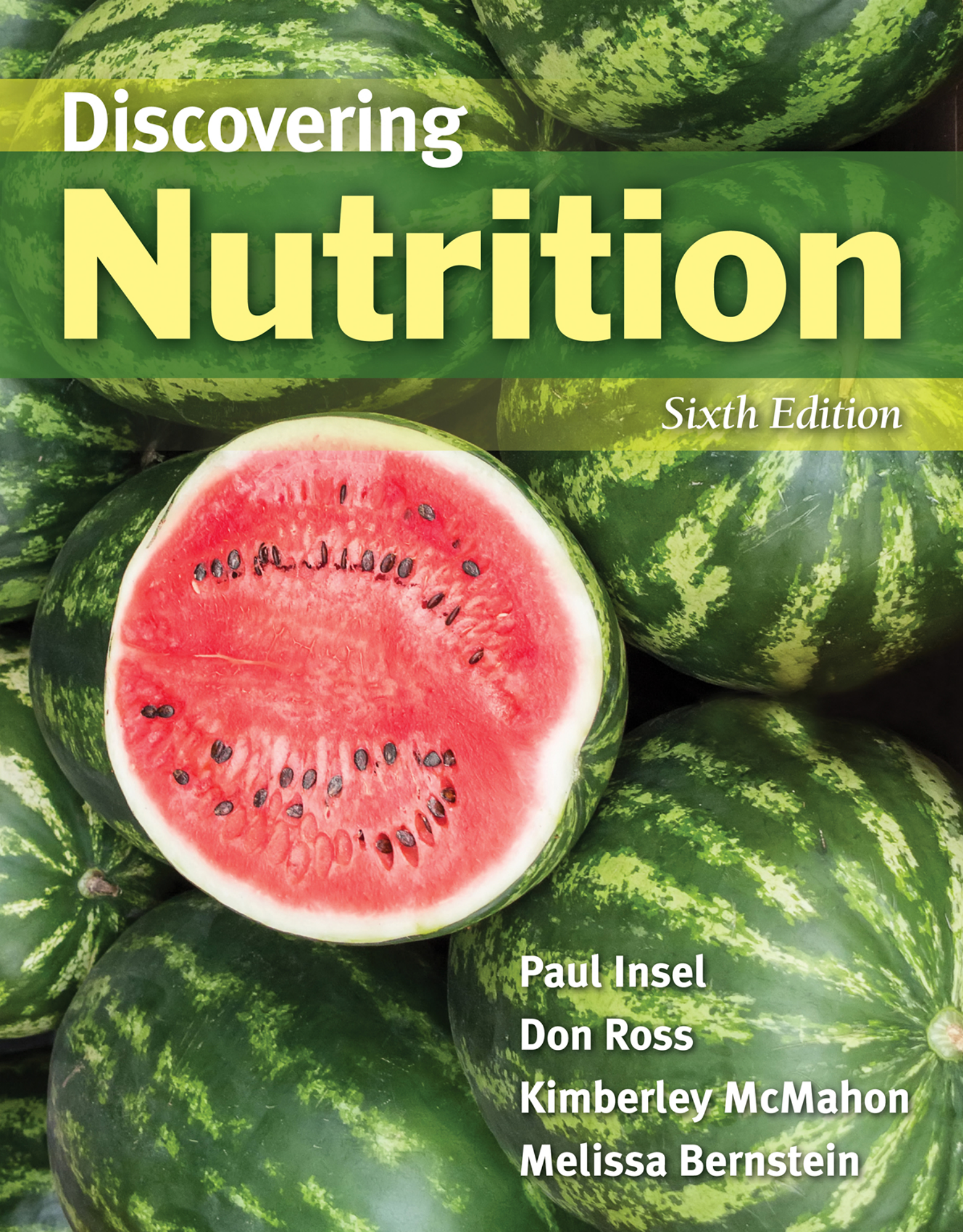
Discovering Nutrition

Sixth Edition



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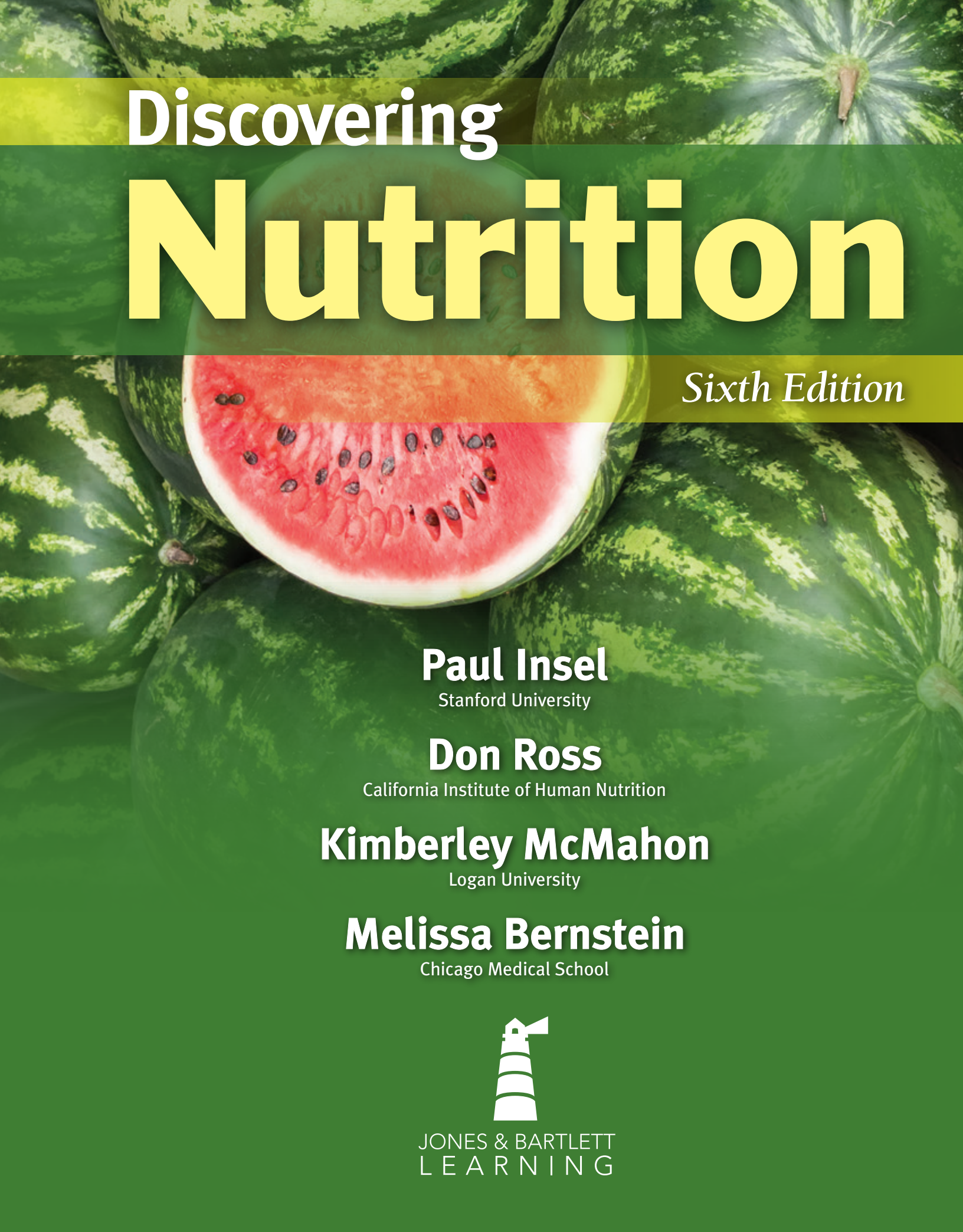

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Brief Contents

Contents

Preface

Welcome to the sixth edition of *Discovering Nutrition.*

With changes in nutrition-related information having never been more exciting or important than they are today, learning about nutrition should be stimulating and engaging. With that in mind, *Discovering Nutrition* takes students on a fascinating journey beginning with curiosity and ending with solid knowledge and a healthy dose of skepticism. Knowledge is power, and our mission is to offer students the tools to logically interpret nutrition information provided by the news media, popular entertainment, food labels, and government agencies. Our goal is to create sophisticated consumers of nutritional science as well as nutrition information.

Discovering Nutrition is unique in its behavioral approach, challenging students not just to memorize material, but to act on it. Familiar experiences and choices beckon students into each chapter. Analogies illuminate difficult concepts. We address important topics that students are curious about, ranging from functional foods and supplements to vegetarianism, athlete diets, and linkages between diet and chronic disease. In special spotlights, we focus attention on topics like alcohol, eating disorders, obesity, and complementary nutrition. For those instructors wishing to cover metabolism, we also include a "Spotlight on Metabolism and Energy Balance" that provides a friendly tour of the metabolic pathways. For this edition, we have significantly revised two areas that are of especially high interest, Chapter 9 "Nutrition for Physical Performance" and the "Spotlight on Eating Disorders," to reflect the current state of knowledge.

Accessible Science

Discovering Nutrition makes use of the latest in learning theory and balances the behavioral aspects of nutrition with an accessible approach to scientific concepts. This text is intended to be a comprehensive resource that communicates nutrition both graphically and personally. We present technical concepts in an engaging and friendly way with an appealing, stepwise, and parallel development of text and annotated illustrations. Illustrations in all chapters use consistent representations. Each type of nutrient, for example, has a distinct color and shape. Icons of an amino acid, a protein, a triglyceride, and a glucose molecule represent "characters" in the nutrition story and are instantly recognizable as they appear throughout the text.

This text leads the way in depicting important biological and physiological phenomena, such as emulsification, glucose regulation, digestion and absorption, and fetal development. Extensive graphic presentations make nutrition and physiological principles come alive.

2015–2020 Dietary Guidelines for Americans

The eighth edition of the *Dietary Guidelines for Americans* emphasizes following a healthy and varied eating pattern that limits calories from added sugars and saturated fats, reduces sodium intake, and incorporates more vegetables and whole grains. On the whole, this edition reflects advances in the scientific understanding of the importance of improving diets and increasing physical activity, two of the most important factors in reducing obesity and preventing chronic diseases in Americans. Focused on science-based recommendations on food and nutrition, the *Dietary Guidelines* empowers the American public to make shifts in what they eat and drink in favor of good health. As you read this text, look for key recommendations of the *Dietary Guidelines* highlighted in the margins.

Food Labeling

The Food and Drug Administration announced a new and redesigned Nutrition Facts label that will be required on most packaged food by January 2020. In an effort to encourage consumers to make more informed decisions, changes on the new label include such things as highlighting calories per serving and serving sizes more prominently, featuring a separate line showing how much sugar has been added to the food, and including updated Dietary Value information. The new label is discussed in Chapter 2 and has been incorporated into all Label to Table features found throughout the text.

New to This Edition

For this edition, the latest scientific evidence, recommendations, and national standards have been incorporated throughout the text.

Key Highlights

- Updated content reflects the *2015–2020 Dietary Guidelines for Americans*, as well as the redesigned Nutrition Facts label.
- The new "Why Is This Important?" feature, tied to the majority of major headings in the text, breaks down the practical importance and value of the key concepts students are learning.
- The new "Getting Personal" feature, found in most of the end-of-chapter Learning Portfolios, encourages students to apply their nutritional knowledge to understanding their own diets.
- Revised statistics and data incorporated throughout the text reflect the current state of nutrition in the United States and the world.
- Revised food source charts in Chapters 7 and 8 more clearly convey common sources for vitamins and minerals.
- Updated Position Statements from the Academy of Nutrition and Dietetics, the American Heart Association, and other organizations appear throughout the text.
- Updated references utilize the latest science in the field.
- New and updated FYI and Quick Bite features provide in-depth discussions of controversial issues and topics for classroom discussion.
- The redesigned Nutrition Facts label has been incorporated into the Label to Table features found throughout the text.

Chapter 1—Food Choices: Nutrients and Nourishment

- Updated discussion of the effects TV advertisements have on childhood nutrition
- Updated coverage of the impact of eating away from home
- Updated section comparing the "healthfulness" of the American diet versus the recommendations of the *2015–2020 Dietary Guidelines for Americans*
- New comparison of phytochemicals and zoochemicals
- New comparison of the terms *kilocalorie* and *calorie*
- New features presenting excerpts from the Academy of Nutrition and Dietetics' practice papers on social media and communicating accurate food and nutrition information
- New Quick Bite feature "Correlation or Causation?"

Chapter 2—Nutrition Guidelines: Tools for a Healthful Diet

- Inclusion of the key recommendations and overarching guidelines of the *2015–2020 Dietary Guidelines for Americans*
- Revised description and discussion of the Nutrition Facts label, reflecting changes announced in 2016
- New Quick Bites features "Early 'Laws' of Health," "SuperTracker: My Foods, My Fitness, My Health" and "Underconsumption of Nutrients"
- Revised FYI feature "Portion Distortion"

Chapter 3—The Human Body: From Food to Fuel

- New section on gut microbiota
- Heavily revised FYI feature "Microbiota Out of Whack? Pre- and Probiotics May Help"
- Expanded description of passive diffusion

Chapter 4—Carbohydrates: Simple Sugars and Complex Chains

- New coverage of agave sweeteners
- New figure summarizing types of carbohydrates
- New table recapping common nonnutritive sweeteners
- New table summarizing the health benefits of fiber, as well as its effects in the gastrointestinal tract
- Heavily revised FYI feature "Is the Glycemic Index a Useful Tool for Constructing a Healthy Diet with Carbohydrates?"
- Expanded discussion of glycemic load
- New Quick Bite feature "Low-Carb Diets"

Spotlight on Alcohol

- Updated description and statistics about college drinking behaviors
- Expanded Quick Bite feature "Energy Drinks + Alcohol = A Recipe for Disaster"

Chapter 5—Lipids: Not Just Fat

- Updated sections providing recommendations for omega fatty acid intake and summarizing the health effects of omega-3 fatty acids
- New table listing good food sources of omega-3 fatty acids
- Updated consideration of seafood consumption guidelines, along with a new figure illustrating healthy and safe fish options for pregnant and breastfeeding women
- Revised FYI feature "Fats on the Health Food Store Shelf" that includes a new section on coconut and grapeseed oil
- New description of fat's structural role in the brain
- New discussion of the lack of a UL for fat, trans fat, or cholesterol

Chapter 6—Proteins and Amino Acids: Function Follows Form

- New FYI feature "Celiac Disease and Gluten Sensitivity"
- New discussion about the lack of evidence for gluten-free diets impacting weight loss
- Updated consideration of protein recommendations for athletes
- Updated discussion of the health benefits and risks of vegetarian diets, including a new table providing healthy tips for vegetarians
- New Position Statement from the Academy of Nutrition and Dietetics on vegetarian diets

Chapter 7—Vitamins: Vital Keys to Health

- Expanded presentation of the impact of vitamin A deficiency on skin and other epithelial cells
- Expanded discussion of vitamin B_{12} deficiency, including atrophic gastritis
- New Quick Bite features "Help the Vitamins Go Down" and "A Yellowish-Orange Hue"

Spotlight on Dietary Supplements and Functional Foods

- Significantly revised FYI feature "Defining Complementary and Integrative Health: How Does Nutrition Fit In?"
- Expanded discussion of fad diets and critical appraisal of diets, foods, and supplements

Chapter 8—Water and Minerals: The Ocean Within

- Revised FYI feature "Tap, Filtered, or Bottled: Which Water Is Best?" that considers current statistics surrounding bottled water use and things to keep in mind when selecting vitamin waters, supplements, or bottled waters
- New table summarizing macronutrients and micronutrients
- New discussion about the controversy surrounding the American Heart Association's suggestion and the *Dietary Guidelines*' recommendation to reduce sodium
- New Quick Bite feature "Processed Foods and Salt"

Spotlight on Metabolism and Energy Balance

- Updated section on portion size based on recent studies
- Revised FYI feature "What's Neat About NEAT?" that expands on sedentary behavior in the workplace
- New Quick Bite feature "Is Tom Brady Too Fat?"

Chapter 9—Nutrition for Physical Performance

- Incorporates new suggestions for eating and drinking before, during, and after exercise
- Expanded discussion of dehydration, including ways to check your hydration status
- New consideration of energy availability
- New section describing how vitamin D may support athletic performance
- New section on the vegetarian athlete
- New table presenting the Physical Activity Guidelines for Americans
- New table summarizing the American College of Sports Medicine's position on the amount and type of fluid to consume before, during, and after activity
- New table presenting a summary of generalized carbohydrate intake by athletes
- Added clarification regarding the distinction between lactic acid and lactate
- New FYI feature "When Are Sports Drinks Recommended?"

- New Position Statement from the Academy of Nutrition and Dietetics on nutrition and athletic performance
- New Quick Bite feature "Alligator Water?"

Spotlight on Eating Disorders

- Reflects the diagnostic criteria presented in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V)*
- Incorporates current theories of causes of eating disorders
- Added background on binge-eating disorder
- New section on the prevalence of eating disorders
- New section elaborating on the consequences of eating disorders
- New FYI features "Exploring the Connection Between Negative Affect and Eating Disorders" and "Night-Eating Syndrome: Not an Eating Disorder, But Sometimes a Concern"
- New Quick Bite features "Body Dysmorphic Disorder," "A Matter of Degree," "Estimates for Prevalence of Binge-Eating Disorder May Soon Rise," and "Changing the Perception of Exercise to Help Combat an Eating Disorder"

Chapter 10—Diet and Health

- New section on the link between diet and cardiometabolic disease, including a table outlining the top five dietary factors associated with cardiometabolic deaths
- Enhanced description of personalized nutrition
- Updated section on the possible link between diet and cancer, including a new table summarizing dietary components and cancer risk

Spotlight on Obesity and Weight Management

- Updated statistics about obesity and overweight rates in the United States
- Expanded discussion of the role of social networks in obesity
- New section on smartphone-based interventions
- New section on weight-loss devices
- Revised FYI feature "Childhood and Teenage Obesity" that includes a discussion of taxes on sugary beverages
- New Position Statement from the Academy of Nutrition and Dietetics on interventions for the treatment of overweight and obesity in adults
- New Quick Bite feature "Dangerous Caloric Restriction"

Chapter 11—Life Cycle: Maternal and Infant Nutrition

- New FYI feature "New Guidelines for Introducing Peanut Products"
- New Quick Bite feature "Would It Be Healthier to Menstruate Less Often?"

Chapter 12—Life Cycle: From Childhood Through Adulthood

- New FYI features "Farmers' Markets" and "School Vending Machines and the Teen Diet"
- Updated American Heart Association recommendations for fiber consumption
- Updated figures showing MyPlate meal and snack patterns for preschoolers and the modified MyPlate for older adults

Spotlight on World Nutrition: The Faces of Global Malnutrition

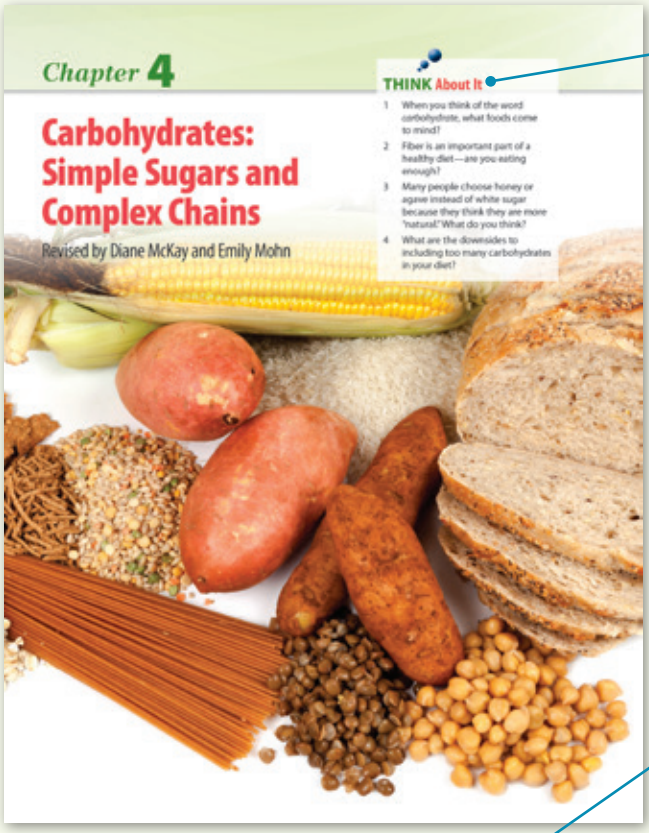
- Updated statistics regarding world hunger, homelessness in the United States, and malnutrition in the United States
- Updated U.S. poverty guidelines
- Expanded description of food deserts
- New Quick Bite features "Is There a Food Desert Near You?" and "To Breastfeed or Not?"

Chapter 13—Food Safety and Technology: Microbial Threats and Genetic Engineering

- Expanded coverage of natural toxins and food allergies
- Expanded coverage of the benefits and risks of genetic engineering
- New Quick Bite features "Flesh-Eating Bacteria?" and "Is It Stomach Flu or Food Poisoning?"

The Pedagogy

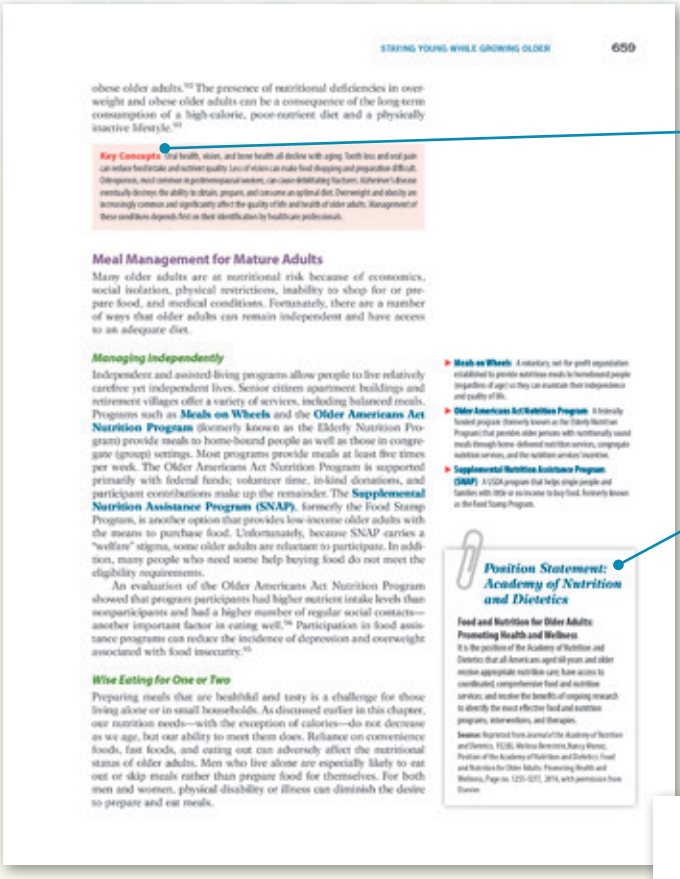
Discovering Nutrition focuses on teaching behavioral change, personal decision making, and up-to-date scientific concepts in a number of novel ways. This interactive approach addresses different learning styles, making it the ideal text to ensure mastery of key concepts. Beginning with Chapter 1, the material engages students in considering their own behavior in light of the knowledge they are gaining. The pedagogical aids that appear in most chapters include the following:



The **Think About It** questions at the beginning of each chapter present realistic nutrition-related situations and ask students to consider how they would behave in such circumstances.

The **Chapter Menu** at the beginning of each chapter gives students a preview of topics that will be covered.

Learning Objectives focus students on the key concepts of each chapter and the material they will learn.



STAYING YOUNG WHILE GROWING OLDER 659

obese older adults.[92] The presence of nutritional deficiencies in overweight and obese older adults can be a consequence of the long-term consumption of a high-calorie, poor-nutrient diet and a physically inactive lifestyle.[93]

Key Concepts Oral health, vision, and bone health all decline with aging. Tooth loss and oral pain can reduce food intake and nutrient quality. Loss of vision can make food shopping and preparation difficult. Osteoporosis, most common in postmenopausal women, can cause debilitating fractures. Alzheimer's disease eventually destroys the ability to obtain, prepare, and consume an optimal diet. Overweight and obesity are increasingly common and significantly affect the quality of life and health of older adults. Management of these conditions depends first on their identification by health care professionals.

Meal Management for Mature Adults

Many older adults are at nutritional risk because of economics, social isolation, physical restrictions, inability to shop for or prepare food, and medical conditions. Fortunately, there are a number of ways that older adults can remain independent and have access to an adequate diet.

Managing Independently

Independent and assisted-living programs allow people to live relatively carefree yet independent lives. Senior citizen apartment buildings and retirement villages offer a variety of services, including balanced meals. Programs such as **Meals on Wheels** and the **Older Americans Act Nutrition Program** (formerly known as the Elderly Nutrition Program) provide meals to home-bound people as well as those in congregate (group) settings. Most programs provide meals at least five times per week. The Older Americans Act Nutrition Program is supported primarily with federal funds; volunteer time, in-kind donations, and participant contributions make up the remainder. The **Supplemental Nutrition Assistance Program (SNAP)**, formerly the Food Stamp Program, is another option that provides low-income older adults with the means to purchase food. Unfortunately, because SNAP carries a "welfare" stigma, some older adults are reluctant to participate. In addition, many people who need some help buying food do not meet the eligibility requirements.

An evaluation of the Older Americans Act Nutrition Program showed that program participants had higher nutrient intake levels than nonparticipants and had a higher number of regular social contacts—another important factor in eating well.[94] Participation in food assistance programs can reduce the incidence of depression and overweight associated with food insecurity.[95]

Wise Eating for One or Two

Preparing meals that are healthful and tasty is a challenge for those living alone or in small households. As discussed earlier in this chapter, our nutrition needs—with the exception of calories—do not decrease as we age, but our ability to meet them does. Reliance on convenience foods, fast foods, and eating out can adversely affect the nutritional status of older adults. Men who live alone are especially likely to eat out or skip meals rather than prepare food for themselves. For both men and women, physical disability or illness can diminish the desire to prepare and eat meals.

- **Meals on Wheels** A voluntary, not-for-profit organization established to provide nutritious meals to homebound people (regardless of age) so they can maintain their independence and quality of life.
- **Older Americans Act Nutrition Program** A federally funded program (formerly known as the Elderly Nutrition Program) that provides older persons with nutritionally sound meals through home-delivered nutrition services, congregate nutrition services, and the nutrition services incentive.
- **Supplemental Nutrition Assistance Program (SNAP)** A USDA program that helps single people and families with little or no income to buy food. Formerly known as the Food Stamp Program.

***Position Statement:* Academy of Nutrition and Dietetics**

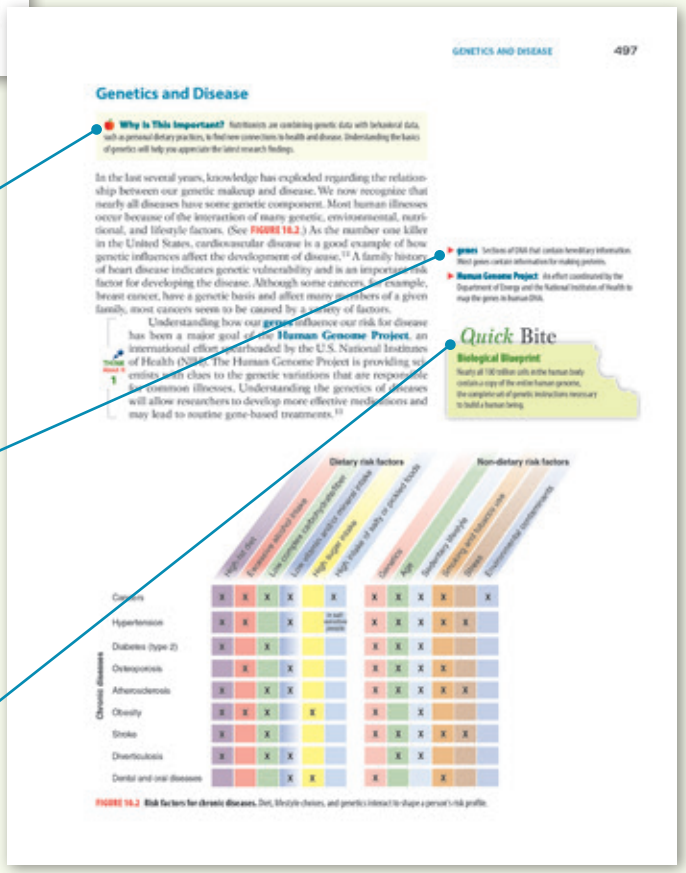
Food and Nutrition for Older Adults: Promoting Health and Wellness

It is the position of the Academy of Nutrition and Dietetics that all Americans aged 65 years and older receive appropriate nutrition care; have access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies.

Source: Reprinted from Journal of the Academy of Nutrition and Dietetics, 113(8), Melissa Bernstein, Nancy Munoz, Position of the Academy of Nutrition and Dietetics: Food and Nutrition for Older Adults: Promoting Health and Wellness, Page no. 1255-1277, 2014, with permission from Elsevier.

Key Concepts summarize previous text and highlight important information.

Position Statements from distinguished organizations such as the Academy of Nutrition and Dietetics, the American College of Sports Medicine, and the American Heart Association relate to the chapter topics and bolster the assertions made by the authors by showcasing concurrent opinions held by some of the leading organizations in nutrition and health.



GENETICS AND DISEASE 497

Genetics and Disease

Why Is This Important? Nutritionists are combining genetic data with behavioral data, such as personal dietary practices, to find new connections to health and disease. Understanding the basics of genetics will help you appreciate the latest research findings.

In the last several years, knowledge has exploded regarding the relationship between our genetic makeup and disease. We now recognize that nearly all diseases have some genetic component. Most human illnesses occur because of the interaction of many genetic, environmental, nutritional, and lifestyle factors. (See FIGURE 10.2.) As the number one killer in the United States, cardiovascular disease is a good example of how genetic influences affect the development of disease.[1] A family history of heart disease indicates genetic vulnerability and is an important risk factor for developing the disease. Although some cancers, for example, breast cancer, have a genetic basis and affect many members of a given family, most cancers seem to be caused by a variety of factors.

Understanding how our **genes** influence our risk for disease has been a major goal of the **Human Genome Project**, an international effort spearheaded by the U.S. National Institutes of Health (NIH). The Human Genome Project is providing researchers with clues to the genetic variations that are responsible for numerous illnesses. Understanding the genetics of diseases will allow researchers to develop more effective medications and may lead to routine gene-based treatments.[2]

- **genes** Sections of DNA that contain hereditary information. Most genes contain information for making proteins.
- **Human Genome Project** An effort coordinated by the Department of Energy and the National Institutes of Health to map the genes in human DNA.

Quick Bite

Biological Blueprint

Nearly all 100 trillion cells in the human body contain a copy of the entire human genome, the complete set of genetic instructions necessary to build a human being.

FIGURE 10.2 **Risk factors for chronic diseases.** Diet, lifestyle choices, and genetics interact to shape a person's risk profile.

New to this edition, **Why Is This Important?** provides students with a brief overview of the practical importance and value of the information they're learning.

Key Terms are in boldface type the first time they are mentioned. Their definitions also appear in the margins near the relevant textual discussion, making it easy for students to review material.

Quick Bites sprinkled throughout the text offer fun facts about nutrition-related topics such as unique foods, social customs, origins of phrases, folk remedies, medical history, and so on.

CARBOHYDRATES IN THE BODY 117

FYI For Your Information

Is the Glycemic Index a Useful Tool for Constructing a Healthy Diet with Carbohydrates?

The glycemic index is a valuable tool and easy-to-use concept that may be important for individuals with diabetes to help fine tune their blood glucose control.* Several popular weight-loss diets use the glycemic index to guide food choices.

How Is the Glycemic Index Measured?

The glycemic index compares the change in blood glucose after eating a sample food to the change expected from eating an equal amount of available carbohydrate from a standard food, such as white bread or from pure glucose. Therefore, the glycemic index is expressed as a percentage, ranging from 1–100, with 100 being the standard food.*

Foods with a high glycemic index trigger a sharp rise in blood glucose, followed by a dramatic fall, often to levels that are below normal. This explains why these foods could be undesirable for a person with diabetes. In contrast, low-glycemic-index foods trigger slower and more modest changes in blood glucose levels, thereby making blood glucose easier to manage. However, the effects of high or low glycemic index foods on people without diabetes are questionable, especially when eating a mixed diet.

What Factors Affect the Glycemic Index of a Food or Meal?

The glycemic index of a food is not always easy to predict. Would you expect a sweet food such as ice cream to have a high glycemic index? Ice cream actually has a low glycemic value because its fat slows sugar absorption. On the other hand, wouldn't you expect complex carbohydrates such as bread or potatoes to have a low glycemic index? In fact, the starch in white bread and cooked potatoes is readily absorbed, so each has a high value.* The glycemic indices of some common foods are listed in TABLE A, and lower-glycemic-index substitutions are provided in TABLE B.

The type of carbohydrate, the cooking process, and the presence of fat, dietary fiber, and other food components in a meal or snack all affect the glycemic response.[36] In a person's diet, it is the glycemic index of mixed meals, referred to as the glycemic load, that is more important than the effect of individual foods on blood glucose.* Specifically, the glycemic load takes into account the amount of carbohydrate consumed. Glycemic load is calculated by multiplying the glycemic index of a food by the amount of carbohydrate in a serving. Because the glycemic index is a percentage, the resulting value is divided by 100. High-glycemic-index foods do not necessarily have high glycemic loads if there is a relatively small amount of carbohydrate in one serving. For example, watermelon has a high glycemic index (72), but it mostly consists of water, and there is only a small amount of carbohydrate per serving.

Why Do Some Researchers Believe the Glycemic Index Is Useful?

Health benefits of following a low-glycemic-index diet can be significant. Diets that emphasize low-glycemic-index foods decrease the risk of developing type 2 diabetes and improve blood glucose control in people who are already afflicted.[37] Epidemiological studies suggest that such diets also reduce the risk of colon and other cancers and may help reduce the risk of heart disease.[38] Diets with a low glycemic load are associated with favorable blood lipid profiles.* Also, studies indicate that the effectiveness of low-fat, high-carbohydrate diets for weight loss can be improved by reducing the glycemic load.[39]

TABLE A
Glycemic Index of Some Foods Compared to Pure Glucose*

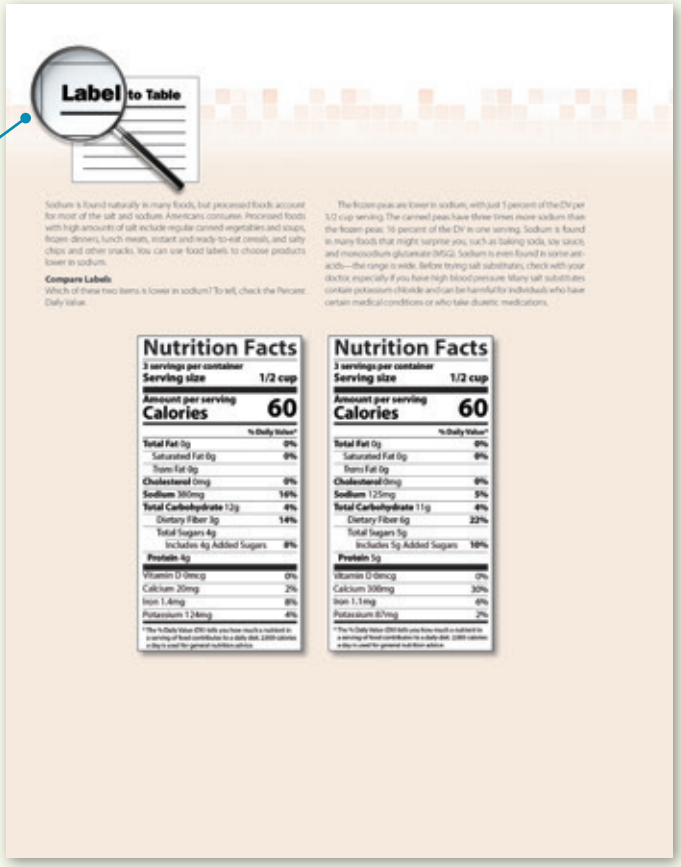
Food	Glycemic Index	Food	Glycemic Index
Bakery Products		**Fruits**	
Vanilla cake	42 ± 4	Apples	39 ± 3
Doughnut	75 ± 7	Watermelon	72 ± 33
Bread/Breakfast Foods		Dates	42 ± 4
Bagel	69	**Legumes**	
Wheat and rye bread	48	Baked beans	40 ± 3
Pita bread	68 ± 5	Black-eyed peas	38
All-Bran*	44 ± 6	Pinto beans	33
Froot Loops*	69 ± 9	**Pasta**	
Porridge	55 ± 2	Lasagna	53
Cereal Grains		Spaghetti	49 ± 5
Couscous	65 ± 7	**Vegetables**	
Sweet corn	52 ± 5	Pumpkin	64
Japonica short-grain brown rice	62 ± 5	Carrots	39 ± 4
Instant white rice	87 ± 2	Baked potato	86 ± 6
Dairy Foods		**Candy**	
Ice cream	37	Marshmallow	62 ± 6
Full-fat milk	41 ± 2	M&M'S®, peanut	33 ± 3

*Glycemic response to pure glucose is 100.
Data from Atkinson FS, Foster-Powell K, Brand-Miller. International Tables of Glycemic Index Values: 2008. 2008 Diab Care; 31(12).

Why Do Some Researchers Believe the Glycemic Index Is Useless?

Whether a person is diabetic trying to control blood glucose levels, attempting weight loss, or reducing risk for heart disease, there is no "best way" to improve your diet. Some researchers question the usefulness of conclusions drawn primarily from epidemiological studies, given that these studies can show an association but cannot prove the cause. Additionally, results on the effectiveness of low-glycemic index/load diets on health outcomes have been mixed.[40,41]

FYI (For Your Information) offers more in-depth discussions of controversial and timely topics, such as claims about the effects of sugar, the protein needs of athletes, and the usefulness of the glycemic index.



Label to Table

Sodium is found naturally in many foods, but processed foods account for most of the salt and sodium Americans consume. Processed foods with high amounts of salt include regular canned vegetables and soups, frozen dinners, lunch meats, instant and ready-to-eat cereals, and salty chips and other snacks. You can use food labels to choose products lower in sodium.

Compare Labels

Which of these two items is lower in sodium? To tell, check the Percent Daily Value.

The frozen peas are lower in sodium, with just 5 percent of the DV per 1/2 cup serving. The canned peas have three times more sodium than the frozen peas; 16 percent of the DV is one serving. Sodium is found in many foods that might surprise you, such as baking soda, soy sauce, and monosodium glutamate (MSG). Sodium is even found in some antacids—the range is wide. Before trying salt substitutes, check with your doctor, especially if you have high blood pressure. Many salt substitutes contain potassium chloride and can be harmful for individuals who have certain medical conditions or who take diuretic medications.

Nutrition Facts

3 servings per container
Serving size 1/2 cup

Amount per serving
Calories 60

% Daily Value*

Total Fat 0g 0%
Saturated Fat 0g 0%
Trans Fat 0g
Cholesterol 0mg 0%
Sodium 380mg 16%
Total Carbohydrate 12g 4%
Dietary Fiber 3g 14%
Total Sugars 4g
Includes 4g Added Sugars 8%
Protein 4g
Vitamin D 0mcg 0%
Calcium 20mg 2%
Iron 1.4mg 8%
Potassium 124mg 4%

Nutrition Facts

3 servings per container
Serving size 1/2 cup

Amount per serving
Calories 60

% Daily Value*

Total Fat 0g 0%
Saturated Fat 0g 0%
Trans Fat 0g
Cholesterol 0mg 0%
Sodium 125mg 5%
Total Carbohydrate 11g 4%
Dietary Fiber 6g 22%
Total Sugars 5g
Includes 5g Added Sugars 10%
Protein 5g
Vitamin D 0mcg 0%
Calcium 300mg 30%
Iron 1.1mg 6%
Potassium 87mg 2%

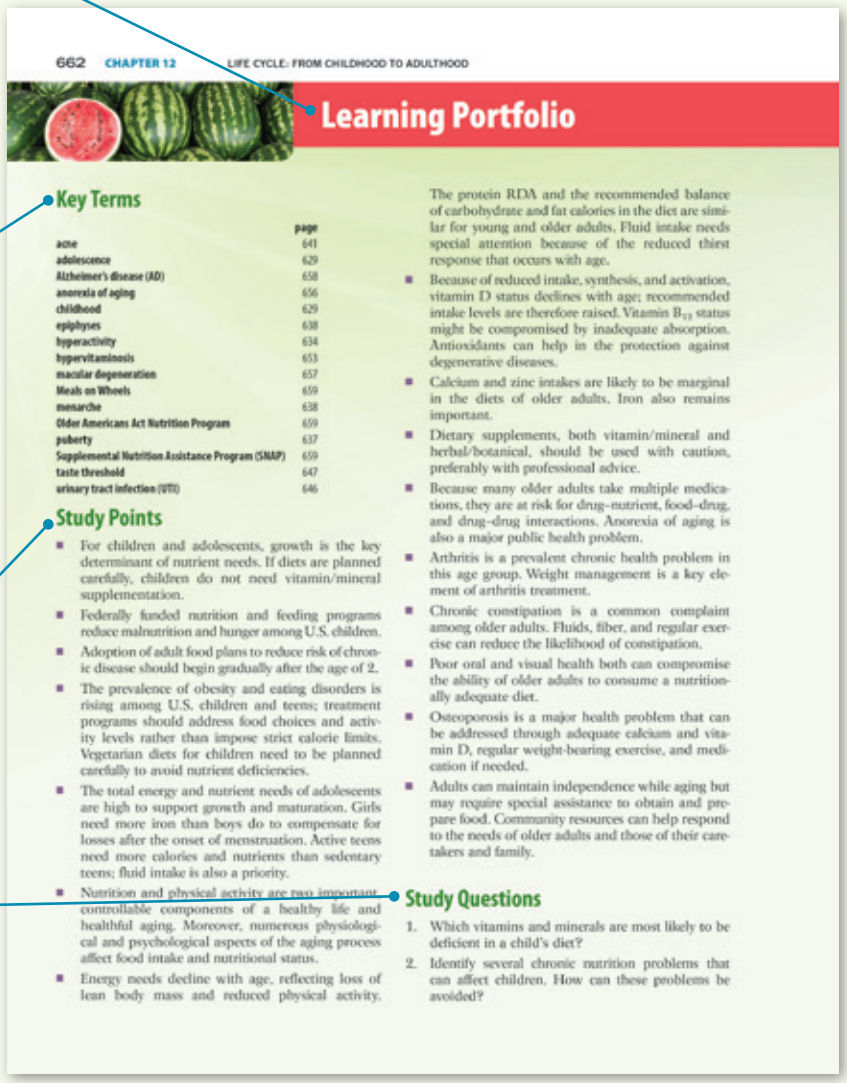
Label to Table helps students apply their new decision-making skills at the supermarket. It walks students through the various types of information that appear on food labels, including government-mandated terminology, misleading advertising phrases, and amounts of ingredients. This feature has been updated for this edition to reflect the new labeling guidelines released by the FDA in May 2016.

The **Learning Portfolio** at the end of each chapter condenses all aspects of nutrition information that students need to solidify their understanding of the material. The various formats will appeal to students according to their individual learning and studying styles.

Key Terms list all new vocabulary alphabetically with the page number of the first appearance. This arrangement allows students to review any term they do not recall and turn immediately to the definition and discussion of it in the chapter. This approach also promotes the acquisition of knowledge, not simply memorization.

Study Points summarize the content of each chapter with a synopsis of each major topic. The points are in the order in which they appear in the chapter, so related concepts flow together.

Study Questions encourage students to probe deeper into the chapter content, making connections and gaining new insights. Although these questions can be used for pop quizzes, they will also help students to review, especially students who study by writing out material.



662 CHAPTER 12 LIFE CYCLE: FROM CHILDHOOD TO ADULTHOOD

Learning Portfolio

Key Terms

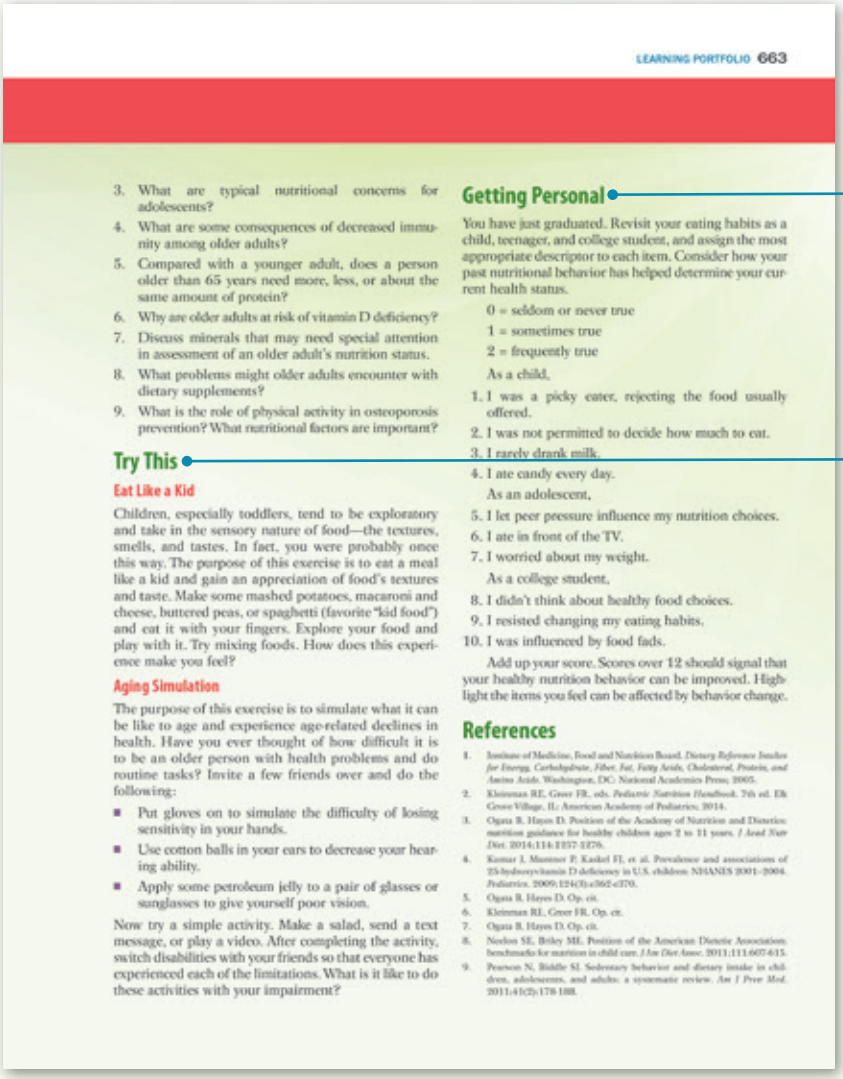
	page
acne	641
adolescence	629
Alzheimer's disease (AD)	658
anorexia of aging	656
childhood	629
epiphyses	638
hyperactivity	634
hypervitaminosis	653
macular degeneration	657
Meals on Wheels	659
menarche	638
Older Americans Act Nutrition Program	659
puberty	637
Supplemental Nutrition Assistance Program (SNAP)	659
taste threshold	647
urinary tract infection (UTI)	646

Study Points

- For children and adolescents, growth is the key determinant of nutrient needs. If diets are planned carefully, children do not need vitamin/mineral supplementation.
- Federally funded nutrition and feeding programs reduce malnutrition and hunger among U.S. children.
- Adoption of adult food plans to reduce risk of chronic disease should begin gradually after the age of 2.
- The prevalence of obesity and eating disorders is rising among U.S. children and teens; treatment programs should address food choices and activity levels rather than impose strict calorie limits. Vegetarian diets for children need to be planned carefully to avoid nutrient deficiencies.
- The total energy and nutrient needs of adolescents are high to support growth and maturation. Girls need more iron than boys do to compensate for losses after the onset of menstruation. Active teens need more calories and nutrients than sedentary teens; fluid intake is also a priority.
- Nutrition and physical activity are two important controllable components of a healthy life and healthful aging. Moreover, numerous physiological and psychological aspects of the aging process affect food intake and nutritional status.
- Energy needs decline with age, reflecting loss of lean body mass and reduced physical activity. The protein RDA and the recommended balance of carbohydrate and fat calories in the diet are similar for young and older adults. Fluid intake needs special attention because of the reduced thirst response that occurs with age.
- Because of reduced intake, synthesis, and activation, vitamin D status declines with age; recommended intake levels are therefore raised. Vitamin B_{12} status might be compromised by inadequate absorption. Antioxidants can help in the protection against degenerative diseases.
- Calcium and zinc intakes are likely to be marginal in the diets of older adults. Iron also remains important.
- Dietary supplements, both vitamin/mineral and herbal/botanical, should be used with caution, preferably with professional advice.
- Because many older adults take multiple medications, they are at risk for drug–nutrient, food–drug, and drug–drug interactions. Anorexia of aging is also a major public health problem.
- Arthritis is a prevalent chronic health problem in this age group. Weight management is a key element of arthritis treatment.
- Chronic constipation is a common complaint among older adults. Fluids, fiber, and regular exercise can reduce the likelihood of constipation.
- Poor oral and visual health both can compromise the ability of older adults to consume a nutritionally adequate diet.
- Osteoporosis is a major health problem that can be addressed through adequate calcium and vitamin D, regular weight-bearing exercise, and medication if needed.
- Adults can maintain independence while aging but may require special assistance to obtain and prepare food. Community resources can help respond to the needs of older adults and those of their caretakers and family.

Study Questions

1. Which vitamins and minerals are most likely to be deficient in a child's diet?
2. Identify several chronic nutrition problems that can affect children. How can these problems be avoided?



LEARNING PORTFOLIO 663

3. What are typical nutritional concerns for adolescents?
4. What are some consequences of decreased immunity among older adults?
5. Compared with a younger adult, does a person older than 65 years need more, less, or about the same amount of protein?
6. Why are older adults at risk of vitamin D deficiency?
7. Discuss minerals that may need special attention in assessment of an older adult's nutrition status.
8. What problems might older adults encounter with dietary supplements?
9. What is the role of physical activity in osteoporosis prevention? What nutritional factors are important?

Try This

Eat Like a Kid

Children, especially toddlers, tend to be exploratory and take in the sensory nature of food—the textures, smells, and tastes. In fact, you were probably once this way. The purpose of this exercise is to eat a meal like a kid and gain an appreciation of food's textures and taste. Make some mashed potatoes, macaroni and cheese, buttered peas, or spaghetti (favorite "kid food") and eat it with your fingers. Explore your food and play with it. Try mixing foods. How does this experience make you feel?

Aging Simulation

The purpose of this exercise is to simulate what it can be like to age and experience age-related declines in health. Have you ever thought of how difficult it is to be an older person with health problems and do routine tasks? Invite a few friends over and do the following:

- Put gloves on to simulate the difficulty of losing sensitivity in your hands.
- Use cotton balls in your ears to decrease your hearing ability.
- Apply some petroleum jelly to a pair of glasses or sunglasses to give yourself poor vision.

Now try a simple activity. Make a salad, send a text message, or play a video. After completing the activity, switch disabilities with your friends so that everyone has experienced each of the limitations. What is it like to do these activities with your impairment?

Getting Personal

You have just graduated. Revisit your eating habits as a child, teenager, and college student, and assign the most appropriate descriptor to each item. Consider how your past nutritional behavior has helped determine your current health status.

0 = seldom or never true
1 = sometimes true
2 = frequently true

As a child,

1. I was a picky eater, rejecting the food usually offered.
2. I was not permitted to decide how much to eat.
3. I rarely drank milk.
4. I ate candy every day.

As an adolescent,

5. I let peer peessure influence my nutrition choices.
6. I ate in front of the TV.
7. I worried about my weight.

As a college student,

8. I didn't think about healthy food choices.
9. I resisted changing my eating habits.
10. I was influenced by food fads.

Add up your score. Scores over 12 should signal that your healthy nutrition behavior can be improved. Highlight the items you feel can be affected by behavior change.

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Getting Personal encourages students to consider their newly gained knowledge in the context of their own diets.

Try This activities provide suggestions for hands-on activities that encourage students to put theory into practice. It will especially help students whose major learning style is experimental.

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- Sample Syllabus, showing how a course can be structured around this text
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In addition, *Discovering Nutrition* is available in a variety of eBook formats, including as a Navigate 2 Advantage eBook containing 36 scientifically based animations that give students an accurate, accessible explanation of the major scientific concepts and physiological principles presented in this text.

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Chapter 1

Food Choices: Nutrients and Nourishment

Revised by Kimberley McMahon

THINK About It

1. What, if anything, might persuade or influence you to change your food preferences?
2. Are there some foods you definitely avoid? If so, do you know why?
3. How do you define nutrients?
4. How do you determine if the nutrition information you read is accurate?

CHAPTER Menu

LEARNING Objectives

1. Define nutrition.
2. List factors that influence food choices.
3. Describe the standard American diet.
4. List the six classes of nutrients essential for health.
5. Outline the basic steps in the nutrition research process.
6. Recognize credible scientific research and reliable sources of nutrition information.

Consider these scenarios. A group of friends goes out for pizza every Thursday night. A young man greets his girlfriend with a box of chocolates. A 5-year-old shakes salt on her meal after watching her parents do this. A man says hot dogs are his favorite food because they remind him of going to baseball games with his father. A parent punishes a misbehaving child by withholding dessert. What do all of these people have in common? They are all using food for something other than its nutrient value. Can you think of a holiday that is not celebrated with food? For most of us, food is more than a collection of nutrients. Many factors affect what we choose to eat. Many of the foods people choose are nourishing and contribute to good health. The same, of course, may be true of the foods we reject.

The science of **nutrition** helps us improve our food choices by identifying the amounts of nutrients we need, the best food sources of those nutrients, and the other components in foods that may be helpful or harmful. The U.S. National Library of Medicine defines nutrition as the science of food; the nutrients and other substances therein; their action, interaction, and balance in relation to health and disease; and the processes by which we ingest, absorb, transport, utilize, and excrete food substances.[1] Learning about nutrition will help us to be informed and more likely to make good nutrition choices, which in turn may not only improve our health, but also reduce our risk of some diseases and may even help us to live longer. Keep in mind, though, that no matter how much you know about nutrition, you are still likely to choose some foods regardless of the nutrients they provide, simply for their taste or just because it makes you feel good to eat them.

▶ **nutrition** The science of foods and their components (nutrients and other substances), including the relationships to health and disease (actions, interactions, and balances); processes within the body (ingestion, digestion, absorption, transport, functions, and disposal of end products); and the social, economic, cultural, and psychological implications of eating.

Why Do We Eat the Way We Do?

Why Is This Important? Many different factors play a role in determining why we choose to eat certain foods and avoid others. Understanding the influence of these factors can shape the way we eat and help us make more healthful food choices.

Do you "eat to live" or "live to eat"? For all of us, the first is certainly true—you must eat to live. But there may be times when our enjoyment of food is more important to us than the nourishment we get from it. We use food to project a desired image, forge relationships, express friendship, show creativity, and disclose our feelings. We cope with anxiety or stress by eating or not eating; we reward ourselves with food for a good grade or a job well done; or, in extreme cases, we punish failures by denying ourselves the benefit and comfort of eating. Factors such as age, gender, genetic makeup, occupation, lifestyle, family, and cultural background can all affect our daily and habitual food choices. In this book we refer to these daily and habitual food choices as a person's "diet." Unless otherwise indicated, the term *diet* is not used to describe a regimen of eating and drinking for the purpose of weight loss, such as "dieting to lose weight," but rather the term *diet* will refer to daily and habitual food choices that a person makes.

Personal Preferences

What we eat reveals much about who we are. Food preferences begin early in life and then change as we interact with parents, friends, and peers. Further experiences with different people, places, and situations often cause us to expand or change our preferences. Taste and other sensory factors such as texture are some of the most important things that influence our food choices; cost and convenience are important, too.[2]

THINK About It 1

Age is another factor in food choices. Consider taste preferences and how they might be influenced even before birth. Science shows that, when compared to adults, children naturally prefer higher levels of sweet and salty tastes and reject bitter tastes.[3] This might help explain why children are drawn to more unhealthy food choices. In support of this idea, studies have found that sensory experiences, beginning early in life, can shape preferences in both a positive and a negative way. For example, an expecting mother who consumes a diet rich in healthy foods can help develop her child's taste preferences in a positive way because flavors from foods that the mother eats are transmitted to amniotic fluid and to mother's milk, creating an environment in which breastfed infants are more accepting of these flavors.[4] In contrast, infants fed formula learn to prefer its unique flavor profile and may have more difficulty initially accepting flavors not found in formula, such as those of fruit and vegetables.[5] Having healthy food experiences early in life may go a long way toward promoting healthy eating throughout a person's life span.

Although young children prefer sweet or familiar foods, babies and toddlers are generally willing to try new things. (See **FIGURE 1.1**.) Experimental evidence suggests that when children are repeatedly exposed to a variety of foods, they are more likely to accept those foods, thus adding more variety to their diet and eating more healthfully. This result is even stronger for children whose willingness to try new foods is encouraged by their caregivers.[6]

Preschoolers typically go through a period of food **neophobia**, a dislike for anything new or unfamiliar. School-age children tend to accept a wider array of foods, and teenagers are strongly influenced by the preferences and habits of their peers. If you track the kinds of foods you have eaten in the past year, you might be surprised to discover how few basic foods your diet includes. By the time we reach adulthood,

FIGURE 1.1 Adventures in eating. Babies and toddlers are willing to try new things, generally after repeat exposure.

▶ **neophobia** A dislike for anything new or unfamiliar.

we have formed a core group of foods we prefer. Of this group, only about 100 basic items account for 75 percent of our food intake.

Like many aspects of human behavior, food choices are influenced by many interrelated factors. Generally, hunger and satiety (the feeling of being full) dictate when we eat, but what we choose to eat is not always determined by physiological or nutritional needs. When we consider that our food preferences are also dictated by factors such as sensory properties of foods (taste, smell, and texture), emotional and cognitive factors (habits, comfort/discomfort foods, food advertising and promotion, eating away from home, etc.), and environmental factors (economics, lifestyle, food availability, culture, religion, and socioeconomics), we can better understand why we choose to eat the foods that we do. (See **FIGURE 1.2**.)

THINK About It 2

Sensory Influence
Taste
Smell
Texture

Environmental Factors
Economic
Lifestyle
Food availability
Culture
Religion
Geographic location
Environment

Social, Emotional, and Cognitive Factors
Habits
Food likes and dislikes
Knowledge and attitudes related to diet and health
Personal values
Comfort/discomfort foods
Food marketing, advertising, and promotion
Food and diet trends

FIGURE 1.2 Factors that affect food choices. We often select a food to eat automatically without thought. But in fact, our choices are complex events involving the interactions of a multitude of factors.

Sensory Influences: Taste, Smell, and Texture

In making food choices, what appeals to our senses also contributes to our personal preferences. People often refer to **flavor** as a collective experience that describes both taste and smell. Texture also plays a part. You may prefer foods that have a crisp, chewy, or smooth texture. You may reject foods that feel grainy, slimy, or rubbery. Other sensory characteristics that affect food choice are color, moisture, and temperature.

We are familiar with the classic four tastes—sweet, sour, bitter, and salty—but do you know that there are more? One of these additional taste sensations is **umami**. Umami is a Japanese term used to describe the taste produced by glutamate.[7] It is the brothy, meaty, savory flavor in foods such as meat, seafood, and vegetables. A seasoning commonly added to Chinese food, canned vegetables, soups, and processed meats, called monosodium glutamate (MSG), enhances this umami flavor. Despite many people identifying themselves as being sensitive to MSG, the Food and Drug Administration (FDA) considers that adding MSG to foods is "generally recognized as safe." People who claim sensitivity report symptoms such as headache, flushing, sweating, and nausea; however, studies have not been able to consistently trigger these reactions.[8]

Quick Bite

Try it Again, You Just Might Like It

Studies have found that children between the ages of 2 and 6 years commonly dislike things that are new or unfamiliar. This is also the age when kids are most likely to reject vegetables. Kids have a better chance to overcome this tendency if they are repeatedly exposed to the food they initially reject—somewhere between 5 and 15 exposures should do it.

- **flavor** The collective experience that describes both taste and smell.
- **umami [ooh-MA-mee]** A Japanese term that describes a delicious meaty or savory sensation. Chemically, this taste detects the presence of glutamate.

Emotional and Cognitive Influences

Habits

Your eating and cooking habits likely reflect what you learned from your parents. We typically learn to eat three meals a day, at about the same times each day. Quite often we eat the same foods, particularly for breakfast (e.g., cereal and milk) and lunch (e.g., sandwiches). This routine makes life convenient, and we don't have to think much about when or what to eat. But we don't have to follow this routine. How would you feel about eating mashed potatoes for breakfast and cereal for dinner? Some people might get a stomach-ache just thinking about

FIGURE 1.3 Comfort foods. Depending on your childhood food experiences, a bowl of traditional soup, a remembered sweet, or a mug of hot chocolate can provide comfort in times of stress.

it, whereas others may enjoy the prospect of doing things differently. Look at your eating habits and see how often you make the same choices every single day.

Comfort/Discomfort Foods

Our desire for particular foods often is based on behavioral motives, even though we may not be aware of them. For some people, food becomes an emotional security blanket. Consuming our favorite foods can make us feel better, relieve stress, and allay anxiety. (See **FIGURE 1.3**.) Starting with the first days of life, food and affection are intertwined. Breastfed infants, for example, experience physical, emotional, and psychological satisfaction when nursing. As we grow older, this experience is continually reinforced. For example, chicken soup and hot tea with honey may be favorites when we feel ill because someone had prepared those foods for us when we were not feeling well. If we were rewarded for good behavior with a particular food (e.g., ice cream, candy, cookies), our positive feelings about that food may persist for a lifetime.

In contrast, at some point you may have gotten sick soon after eating a certain food, and you still avoid that food.

Food Advertising and Promotion

Aggressive and sometimes deceptive advertising can influence a person's food-buying decisions; therefore, it may not surprise you that some of the most popular food purchases are high-fat and high-sugar baked goods and alcoholic beverages. According to the Federal Trade Commission (FTC), businesses spend $9.6 billion annually marketing food and beverages, both on television and online. More than $1.79 billion specifically targets children and adolescents, promoting items such as sugared breakfast cereals, fast food, and soft drinks.[9] Exposure to food advertising increases the preference and purchase of the advertised foods, particularly by overweight or obese adults and children.[10]

Food and beverage advertising greatly influences children's eating behavior. Children and teens see about 12–16 TV advertisements per day for products generally high in saturated fat, sugar, and/or sodium.[11] One study suggests that advertising changes the way children consider the importance of taste when making food choices: after watching food commercials, children rely less on health values for their food choices, and instead place significantly more importance on taste.[12] In another study, children consumed 14% more high-sugar breakfast cereal for every 10 advertisements seen for that kind of cereal.[13]

Although the majority of food advertisements are for less healthy foods, positive food advertising also exists. We are seeing more innovative advertising that promotes locally grown, hormone- and pesticide-free foods, plus whole grains, nuts, berries, vegetarian foods, and other nutrient-dense products.

Eating Meals Prepared Outside the Home

In recent years there has been a general shift away from domestic cooking and toward the use of pre-prepared and ultra-processed foods. There has also been an upsurge in time and money devoted to dining out. In all, Americans spend almost half of their food budget on foods prepared away from home, however, they also underestimate the amount of calories and fat in these foods, which is likely contributing to increasing weight and obesity.[14] This trend has promoted an increased interest in

information on calories, fat, sodium, and other nutrients on menus. When calories are present on menus, people order foods with fewer calories compared to those ordering from menus without calories identified, and parents order foods with fewer calories for their children.[15] The Food and Drug Administration (FDA) has implemented guidelines in which nutrition labeling in chain restaurants and similar food establishments will provide consumers with clear and consistent nutrition information in a direct and accessible manner.

FIGURE 1.4 Food and Diet Trends. Online grocery shopping and delivery are becoming popular across the United States.
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Food and Diet Trends

The popularity of different diets can influence changes in food product consumption. Beginning in the late 1980s, low-fat diets became popular and were accompanied by an explosion of reduced-fat, low-fat, and fat-free products. When the low-carbohydrate diet became popular, there was a rise in low-carb and no-carb products. Diet and health-related products also compete for consumer dollars. For example, sales of gluten-free products in the United States continue to rise due to the increased diagnosis of celiac disease and the unproven belief that eliminating gluten, a protein found in wheat and related grains such as barley and rye, from the diet will treat other conditions as well. Some notable food trends of the last decade include organic foods, locally grown and prepared foods, fermented foods that contain live cultures, and "craft foods" that hail from a particular locale and claim to have unique tastes. Other trends relate more to our behaviors than particular foods, but they ultimately affect our food purchases; they include snacking throughout the day, using online grocery shopping and delivery services, using apps to calculate the exact nutritional content of meals, and shopping at supermarkets converted into socializing spaces. (See **FIGURE 1.4**.)

FIGURE 1.5 Social facilitation. Interactions with others can affect your eating behaviors.
© Fuse/Thinkstock.

Social Factors

Social factors exert a powerful influence on food choice. Food is often at the center of family gatherings, social events, and office parties. Perhaps even more influential, though, are the messages from peers about what to eat or how to eat.

As **FIGURE 1.5** illustrates, eating is a social event that brings together people for a variety of purposes (e.g., religious or cultural celebrations, business meetings, family dinners). Social pressures, however, also can restrict our food intake and selection. We might, for example, order nonmeat dishes when dining with a group of vegetarian friends.

FIGURE 1.6 Where do you get your nutrition information? We are constantly bombarded by food messages. Which sources do you find most influential? Are they also the most reliable?
© Jones & Bartlett Learning. Photographed by Sarah Cebulski.

Knowledge of Health and Nutrition

Many people select and emphasize certain foods they think are "good for them." (See **FIGURE 1.6**.) Consumer health beliefs, perceptions of disease susceptibility, and desires to take action to prevent or delay disease onset can have powerful influences

on diet and food choices. For example, people who feel vulnerable to disease and believe that dietary change might lead to positive results are more likely to pay attention to information about links among dietary choices, dietary fat, and health risks. A desire to lose weight or alter one's physical appearance also can be a powerful force shaping decisions to accept or reject particular foods. Furthermore, consumers are placing a higher priority on foods for health and seeking foods with more protein, less sugar, and minimal processing.[16]

How nutrition information is delivered to consumers may also play a role in food choices. One study that compared the type of nutrition information provided, education levels, and obesity predominance in three different countries (France, Canada, and the United States) supported the idea that a "scientific" or nutrient-based approach to food might not result in the most beneficial food choices, indicating that in these instances consumers lose sight of the big picture. It has been suggested that nutrition education that focuses on overall results, or how current nutrition decisions will effect overall health, may lead to better overall food choices.[17]

Key Concepts Many factors influence our decisions about what to eat and when to eat. Some of the main factors include personal preferences such as taste, texture, and smell; our habits with eating; the emotional connections of comfort or discomfort that are linked to certain foods; advertisements and promotions; whether we choose to eat our meals at home or away from home; and knowledge of health and nutrition. The cultural environment in which people live also has a major influence on what foods they choose to eat.

Environment

Your environment—where you live, how you live, whom you live with—has a lot to do with what you choose to eat. People around us influence our food choices, and we generally prefer the foods we grew up eating. Environmental factors that influence our food choices include economics, food availability, culture, and religion. In the United States, our environment and the choices we make play a significant role in the current obesity epidemic. We live in what has been termed an **obesogenic environment**; in other words, an environment that promotes gaining weight and one that is not conducive to weight loss within the home or workplace.[18]

▶ **obesogenic environment** Circumstances in which a person lives, works, and plays in a way that promotes the overconsumption of calories and discourages physical activity and calorie expenditure.

Economics

Where you live not only influences which foods are most accessible to you, but also affects food costs, which are a major determinant of food choice. You may have "lobster taste" but a "hot dog budget." The types of foods purchased and the percentage of income used for food are affected by total income. Households spend more money on food when incomes rise. In 2014, middle income families spent an average of $5,992 on food, representing about 13 percent of income, whereas the lowest income households spent an average of $3,667 on food, representing 34 percent of income.[19] Rising food prices and falling incomes put pressure on food budgets. How much does it cost to follow dietary recommendations? For adults on a 2,000-calorie diet, the cost of meeting the *2015–2020 Dietary Guidelines for Americans* recommendations for fruit and vegetable consumption is $2.00 to $2.50 per day, according to an analysis by the U.S. Department of Agriculture (USDA).[20]

Food Availability

Poor access to healthy, nutritious foods can negatively affect food choices, and therefore health and well-being. Approximately 23.5 million Americans, including 6.5 million children, live in nutritional wastelands commonly referred to as **food deserts**.[21] Food deserts are low-income areas where residents lack access to a supermarket or large grocery store to buy affordable fruits, vegetables, whole grains, low-fat milk, and other foods that make up the full range of a healthy diet.[22]

Not only do many people who live in food deserts lack the ability to get fresh, healthy, and affordable foods easily, but they often rely on "quick markets" that offer a lot of highly processed, high-sugar, and high-fat foods. Their communities often lack healthy food providers, such as grocery stores and farmers' markets. In these neighborhoods, food needs typically are served by inexpensive restaurants and convenience stores, which offer few fresh foods.

Cultural Influences

One of the strongest influences on food preferences is tradition or cultural background. In all societies, no matter how simple or complex, eating is the primary way of initiating and maintaining human relationships.

To a large extent, culture defines our attitudes. "One man's food is another man's poison." Look at **FIGURE 1.7**. How does the photo make you feel? Insects, maggots, and entrails are delicacies to some, whereas just the thought of ingesting them is enough to make others cringe. Cultural forces are so powerful that if you were permitted only a single question to establish someone's food preferences, a good choice would be "What is your ethnic background?" (See the FYI feature "Food and Culture.")

Knowledge, beliefs, customs, and habits all are defining elements of human culture. Although genetic characteristics tie people of ethnic groups together, culture is a learned behavior and, consequently, can be modified through education, experience, and social and political trends.[24]

In many cultures, food has symbolic meanings related to family traditions, social status, and even health. In fact, many folk remedies rely on food. Some of these have gained wide acceptance, such as the use of spices and herbal teas for purposes ranging from allaying anxiety to preventing cancer and heart disease. Just as cultural distinctions eventually blur when ethnic groups take part in the larger American culture, so do many of the unique expectations about the ability of certain foods to prevent disease, restore health among those with various afflictions, or enhance longevity. However, food habits may be among the last practices to change when an immigrant adapts to a new culture.

Religion

Food is an important part of religious rites, symbols, and customs. Some religious rules apply to everyday eating, whereas others are concerned with special celebrations. Christianity, Judaism, Hinduism, Buddhism, and Islam, for example, all have distinct dietary laws, but within each religion different interpretations of these laws give rise to variations in dietary practices.

Social-Ecological Model

The social-ecological model included in the *2015–2020 Dietary Guidelines for Americans* is designed to illustrate how individual factors, environmental settings, various sectors of influence, and social and

▶ **food deserts** Low income areas where it is difficult to purchase food that is fresh, of good-quality, and affordable.

Quick Bite

Bad Food Habits Are Hard to Break

Bad habits like eating while watching TV, eating in the car, skipping breakfast, or eating too quickly are easy to develop and hard to break. But being aware of your behavior can help you take some steps toward positive change. For example, if you are guilty of eating too quickly, slow down, relax, chew your food, and enjoy the taste of what you are eating. It takes about 20 minutes for your stomach to tell your brain that it is full. If you wait to stop eating until you actually feel full, you have already overeaten!

FIGURE 1.7 Cultural influences. If you were visiting China, would you sample the local delicacy—deep-fried scorpion?

Quick Bite

Nerve Poison for Dinner?

The puffer fish is a delicacy in Japan. Danger is part of its appeal; eating a puffer fish can be life threatening! The puffer fish contains a poison called tetrodotoxin (TTX), which blocks the transmission of nerve signals and can lead to death. Chefs who prepare the puffer fish must have special training and licenses to prepare the fish properly, so diners feel nothing more than a slight numbing feeling.