REAL DATA.
REAL STUDIES. REAL LIFE.

"This is a rare text that focuses on quantitative research in the communication discipline, as opposed to social sciences more generally. One of the most compelling features is the authors' original communication-based dataset that was collected for students to practice working with and analyzing data."

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QUANTITATIVE RESEARCH METHODS
FOR COMMUNICATION

FOURTH EDITION

OXFORD

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QUANTITATIVE RESEARCH METHODS

FOR COMMUNICATION

A Hands-On Approach

Jason S. Wrench
Candice Thomas-Maddox
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Brief Contents

Contents

Preface

REAL DATA. REAL STUDIES. REAL LIFE.

At the turn of the 20th century, noted science-fiction author H. G. Wells (1866–1946) once wrote, "The time may not be very remote when it will be understood that for complete initiation as an efficient citizen of one of the new great complex world-wide States that are now developing, it is as necessary to be able to compute, to think in averages and maxima and minima, as it is now to be able to read and write" (p. 204). So important was this prediction that President of the American Statistical Association, Samuel S. Wilks, paraphrased Wells's quotation in his 1951 national address to the association, "Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write" (p. 5). Both Wells and Wilks realized that understanding how statistics function within our world was no longer a luxury of scientists and mathematicians, but a necessary endeavor for all citizens. In the 21st century, however, increasing numbers of people sadly are numerically illiterate. John Allen Paulos (1988) first tackled the notion of numerical illiteracy, or innumeracy, by defining it as "an inability to deal comfortably with the fundamental notions of number and chance" (p. 3). Unfortunately, most people simply do not understand enough about the world of statistics and scientific research to make much sense of the statistics in their daily lives.

People are bombarded with statistics, and most are unable to accurately process the information to any usable degree. Milroy (2001) argued that with the proliferation of science and pseudo-science today, people must be able to engage in strategic "junk science judo." Yet most people are unaware of the extent to which their lives are controlled by quantitative research. Although the goal of this book is not to discuss nifty marketing tricks or medical research, the basics of quantitative research methods and reasoning are the same across fields that use social scientific research methods. And while this book does not attempt to correct all of the problems associated with innumeracy, it does engage communication students on two levels.

On the first level, this textbook hopes to teach readers the basics of the scientific process necessary in quantitative communication research. Although college students typically learned the scientific method in elementary school, most cannot accurately translate this understanding outside the physical sciences. In this text, we promote a strategic use of the scientific method when conducting quantitative research examining communication topics. Along the way, we hope that students begin to understand the steps necessary for conducting research in a manner that will be transferable to

other parts of their lives. Scientific and statistical processes are the same whether they are utilized by communication researchers or by medical researchers. Therefore, one of our goals for this text is simply to educate readers about the scientific method and the most commonly used statistical tools. Although the examples used throughout this textbook focus on communication-related phenomena, we believe students can transfer this knowledge into other areas of science and statistics when faced with them.

On the second level, this textbook hopes to help students engage in real quantitative research projects of real importance. The four authors of this textbook have a history of working with both undergraduate and graduate students to develop, write, present, and publish quantitative research projects. We all believe that the only way for students to learn and grasp quantitative research methods is through real examples and hands-on work. In our vast experience teaching quantitative research methods, we have learned that students cannot transfer theoretical knowledge of research methods and statistics to actual projects and datasets unless they have actively engaged in the research process when learning. In other words, it is one thing to read about what a correlation is and how correlations work, but quite a different thing to find significant relationships in real datasets.

IMPROVEMENTS TO THE FOURTH EDITION

As with any new edition of the text, there are always a number of important improvements that are made to ensure that the quality of the book meets new demands and reflects the input from instructors who have used it in the past. The authors of this text have taught short courses at various national and regional conventions and received feedback from both students and instructors alike. The changes made to this book reflect this feedback along with our own insights after having regularly used the first three editions ourselves. Here are the important changes and additions we have made to this edition:

- Added more section headings to ease readability. We also focused more on the overall aesthetic look of the book as a factor of readability.
- Increased the number of illustrations within the book to add levity and to further illustrate concepts.
- Decreased the number of learning outcomes at the beginning of each chapter. Our goal here is to streamline the chapter learning outcomes to ensure that readers are more clearly able to ascertain what they should accomplish by reading the chapters.
- Starting in the second edition of the textbook, we made a real effort to demonstrate how the techniques discussed here could be used in the real world. We have expanded on these in the fourth edition. For example, we now have information on writing research in the organizational environment, writing research reports for the public, and data visualization.

- Updated the information on research ethics to include the 2017 update of the Common Rule.
- Updated the information on manuscript formatting, including references, footnotes, tables, and figures.
- Placed the chapters on Big Data and Advanced Research Methods on the textbook's website (https://oup-arc.com/wrench) along with the textbook survey, the chapter on qualitative research methods, and the discussion of free and open-source alternatives to Statistical Package for the Social Sciences (SPSS). We realize that not every professor will use these advanced chapters, but we still want to ensure that they are available to read.
- Added a new discussion on the use of computer simulations in experiments.
- Completely updated the book's website with even more features than ever before. Students will be able to access the research articles discussed in the textbook, the book's skeletal outline, and supplemental chapters. Plus, there will be video walkthroughs for various software packages including proprietary software packages like SPSS, Excel, and STATA and free/open source software like PSPP, JASP, and R.

KEY FEATURES OF THE BOOK

Students are often intimidated on the first day of a research methods class, so we wanted this book to be extremely practical for both students of quantitative research methods and their instructors. This book is built on decades of pedagogical theorizing and in-classroom teaching experience, and was written expressly to help alleviate the fear students may have by structuring a learning environment that clearly helps students succeed, and students who have learned quantitative research methods using the methods discussed in this textbook have gone on to have careers that utilize quantitative research both in the private sector and in academia. We strongly believe that this text is a great first step in understanding quantitative research methods utilized by modern communication researchers. For this reason, we have incorporated five unique factors within the book:

1. Actual Data Sample

One unique component to this text is an actual dataset that was collected by the authors of the project with its express purpose for use in this textbook. A series of research scales written by the authors of this book were used in the creation of a survey instrument:

Nominal variables (biological sex and political affiliation)

Ordinal variable (time spent each week online and year in school)

Interval variables (communication apprehension, willingness to communicate, ethnocentrism, humor assessment, nonverbal immediacy, sociocommunicative orientation—assertiveness and responsiveness, attitude about college, and belief that everyone should be required to take public speaking in college)

Ratio variable (age)

This dataset is available to book users in four different formats: SPSS, Excel, STATA, or text. By having three options available, a teacher can easily choose the format that he or she prefers. Furthermore, because data were collected from 654 actual people, students can manipulate data to receive real answers to research questions and hypotheses. Furthermore, the textbook's website also contains the example statistics discussed in the text in all three formats.

In essence, students will be able to conduct statistical tests on actual data and double-check that the findings we report in the book match the findings they are able to obtain using a statistical software package.

2. Actual Studies

The authors of this text made an agreement to republish a series of 10 articles from either *Communication Research Reports* or *Communication Quarterly*, two journals published by the Eastern Communication Association, for inclusion on the textbook's website. The articles were chosen because they are exemplars on how to conduct specific aspects of research methods and/or statistical analysis. When selecting the articles for inclusion on the textbook's website, we included those from an array of communication contexts (communication traits, instructional, listening, mediated, organizational, public relations, etc.). The articles chosen for this book are as follows:

SCALE DEVELOPMENT

McCroskey, J. C., Richmond, V. P., Johnson, A. D., & Smith, H. T. (2004). Organizational orientations theory and measurement: Development of measures and preliminary investigations. *Communication Quarterly, 52*, 1–14.

Thomas, C. E, Richmond, V. P., & McCroskey, J. C. (1994). The association between immediacy and sociocommunicative style. *Communication Research Reports, 11*, 107–115.

Wrench, J. S., & Richmond, V. P. (2004). Understanding the psychometric properties of the humor assessment instrument through an analysis of the relationships between teacher humor assessment and instructional communication variables in the college classroom. *Communication Research Reports, 21*, 92–103.

CHI-SQUARE

Brummans, B. H. J. M., & Miller, K. (2004). The effect of ambiguity on the implementation of a social change initiative. *Communication Research Reports, 21*, 1–10.

t TESTS

Weber, K., Fornash, B., Corrigan, M, & Neupauer, N. C. (2003). The effect of interest on recall: An experiment. *Communication Research Reports, 20*, 116–123.

ONE-WAY ANALYSIS OF VARIANCE (ANOVA)

Boiarsky, G., Long, M., & Thayer, G. (1999). Formal features in children's science television: Sound effects, visual pace, and topic shifts. *Communication Research Reports, 16*, 185–192.

CORRELATION

Chesebro, J. (1999). The relationship between listening styles and conversational sensitivity. *Communication Research Reports, 16*, 233–238.

Punyanunt, N. M. (2000). The effects of humor on perceptions of compliance-gaining in the college classroom. *Communication Research Reports, 176*, 30–38.

REGRESSION

Rocca, K. A., & Vogl-Bauer, S. (1999). Trait verbal aggression, sports fan identification, and perceptions of appropriate sports fan communication. *Communication Research Reports, 16*, 239–248.

Wrench, J. S., & Booth-Butterfield, M. (2003). Increasing patient satisfaction and compliance: An examination of physician humor orientation, compliance-gaining strategies, and perceived credibility. *Communication Quarterly, 51*, 482–503.

3. Hand Calculations and Statistical Package Summaries

This book takes students step by step through the statistical computation process. Although many books try to teach students the mathematical process for computing statistical tests, this text clearly spells out each step in the necessary sequence to come to an end result. In fact, in the classroom, this process has consistently been used, and students find the mathematical computations to be one of the easiest parts of learning quantitative research methods. We believe students must learn how to calculate the problems by hand because the physical process of calculating helps to solidify how the mathematical process works.

Besides providing the hand computations, we also provide information on how to conduct statistical tests with one of the most commonly used statistical packages: SPSS. We understand that most researchers do not calculate lengthy tests by hand, so demonstrating how the various statistical processes can be calculated using both programs helps the students conduct their own statistical analyses using the software packages. In addition to the instruction for SPSS, we also provide printouts of statistical results utilizing this software package. We understand that knowing how to use a software package is one thing, but that being able to read and interpret the statistical

output is completely different. Although this edition only incorporates SPSS into the text itself, the corresponding website will contain video walk-throughs for the following additional packages: PSPP, R, JASP, and STATA.

4. Glossary

The book has an extensive glossary with commonly confused terms. We always tell our students that learning quantitative research methods is akin to learning a foreign language. For this reason, we have provided the students with a "language guide" to help them remember definitions.

5. Qualitative Research Chapter

Finally, we asked two prominent scholars in the field of qualitative and critical research, James W. Chesebro and Deborah J. Borisoff, to write a chapter for this book on qualitative research. Although the purpose of this text is to focus on quantitative research methods in communication, we strongly believe that students should at least be exposed to qualitative research methods so that they can more clearly differentiate between the two epistemological approaches. We believe that this chapter (located as Appendix A on the textbook's website) is a balanced and helpful introduction to the differences in epistemology and the tools utilized to draw research conclusions.

ACKNOWLEDGMENTS

Although the bulk of this text is based on our own experiences as both students and teachers of quantitative research methods, we thank the editorial teams at Roxbury Publishers and Oxford University Press for shepherding this project through its various phases. We also thank the reviewers who gave us such great insight along the way as we have written this text:

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Aziza Zemrani, The University of Texas Rio Grande Valley

DEDICATION

Since the publication of the second edition of this book, we lost the single most published scholar in the field of communication and our coauthor, Dr. James C. McCroskey. This book has been a labor of love for all of us, but Jim's influence is clearly seen in every page of this text. In fact, trying to separate our memories of conducting communication research from our relationships with Jim is impossible. Each chapter brings forward different memories of conversations and research projects we conducted together. Without him, this book never would have been what it is today. And without him, the field of communication would not be what it is today. For these reasons, we dedicate this edition to our teacher, mentor, and friend.

Jason S. Wrench
Candice Thomas-Maddox
Virginia Peck Richmond

INSTRUCTOR ANCILLARIES

If you have not received a copy of the Instructor's Manual from your Oxford University Press representative, please ensure you get one. The instructor's manual has been completely overhauled for the fourth edition. Here are some of the important ancillary materials we have included to make your life easier as you prepare to teach this course:

1. Sample Syllabi

In the Instructor's Manual, you will find a variety of different types of courses contexts where this textbook has been previously used (e.g., undergraduate face-to-face class, undergraduate online class, and graduate face-to-face class). Furthermore, we offer multiple approaches a teacher could take with the course. Whether you take a strictly content-based approach to the class or a project-based approach to teaching research methods, the sample syllabi will definitely help you structure your course.

2. Chapter Outlines

On the textbook's website, every student has access to a skeletal outline of the different chapters' content. In the Instructor's Manual, we have not only the skeletal outlines, but also completely annotated versions to help you prepare your course notes. Many instructors tell us that all they need to do is grab the Instructor's Manual and take it with them to class for fully realized lectures.

3. PowerPoint-Based Slide Deck

Many instructors asked for a PowerPoint-based slide deck after the first edition of the textbook was released, so we added a comprehensive slide deck to the later editions. The comprehensive slide deck reflects the annotated chapter outlines within the Instructor's Manual directly.

4. In-Class Activities for Each Chapter

For each chapter, we provide a range of different activity ideas to make your class more engaging. Numerous worksheets and assignments that we have used in the past can be found in the Instructor's Manual. None of the activities or assignments discussed within the Instructor's Manual was created specifically for the Instructor's Manual. All of the activities and assignments have been utilized within our own classrooms.

5. Test Bank

The test bank has been completely updated and revised for the fourth edition of the Instructor's Manual. We provide a range of multiple-choice, true-or-false, and short-answer/essay questions for your course's examinations.

COMPANION WEBSITE

Please visit our companion website at http://www.oup-arc.com/wrench for a range of supplementary materials for both you and your students. The website has links to podcasts related to some of the chapters, sample American Psychological Association (APA) style papers, further discussion of statistical software (with video tutorials), and many other features.

LAST WORD

To Students:

Thank you for taking up the challenge of learning quantitative research methods for communication. For most of you, this is a daunting course and unlike any you have taken within a communication studies department before. Please realize that you can get through the course and succeed. We need a new generation of communication researchers coming through the pipeline for our field to grow and thrive. Furthermore, the methods and practice of conducting research that you learn in this book can be applied to any field of research that examines humans or phenomena statistically. Although different fields have their own avenues of interest and advanced statistical preferences, the basics you learn in this course could easily be applied to any social or physical science research undertaking.

To Instructors:

Thank you for choosing to use *Quantitative Research Methods for Communication: A Hands-On Approach*. If you would like help or clarification teaching communication research methods, please do not hesitate to reach out to any of the authors of this text. If one of us does not know the answer to a question, we will forward it to the others so that we can assist you best. Also, please feel free to give us your feedback. As we look toward revising the book in the future, instructor feedback is unbelievably helpful.

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Paulos, J. A. (1988). *Innumeracy: Mathematical illiteracy and its consequences*. New York, NY: Hill & Wang.

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Wilks, S. S. (1951) Undergraduate statistical education. *American Statistical Association, 46*, 1–18.

QUANTITATIVE RESEARCH METHODS

for Communication

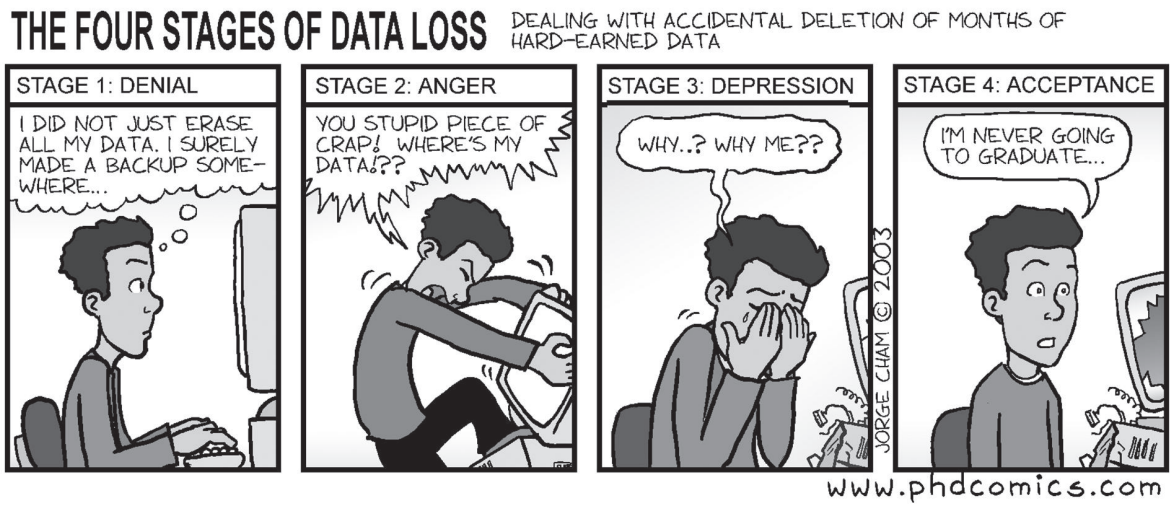
1

An Introduction to Communication Research

CHAPTER OBJECTIVES

1. Explain the difference between physical and social sciences.
2. Describe the history of social sciences and its relation to the field of communication.
3. Define the term *communication*.
4. Explain Claude Shannon and Warren Weaver's (1949) model of communication.
5. Understand the basic layout of this textbook.

Every day, people around the globe participate in an activity that helps shape our understanding of the world. This activity is research. Ever since you were a child in elementary school, you were taught all kinds of facts. But most students do not stop to think about where these "facts" come from in the first place. Whether it was learning that Newton created his theory of gravity after having an apple fall on his head or memorizing all of the elements in the periodic table, most of your academic endeavors have been built around knowledge that has not always existed. At some point in history, a scientist had to conduct a research study to find what we often take for granted as common knowledge today.



▲ The Four Stages of Data Loss (Source: Piled Higher and Deeper by Jorge Cham–www.phdcomics.com)

Although most people are familiar with many basic facts about the **physical sciences**, or the study of the objective aspects of nature (biology, chemistry, physics, astronomy, etc.), as a result of K–12 schooling, people do not tend to be as aware of the research in the area called the social sciences. The **social sciences** consist of a group of fields that study how humans live and interact. These include many disciplines: anthropology, communication, cultural studies, economics, education, geography, history, linguistics, political sciences, psychology, sociology, social work, and so on. All of these fields have at their core a desire to understand how humans live and interact. Although each social scientific field may approach the study of human life and interaction differently, they all have the same basic origin in history. This chapter first presents a brief history examining the development of the social sciences and then discusses how the field of communication has become what it is today.

THE HISTORY OF THE SOCIAL SCIENCES

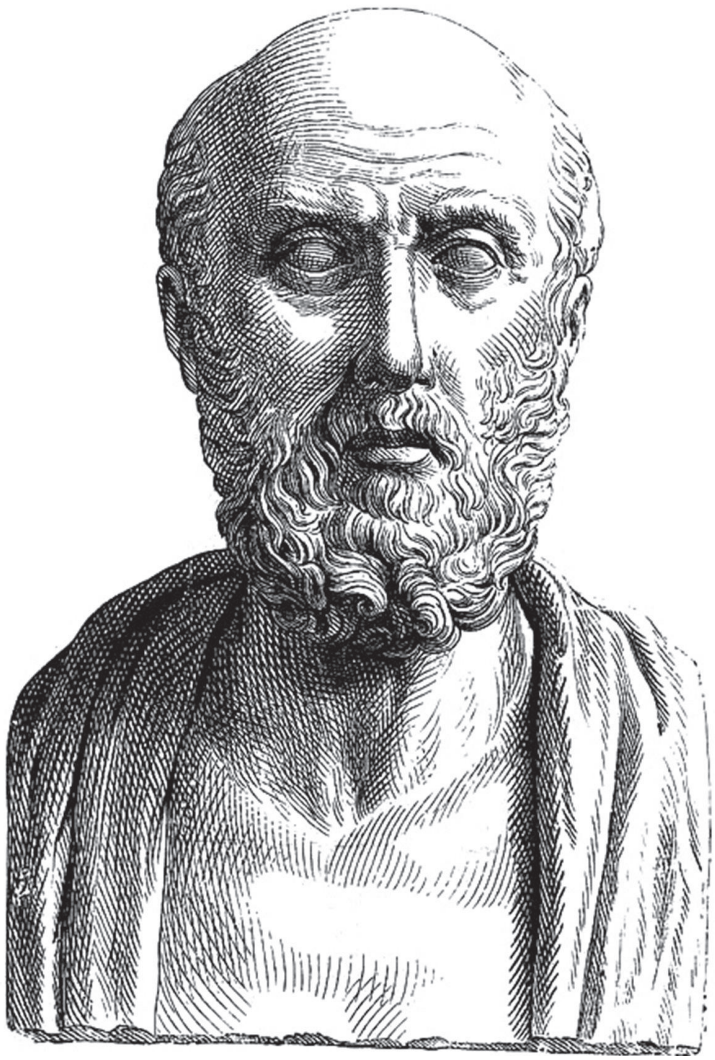
The earliest recorded scientists would be shocked to see the division that exists today between the physical sciences and the social sciences.

Ancient Greece

In ancient Greece, the physical sciences and philosophy were perceived as handmaidens because one informed the other. Most of the ancient Greek philosophers wrote not only about science but also about rhetoric, poetry, drama, and other intrinsically human-oriented topics.

For example, Hippocrates of Cos (c. 460 BCE) is most noted for the oath all physicians take that states physicians should first do no harm. Hippocrates was

also the first researcher in history to classify his patients by various temperaments, which is now seen as the general origin of personality theory that social scientists study today. To Hippocrates, science was an extremely important part of understanding the world in both the physical sense and the humanistic sense; he wrote, "There are in fact, two things: science, and opinion; the former begets knowledge, the latter ignorance." Even later Greek thinkers such as Plato and Aristotle often wrote on both physical and social scientific topics and sometimes combined the two. Plato used geometric proofs (a physical science tool) to demonstrate his perspective on the intrinsic state of knowledge (a social scientific concept). Aristotle studied planetary motion with the same rigor and scientific processes with which he studied poetry and rhetoric. To the ancient Greeks, both physical nature and human social processes were avenues of research to be done scientifically.



▲ Hippocrates

Sir Isaac Newton

This lack of division between physical and social sciences stayed fairly intact until the publication of the three volumes of Sir Isaac Newton's *Philosophiae Naturalis Principia Mathematica* (*Mathematical Principles of Natural Philosophy*) in 1687. In essence, Newton sets forth in these three volumes the foundation of classical mechanics and his law of gravity. Newton's publication revolutionized scientific thought because he argued that the underlying rule of all physical nature was mathematics. Whereas physical scientists quickly latched onto and applied Newton's writings, only later did many scientists studying the social aspects of humans try to make their research more mathematically oriented as well.

▲ Sir Isaac Newton

Charles Darwin

This trend of physical sciences creating revolutions that remake how we understand science continued with the publication of Charles Darwin's **theory of natural selection**. Although mathematics clearly impacted physics and chemistry, natural selection revolutionized how we understood biology. Yet again, the physical sciences were light years ahead of social scientists in their understanding of nature, but eventually, the social scientists came to understand how Darwin's theory applied to the social sciences. In fact, Sigmund Freud (in Austria) and William James (in the United States) were the first social scientists to examine how natural selection applied to the social sciences.

Late 1800s to Early 1900s

During the late 1800s and early 1900s, the rise of quantitative or mathematical measurement in the physical sciences became the norm. Ernest Rutherford, the father of nuclear physics, once wrote that any knowledge that cannot be measured numerically is a poor sort of knowledge. Ultimately, during the early 1900s, a rift emerged between humanists, who believed in universal human qualities (rationality, common history, experience, and belief), and social scientists, who saw the need to objectively quantify human experience. In communication, we also saw this debate occurring within our own ranks.

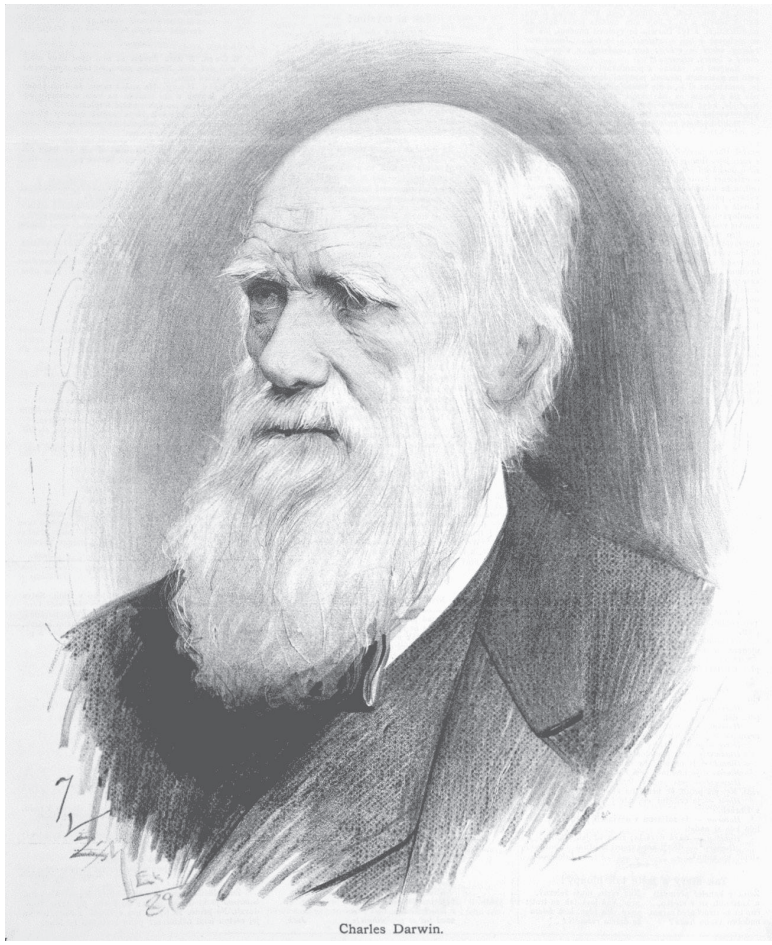
James A. Winans and Everett Lee Hunt

Early in the 20th century, James A. Winans (1915) and Everett Lee Hunt (1915) led an interdisciplinary debate regarding the need for research in public speaking. Winans wanted scientific research to be conducted on three levels: speech pathology, speech psychology, and rhetorical history. Hunt, by contrast, believed the scientific approach was antithetical to the enthusiasm and inspiration needed for good public speakers. This divergence of ideology created the social science–versus–humanist debate in communication studies, which has continued for the greater part of the 20th and into the 21st century.

Social Sciences After World War I

Social scientific research started finding its own way after World War I as research in a variety of new avenues began to flourish. In 1918, William Isaac Thomas and Florian Znaniecki defined social psychology as "the study of attitudes." Along with the development of attitudinal research, Jowett and O'Donnell (1992) note,

> Other social sciences such as sociology and psychology were also stimulated by the need to pursue questions about human survival in an age in which social strain grew heavy with concerns about warfare, genocide, economic depression, and human relationships. These questions were about influence, leadership, decision making, and changes in people, institutions, and nations. Such questions were also related to the phenomena of propaganda, public opinion, attitude change, and communication. (p. 123)



▲ Charles Darwin

Overall, the period after World War I saw a dramatic increase in research in the social sciences. By the 1920s, marketing agencies were surveying consumer behavior, and politicians and media outlets realized that the new techniques being created by social scientists to research humans could examine political preferences. With the burgeoning need for social scientific research, Likert (1932), Guttman (1944), and Osgood (1952) developed three measures of attitudes that are still used by researchers today (these will be discussed in greater detail in Chapters 6 and 7).

Social Sciences During World War II

When World War II broke out in Europe, the US government turned to social scientists to understand propaganda, attitudes, and persuasion (Albarraćin, Johnson, &

Zanna, 2006). The US government quickly realized that to maintain morale during wartime, the media was going to be extremely important. The creation of the US Office of War Information was one step in this effort (Lazarsfeld & Stanton, 1944). In 1941, Lazarsfeld published the first review of the discipline of communication based on his and others' research at the Bureau of Applied Social Research. Ultimately, Lazarsfeld determined that communication could be broken into four categories: (1) who, (2) said what, (3) to whom, and (4) with what effect. The US government was most interested in the last category as a way to fuel the war effort at home.

Carl Hovland and Post–World War II Research

At the conclusion of World War II, the shift in social scientific communication research took its next major step as a result of 30 researchers at Yale University led by Carl Hovland. The primary purpose of the research conducted by the Yale group was to analyze how attitude change occurred. Overall, the Yale group examined a wide range of differing variables shown to influence persuasion: source credibility, personality traits, argument ordering, explicit versus implicit conclusions, and fear appeals (Hovland, Janis, & Kelly, 1953). The legacy of the research conducted by Hovland and his colleagues ultimately led future researchers to examine other communication contexts.

Social Sciences in Communication Today

Today, the contexts for research in the field of communication are numerous. In fact, in 2004, Wickersham, Sherblom, and Richmond published a 20-year retrospective (1984–2004) of the types of empirical articles published in *Communication Research Reports* (*CRR*). Since its first publication, *CRR* has been devoted to short, concise, quantitative research articles. As a result of the nature of *CRR*, analyzing the concepts published in the journal allows researchers to see the overarching scope of the field of empirical communication research.

Figure 1.1 contains the results of the Wickersham et al. (2004) study. Overall, the top four concepts explored in *CRR* are general communication, relationships, perception,

Wilbur Schramm and David Berlo

Wilbur Schramm is credited with creating the modern conceptualization of the field of communication studies with the founding of the Institute for Communications Research at the University of Illinois. One of his students, David Berlo, is credited with the shift in focus to quantitative research methodologies within the field of communication while at Michigan State University.

Communication concept explored	No. of articles	% of total
General Communication	229	9.8
Relationships	116	4.9
Perception	90	3.8
Apprehension	68	2.9
Students	53	2.3
Self	45	1.9
Television	44	1.9
Behavior	37	1.6
Satisfaction	35	1.5
Culture	35	1.5
Social	34	1.5
Interpersonal	33	1.4
Organizations	32	1.4
Style	31	1.3
Teacher	31	1.3
Public	31	1.3
Gender	28	1.2
Development	28	1.2
Verbal	27	1.2
Anxiety	27	1.2
Roles	27	1.2
Aggression	26	1.1
Competence	26	1.1
Classroom	26	1.1
Motivation	26	1.1
Interaction	25	1.1
Influence	23	1.0
American	23	1.0
Immediacy	22	0.9
Sex	21	0.9
Messages	21	0.9
Group	20	0.9
Japan	20	0.9
Nonverbal	20	0.9

FIGURE 1.1
1984–2004 Articles Published in *Communication Research Reports*

and apprehension, which have been directly influenced by research in both attitudes and persuasion initiated during the early and mid-1900s. Along with an expansion in the type of research that qualifies as "communication research," our understanding of communication has also changed.

Since the publication of the previous edition of this book, the types of research being conducted in *CRR* have taken a modern turn. As you can see in Figures 1.2 and 1.3, the journal is publishing more new media and health research than it has in the past, which indicates how the field is changing and evolving. However, traditional

research areas in communication like instructional, interpersonal, organizational, persuasion, political, and so on are still published as well. The size of a word in Figures 1.2 and 1.3 directly corresponds to the number of titles in which the word was found.

FIGURE 1.2
2005–2014
***Communication Research Reports* Titles**
Word Cloud

FIGURE 1.3
2014–2017
***Communication Research Reports* Titles**
Word Cloud

Communication

The process by which one person stimulates meaning in the mind(s) of another person (or persons) through verbal and nonverbal messages. (McCroskey, 2006, pp. 20–21)

THE NATURE OF COMMUNICATION

Although others may define communication from a different perspective than McCroskey (2006), we see **communication** as primarily meaning focused. And to comprehend McCroskey's definition fully, a few of its parts need some clarification.

The word "process" suggests that human communication is dynamic and changing, the notion that communication does not start, stop, or break. Berlo (1960) suggested that communication is like the river described by the Greek philosopher Heraclitus, who believed that it was impossible to step into the same river twice because the moment you take your foot out of the water, the river changes so much that it is no longer the same river. In life, humans are changing as we go through various events, and our communication with other people also naturally evolves over time. Therefore, humans never communicate in the same way twice. Even professional actors who recite the same lines over and over again never recite them in the same way.

The second part of McCroskey's definition of communication involves the phrase "stimulates meaning in the mind(s) of another person (or persons)." The basic goal of communication is to take a thought that you have inside your head and determine the appropriate method for getting that thought into the head of another person or the heads of a group of people. Through the processes of stimulating meaning, we develop, cultivate, share, expand, and reshape ideas. Rare is the occasion when we develop an idea on our own. The thoughts that lead to an idea result from our experiences of talking with others, reading various literatures, and observing and interacting with the world around us. Such ideas or combinations of ideas are the meaning stimulated through the verbal and nonverbal messages that are exchanged. But before we can discuss verbal and nonverbal messages, we must explain the basic model of communication.

Modeling Communication

Claude Shannon and Warren Weaver (1949) developed a model for describing the process of communication for the Bell Telephone Company. The Shannon and Weaver Model was simple because it explained how people use telephones. The telephone is designed with two basic parts: a source you talk into and a receiver in which you hear

people on the other end. The full Shannon and Weaver Model is often referred to as the source–message–channel–receiver (SMCR) model.

SOURCE

The **source** is the person(s) who originates a message. This person(s) goes through a process called encoding to create a message. McCroskey and Wheeless (1976) defined **encoding** as "the process of creating messages that we believe represent the meaning to be communicated and are likely to stimulate similar meaning in the mind of a receiver" (p. 24). In other words, encoding involves translating ideas and information inside your head into messages that can be sent to a receiver(s). Encoding requires some degree of accuracy and precision for effective communication to take place, however, because if your receiver cannot understand what you are saying, communication will be ineffective. Inaccurate and imprecise encoding often leads to confusion. Therefore, it is important to select messages that have similar meanings for us and our receiver(s).

RECEIVER

Whereas the source sends messages, a **receiver** receives messages. And as receivers, we must not just receive messages but also assign meaning to them. The process we go through as receivers to assign meaning to messages is called **decoding**. The meaning we assign a given message depends to a great degree on previous messages we have received from either the source and/or our previous experiences. Often, the meaning(s) we assign specific messages may not be close to the meaning intended by the source. Remember when you first analyzed poetry in school and your teacher would tell you about the hidden meanings within a poem you simply did not see at all? Verbal and nonverbal communication and meaning can function the same way; people often completely miss the meaning of a message or assign a meaning to the message that was not intended. For communication to be effective, it is necessary for us, as receivers, to consider our background and experience compared with the background and experience of the source, which may require that we put ourselves in the other person's shoes. The converse of this is also true. As sources of messages, we must know who our receivers are. If we talk about media to a group of college freshmen, then using references to Lawrence Welk and Ed Sullivan might not be useful (if you do not know who either of those men are, you just proved our point).

MESSAGE

The next part of the SMCR model is the message. A **message** is any verbal or nonverbal stimulus that stimulates meaning in a receiver. As our definition of communication in this textbook is meaning focused, so is the basic model of communication. The message is simply what you want your receiver(s) to know, feel, and/or do when you are done communicating.

CHANNEL

The last part of the SMCR model of communication is the channel. A **channel** is the means by which a message is carried from one person to another. In communication, we typically talk about two primary channels: verbal and nonverbal.

By **verbal messages**, we mean **language**, which is a system of symbols or codes that represent certain ideas or meanings. The use of symbols and codes is regulated by a set of formal rules, which we call grammar and syntax. We transmit these messages either in spoken or in written form. According to Simons (2017), approximately 7,099 oral languages exist, but no single language is spoken or understood by a majority of humans (although Mandarin is spoken by more people in the world than any other language). Thus, even today, when people travel to various parts of the world, they often resort to communicating messages through nonverbal channels.

Nonverbal messages refer to any messages other than verbal ones. These messages include such things as tone of voice, eye movements, hand gestures, and facial expressions. All in all, nonverbal messages are important. Nonverbal researchers have estimated that between 65% and 93% of our understanding of a source's message is a result of how we decode the source's nonverbal communication. Humans look more to how a source communicates than to the language choices he or she uses to communicate; this does not mean that language is unimportant, only that meaning is a combination of both verbal and nonverbal messages.

Both verbal and nonverbal channels can be utilized when communicating messages. However, verbal and nonverbal channels are not the only channels available to communicators. A **mediated channel** is any channel that uses some kind of mediating device to help transmit information. Telephones, e-mail, newspapers, television, radio, and text messaging are all examples of technologies that help mediate communication between people. Whether two people are on opposite sides of the world using mediated channels to communicate or sitting side-by-side text messaging each other to avoid eavesdroppers, people in today's world are constantly communicating via mediated messages.

The first medium used to communicate messages was cave drawings, but these were neither efficient nor particularly effective channels for communicating anything but the most primitive of thoughts. In fact, some people try to make a case for prehistoric extraterrestrial contact based on the drawings found in caves. People can see pretty much anything they want in a cave drawing, so as an historical tool, they are not reliable. Such drawings slowly evolved into more complex picture systems as they took on more substantial forms, where specific pictures meant things, which then evolved into written language. If the history of human communication were represented by a typical 12-inch ruler, the history of writing would be included in less than the last quarter of an inch.

The most rapid improvement in mediated channels has occurred in the past 150 years. Ever since the first message was sent by Morse Code in 1844, mediated technology has

been improving. From Morse Code to radios, to televisions, to cable televisions, to the Internet, to whatever comes next, mediated technology is evolving. For this reason, many people in the field of communication devote themselves to the study of mediated **communications**. In the field of communication, the letter "s" at the end of the word "communication" signifies mediated technologies. The field of mass communications studies how mediated technologies communicate messages to large numbers of people. However, most of the research within the field of communication does not examine mediated technologies, so the letter "s" must not be added to the word "communication" unless one is talking about communication occurring through mediated technologies.

Now that we have discussed both the history of social science research and the nature of communication, the rest of the chapter will briefly explain the organization of this volume.

UNDERSTANDING THE BOOK'S FORMAT

The authors of this book have more than 100 years combined experience conducting empirical research in the field of communication. Historically, the West Virginia University (WVU) Department of Communication Studies has mentored many of the top quantitative researchers in the field, although the department did not technically have its own doctorate program until the fall of 2006. Individuals who graduated from WVU with a doctorate received their degree in education (either curriculum and instruction or educational psychology), so all WVU graduates have extensive training in both communication and educational theory and practice. Overall, the approach that WVU takes to teach research methods has been successful; in 2003, WVU was listed as one of the top doctorate programs for graduates publishing research in the field (Hickson, Turner, & Bodon, 2003). Furthermore, WVU was the number-one program for faculty research publications. For this reason, our book takes the approach used at WVU to train many of the most prolific quantitative researchers in the field. All four of the authors of this text have WVU roots: two as faculty (James C. McCroskey and Virginia Peck Richmond) and two as program graduates (Candice Thomas-Maddox and Jason S. Wrench). In various analyses of the field, WVU graduates and faculty have made important contributions to the field of communication. Over a 30-year period, the instruction in quantitative research methods at WVU has been fine-tuned to enable both undergraduate and graduate researchers to understand the research process. This book is the culmination of years of teaching instruction in quantitative research methods by all of the authors.

Chapters 2 and 3 introduce you to the basic aspects of communication research. Chapter 2 explores empirical research and the scientific method, which is what this book is designed to teach you. If you are interested in nonquantitative research methods, Appendix A (see the textbook's website, https://oup-arc.com/wrench) includes

a chapter written by James Chesebro and Deborah Borisoff that discusses qualitative and critical research methods. Chapter 3 discusses the ethical standards that modern researchers are required to follow both philosophically and legally.

Chapters 4 and 5 take you through the basic process necessary for conducting research. Chapter 4 examines how to use libraries and other sources for finding research previously conducted on a given topic. In addition to basic library skill discussions, Chapter 4 lays out how to format papers and cite sources using the sixth edition of the American Psychological Association's style manual. Chapter 5 then breaks down each section of a research study and gives tips and examples for writing these sections for your own research projects.

Chapters 6 through 8 examine the most fundamental parts of a research project. Chapter 6 explains what variables are, the different types of variables that exist in empirical sciences, and various communication variables. The communication variables discussed in this chapter will help you understand the majority of the examples used in this text. Furthermore, an actual research dataset was collected on the variables discussed in Chapter 6; you can find this dataset on the textbook's website. Chapters 7 and 8 explain how social scientists measure human behavior and perceptions and how to ensure these measurements are reliable and valid. Chapter 7 discusses how researchers measure communicative behaviors and perceptions. Chapter 8 details two important characteristics—reliability and validity—involved in the measurement process that must be clearly followed for research to be meaningful.

In Chapters 9 through 11 and Appendix D (see the textbook's website), we explore four common techniques for conducting communication research: survey, content analysis, experiment, and Big Data. Chapter 9 examines survey research. The methods discussed in this chapter date back to the techniques created during the 1930s and 1940s by the social scientists studying human attitudes. Chapter 10 explores the research method called content analysis, and Chapter 11 presents the nature of experiments and various methods researchers can employ to ensure that experiments are successful. Appendix D discusses the new and emerging field of Big Data and how it is impacting our understanding of human communication.

Chapters 12 and 13 explore some basic concepts related to research methods: sampling and hypothesis testing. Chapter 12 explains how to go about finding the appropriate research participants to ensure your research projects are successful and meaningful. Chapter 13 provides the basic explanation for how the statistical process is conducted. Although this chapter is the densest one in this text to read, the information it contains is important to understanding the next six chapters.

Chapter 14 starts our discussion of statistics by introducing you to descriptive statistics. Most people are somewhat familiar with the ideas of descriptive statistics, but here, we show how descriptive statistics are the basic building blocks for more advanced statistics.

Chapters 15 through 19 examine different statistical tools that can help you in answering actual questions about communication phenomena. The first segment in each chapter walks you through the step-by-step process necessary to compute statistical formulas by hand. This is the part of quantitative research methods that many students are nervous about when first learning. Trust us, if you follow our step-by-step instructions, you will have no problems whatsoever learning how to calculate these mathematical formulas. The first part of every chapter also presents a scenario for the type of statistical test that each chapter represents. These scenarios are designed to help you compute the statistical tests by hand. For this reason, the data used in these examples are fabricated to make the math as easy as possible. Although the first examples in each chapter may be interesting, they are not based on actual empirical data. In addition to calculating the problems by hand, you will be provided with statistical output using the Windows version of the IBM Statistical Package for the Social Sciences (SPSS), version 20.0, which is a useful tool used by quantitative communication researchers. Additionally, information will be provided on the utility of two open-source statistical software packages: PSPP and R. PSPP is a pared-down version of SPSS that is freely available. R, in contrast, is a statistical programming language and is best suited for those in graduate school. However, a graphic user interface called R-Commander enables R to function in a manner similar to that of SPSS. To learn more about these free statistical software packages, see Appendix C on the textbook's website.

The second segment in Chapters 15 through 19 consists of real data–driven research questions from the dataset collected for this textbook. In these examples, you will be presented first with a research scenario and then with the SPSS results, similar to the examples in the first part. The biggest difference between these examples and those in the first part of each chapter is that these examples are based on actual collected data, so these are real research findings. We could have used the examples in the second half of each chapter to compute the statistics by hand, but that process would have been much more complicated and not beneficial to your understanding of the mathematical processes needed to compute these statistics.

The third and final segment in Chapters 15 through 19 examines the articles on the textbook's website. To see how each of these statistical tests can be used by researchers to answer actual hypotheses and research questions, we recommend that you read the first two sections of every chapter first, then read the corresponding article on the textbook's website, and finally examine the analysis of the article we have provided for you in the chapter. By completing the readings in the way we recommend, you will be able to determine whether you truly understand the statistical concept and how it can be employed in research. If Chapters 15 through 19 aren't enough, we also have a chapter on Advanced Statistical Procedures in Appendix E online.

The final chapter in this book, Chapter 20, discusses the processes that researchers go through to present their findings to other people. This chapter examines how to design effective research posters for presentation at conferences and conventions,