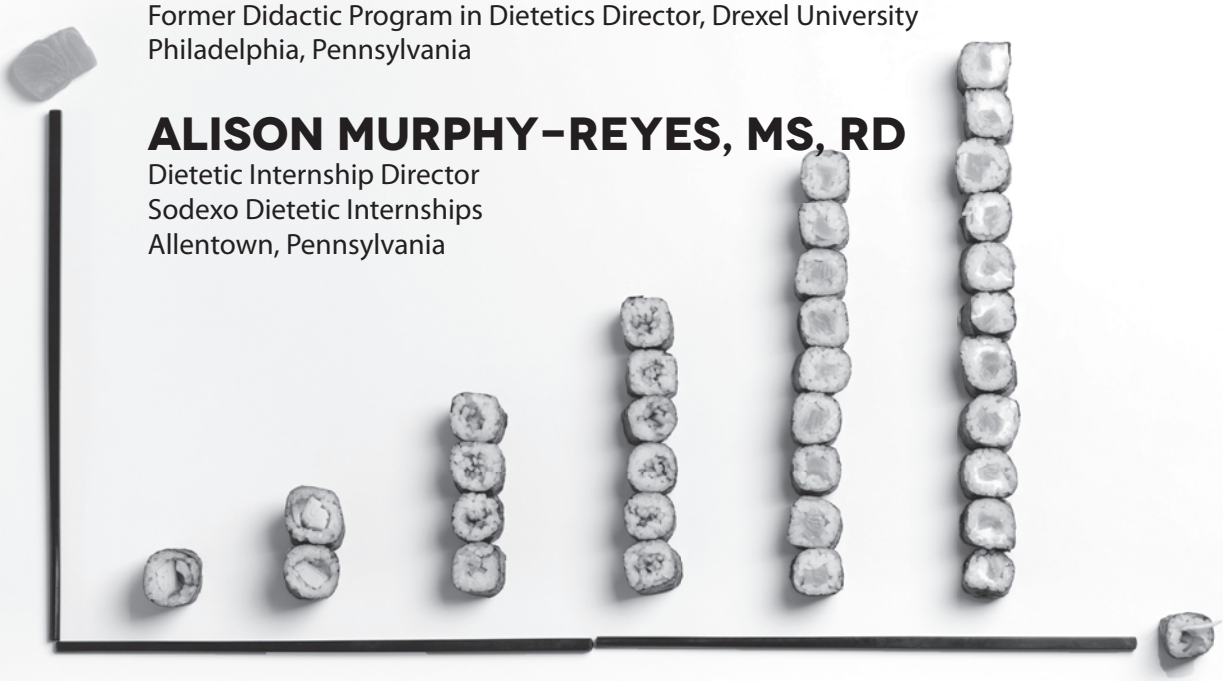
NUTRITION RESEARCH

CONCEPTS AND APPLICATIONS

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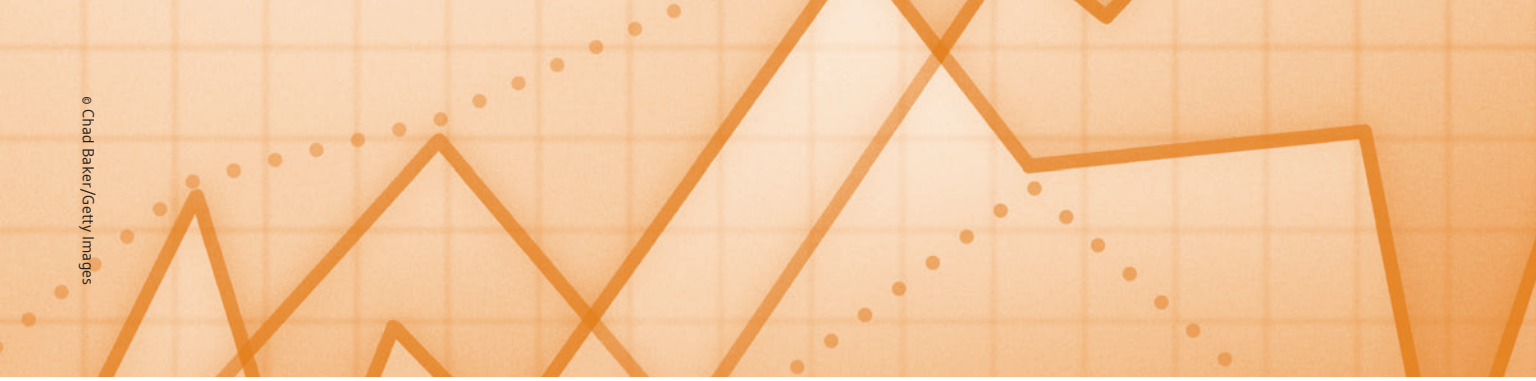
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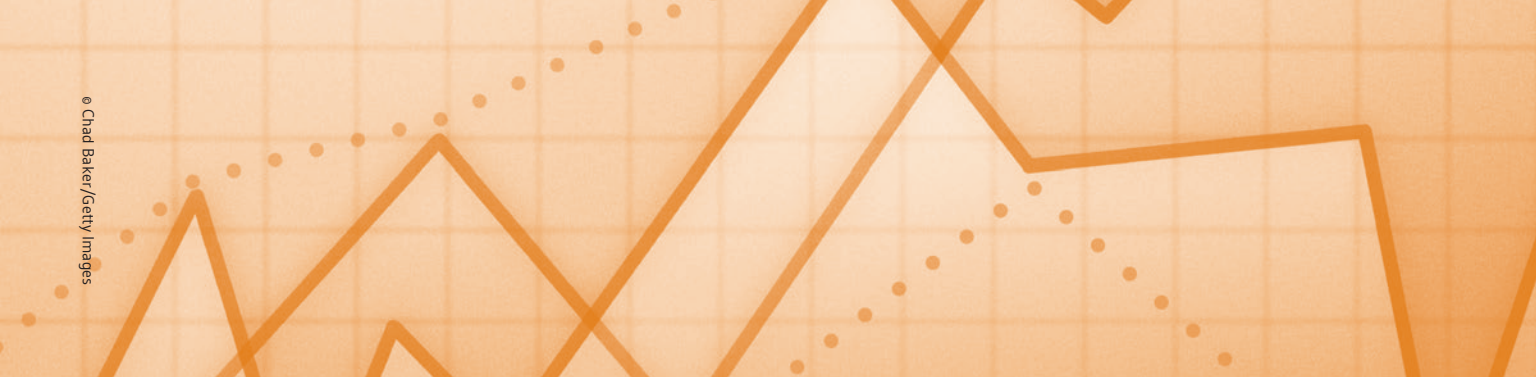
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For Caitlin.
K.E.D.

To my late mother. Thank you for being my very first English teacher and giving me the best writing advice. Thanks, Dad, for being a great role model and teaching me to work hard in all that I do. To my loving husband Robert, who devotes his life to our family and medical research.
A.R.

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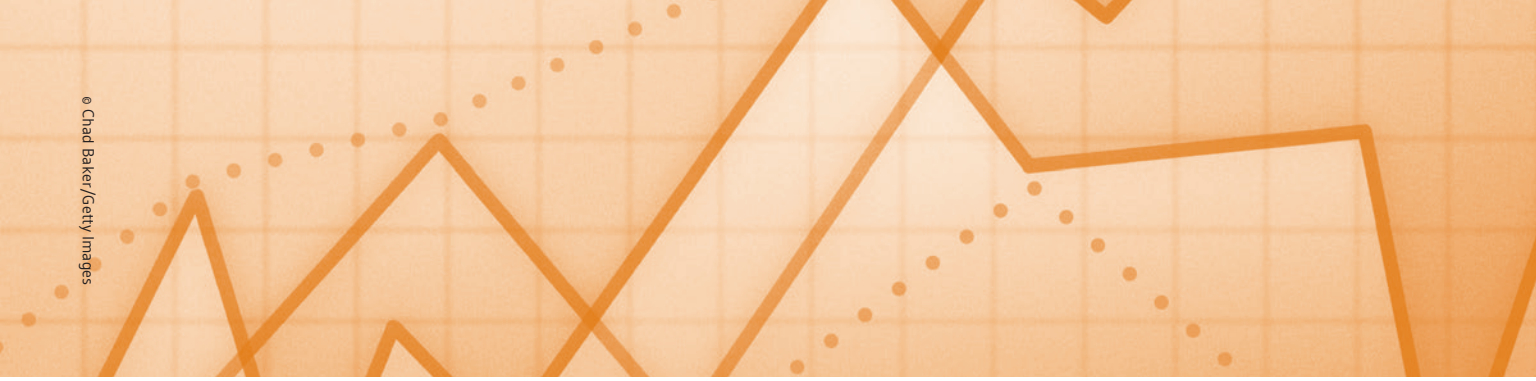
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PREFACE

Reading and evaluating research articles is a vital skill for nutrition students and practitioners, and it is critical for our profession. From teaching in didactic nutrition programs and dietetic internships, we saw a need for a nutrition research methods book to get students interested and proficient in reading and appraising research. Research can be exciting for students (after all, research can be like a good mystery), as long as students understand what they are reading. Using a step-by-step approach that combines discussion of research concepts with applications using research articles, *Nutrition Research: Concepts and Applications* helps students experience each stage in the research process.

Changes in the field of nutrition research present challenges to students. The amount of nutrition research published has grown tremendously over the years, mirroring the growth in medical and nursing research. The annual number of MEDLINE articles increased 46% between 1978 to 1985 and 1994 to 2001, and the proportion of reported randomized controlled trials jumped from 1.9% to 6.2% over these same time periods (Druss & Marcus, 2005). With so much published research, it can be difficult for students to locate the most appropriate articles on a specific topic. In addition, many open-access journals featuring free online articles have entered the market over the past 20 years. Although Björk and Solomon (2012, p. 9) found that many open-access journals are of "high quality and widely cited," students must be able to evaluate and appraise each journal article they read, whether from open-access or subscription journals.

In addition to the explosion of published research, a knowledge of statistical tests beyond correlation, t-tests, and ANOVA is very important to understand research today. Nutrition students need to grasp what is meant by effect size, how to translate results from linear or logistic regression models, and how to interpret relative risk and hazard ratios—concepts not often included in a basic statistics class.

Nutrition Research: Concepts and Applications is appropriate for undergraduate students as well as graduate students who have minimal skills for reading research. This text will help students develop the skills necessary to:

- become knowledgeable consumers of research,
- conduct and document research projects, including a master's thesis, and
- use research findings in the classroom and supervised practice.

Our aim is to make research articles approachable and understandable to students so they feel confident reading and interpreting not just primary research but also narrative and systematic reviews. Because systematic reviews serve as the foundation for evidence-based practice guidelines, this text also helps students understand and access practice guidelines to enable their participation in evidence-based nutrition and dietetics practice.

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APPROACH

Learning research methods should not be dull or overwhelming. The approach taken in this text is based on giving the student:

- *step-by-step* mastery of concepts; and
- lots of *examples* of concepts in each chapter; and
- ample *practice* using actual studies to answer simple questions, such as identifying the independent variable, as well as questions involving more critical thinking, such as explaining a study's results or writing an abstract.

For example, in the chapter on systematic reviews, a table explains each of the 10 steps in the process alongside a description of how this actually occurred in a study. The Critical Thinking Questions (at the end of each chapter) then ask students to practice identifying and explaining these steps after reading a systematic review article (answers are in the Instructor's Manual). Throughout the book, an incremental approach is used so that students first learn to identify original research, then decide if it is quantitative or qualitative, then identify types of variables, next determine whether an intervention took place, and so on. Two full-length studies are provided in the appendices to help students make connections to concepts discussed in the text.

This is the first nutrition research text that starts with the basics and is very comprehensive in approach. For example, two entire chapters help students find appropriate research studies for class assignments, use databases, write like scientists, organize and write research proposals and complete studies, and make and present a poster. Because surveys frequently are used in student research, another chapter is devoted to survey development and testing. Students also learn the nuts and bolts of using the Academy of Nutrition and Dietetics Evidence Analysis Library (EAL) and searching for grants.

ORGANIZATION

Nutrition Research: Concepts and Applications is organized into four parts.

- Part 1 includes three foundational chapters: an introduction to research, how to find appropriate research articles, and research ethics. The first chapter describes the research process, ways to classify research, and major types of research such as intervention and translational research. In the second chapter, much help is given to students on using databases to find *appropriate* journal articles for assignments, as well as guidance on writing scientific papers. The last chapter in Part 1 discusses the history of research ethics, responsible conduct of research, informed consent, privacy, and institutional review boards.
- Part 2 includes five chapters on quantitative research. The first chapter introduces foundations such as reliability, validity, bias, sampling, instruments, statistical significance, as well as a walk-through of a research study with many examples. Next in Part 2 are chapters on statistics and research designs, ending with a chapter that explains and demonstrates how to critique a study.
- Part 3 on qualitative research includes three chapters on foundational concepts, research designs, and how to critique a study.
- Part 4 includes four chapters on understanding systematic reviews and evidence-based practice guidelines, developing surveys, writing research proposals and papers, and finding grants. The first chapter explains and demonstrates how a systematic review is conducted, including how to read and interpret the results of a meta-analysis. Students also go through the systematic review process used by the EAL to see how conclusions from evidence analysis questions are used to

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develop recommendations and guidelines. An entire chapter is devoted to helping students develop and use surveys. Part 4 also includes a complete guide to writing a research proposal and paper, and tips on disseminating study results. A sample research proposal is available on the Navigate Companion Website.

Several appendices appear at the end of this text, including study checklists and two full-length studies (one randomized controlled trial and one quasi-experimental study) that are used as examples in a number of chapters.

Features and Benefits

Nutrition Research: Concepts and Applications uses a variety of strategies to enhance student learning.

- *Outline*: The Outline at the beginning of each chapter helps students organize what they are going to learn as well as anticipate what will be covered.
- *Learning Outcomes*: Each chapter's Learning Outcomes can be used by students to help guide and focus study.
- *Tips*: Each chapter contains several Tips, a special feature that is used to make a concept easier to understand or to pull several ideas together.
- *Applications*: Each chapter also contains Applications—another special feature—that pose one or more questions to students to help them apply the information in the text. Answers to questions posed in the Application feature are in the Instructor's Manual.
- *Key Terms*: All bolded terms are defined in the Glossary, which is found at the back of the book.
- *Tables and Figures*: The text uses many tables and illustrations to further explain concepts and make it easy for students to find and review information.
- *Researcher Interview*: Eight chapters contain interviews with researchers in different areas in which they discuss their research, what they enjoy about research, and tips for anyone who wants to get involved in research.
- *Summary*: Designed to help students focus on the important concepts within the chapter, a numbered summary is provided at the end of each chapter.
- *Review Questions*: These questions, from multiple-choice to short essays, check the comprehension of factual material in the chapter. Answers for these questions and the Critical Thinking Questions are in the Instructor's Manual.
- *Critical Thinking Questions*: These exercises ask students to apply the chapter's concepts to a variety of studies, so students gain a deeper understanding. From determining which variable is independent and which is dependent in one study, students begin to understand these concepts. But they need to repeat this by looking at more studies and different types of studies to really make it second nature to them. Critical Thinking Questions are provided for a number of articles to allow for practice. The studies chosen are from the *Journal of the Academy of Nutrition and Dietetics*, open-access journals, or another journal to which students typically have access.
- *Suggested Readings and Activities*: At the end of each chapter are citations for readings that are particularly useful as well as Websites with helpful exercises, videos, and so on.

In addition, a Navigate Companion Website offers students additional learning opportunities to understand and apply concepts, such as watching videos and completing an interactive chapter summary.

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INSTRUCTOR RESOURCES

Qualified instructors can receive access to the full suite of Instructor Resources, including the following:

- *Slides in PowerPoint format*, featuring more than 400 slides.
- *Test Bank*, containing more than 700 questions.
- *Instructor's Manual*, providing Outlines, Classroom Activities, and Answer Keys to the in-text Application Questions, Review Questions, and Critical Thinking Questions.

STUDENT RESOURCES

By accessing the Navigate Companion Website—access to which accompanies every new print copy of this text—students will have these useful resources at their fingertips:

- *Video Lectures* for each chapter help explain specific chapter topics. The purpose of these videos is to help students understand some of the more difficult concepts. Many of the videos demonstrate how to read and understand a part of a study, such as statistical results. Some chapters may have more than one video.
- An *Interactive Summary* of each chapter contains blanks that students fill in using a drop-down menu. This tool helps with comprehension and retention of factual material.
- An *Interactive Glossary* and *Flashcards* help students learn definitions.
- *Web Links* take students to Websites that can enhance learning through videos and other methods.
- A *Sample Research Proposal* helps students get an idea of what the finished product should look like.

REFERENCES

Björk, B., & Solomon, D. (2012). Open access versus subscription journals: A comparison of scientific impact. *BMC Medicine*, *10*(73), 1–10.

Druss, B. G., & Marcus, S. C. (2005). Growth and decentralization of the medical literature: Implications for evidence-based medicine. *Journal of the Medical Library Association*, *93*, 499–501.

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THE PEDAGOGY

Nutrition Research: Concepts and Applications uses a variety of techniques, many interactive, to address different learning styles, increase interest and participation, as well as enhance mastery of key concepts.

The **Outline** at the beginning of each chapter helps students see the big picture and organize what they are going to learn. The **Learning Outcomes** provide instructors and students with a snapshot of the key information and skills they will encounter, which students can use as a checklist to help focus their study.



CHAPTER 1

Introduction to Research

CHAPTER OUTLINE

- Introduction
- What Is Research?
- Purposes of Nutrition Research
- Ways to Classify Research
- Major Types of Nutrition Research Studies
- Practice-Based Research Networks
- Researcher Interview: Translational Research, Dr. Wahida Karmally

LEARNING OUTCOMES

- Explain what research is, and give the steps in the scientific method.
- Describe the four purposes of nutrition research.
- Identify a research study as quantitative or qualitative and basic or applied.
- Explain why quality improvement is not considered research.
- Define and identify research that is classified as intervention, outcomes, epidemiological, or translational research.
- Describe what a practice-based research network is and does.

APPLICATION 1.1

Read this study summary and answer the questions.

Study: Computer kiosks with interactive nutrition software were installed in three middle schools in Toulouse, France. The kiosks were used by students there for 6 months. Students would use individual identification cards with their personal profile to access the kiosk just before going to the cafeteria and would adjust meal recommendations to each child's age, height and weight, and physical activity level. Each child interacted with the computer to compose a well-balanced meal meeting his or her individual needs. The ability to put together a balanced meal was measured for each child using the software. The children did not have to eat the meal they had chosen on the computer. After 6 months, results showed that BMI decreased significantly during the study, and the students became more competent at picking healthful meals using the personalized interactive software (Turnin et al., 2016.)

Questions: What were the research objectives, intervention, independent and dependent variables, outcomes measures, and results?

PURPOSES OF NUTRITION RESEARCH

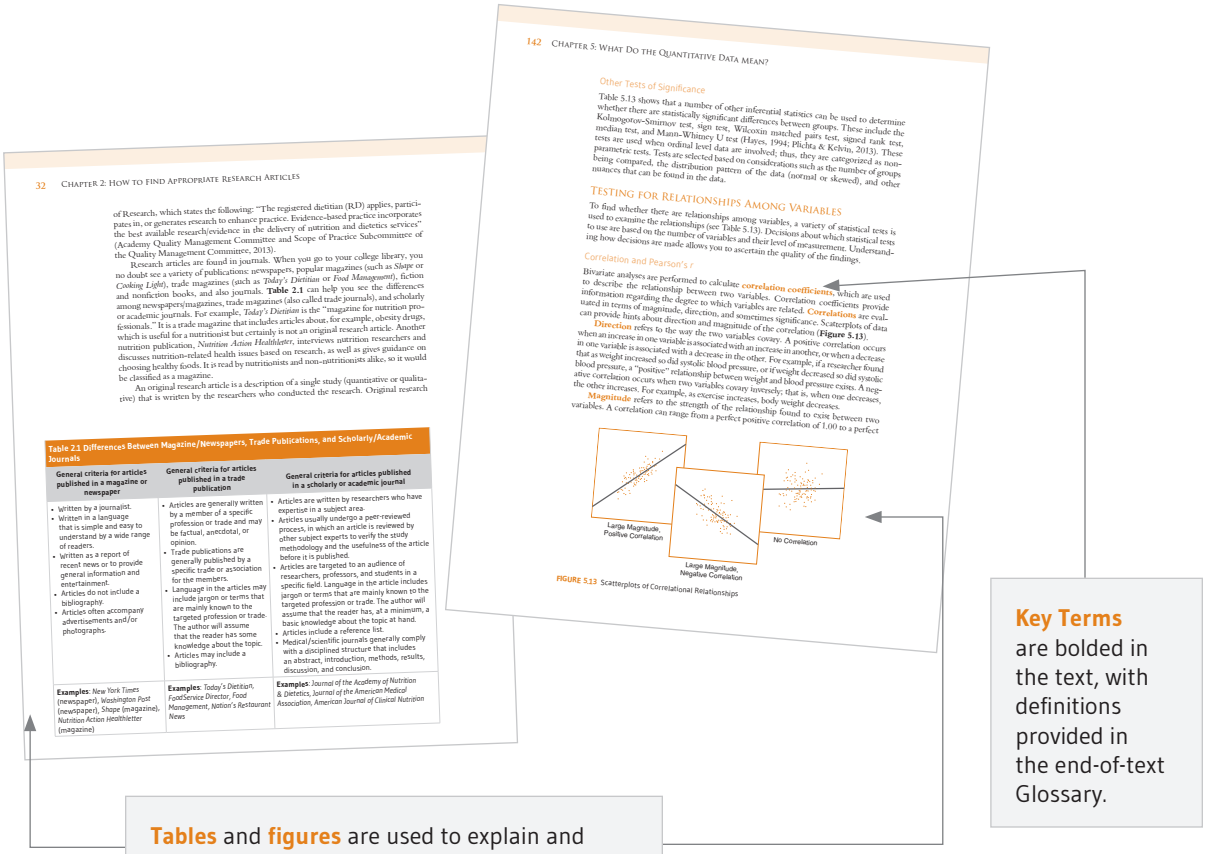
APPLICATION 2.4

CHECKLIST FOR SELECTING

TIP

Tip and **Application** features appear throughout each chapter. The Tip feature helps make concepts easier for students to grasp, and the Application feature poses questions for students that can also be used as a springboard for discussion.

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32 CHAPTER 2: HOW TO FIND APPROPRIATE RESEARCH ARTICLES

of Research, which states the following: "The registered dietitian (RD) applies, participates in, or generates research to enhance practice. Evidence-based practice incorporates the best available research/evidence in the delivery of nutrition and dietetics services" (Academy Quality Management Committee and Scope of Practice Subcommittee of the Quality Management Committee, 2013).

Research articles are found in journals. When you go to your college library, you no doubt see a variety of publications: newspapers, popular magazines (such as *Shape* or *Cooking Light*), trade magazines (such as *Today's Dietitian* or *Food Management*), fiction and nonfiction books, and also journals. **Table 2.1** can help you see the differences among newspapers/magazines, trade magazines (also called trade journals), and scholarly or academic journals. For example, *Today's Dietitian* is the "magazine for nutrition professionals." It is a trade magazine that includes articles about, for example, obesity drugs, which is useful for a nutritionist but certainly is not an original research article. Another nutrition publication, *Nutrition Action Healthletter*, interviews nutrition researchers and discusses nutrition-related health issues based on research, as well as gives guidance on choosing healthy foods. It is read by nutritionists and non-nutritionists alike, so it would be classified as a magazine.

An original research article is a description of a single study (quantitative or qualitative) that is written by the researchers who conducted the research. Original research

Table 2.1 Differences Between Magazine/Newspapers, Trade Publications, and Scholarly/Academic Journals

General criteria for articles published in a magazine or newspaper	General criteria for articles published in a trade publication	General criteria for articles published in a scholarly or academic journal
• Written by a journalist. • Written in a language that is simple and easy to understand by a wide range of readers. • Written as a report of recent news or to provide general information and entertainment. • Articles do not include a bibliography. • Articles often accompany advertisements and/or photographs.	• Articles are generally written by a member of a specific profession or trade and may be factual, anecdotal, or opinion. • Trade publications are generally published by a specific trade or association for the members. • Language in the articles may include jargon or terms that are mainly known to the targeted profession or trade. The author will assume that the reader has some knowledge about the topic. • Articles may include a bibliography.	• Articles are written by researchers who have expertise in a subject area. • Articles usually undergo a peer-reviewed process, in which an article is reviewed by other subject experts to verify the study methodology and the usefulness of the article before it is published. • Articles are targeted to an audience of researchers, professors, and students in a specific field. Language in the article includes jargon or terms that are mainly known to the targeted profession or trade. The author will assume that the reader has, at a minimum, a basic knowledge about the topic at hand. • Articles include a reference list. • Medical/scientific journals generally comply with a disciplined structure that includes an abstract, introduction, methods, results, discussion, and conclusion.
Examples: *New York Times* (newspaper), *Washington Post* (newspaper), *Shape* (magazine), *Nutrition Action Healthletter* (magazine)	**Examples**: *Today's Dietitian*, *Food Service Director*, *Food Management*, *Nation's Restaurant News*	**Examples**: *Journal of the Academy of Nutrition & Dietetics*, *Journal of the American Medical Association*, *American Journal of Clinical Nutrition*

142 CHAPTER 5: WHAT DO THE QUANTITATIVE DATA MEAN?

Other Tests of Significance

Table 5.13 shows that a number of other inferential statistics can be used to determine whether there are statistically significant differences between groups. These include the Kolmogorov-Smirnov test, sign test, Wilcoxin matched pairs test, signed rank test, median test, and Mann-Whitney U test (Hayes, 1994; Plichta & Kelvin, 2013). These tests are used when ordinal level data are involved; thus, they are categorized as non-parametric tests. Tests are selected based on considerations such as the number of groups being compared, the distribution pattern of the data (normal or skewed), and other nuances that can be found in the data.

TESTING FOR RELATIONSHIPS AMONG VARIABLES

To find whether there are relationships among variables, a variety of statistical tests is used to examine the relationships (see Table 5.13). Decisions about which statistical tests to use are based on the number of variables and their level of measurement. Understanding how decisions are made allows you to ascertain the quality of the findings.

Correlation and Pearson's *r*

Bivariate analyses are performed to calculate **correlation coefficients**, which are used to describe the relationship between two variables. Correlation coefficients provide information regarding the degree to which variables are related. **Correlations** are evaluated in terms of magnitude, direction, and sometimes significance. Scatterplots of data can provide hints about direction and magnitude of the correlation (**Figure 5.13**).

Direction refers to the way the two variables covary. A positive correlation occurs when an increase in one variable is associated with an increase in another, or when a decrease in one variable is associated with a decrease in the other. For example, if a researcher found that as weight increased so did systolic blood pressure, or if weight decreased so did systolic blood pressure, a "positive" relationship between weight and blood pressure exists. A negative correlation occurs when two variables covary inversely; that is, when one decreases, the other increases. For example, as exercise increases, body weight decreases.

Magnitude refers to the strength of the relationship found to exist between two variables. A correlation can range from a perfect positive correlation of 1.00 to a perfect

FIGURE 5.13 Scatterplots of Correlational Relationships

Key Terms are bolded in the text, with definitions provided in the end-of-text Glossary.

Tables and **figures** are used to explain and summarize key concepts.



22 CHAPTER 1: INTRODUCTION TO RESEARCH

RESEARCHER INTERVIEW Translational Research

Wahida Karmally, Dr.PH, RDN, CDE, CLS, FNLA
Associate Research Scientist and Director of Bionutrition Research Core for the Irving Center for Clinical and Translational Research, Columbia University Medical Center, New York, NY

1. **Briefly describe the areas in which you do research.**
The mission of Columbia University Medical Center's Clinical and Translational Science Award (CTSA) is to transform the culture of research to hasten the discovery and implementation of new treatments and prevention strategies. In October 2006, the Irving Center for Clinical Research joined a national consortium created by the National Center for Research Resources (NCRR) branch of the NIH to energize the discipline of clinical and translational research, ultimately enabling researchers to provide new treatments more efficiently and quickly to patients.

My interest in research began when I was a graduate student in India conducting experiments on hundreds of albino rats to study bioavailability of iron from green leafy vegetables that grow on the roadside and are accessible to anyone who desires to pick them. This research was of public health significance because iron is a shortfall micronutrient in many populations. The results showed that the greens provide nutritional benefits that were cost-effective.

My interest in research continued during my postgraduate studies in London, UK. As an intern, I helped with clinical research at the Middlesex Hospital in London. I started working in research studies at the Mount Sinai Medical Center in New York with Dr. Virgil Brown in the early 1980s in the Diabetes Demonstration Project and on studies examining the effectiveness of statins.

I moved to Columbia University in 1987 as the director of nutrition in the General Clinical Research Center, and in 2006 the center became the Irving Institute for Clinical and Translational Research. In my current position as director of the Bionutrition Research Core, I had the opportunity to run the diet component of a multicenter landmark study: DELTA (Dietary Effects on Lipoproteins and Thrombogenic Activity). This study in essence determined that one standard macronutrient distribution in the diet does not "fit" all sections of the population. In individuals with insulin resistance, the results suggested that the replacement of dietary saturated fatty acids with monounsaturated fatty acids rather than carbohydrate is preferred because of associated smaller reductions in high-density lipoprotein cholesterol (HDL-C) and a trend toward reduction in fasting triglycerides (TG). Diets lower in saturated fat and higher in monounsaturated fat may benefit individuals with normal HDL-C levels or with high TGs. DELTA's results added to the body of evidence for the Therapeutic Lifestyle Changes (National Cholesterol Education Program), which stated that rather than relying on a single dietary recommendation for all, individualized nutrition counseling ("personalized nutrition") should be provided based on risk factors for the treatment and prevention of coronary artery disease.

I have been an investigator on several diet-related studies, including examining the effects of different intakes of dietary cholesterol in young men and women, beta-glucan from a ready-to-eat cereal on LDL-C in Hispanic Americans, the effects of diacylglycerol on TGs, very low calorie diets on insulin sensitivity and beta cell function in patients with type 2 diabetes, and studies on lipoprotein metabolism. The bionutrition core has supported protocols on energy homeostasis and osteoporosis as well as several pharmacokinetic studies, to name a few.

A collaboration with the National Heart, Lung, and Blood Institute (NHLBI) on the Latino and African American Initiatives resulted in the development of materials with culturally appropriate heart-healthy recipes for Latino and African Americans based on evidence-based recommendations for the prevention and treatment of cardiovascular risk factors. This was a "translational" strategy to improve the health of minority communities.

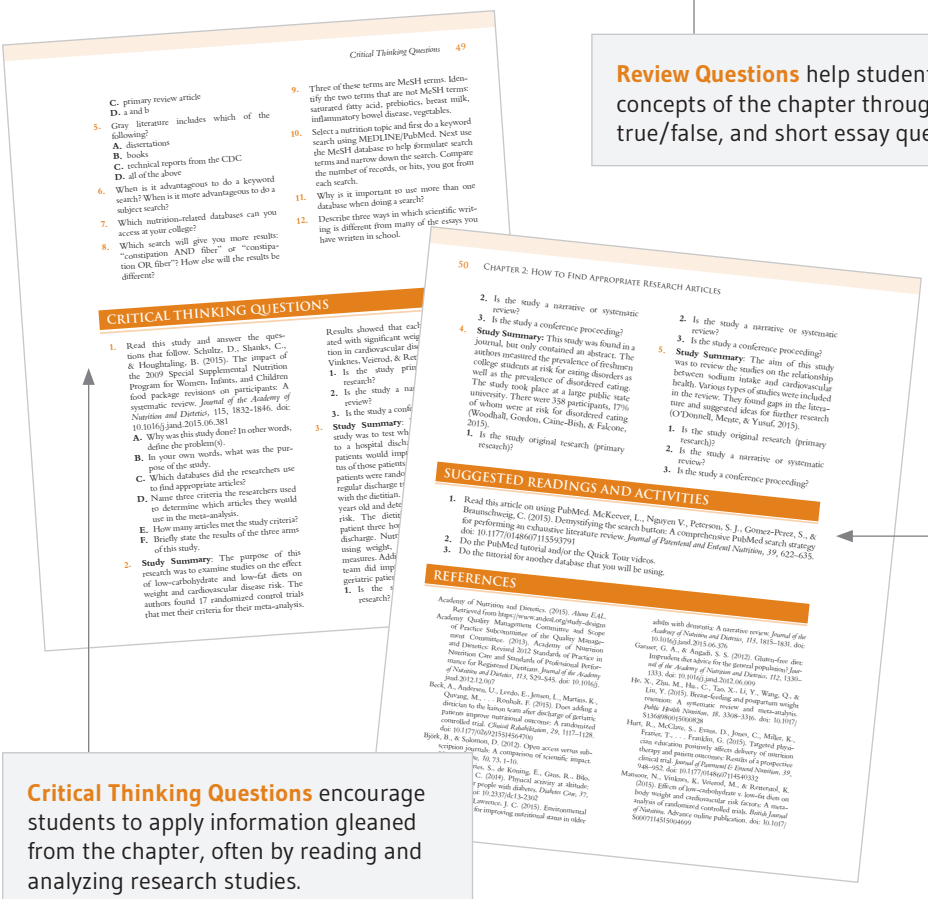
Found in eight chapters, **Researcher Interviews** provide students with a unique opportunity to learn from researchers about how they do research in their specialty areas and what they enjoy about it. The researchers also provide tips for students on how to get involved in research.

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The **Summary** at the end of each chapter compiles the pertinent and key information for quick review in list form.



Review Questions help students review the key concepts of the chapter through multiple-choice, true/false, and short essay questions.

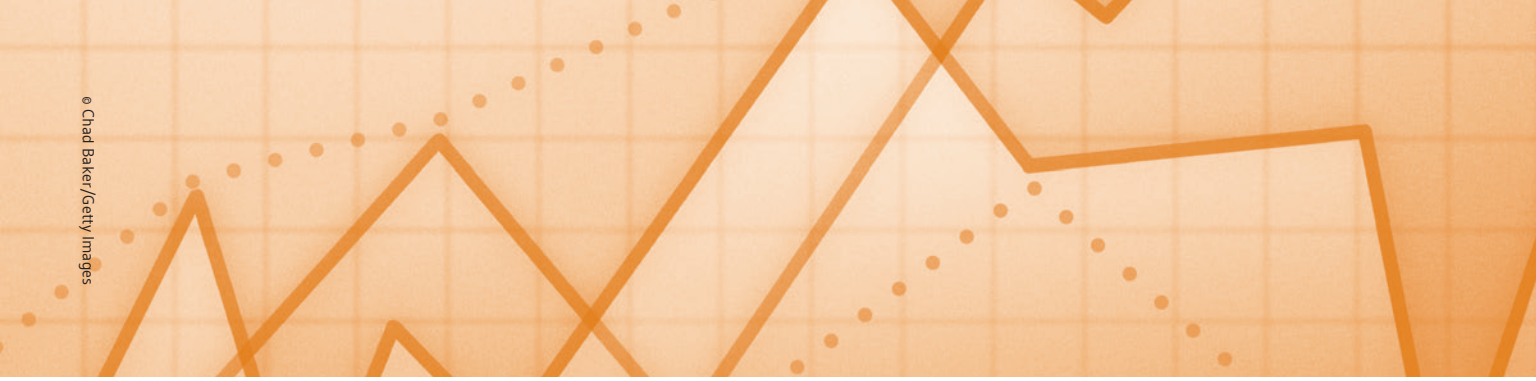


Critical Thinking Questions encourage students to apply information gleaned from the chapter, often by reading and analyzing research studies.

Suggested Readings and Activities provide additional sources of information or activities.

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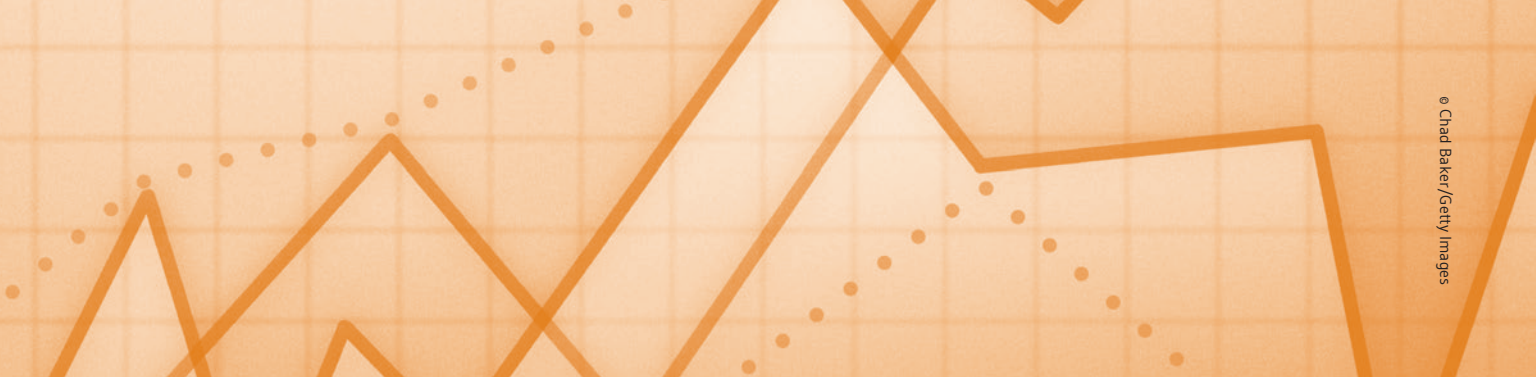
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