.³⁶

A **moderating variable** (MV) influences the strength of the relationship between the IV and DV variables and is characterized statistically as an interaction. Sometimes an MV is included because it is thought to have a significant contributory or contingent effect on the primary IV-DV relationship.

Will telecommuting (IV) lead to increased job satisfaction (DV), especially among employees whose childcare needs conflict with traditional work hours (MV)?

Extraneous variables are among a countless number of peripheral variables that could affect a given relationship. **Extraneous variables** are variables not intentionally being studied or are unknown to an experimenter that may affect the outcome or introduce error. For example, environmental cues may influence participant behavior or researcher cues prompt participants to interpret how they should behave. The participants themselves may have individual characteristics unknown to the researcher such as prior knowledge, health issues, fatigue, or other disorders. The setting is also a source of influence: lighting, temperature, or noise. When known, these variables may be controlled so as not to become a *confounding variable* and provide an alternative explanation of the study's intended results. The nature of the work, for example, could affect any work schedule's impact on job satisfaction. The researcher might now introduce a *control variable* (CV). A **control variable** is a variable that is held constant (unchanging) throughout an experiment or observation designed to test the impact of the IV. In the IV-DV relationship, if certain variables are not held constant, they become extraneous factors that can invalidate the study's findings.

Among financial analysts (CV), will telecommuting (IV) lead to increased job satisfaction (DV), especially among employees whose childcare needs conflict with traditional work hours (MV)?



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After several decades of allowing employees to perform their jobs remotely, companies such as Yahoo, Bank of America, Aetna, Honeywell, Best Buy, Hewlett-Packard, and IBM have called their remote workers back into the office, thereby reducing or eliminating their work-from-home or telecommuting programs.

Intervening variables (IVVs) are a conceptual mechanism through which the IV and MV might affect the DV. They are also known as mediating variables because they help explain how or why the IV affects the DV. Even if a remote-work policy results in higher job satisfaction, this may not be the full explanation. Perhaps telecommuting affects an intervening variable, which, in turn, results in higher job satisfaction. Now, we might hypothesize that the IVV is the amount of worker autonomy.

Among financial analysts (CV), will telecommuting (IV) increase employee autonomy (IVV), thereby leading to higher job satisfaction (DV), especially among employees whose child care needs conflict with traditional work hours (MV)?

Hypotheses

Hypotheses and propositions have overlapping meanings. A **proposition** makes a statement about concepts that is judged true or false if it refers to observable phenomena. When the proposition is constructed for empirical testing, it is called a **hypothesis**. Thus, a hypothesis is a verifiable counterpart of a proposition. The hypothesis states what is expected to happen in the study's predicted relationship between two or more variables.

You will note that the *interrogative sentences* in the telecommuting examples could be converted to *declarative sentences* as hypotheses. For example, "Telecommuting (IV) leads to increased job satisfaction (DV), especially among employees whose childcare needs conflict with traditional work hours (MV)." I distinguish between a **research hypothesis** and a **statistical null hypothesis** at this reference.³⁷ Hypotheses guide the investigation of the problem or provide possible explanations for observations. Some might say a hypothesis is also tentative and conjectural, or an insightful guess about how one might answer the "research question" or support the hypothesis. (Research questions are explained in the next chapter.) Note that one supports a hypothesis; it is not "proven." Recall the discussion of induction: the conclusion is a hypothesis. It represents one explanation, but other explanations may explain the fact equally well. "Formulating hypotheses and operationalizing variables" is also illustrated in Chapter 3.

Descriptive hypotheses typically state the existence, size, form, or distribution of some variable. As univariate hypotheses, they contain only one variable; but they may also refer to several variables or groups. The descriptive hypothesis is a testable prediction revealing what you expect in your study. Examples include the following: "The current unemployment rate in Detroit exceeds 10% of the labor force" or "The professional networking site LinkedIn provides fewer employment opportunities in Europe than Xing." Researchers sometimes use a research question in place of a descriptive hypothesis such as "What is the unemployment rate in Detroit?"

Relational hypotheses are statements that describe the relationship between two or more variables. Among relational hypotheses are correlational and explanatory/causal hypotheses. **Correlational hypotheses** state that variables occur together in some specified way that establishes an association or trend. Examples of correlational hypotheses are as follows: “Isolation of clerical workers increases with the amount of Internet use” and “There is a positive relationship between learning course objectives and the number of hours accessing electronic course materials.” There is no cause-effect claim in a correlational hypothesis. The phrase “correlation does not imply causation” applies here but could be expanded to “empirically observed covariation is a necessary but not sufficient condition for causality.”³⁸

An **explanatory or causal hypothesis** suggests that the presence of or a change in one variable (IV) causes an effect to occur in the other variable (DV). Because “cause” translates to “helps to make happen,” the IV is not the only possible explanation for changes in the DV, as you saw in the telecommuting example. A causal example might be “Executives of charitable organizations who communicate the vision for their organization (IV) outperform noncommunicative executives from similar charities who do not communicate the vision for their organization on outcomes of revenue (DV₁) and reputation (DV₂).” Another example is “Increased amounts of assignment-related stress lead to diagnoses of fatigue, headaches, and depression among undergraduate students.”

When researchers craft research hypotheses, they must also consider both the direction of the relationship (positive, negative, more than, or less than) and which variable influences the outcome. Especially with causal hypotheses, it may be necessary to identify other causes and control their effects. Hypotheses serve significant roles in research: (1) They guide and limit the scope of the study, (2) they identify relevant information, (3) they suggest which research design is most useful, and (4) they create a framework for arranging conclusions.

Theory

A simple definition of theory contains the components we have just discussed. That is, a **theory** systematically *interrelates* concepts, constructs, definitions, and propositions to explain and predict phenomena (facts). Others expand this definition by including “interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables with the purpose of explaining and predicting the phenomena.”³⁹ We have many theories and use them continually to explain or predict what goes on around us. To the extent that our theories are sound and fit the situation, we are successful with our explanations and predictions. Thus, theories are practical not just theoretical. The situation, domain, or setting where the theory applies is equally important because it specifies factors that limit the occurrences of when and where a theory can be used effectively.⁴⁰ Thus, the components of the

EXHIBIT 2.8 ■ A Synopsis of the Theory of Disruptive Innovation

“Disruption” describes the process whereby a smaller company with fewer resources can challenge established incumbent businesses successfully. Specifically, as incumbents focus on improving their products and services for their most demanding (and usually most profitable) customers, they exceed the needs of some segments and ignore the needs of others. Entrants that prove disruptive begin by successfully targeting those overlooked segments, gaining a foothold by delivering more suitable functionality, often at a lower price. The incumbents, chasing higher profitability in more demanding segments, tend not to respond vigorously. Entrants then move upmarket, delivering the performance that incumbents’ mainstream customers require, while preserving the advantages that drove their early success. When mainstream customers start adopting the entrants’ offerings in volume, disruption has occurred.

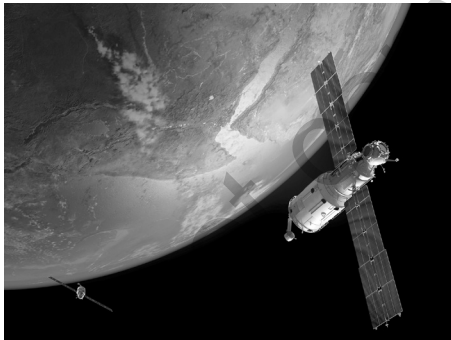
theory I mentioned satisfy the natural language questions of who, what, when, where, how, and why and the predictive claims of whether a specific event could, should, or would occur.⁴¹

Let’s look at the “theory of disruptive innovation” by Clayton Christensen, a Harvard business professor.⁴² Exhibit 2.8 shows an example of a theory that improves predictions about which businesses will succeed (think about Apple under Steve Jobs, Netflix, Google Apps, and Skype, to name a few).

Theory serves us in many useful ways. One of the most famous sayings about theories comes from Kurt Lewin’s classic article in 1952 about field theory (yes, that is just after World War II, but it is still incredibly relevant). He said, “There is nothing so practical as

a good theory.”⁴³ Lewin’s colleagues expanded this notion and further clarified it by saying “theorists should try to provide new ideas for understanding or conceptualizing a (problematic) situation, ideas which may suggest potentially fruitful new avenues of dealing with that situation. Conversely, applied researchers should provide theorists with key information and facts relevant to solving a practical problem, facts that need to be conceptualized in a detailed and coherent manner.”⁴⁴

What about practicality? Einstein’s theory of relativity is known universally. But did you know that its application to your car’s GPS system embodies relativistic effects? Since a satellite moves at about 6,000 miles/hour at over 12,000 miles above the earth while sending signals to earth stations, your GPS experiences higher acceleration due to gravity than the orbiting satellite. Without the benefit of a clock calibrated to nanoseconds to account for gravitational



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Theories of GPS accuracy. How accurate are they? It depends. GPS satellites broadcast their signals in space with a certain accuracy, based on distance or range from multiple GPS satellites. But user accuracy refers to the device’s calculated position from a true point, expressed as a radius. You are where you expect to be based on several factors, including satellite geometry, signal blockage, atmospheric conditions, and receiver design features/quality.

creep, your GPS would tell you that a half-mile to your destination would become a 5-mile discrepancy after 1 day.⁴⁵

Theory is also useful in narrowing the range of facts we need to study. Since one can explore any problem from different perspectives, a theory can suggest ways most likely to be fruitful. It may likewise help the researcher define a scheme to impose on data for classification. Finally, theory summarizes and catalogs known phenomena and alludes to facts that lie beyond the immediate scope of observation, thereby predicting further facts.

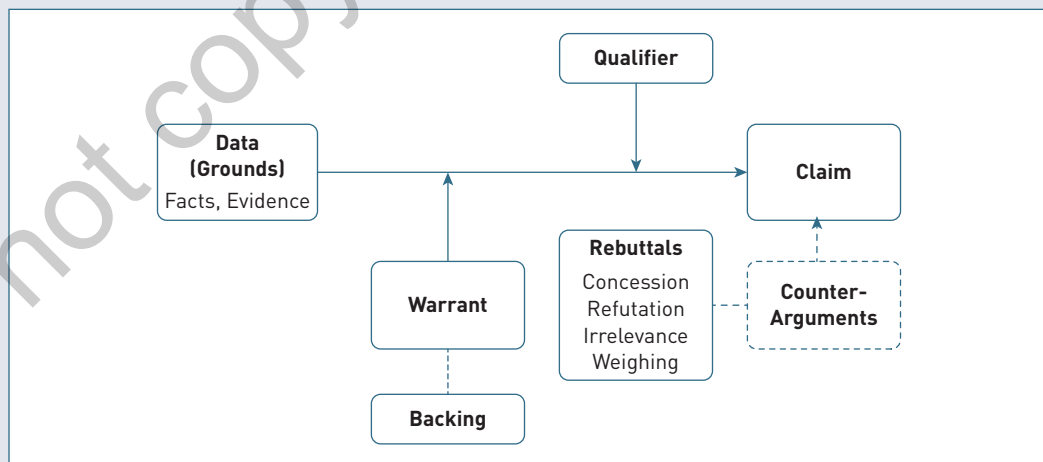
CASE STUDY:

THE TOULMIN MODEL OF ARGUMENTATION AND REASONING— “WOMEN MAKE SUPERIOR MANAGERS”

For students of research methods, this model of reasoning has particular importance in structuring the arguments for your term project. The research problem must be stated precisely, unambiguously, and authoritatively. Its rationale for selection, importance to the field, and the benefits to be derived are all arguments. Collectively, they convince the reader that your work is a worthwhile endeavor. Your review of the literature assembles the argument that leads the

reader from broadly related studies to those that are directly related your problem and pertinently bear on its resolution. The connection of the literature to the problem also requires an argument (i.e., building a case that links them). Your selection of design, method, procedures, and sample demand arguments that lead the reader to conclude that your decisions were the most appropriate and sensible for the research purpose. The interpretation of your findings,

THE TOULMIN MODEL OF ARGUMENTATION AND REASONING



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the degree to which they answer the research question, and the implications suggested by the findings are, again, arguments that writers must make convincingly.

Toulmin's model is a structure for constructing decisive arguments containing six components that evaluate the pros and cons and the effectiveness of rebuttals. The structure has three primary components: a claim, the data (evidence, grounds) to support that claim, and a warrant that backs the data or evidence. These three elements—

claim, data, and warrant—are present in every argument. Three secondary components of the model may be added as necessary: a backing (for the warrant), rebuttals, and qualifier(s).

To explain this process, I will first provide a diagram, then define the elements represented in that diagram, and subsequently provide an example entitled "Women Make Superior Managers," which reveals the usefulness of this reasoning process. Discussion questions follow the case to test your understanding of the Toulmin Model.

DEFINITIONS OF COMPONENTS IN THE TOULMIN MODEL

Claim: The claim is the "... conclusion whose merits we are seeking to establish."^a It is the statement, thesis, or assertion being argued. It is constructed in such a way that there is no doubt what side of the issue the arguer is on. Claims are often stated in the form of a proposition. The 2017 debate proposition for the 600 colleges and universities in team competition is, Resolved: The United States Federal Government should substantially increase its economic and diplomatic engagement with the People's Republic of China.^b

Claims fall into three categories:

1. **Fact-Based Claim:** A claim that focuses on empirically verifiable phenomena (through direct observation, experimentation, or other data-supported research). Example: *There are more billionaires in New York State than in the rest of North America.*
2. **Judgment and Value Claim:** Claims involving opinions, attitudes, and subjective evaluations. Example: *Mozart is the best composer of all time.*
3. **Policy-Based Claim:** This claim is advocating courses of action that should be taken. Example: *The United States Treasury should quit producing and distributing pennies.*^c

Data: The data are the grounds, facts, or evidence on which the claim is based. They are used to prove or support the claim being argued. Data represent the arguer's rationale or perspective for supporting the issue. The data are the foundation of the argument and answer the question, "What is the proof?" The evidence used is often statistics, scientific or company reports, media reports, documented historical or existing events, physical evidence, and authoritative quotes. If testimony is not from a respected authority, it is most certainly attacked.

Warrant: Just as the data provide the answer to the question of what is your proof, the next question is, "How do you get there?"^d Since the data have committed you to a step toward proof, the challenge of "getting there" is not to bring in new and more data, "but propositions of a rather different kind: rules, principles, inferences—licenses . . . that taking these data as a starting point, the step to the original claim or conclusion is an appropriate and legitimate one."^e The warrant clearly demonstrates the connection between data and claim by creating a bridge—a link in the form of a logical statement—that shows why the evidence supports the claim and makes it true. There are several classes of warrants that act as widely accepted truths and are acknowledged to have universal application:

- **Generalization:** Connects what is true for a representative sample to what is likely true for the population.^f
- **Sign:** Connects the evidence as a sign, clue, or symptom of the claim.
- **Authority:** In supporting the claim, it connects the evidence to authoritative sources.
- **Analogy:** Connects the evidence to the claim using analogies of similar relevant situations, events, or precedents.
- **Causality:** Connects the evidence as being caused by or the result of the claim.
- **Principle:** Connects the evidence to the claim as an application of a broader, important principle.

The difference between the questions of “what do you have to go on” and “how do you get there” is not a trivial step. In some cases, it may be possible to distinguish between the two logical functions “. . . if one contrasts the two sentences, ‘Whenever A, one *has found* that B’ and ‘Whenever A, one *may take it* that B.’”^g

Some warrants allow one to accept a claim unequivocally, whereas others require us to take the step conditionally, or what Toulmin calls a “Qualifier.” These phrases include “probably” or “presumably” that “make the step from data to the conclusion either tentatively; or else subject to conditions, exceptions, or qualifications.”^h

Backing: Sometimes, the warrant does not convince the reader or listener. Then, additional support is required to explain the connections between the data, warrant, and claim, support the warrants, or bring credibility to the warrant’s reliability or relevance. These “backing” arguments don’t prove the claim but support the truth of the warrant. “It is similar to evidence supporting a claim: It can include statistics, quotations, reports, findings, physical evidence, or other data or reasoning. However, there is a big difference: evidence supporting a claim is a necessary component of a logical argument; but, while backing strengthens an argument, it is not an essential component. That said, when the backing is included, it must be explicitly stated rather than implied.”ⁱ

Qualifiers: Qualifiers typically revolve around concerns about the soundness of evidence, the strength of the warrant(s), or counter-arguments. They limit the strength of the argument or statements by proposing the conditions or a context under which the argument is true. Thus, qualifiers add limits, nuances, or specificity to the claim, helping to counter rebuttals. They are frequently stated in words that reflect the likelihood of the claim’s correctness: absolute uncertainty, unlikely, possibly, likely, probably, and absolute certainty.^j The model shows the qualifier beside the claim that it qualifies and above the arguments that could defeat or rebut the warranted conclusion.^k

Rebuttals: Rebuttals mitigate possible objections and counter-arguments to an author’s claim by suggesting reasons why a counter-argument is flawed, why it lacks credible evidence, significance, or is not reasonable or realistic. The writer or speaker anticipates the opposing point of view and considers the best evidence of the opposition so it may be discredited handily. “Dealing with counterarguments and objections is thus a key part of the process of building arguments, refining them, interpreting and analyzing them.”^l

Four Types of Rebuttals

There are four types of rebuttals: concession, refutation, demonstration of irrelevance, and weighing.^m

Concession: The author “concedes” there are some valid aspects of the opposition’s perspective, but admits this only to appear even-handed in acknowledging of merits of a different view. When restating

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the value of the claim, you may include minor parts of the opposition's argument as a concession while rejecting others. This strategy is similar to "comparative advantage" case where you stress the superiority of your claim over the status quo or another aspect of the opponent's case.

Refutation: When using refutation, the best defense is a good offense. The writer/speaker undermines the opponents' position revealing important weaknesses and shortcomings, rebuilds arguments supporting her claim, and clarifies her arguments, which may have been weakened by the opposition. This process supports the validity of the original claim and shows that the position is still more widespread, demonstrably true, just, or preferable; and thus, the opposing argument ought to be rejected.

Demonstration of Irrelevance: Irrelevant arguments are exposed by explaining the logical fallacies in the opposition's position, that they have introduced evidence that is unrelated to the thesis, or that their position does not meet the criteria of relevance that defines the issue.

Weighing: *This is one of the most underused yet significant parts of refutation.* Weighing is comparing your arguments with your opponent's. The ways to weigh an argument include the following:

- **Scope:** How broadly is the impact felt?
- **Magnitude:** How severe is the impact?
- **Probability:** How likely is the event, situation, or circumstance?
- **Reversibility:** Can the harms be undone?
- **Time Frame:** Is the harm short term or long term? Will it come about now or later?

"Women Make Superior Managers"

Refer to the diagram ("The Toulmin Model of Argumentation and Reasoning") to follow the flow of the argument and to the box ("Definitions of Components in the Toulmin Model") as a reminder of definitions.

Claim: Women make superior managers.

Data: According to the recent Gallup "State of the American Manager: Analytics and Advice for Leaders" report, employees who work for a female manager rather than a male boss are:

- 1.26 times more likely to agree strongly "there is someone at work who encourages my development and cultivates my potential."
- 1.29 times more likely to agree strongly "in the last six months, someone at work has talked with me about my progress."

- 1.17 times more likely to agree strongly "in the last seven days, I have received recognition or praise for doing good work."
- 41% of female managers (versus 35% of males) are engaged at work (i.e., emotionally committed to the firm, motivated, and productive).^o

In a study on women's leadership effectiveness including 16,000 leaders (two-thirds male and one-third female), the Zenger Folkman consultancy^p found that leadership effectiveness is contingent on age. Early career: there is little-perceived difference between men and women; soon, men are more effective; as women mature, they are perceived as more effective than their male counterparts. This advantage was attributed to women working twice as hard for the same rewards and recognition. From a self-development standpoint (managers ask for feedback and make changes),

men and women are similar up to age 40, where women continue to improve and men decline by 12% because they assume they are doing well and don't need feedback.

In the same Zenger Folkman study, on a 360-degree instrument measuring 16 competencies, women scored higher on 12 of 16 (with statistically significant differences on 11 competencies). In examining differences in function, "in the traditional male bastions of sales, legal, engineering, IT and the R&D function, women actually received higher effectiveness ratings than males."⁹ Finally, in three levels of management (executive manager, senior manager, and middle manager), women were perceived more positively by 4–6%.

Warrants:

- Women have a tight right-left brain connection creating excellent multi-tasking, listening ability, memory, higher concentration, and intuition. (Established by neurological research.)
- Women are better at assessing risk, especially in determining the probability of adverse outcomes. (Established by insurance studies.)
- Most women's communication ability makes them more diplomatic in the workplace. (Established by organizational communication studies.)

Backing: The Bureau of Labor Statistics reports that women hold 51.5% of managerial, professional, and related positions in organizations.⁷ Because of the scientific research on women's intrinsic capacities, a substantially increased level of work experience since 1970, and current educational opportunities (women earn almost 60% of undergraduate degrees and 60% of all master's degrees), women have demonstrated the capacity to excel in leadership roles.⁵

Qualifier: The claim is qualified with the caveat that gender is not a precondition for managerial

success. However, and almost certainly, college-educated women with organizational experience have unique attributes including greater work-life balance, superior communication and listening skills, a strong ethical code, excellent consensus building and collaboration skills, and patience. These attributes, according to research, give women an advantage as managers.

Counter-Arguments: The first counter-claim of the opposition is that inexperienced women managers are inclined to imitate tough and authoritative male bosses, which reduces their effectiveness, alienates workers, and constrains future promotions. This practice, in turn, slows the upward movement of all women. Also, when placed in responsible positions, women managers may create an entitlement culture to over-compensate for former male bosses who did not care about balancing work, children, and a working husband. This climate leads to inequities that favor female over male employees. Moreover, many women managers show more interest in their personal success than the development of their subordinates; this is often accurate of women managers with female subordinates.

Dr. Akbari, a sociologist and entrepreneur, quotes a successful female business owner as saying: "Men may not like each other, but they'll still promote each other. A woman will write off another woman because she doesn't like her shoes.' An oversimplification, yes, but I get her point."¹¹

Second, 4 decades after the women's movement, women have not achieved significantly. They have not moved into positions of influence and prominence at a rate necessary to reach parity with men. Despite earning more than 44% of master's degrees in business and management, including 37% of MBAs, women are only 14.6% of executive officers, 8.1% of top earners, and 4.6% of Fortune 500 CEOs.⁴

Third, women should take responsibility for the reduction of their numbers in leadership positions. "Roughly a third of high-achieving women—those with graduate degrees or bachelor's degrees with honors—currently leave their jobs

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to spend extended time at home, and 66 percent of high-achieving women at some point switch to career-derailing part-time, reduced-time, or flex-time work schedules.”^v

General Rebuttal: Historically, women have been denied opportunities in business, which has diminished their numbers in managerial and professional positions. “For women, the issue of having more female leaders goes far beyond equality in the workplace. Four-in-ten of them (38%) say having more women in top leadership positions in business and government would do a lot to improve the quality of life for all women. An additional 40% of women say this would have at least some positive impact on all women’s lives.”^w

Counter-claims need to be conscious of gender bias, disqualifying stereotypes that would only place women in management positions comparable to “homemakers/caregivers,” as well as cultural barriers (e.g., the conflict between leadership stature and female likability). Multi-role needs (affordable child care and access to paid sick days and paid pregnancy leave) are additional burdens faced by female candidates for managerial positions. The unrealistic “anytime, anywhere” criterion (working long hours) for recognized managerial performance cannot be reconciled with the burden of a working manager/working mother.

Male-dominated organizations by definition lack appropriate female role models, mentors, and sponsors (that normally lead to promotions). The lack of role models is perceived as a barrier by 64% of women in the United States.^x Similarly, the managerial skills nurtured by mentoring, sadly lacking in these organizations, creates the perception that women are not adequately prepared for managerial responsibility.^y

Issue-Specific Rebuttals:

- **Concession:** For the first argument, the limited merit of a different point of view is conceded. Gender is not a prerequisite for superior managerial skills but is

under-rated, ignored, or disparaged by those unfamiliar with the research in neurobiology and business. Also, exceptions to the claim that “women make superior managers” are known to occur in the workplace. However, the counter-claim was not stated regarding how many women managers (%) behave in this fashion, how often dysfunctional behaviors occur (%), or to what extent the different characterizations are demonstrably true. Furthermore, there is no compelling evidence that women engage in counterproductive managerial behavior with greater frequency than male managers. Without evidence for those assertions, the opposition based its case on simplistic generalizations. An inadequate number of cases or the lack of objective observation or systematic investigation undoubtedly drives such generalizations. Thus, their contentions are equivalent to hearsay.

- **Refutation:** The opposition’s second counter-argument addresses the disparity between education and the opportunity to reach the highest levels of executive leadership and pay. It does not address the claim that women do not possess characteristics that make “superior managers.” Furthermore, being a superior manager (at several levels) is not synonymous with rising to the level of a Fortune 500 CEO or board member.
- **Relevance:** The third counter-argument has no connection to the claim. There are many statistics about women from entry level to executive positions but those mentioned in the counter-argument are restricted to a class of affluent, high-achieving women who (1) may or may not be in managerial positions, (2) who may or may not possess the characteristics of superior managers (e.g., they might be technically trained professionals in law,

medicine, education, or government), and (3) they may or may not return to work at a later time, create a start-up, or change career aspirations. In short, the counter-argument is irrelevant.

Weighing: Two of five criteria can be applied to this case.

- (*Problem Scope*) Problems for women in the workforce, notwithstanding their slow rise in management, are global. The participation rate fell from 52% in 1995 to 49% in 2015.^e The odds of women's participation remain 30% less than a man's.^{aa} The claim is inherently interwoven with past discrimination and does not end with the argument about gender superiority in management. Its tentacles reach into equal pay, working mothers, lack of advocates (not just role models), and the fact that despite leadership training helping women, it helps men more.^{bb}
- (*Time Frame*) When we consider women managers, "at the current rate of change, it will take until 2085 for women to reach parity with men in *leadership roles* in our country."^{cc}

Discussion Questions

1. What assumptions have been made in this argument?^{dd} What do those assumptions tell you about the intended audience? (Consider: What are the sources of information? Who would read or discuss it? Does the argument identify important data or does it assume you are familiar with them? Does the argument use credible sources? If so, does it name them or assume you recognize them?)
2. What is the argument asserting? Can you identify explicit and implicit claims? (Consider: What does the argument want you to do? Feel a strong emotion? Change your opinions or attitudes? Strengthen a pre-existing belief?)
3. On what grounds? If the data (evidence, grounds) are not explicitly presented, can you think of any data that might make the argument more persuasive? (Consider: Are the data concrete and credible? Or does the argument simply ask you to make assumptions?)
4. Is there a qualifier? (Consider: Does the argument limit the strength of the argument or statements by proposing the conditions or a context under which the argument is true? Will the argument only hold in certain situations, for certain individuals? Do the argument's qualifiers add limits, nuances, or specificity to the claim, helping to counter rebuttals?)
5. What is the warrant? (Consider: Does it demonstrate the connection between data and claim by creating a bridge that shows *why* the evidence supports the claim and makes it true? Of the several classes of warrants, which type is this: generalization, sign, authority, analogy, causality, or principle?)
6. What rebuttals could you make? (Consider: Do you have questions that the evidence or warrant has not answered? What issues might lead you to question the claim? Can you produce counter-arguments to the claim by suggesting reasons why it lacks credible evidence, significance, or is not reasonable or realistic? If you are convinced by the claim, can you refute counter-arguments to the claim with an issue-specific rebuttal? Select any of the following to demonstrate how you would do so: concession, refutation, relevance, or weighing.)
7. What backing is required to justify the claim and convince the reader or listener?

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(Consider: Does the claim provide any evidence that it is true? Does the backing support the truth of the warrant? Does the backing contain statistics, quotations, reports, findings, physical evidence, or other data? What support would the argument need to include to counter your rebuttals?)

¹Toulmin, Stephen E., *The Uses of Argument*, updated ed. (Cambridge, UK: Cambridge University Press, 2003), 90.

²National Speech and Debate Association, "2016–2017 Policy Debate Topic Announced," SpeechandDebate.org, retrieved March 8, 2016.

³Wilson, G. Peter, and Carolyn R. Wilson, "The Toulmin Model of Argumentation" [Original authors; modified by D. Cooper], NavigatingAccounting.com, November 2016, Creative Commons BY-NC-SA: 1, http://www.navigatingaccounting.com/sites/default/files/Posted/Common/Resources_web_book/Toulmin_Model_of_Argumentation.pdf.

⁴Toulmin, 90.

⁵Ibid., 91.

⁶Wilson, 2.

⁷Toulmin, 92.

⁸Ibid., 93.

⁹Wilson, 3.

¹⁰Ibid., 4.

¹¹Toulmin, 94.

¹²Wilson, 3.

¹³Quinn, Simon, *Debating in the World Schools Style: A Guide* (New York: International Debate Education Association, 2009), <http://archive.idebate.org/content/debating-worlds-school-style-guide>.

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¹⁵Gallup Inc., "State of the American Manager: Analytics and Advice for Leaders," *Gallup*, April 2, 2015, <http://www.gallup.com/services/182216/state-american-manager-report.aspx>.

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¹⁷Ibid.

¹⁸Bureau of Labor Statistics, Current Population Survey, "Table 11: Employed Persons by Detailed Occupation, Sex, Race, and Hispanic or Latino Ethnicity," *Household Data Annual Averages 2015*, last modified January 19, 2018, <https://www.bls.gov/cps/cpsaat11.htm>.

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²⁰Akbari, Anna, "Why Women Don't Want a Female Boss," *Dailyworth*, January 20, 2015, <https://www.dailyworth.com/posts/3253-why-women-don-t-want-a-female-boss>.

²¹Warner, Judith, "Women's Leadership: What's True, What's False, and Why It Matters," *Center for American Progress*, March 7, 2014, <https://www.americanprogress.org/issues/women/reports/2014/03/07/85467/womens-leadership/>.

²²Ibid.

²³Pew Research Center, "Women and Leadership: Public Says Women are Equally Qualified, but Barriers Persist," *Pew Research Center Social & Demographic Trends*, January 14, 2015, <http://www.pewsocialtrends.org/2015/01/14/women-and-leadership/>.

²⁴Catalyst and The Conference Board, "Women in Leadership: A European Business Imperative," *Catalyst*, June 15, 2002, <http://www.catalyst.org/knowledge/women-leadership-european-business-imperative>.

²⁵Warner, "Fact Sheet."

²⁶International Labour Office, *Women at Work: Trends 2016* (Geneva: International Labour Organization, 2016), http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_457317.pdf.

²⁷World Economic Forum, "Ten Years of the Global Gender Gap," published 2016, <http://reports.weforum.org/global-gender-gap-report-2015/report-highlights/>.

²⁸Frank, Lydia, "How the Gender Pay Gap Widens as Women Get Promoted," *Harvard Business Review*, November 5, 2015, <https://hbr.org/2015/11/how-the-gender-pay-gap-widens-as-women-get-promoted>.

²⁹Warner, "Fact Sheet."

³⁰Some questions are adapted from this suggested reading: Ramage, John, D., John C. Bean, and June Johnson. *Writing Arguments: A Rhetoric with Readings*, 10th ed. (Boston: Pearson, 2015).

Chapter Summary

- The researcher's essential tools were explained to include the scientific method and its "influence" on the conduct of research. The scientific method is a system for originating and developing knowledge and makes a practical and valuable contribution to science. The theme was that the "doing" of scientific research is not a series of steps; it is a way of thinking about the study of phenomena from diverse perspectives. The method of science is a process of inquiry.
- The scientific method is more than a recipe—it is a mindset. Whereas method implies an algorithm for answering questions, a trained mind possesses a talent for asking them. Curiosity and suspicion characterize this scientific mindset.
- Four types of argument for reasoning to sound conclusions are deduction, induction, abduction, and Toulmin's Model of Argumentation.
 - Deduction is a form of reasoning that purports to be conclusive—the conclusions must necessarily follow from the reasons (premises) given. The conclusion is contained in the truth of the premises and represents a proof if the premises are true and the form of reasoning is valid (i.e., premises must be arranged in a proper form).
 - Induction draws a conclusion from one or more particulars (particular facts or pieces of evidence). The premises are intended to be strong enough that if they were true, it would be *improbable* that you would produce a false conclusion. The conclusion explains the facts and the facts support the conclusion.
 - Abduction is a form of logical inference in which one chooses the hypothesis that would best explain the relevant evidence if that evidence were true. Abductive reasoning begins with a set of accepted facts and infers the simplest, most probable, or best explanation. Whereas true premises and a valid form guarantee a true conclusion in deduction, inductive and abductive premises do not.
 - The Toulmin Model of Argumentation and reasoning was proposed as being especially useful *to students of research methods because it is highly versatile in structuring the arguments in a study's report*. It involves six components that evaluate the pros and cons of an argument and the effectiveness of rebuttals. The first three follow the practice of making a claim, supporting that claim with data, and backing the data or evidence with a warrant—all are present in every argument. Three additional elements of Toulmin's model include a backing (for the warrant), rebuttals, and qualifier(s) that may be added as necessary.
- I defined, explained, and provided examples of the terms (and their variations) that researchers use every day: concepts, constructs, definitions, variables, hypotheses, and theory.

Key Terms

abduction	empirical testing	premise
backing (Toulmin)	explanatory or causal	proposition
categorical or classificatory variable	hypothesis	qualifier (Toulmin)
claim (Toulmin)	extraneous variable	ratio variable
concept	hypothesis	rebuttal (Toulmin)
construct	independent variable (IV)	relational hypothesis
continuous variable	induction	research hypothesis
control variable	interval variable	scientific method
correlational hypothesis	intervening variable (IVV)	statistical null hypothesis
criterion variable	measurement	theory
data (Toulmin)	moderating variable (MV)	Toulmin Model (reasoning/argumentation)
deduction	nominal scale	variable
dependent variable (DV)	operational definition	warrant (Toulmin)
descriptive hypothesis	ordinal (ranking) variable	
dichotomous variable	polytomous (multicategory) variable	
discrete variable	predictor variable	

Discussion Questions

1. What are the characteristics (tenets) of the scientific method?
 - a. Is the scientific method synonymous with empiricism?
 - b. Does the notion of scientific inquiry being “a series of steps or a recipe” seem like a wrong-headed assumption?
 - c. Apply the Reflective Inquiry diagram (Exhibit 2.1) to a business problem from one of your courses in finance, accounting, management, or marketing.
2. Describe the reasoning process using a simple research inquiry of how you would apply deduction, induction, and abduction.
 - a. Differentiate the role of premises and conclusions in deduction versus those in induction and abduction.
 - b. How are induction and abduction different?
3. How does the Toulmin Model of reasoning help you prepare written and oral arguments to support a case?
 - a. Define the three main components of the Toulmin Model. How do the three additional components work and what are they for?
 - b. Assume you read four journal articles in organizational behavior on motivation. Develop a brief Toulmin Model to use the information you obtained as evidence (data) to support a conclusion (claim) that you want to make on the motivation of employees. Add the warrant, which shows *why* the evidence supports the claim and makes it true. Go to the example following Exhibit 2.6 if you need a template.
4. The language of research is unique just like medical terms or those in physics. Use any

of your courses to provide an example of the following:

- a. concept
 - b. construct
 - c. dictionary definition
 - d. operational definition
 - e. variable
 - f. hypothesis
 - g. proposition
 - h. theory
5. Differentiate between the four levels of measurement and explain whether as you move from nominal to ratio variables, you accumulate more or less powerful measurement characteristics.
- a. On what scale would you measure your age, level of progress in the university (e.g., junior), level of satisfaction with the business curriculum, or the price-to-earnings ratio?
6. What is the difference between a discrete and continuous variable?
7. What are the various types of discrete variables?
6. Construct an example of a hypothesis or research question containing an independent variable, dependent variable, intervening variable, control variable, and moderating variable.
7. Explain the difference between a descriptive, relational, and explanatory hypothesis.
8. Find an article that provides an example of a practical *theory* that most executives would want to read.