Food Literacy: How Do Communications and Marketing Impact Consumer Knowledge, Skills, and Behavior? Workshop Summary

DETAILS

160 pages | 6 x 9 | PAPERBACK
ISBN 978-0-309-39131-3 | DOI: 10.17226/21897

AUTHORS

Leslie Pray, Rapporteur; Food Forum; Food and Nutrition Board; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine

FOOD LITERACY

How Do Communications and Marketing Impact Consumer Knowledge, Skills, and Behavior?

WORKSHOP SUMMARY

Leslie Pray, *Rapporteur*

Food Forum

Food and Nutrition Board

Health and Medicine Division

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, DC
www.nap.edu

THE NATIONAL ACADEMIES PRESS 500 Fifth Street, NW Washington, DC 20001

This activity was supported by contracts between the National Academy of Sciences and the National Institutes of Health (HHSN26300002); the U.S. Department of Agriculture (59-1235-2-114, AG-3A94-P-14-0116, CNPP-IOM-FY-2014-01, and FS_NAS_IOM_FY2014_01); and the U.S. Food and Drug Administration (HHSP233201400020B/HHSP23337012), with additional support by Abbott Laboratories, Incorporated; Cargill, Inc.; The Coca-Cola Company; ConAgra Foods, Inc.; Dr Pepper Snapple Group; General Mills, Inc.; Kellogg Company; Kraft Heinz; Mars, Inc.; Monsanto; Nestlé Nutrition; Ocean Spray Cranberries, Inc.; PepsiCo; and Tate & Lyle. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project.

International Standard Book Number-13: 978-0-309-39131-3
International Standard Book Number-10: 0-309-39131-8
Digital Object Identifier: 10.17226/21897

Additional copies of this report are available for sale from the National Academies Press, 500 Fifth Street, NW, Keck 360, Washington, DC 20001; (800) 624-6242 or (202) 334-3313; http://www.nap.edu.

Printed in the United States of America

Cover credit: Design by Casey Weeks.

Suggested citation: National Academies of Sciences, Engineering, and Medicine. 2016. *Food literacy: How do communications and marketing impact consumer knowledge, skills, and behavior?: Workshop summary.* Washington, DC: The National Academies Press. doi: 10.17226/21897.

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

The **National Academy of Sciences** was established in 1863 by an Act of Congress, signed by President Lincoln, as a private, nongovernmental institution to advise the nation on issues related to science and technology. Members are elected by their peers for outstanding contributions to research. Dr. Ralph J. Cicerone is president.

The **National Academy of Engineering** was established in 1964 under the charter of the National Academy of Sciences to bring the practices of engineering to advising the nation. Members are elected by their peers for extraordinary contributions to engineering. Dr. C. D. Mote, Jr., is president.

The **National Academy of Medicine** (formerly the Institute of Medicine) was established in 1970 under the charter of the National Academy of Sciences to advise the nation on medical and health issues. Members are elected by their peers for distinguished contributions to medicine and health. Dr. Victor J. Dzau is president.

The three Academies work together as the **National Academies of Sciences, Engineering, and Medicine** to provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and inform public policy decisions. The Academies also encourage education and research, recognize outstanding contributions to knowledge, and increase public understanding in matters of science, engineering, and medicine.

Learn more about the National Academies of Sciences, Engineering, and Medicine at **www.national-academies.org**.

PLANNING COMMITTEE FOR A WORKSHOP ON FOOD LITERACY: HOW DO COMMUNICATIONS AND MARKETING IMPACT CONSUMER KNOWLEDGE AND BEHAVIOR?[1]

Sarah Roller (*Chair*), Partner, Kelley Drye & Warren, LLP, Washington, DC
Fergus Clydesdale, Distinguished Professor and Director of the Food Science Policy Alliance, Department of Food Science, University of Massachusetts at Amherst
Sonya Grier, Associate Professor, Department of Marketing, Kogod School of Business, American University, Washington, DC
Linda Harris, Team Leader, Health Communication and eHealth Team, Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services, Rockville, Maryland
Kristen Harrison, Professor, Department of Communication Studies, Director, Media Psychology Program at the Research Center for Group Dynamics, Institute for Social Research, University of Michigan, Ann Arbor
Wendy L. Johnson-Askew, Director, Public Policy, Nestlé Nutrition, Florham Park, New Jersey
Jason Riis, Visiting Assistant Professor of Marketing, The Wharton School, University of Pennsylvania, Philadelphia

[1] The National Academies of Sciences, Engineering, and Medicine's planning committees are solely responsible for organizing the workshop, identifying topics, and choosing speakers. The responsibility for the published workshop summary rests with the workshop rapporteur and the institution.

FOOD FORUM[1]

SYLVIA ROWE (*Chair*), President, SR Strategy, LLC, Washington, DC
NELSON ALMEIDA, Kellogg Company, Battle Creek, Michigan
MARK ANDON, ConAgra Foods Inc., Omaha, Nebraska
DAVID J. BAER, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland
FRANCIS (FRANK) BUSTA, University of Minnesota, St. Paul
PAUL M. COATES, Office of Dietary Supplements, National Institutes of Health, Bethesda, Maryland
DAVID B. COCKRAM, Abbott Laboratories, Columbus, Ohio
DAVID GOLDMAN, Food Safety and Inspection Service, U.S. Department of Agriculture, Washington, DC
DANIEL A. GOLDSTEIN, Monsanto, St. Louis, Missouri
DANIELLE GREENBURG, PepsiCo, Purchase, New York
SONYA A. GRIER, American University, Washington, DC
BRENDA HALBROOK, Food and Nutrition Service, U.S. Department of Agriculture, Alexandria, Virginia
KATE J. HOUSTON, Cargill Incorporated, Washington, DC
STEPHEN P. JAMES, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, Maryland
LEE-ANN JAYKUS, North Carolina State University, Raleigh
GORDON L. JENSEN, Pennsylvania State University, University Park
HELEN H. JENSEN, Iowa State University, Ames
RENÉE S. JOHNSON, Library of Congress, Washington, DC
WENDY L. JOHNSON-ASKEW, Nestlé Nutrition, Florham Park, New Jersey
CHRISTINA KHOO, Ocean Spray Cranberries, Inc., Lakeville, Massachusetts
SUSAN TAYLOR MAYNE, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, College Park, Maryland
S. SUZANNE NIELSEN, Purdue University, West Lafayette, Indiana
ERIK D. OLSON, Natural Resources Defense Council, Washington, DC
RICHARD OLSON, Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services, Rockville, Maryland
LUCY REID, The Coca-Cola Company, Atlanta, Georgia
CLAUDIA RIEDT, Dr Pepper Snapple Group, Plano, Texas
STEVEN W. RIZK, Mars, Inc., McLean, Virginia

[1] The National Academies of Sciences, Engineering, and Medicine's forums and roundtables do not issue, review, or approve individual documents. The responsibility for the published workshop summary rests with the workshop rapporteur and the institution.

SARAH ROLLER, Kelley Drye & Warren LLP, Washington, DC
SHARON A. ROSS, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
KARI HECKER RYAN, Kraft Foods, Glenview, Illinois
PAMELA STARKE-REED, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland
ANGELA M. TAGTOW, Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, Alexandria, Virginia
MAHA TAHIRI, General Mills, Inc., Minneapolis, Minnesota
PATRICIA WILLIAMSON, Tate & Lyle, Hoffman Estates, Illinois

Forum Staff

HEATHER DEL VALLE COOK, Co-Director
LESLIE J. SIM, Co-Director
ANNA BURY, Research Assistant
GERALDINE KENNEDO, Administrative Assistant
ANN YAKTINE, Director, Food and Nutrition Board

Reviewers

This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published workshop summary as sound as possible and to ensure that the workshop summary meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the process. We wish to thank the following individuals for their review of this workshop summary:

Renée S. Johnson, Library of Congress
S. Suzanne Nielsen, Purdue University
Sarah Roller, Kelley Drye & Warren, LLP
Patricia Williamson, Tate & Lyle

Although the reviewers listed above provided many constructive comments and suggestions, they did not see the final draft of this workshop summary before its release. The review of this workshop summary was overseen by **Caswell A. Evans, Jr.,** University of Illinois at Chicago. He was responsible for making certain that an independent examination of this workshop summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this workshop summary rests entirely with the rapporteur and the institution.

Contents

Introduction[1]

On September 3–4, 2015, the National Academies of Sciences, Engineering, and Medicine's Food and Nutrition Board convened a workshop in Washington, DC, to discuss how communications and marketing impact consumer knowledge, skills, and behavior around food, nutrition, and healthy eating. The workshop was divided into three sessions, each with specific goals that were developed by the planning committee:

- Session 1 described the current state of the science concerning the role of consumer education, health communications and marketing, commercial brand marketing, health literacy, and other forms of communication in affecting consumer knowledge, skills, and behavior with respect to food safety, nutrition, and other health matters.
- Session 2 explored how scientific information is communicated, including the credibility of the source and of the communicator, the clarity and usability of the information, misconceptions/misinformation, and the impact of scientific communication on policy makers and the role of policy as a macro-level channel of communication.

[1] The planning committee's role was limited to planning the workshop, and the workshop summary has been prepared by the workshop rapporteur as a factual summary of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and participants and are not necessarily endorsed or verified by the National Academies of Sciences, Engineering, and Medicine, and they should not be construed as reflecting any group consensus.

- Session 3 explored the current state of the science concerning how food literacy can be strengthened through communication tools and strategies.

The statement of task for the workshop is provided in Box I-1. The organization of this summary parallels that of the workshop itself. Chapter 1 summarizes the presentations and discussion that took place during Session 1, which addressed food literacy and the role of communications relating to food safety, nutrition, and other health matters. Chapter 2 summarizes the presentations and discussion that occurred during Session 2, which explored food literacy and communications conveying scientific information concerning food safety, nutrition, or other health matters—opportunities and challenges. Chapter 3 summarizes the Session 3 presentations and discussion on promoting food literacy: communication tools and strategies. Finally, Chapter 4 summarizes the concluding session, which included discussion of next steps in food literacy. Each chapter begins with an overview of key points made during the respective session. Appendix A presents the workshop agenda; Appendix B provides a list of acronyms and abbreviations used; and Appendix C contains biosketches of the workshop speakers.

BOX I-1
Workshop Statement of Task

An ad hoc committee will plan and conduct a 2-day public workshop that will explore the current state of knowledge regarding the role of communications and marketing on consumer knowledge and behavior, specifically related to how commercial and public health messaging concerning food, nutrition, and food safety inform, influence, and impact the population at the individual, family, and community levels regarding food choices and behavior. The workshop agenda will include presentations and discussion that will address scientific credibility, the role of scientific communications in consumer knowledge and behavior related to food and nutrition, and the impact of marketing on consumer decision making.

The committee will develop the workshop agenda, select and invite speakers and discussants, and moderate the discussions. After the workshop, a brief workshop summary and full workshop summary of the event will be prepared by a designated rapporteur in accordance with institutional guidelines.

1

Session 1: Food Literacy and the Role of Communications Relating to Food Safety, Nutrition, and Other Health Matters

> "Food is so much more than a plate of nutrients. . . . When it's done right, food is well-being."
>
> —Sonya Grier

The goal of the first session of the workshop, moderated by Sarah Roller of Kelley Drye, planning committee chair and member of the the National Academies of Sciences, Engineering, and Medicine's Food Forum, was to describe the current state of the science concerning the role of consumer education, health communications and marketing, commercial brand marketing, health literacy, and other forms of communication in affecting consumer knowledge and behavior with respect to food safety, nutrition, and other health matters.

Food is so much more than a plate of nutrients, Sonya Grier, American University, stated in her opening presentation. Rather, she suggested, it is love; it is nurturance; it is comfort; it is a gift. "When it's done right, food is well-being," she said. Grier set the conceptual stage for the remainder of the workshop by arguing that food literacy should be considered within the broader context of food well-being. Decision making related to food is complex, she noted. Many different factors drive people's choices—not just knowledge about nutrition, but also how one has been socialized around food (e.g., whether one grew up eating dinner at the table or going out for fast food), how food is marketed (which influences attitudes and behaviors), whether and which foods are available (e.g., the proximity of grocery stores), and policies concerning food (e.g., how many fast food restaurants are allowed in one's neighborhood). In Grier's opinion, gaining a better understanding of how people behave with respect to food will require examining all these factors and how they interact. The notion of food well-being resonated with many other speakers.

Building on Grier's talk and drawing on lessons learned from the field

of health literacy, Cynthia Baur, Centers for Disease Control and Prevention (CDC), explained that food literacy is not only knowledge about food and eating but also a range of skills related to what people understand about and do with the information being communicated. Baur described how decisions about food are not always made rationally or logically; rather, they may happen "unconsciously in a very emotional way." A goal of food literacy, she suggested, should be to bridge the gap between what experts know and want to communicate and what consumers know and want. But Baur emphasized that communication does not happen by pushing messages at people. It happens, she suggested, when people—the audience or receivers, in communication terms—understand and make meaning from those messages. Closing the communication gap requires starting with the audience, or consumer; thinking about the consumer's perspective, experience, and needs; and finding solutions that help the consumer, rather than serving the communicators' organizational or other needs. These steps are supported by communication and health literacy research, Bauer noted.

FOOD LITERACY AS A PATH TO FOOD WELL-BEING[1]

In discussing food literacy in the broader context of food well-being, Grier spoke about (1) the nature of the challenge being addressed at the workshop, (2) the concept of food well-being as the end goal, (3) the origin and dimensions of the food well-being model, including food literacy as one dimension of food well-being, and (4) the interaction of the different dimensions of food well-being.

The Nature of the Challenge

The complexity of the challenge addressed at the workshop stems from the many different consumer education, scientific communication, and social and commercial marketing factors affecting not just what consumers know about food, Grier explained, but also how they act on that information. "We are talking about a very large and variant terrain," she said.

Compounding the challenge is what Grier referred to as "the food paradox." People are increasingly food-centered, with an entire industry having grown around food television programming and celebrity chefs and with the rising popularity of a wide range of eating styles (e.g., veganism, paleo diets, gluten-free foods). Additionally, there has been a growing focus on the relationship of food to health and a shift in ideology so that many people think of food as medicine. Yet at the same time, Grier observed, Americans are spending less time planning meals, preparing food, and eat-

[1] This section summarizes information presented by Dr. Grier.

ing together. Therefore, she said, while becoming more interested in food, people are actually becoming more disconnected from it.

Another paradox, Grier observed, is that the population has become increasingly obese even as people have become increasingly obsessed about fat, calories, and body mass index (BMI). For example, people eat entire boxes of fat-free cookies while counting calories. At a global level, obesity and related diseases coexist with hunger and food insecurity. Again, this paradox, or disconnect, points to "a lack of a healthy relationship with food," Grier said. She emphasized the importance of understanding this unhealthy relationship.

The Concept of Food Well-Being

The concept of food well-being originated at a conference on Transformative Consumer Research, where Grier co-chaired a session on food and health. The session involved a diverse group of 12 international consumer researchers with varied approaches (which included experimentalists, cultural theorists, qualitative researchers, behavioral decision theorists, information processing researchers, and modelers) plus an epidemiologist, who was considered an "out-of-field" researcher. The researchers spent 2 days brainstorming on the state of knowledge in the topic area, Grier reported, highlighting theories, identifying research gaps, and beginning collaboration on a paper based on their deliberations (Block et al., 2011). The out-of-field researcher was epidemiologist Shiriki Kumanyika. Her statement that "No one sits down to eat a plate of nutrients" guided the remainder of the conference, Grier recalled, and led to the emergence of the concept of food well-being: that food provides not only physical but also emotional and psychological nourishment. Grier noted the many rituals associated with food and how eating is "something you do with your family."

Shifting the paradigm from the notion that food equals health to this notion that food equals well-being appears to be a small shift, but it is one with many implications, Grier explained. Instead of being focused on the functions and medicinal properties of foods, food well-being calls for thinking about how food fits into people's broader lifestyles. As opposed to a paternalistic view that entails telling people that a food is good or bad, Grier said, food well-being calls for thinking about people's goals and what they want to get from foods. Rather than restraint and restriction, for example—instead of saying, "Don't eat this" or "Don't eat too much of that"—food well-being takes a more positive approach. It involves thinking about how consumers view foods as pleasurable and as an important part of their lives, Grier explained. The focus is not on calories and weight but on how food is embedded in and contributes to people's lives.

For marketers, Grier noted, food well-being requires thinking about

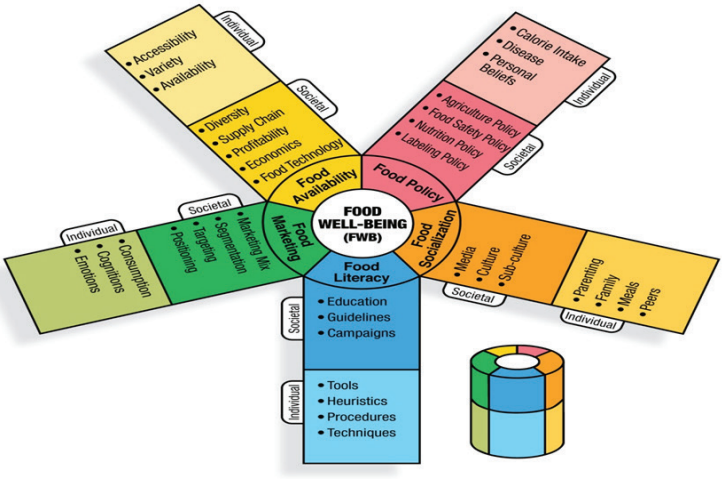

FIGURE 1-1 The food well-being model and its five dimensions.
SOURCE: Presented by Sonya Grier on September 3, 2015. Republished with permission of The Division, from Block et al., 2011, *Journal of Public Policy and Marketing*; permission conveyed through Copyright Clearance Center, Inc.

the consumer's relationship with food and how a positive relationship with food is essential to well-being. Additionally, she suggested, food well-being implies a richer definition of food—one that connects multiple ways of thinking about food. For example, although the slow food movement[2] and food insecurity may appear to be distantly related concepts, Grier asserted that thinking about food as well-being provides an expanded conceptual framework for connecting such different food-related phenomena and practices.

The Food Well-Being Model

Grier explained that the food well-being model has five core dimensions: (1) food socialization, (2) food marketing, (3) food availability, (4) food policy, and (5) food literacy (see Figure 1-1) (Block et al., 2011). These

[2] Slow Food is a grassroots organization founded in Italy in the 1980s that has since spread worldwide. The movement promotes an alternative to fast food through the preservation of traditional and regional cuisine and encourages farming of plants, seeds, and livestock characteristic of the local ecosystem (www.slowfood.com). It was the first established component of the broader slow movement that advocates a cultural shift toward slowing down the pace of life.

five dimensions work together to describe and define a person's relationship with food, she said. She discussed each in turn.

Food Socialization

Food socialization includes the processes by which people learn about food, Grier explained. It begins early, within one's family, either implicitly (e.g., parents modeling cooking or eating behaviors such as eating large amounts of candy) or explicitly (e.g., parents telling children that they should not eat too much candy). In addition to the information that is thus passed along, family-level food socialization exerts a normative pressure that helps determine how a person will think about and relate to food in the future, Grier said.

Although these early family-level processes may be the most significant type of food socialization, there are others as well, Grier continued. Consumers live within societal structures, including ethnic rituals, media, and marketing. Grier stressed the importance of considering the interplay between how children are socialized within families and how these broader societal structures provide information and influence behavior.

Food Marketing

Grier described food marketing as the strategic use of product, price, and promotion (i.e., the "marketing mix" minus place) to influence consumer attitudes and behaviors concerning foods. Marketing has an important influence on what people eat, she stated. She explained that people make consumption decisions within an emotional context, often with little cognitive effort or awareness, such that something as simple as a picture on a box of food can influence how much of that food a person eats. She emphasized the need to consider how other factors, not just cognition, are at play in consumers' decisions, and the emotional properties of food influence what people actually eat. "You have to think about people's pleasure from food," she said.

Food marketing influences consumer behavior not just at the individual level but also at the aggregate or societal, level, Grier noted. She pointed to all the meta-messages that consumers receive, or do not receive, from multiple types of ads about certain food products. While consumers see many energy-dense products being advertised, for example, they normally do not see fruits and vegetables being advertised. The aggregate effect of the products being marketed, the types of information provided, and the prices being charged have a major influence on the way people think about those products, Grier asserted. Based on her own research on marketing targeted to particular groups, she observed that these aggregate-level marketing mes-

sages can actually contribute to health disparities by giving different groups of people different types of information. While marketing contributes to the problem, however, she suggested that it can also contribute to the solution. She believes that both commercial marketing practices and social marketing (i.e., the use of traditional commercial marketing practices to achieve social goals) can support food well-being.

Food Availability

Food availability, a third core dimension of food well-being, is separated out from food marketing, Grier explained, because it is so important in terms of people's access to food. People constantly face multiple decisions as to where they are going to obtain their food (e.g., from the farmers' market versus different types of grocery stores). There are many different food sources, Grier noted, which vary with respect to prices, convenience, and, sometimes, food quality. Additionally, she said, consumers must select among available food options that vary in processing, taste, and healthfulness.

As with the other dimensions of food well-being, Grier explained, food availability has both individual and societal components. The built environment determines access to healthy foods not just for individuals but for entire neighborhoods. Grier pointed to the many food "deserts" or "swamps" where people have no or limited access to healthy foods. She noted that these neighborhood-level differences in accessibility can have a strong influence on consumers' ability to achieve well-being in their relationship with food. She observed that, in addition to these neighborhood-level influences, the economic environment influences food availability as well.

Food Policy

The fourth core dimension of food well-being includes policies related to agriculture or food production, food pricing, food safety, and food labeling, all of which have a major impact on whether consumers can achieve food well-being, Grier stated. At the individual level, she explained, policies can impact food well-being by allowing consumers to make informed decisions and give them peace of mind in their choices. At the societal level, policies such as dietary guidelines can contribute not only to food well-being but also to environmental sustainability or, as Grier described it, "societal food well-being."

Food Literacy

Grier remarked how ample research has shown that knowledge about food and nutrition can improve the quality of consumption choices. "But we also know that knowledge alone is not enough," she said. She emphasized the importance of motivation, ability, and opportunity to apply that knowledge when making food choices. Considering this broader context, she defined food literacy as "understanding nutrition information and acting on it in a way that is consistent with nutrition goals and with food well-being."

At the individual level, food literacy has three main components, Grier explained. First is conceptual knowledge, which is the acquisition and comprehension of food-related information (e.g., learning how to prepare food, learning which foods contribute to certain types of outcomes). Most past thinking about food literacy has focused on such conceptual knowledge, Grier suggested. The second main component of individual-level food literacy, she continued, is procedural knowledge. That is, what does one do with ingredients? How does one prepare a meal? How does one cook a particular dish? People learn "scripts" for how to cook foods or how to behave when in a fast food versus a sit-down restaurant, for example, and learning these scripts contributes to the way they understand food. Motivation to participate is the third main component of individual-level food literacy. Grier referred to remarks she had made at the outset of her presentation with respect to people being interested in food but not being motivated enough to do what is necessary to apply their conceptual or procedural knowledge (e.g., being interested enough to buy something but not motivated enough to make it themselves). She noted that many different levels of motivation and barriers come into play in different food-related contexts that prevent consumers from applying their knowledge.

With respect to societal-level food literacy, Grier emphasized that guidelines, campaigns, and educational initiatives serve an important role in informing people about how to incorporate food into their lives. She explained that the food well-being model involves reframing these approaches so they are focused not only on food as health but also on what food means to the target consumer.

Interaction of the Dimensions of Food Well-Being

"Food literacy does not exist alone," Grier said. Rather, all five core dimensions of food well-being intersect. For example, she said, consider two children, one who grows up in a family that cooks together and eats meals at the dinner table every night, and another whose family goes out every night and buys fast food. These different socialization processes, Grier

explained, lead to different levels of food literacy. They also may affect how children respond to food marketing, as well as how different policies and guidelines influence their choices and behaviors. Grier emphasized the comprehensive understanding that derives from considering the intersection of the dimensions of food well-being.

Grier speculated how some of her own past research might have yielded more comprehensive results if she had considered these different dimensions and their intersection. She mentioned a 2003 ad for McDonald's with the message, "When will she have her first french fry?" The ad, she recalled, triggered her interest in fast food norms. When she entered the field, most researchers were focused on fast food marketing to children. But she wondered whether marketing to parents might influence children indirectly by socializing them with regard to what is appropriate.

In a cross-sectional study of eight U.S. Health Resources and Services Administration (HRSA) health centers in medically underserved communities, Grier and colleagues (2007) looked at how marketing strategies, product, price, promotion, and access influence parental attitudes and social norms around fast food consumption and how those attitudes and norms, in turn, influence the amount of fast food parents feed their children. The researchers interviewed caregivers of children aged 2 to 12 years and collected the children's height and weight measurements (for BMI calculations). They found that increased exposure to fast food promotion was associated with parents' beliefs that eating fast food is normal, and that this social norm ("all my friends feed their kids fast food") led to their children's more frequent consumption of fast food. Additionally, they found that, compared with white and Asian parents, black and Hispanic parents reported greater exposure to fast food promotion, greater access to fast food, and higher levels of fast food consumption by their children. Grier suggested that if that study had incorporated a food well-being model—that is, if she and her collaborators had collected information not just on food marketing and availability but also on food literacy (e.g., parents' skill levels in food preparation), socialization (e.g., how permissive parents were with their children), and policy (e.g., related to zoning and fast food prevalence)—they would have presented a much stronger and larger picture of how the people participating in the study related to food and how interventions could be developed to enhance their food well-being.

Implications and Concluding Thoughts

To summarize, Grier reiterated that a food well-being model highlights the importance of understanding what food means to consumers. She noted that the model incorporates a broad range of influences across disciplines to better organize the complexity of the food decisions people make and

the ability of food to contribute to social, psychological, and physical well-being. It embeds food literacy within the broader context of people's relationship with food and highlights the need to consider the interrelationships of the different dimensions of food well-being. Grier expressed hope that a food well-being framework would stimulate new ways of thinking about how consumers' relationships with food can be transformed—through consumers' own choices, marketers' practices, and public health efforts and policy initiatives. "We hope that it will help us move beyond just educating consumers about the nutritional aspects of food," she said, and "to think more critically about the whole plethora of messages that they receive."

A HEALTH LITERACY PERSPECTIVE ON CONSUMERS' FOOD EDUCATION, SKILLS, AND BEHAVIOR[3]

Baur began by suggesting that there are many similarities between the health literacy paradigm and the food well-being model described by Grier, but with differences in terminology.

The Complexity of Health Literacy

Baur posed the question, "What is so confusing or hard to understand about food and nutrition?" She cited several concepts that experts consider when trying to develop messages about food and nutrition, including nutrition quality, dietary intake, food preparation, and healthy eating. She suggested that, although the words "healthy" and "eating," for example, are not particularly difficult concepts by themselves, "healthy eating" is a complex concept open to different points of view or interpretations.

Moreover, Baur explained, health literacy is not just about confusing or complex words; it is also about numbers, as a great deal of health information is heavily laden with numbers that may be difficult or unfamiliar. She showed the audience some numbers and abbreviations from food products in her own kitchen cupboard: "only 5 g of sugar," "serving size 2 oz (56 g—about 1/8 box)," "sodium 0 mg 0%," and "2,000 calorie diet." "I am somebody who spends a lot of time thinking and studying and learning about health information," she said. "To be honest, I am not really sure what I am supposed to do with these pieces of information."

Added to the numeracy challenge, Baur suggested, is that the messages being imparted exist in a complex system. "People are having to make these micro-decisions within the midst of a very complex environment," she said. She asserted that communicators need to be aware of the "full spectrum"

[3] This section summarizes information presented by Dr. Baur.

of what people know and do in relation to food, ranging from being concerned about food safety to balancing eating and physical activity.

Further compounding the challenge of understanding food and nutrition is that food has risks and benefits, Baur observed. Among its risks, food can be contaminated with pathogens, she noted, or places or settings where food is prepared or eaten can potentially expose people to health risks. Additionally, some behaviors can generate additional risks, and certain food choices are associated with risks of poor health. Baur referred to the benefits of food cited by Grier, which include pleasure and enjoyment; good health and nutrition; and the bonding, traditions, and other connections and experiences associated with food. These risks and benefits need to be weighed together, Baur said. Choices about food are not always made on a rational and logical level; they are, she said, "happening unconsciously in a very emotional way."

Lessons from Health Literacy

For Baur, lessons from health literacy can inform the food literacy discussion, helping social scientists understand why people know less than experts expect and would like them to know, why people do not appear to care much about the food-related messages they receive, and why people are not doing what experts recommend that they do. She reminded the workshop audience that the field of food and nutrition is not the only field in which experts are concerned about what people do not know. Experts in such fields as medicine, public health, and dentistry are equally concerned, she observed, and communicators often are dealing with a large gap between what these experts and lay people understand, expect, and want to happen.

Adult Literacy, Numeracy, and Health Literacy Baselines

At an even more basic level, few adults have no literacy skills at all, Baur explained, and most fall somewhere on a spectrum of skills, ranging from very low to somewhat high. In the most recent study of U.S. English-speaking adults, conducted by the U.S. Department of Education in 2012, the average adult literacy score was 270 on a 500-point scale (Goodman et al., 2013). That score is below the international average of the 23 OECD countries that participated in the study. Only 12 percent of the adult U.S. population scored at the highest level of literacy. Based on the results of this survey, at least 18 percent of the adult U.S. population would struggle with average literacy tasks, such as putting two pieces of information together, paraphrasing something, comparing and contrasting, and drawing a very low-level inference. Most of these average literacy tasks are necessary for

doing many of the things Grier had described with respect to food well-being, Baur observed.

Unfortunately, the outlook on numeracy is not even as good as that on literacy, Baur continued. The average numeracy score on the U.S. Department of Education survey was 253 (out of 500), which again was below the international average. Only 9 percent of respondents scored at the highest level of proficiency. Based on the survey results, at least 30 percent of the adult U.S. population would struggle with average numeracy tasks, which relate to explicit or visual math content with few distractors; two-step calculations with whole numbers and common decimals, percents, and fractions; and simple measurements. Again, according to Baur, these are skills necessary for many of the things Grier had discussed as contributing to food well-being.

The only national assessment of health literacy skills that has been conducted in the United States was part of a 2003 U.S. Department of Education study. The results were published in 2006 (Kutner et al., 2006). The assessment was based on a specific set of tasks related to health and health information. Only 12 percent of those surveyed scored at the highest proficiency level; most (53 percent) scored at an intermediate level; and about one-third scored at a basic (22 percent) or below basic (13 percent) level. An example of an everyday health literacy task is figuring out the cost of a health insurance premium from a form; individuals who could do this successfully were scored as proficient. Bauer remarked that having basic or below basic health literacy skills affects a person's ability to find, understand, and use health information.

What Is Health Literacy?

Baur described health literacy as encompassing

- how people get information;
- how they process that information cognitively;
- how they understand that information, or the meaning they make of it; and
- what they decide.

She suggested that behavior change should be considered separately from health literacy because people can have many reasons for following or not following health behavior recommendations.

Health literacy builds on general literacy and numeracy by encompassing cultural and contextual factors; beliefs, experiences, and preferences; and knowledge of the body and how it works, as well as knowledge of science and how it works. With respect to science knowledge, Baur said,

"a lot of the information that we try and relay to the public really relies on an implicit understanding of how science works." Given the data on literacy, numeracy, and health literacy, she questioned the extent of that understanding and how people interpret a statement such as "science supports . . ." and messages about risk. The notion of risk is in almost every message the public receives from health communicators, she observed. But being told that one is "at risk for something" or "at increased risk" invokes potentially conflicting or distracting meanings for people, she noted.

Baur suggested thinking about health literacy from a public health ecological perspective, whereby communication and health literacy are embedded in a complex set of interactions and results. Doing so makes health literacy more difficult to study but better reflects reality, she said, citing the public health ecological model of Maibach and colleagues (2007). In this model, cognition, beliefs, messages, skills, and other individual factors that influence health literacy are part of a larger overall picture that also includes marketing practices, food availability, social norms, and other aggregate-level attributes. Baur noted the complementarity between this model and Grier's food well-being model.

Baur told the workshop audience she dissuades people from thinking that health literacy can be measured by readability formulas because such formulas are too simplistic. She suggested that, although measuring readability may provide some information about the material, the scores are not helpful when one thinks about communication in terms of "meaning making," which is a fundamental principle of communication. Again, she said, although "healthy" and "eating" are familiar terms to most people, combining them into "healthy eating" creates a complex and potentially unfamiliar concept that becomes difficult to communicate because of people's experiences, beliefs, and values.

Baur noted that researchers have reported several different types of outcomes associated with limited health literacy (Berkman et al., 2011). With respect to health outcomes, she said, limited health literacy hinders people's ability to take medications appropriately and interpret labels and health messages, and is associated with lower health status and quality of life and increased mortality, particularly among seniors (Berkman et al., 2011). With respect to outcomes related to health services, limited health literacy has been associated with more frequent hospitalization and rehospitalization, greater use of emergency care, and lower likelihood of influenza immunization. In terms of knowledge and comprehension, Baur observed, limited health literacy has been associated with less knowledge about almost every health topic studied.

Baur reiterated the importance of starting communication "where people are"—with what people know and can do in the moment. She suggested that health communicators need to consider the literacy and numeracy skills of their audience and then adjust recommendations accordingly. The

education sector is an important partner in helping to make those adjustments, she asserted.

Too often communicators focus on the "push side," according to Baur. That is, they have a message they want to deliver, they format it, and then "push" it out. But communication does not happen until the communicator and audience reach a shared understanding about the intended meaning of a message, Baur explained, which means a single exposure to information usually is not enough to achieve understanding. When someone is looking at a fact sheet on www.cdc.gov at 11 PM at night, for example, the communicator is not sitting by that person's side saying, "I did not really mean that. I meant this instead." Verbal communication through dialogue, in contrast, allows people to say, "I don't get it. Could you give me an example? Could you show me what you mean? Could you restate it?" Baur emphasized the dynamic nature of communication—written and oral—and the importance of building opportunities into that process to correct for miscommunication and misunderstanding.

Questions to Consider

Based on her work in health literacy, Baur posed a list of questions for workshop participants to consider with regard to food literacy. First, she asked, what do experts think people should know about food, and do experts from different disciplines agree? Baur noted that many different disciplines were represented at the workshop and cautioned that disagreement and lack of clarity about what experts want people to know have several consequences. Multiple, confusing, and potentially conflicting messages are left to the audience to sort out, she noted. People can end up confused and misinformed, throwing up their hands and relying instead on what they already know and what their friends and others in their networks tell them. Baur cautioned that communicators need to be realistic and understand that people are not going to sit down and study materials for 30 minutes. When they go to the CDC website, for example, if they are not provided with relevant information immediately—information that they find interesting, useful, and understandable—they leave the site. Ultimately, Baur observed, if people do not understand a message, they probably will not follow the recommendation. Often when people appear "irrational" or are labeled "illiterate" because they do not understand, she suggested, it is the communicator who is at fault for not presenting the information clearly.

Next, Baur asked, how well do experts' expectations match people's interest in knowing and capacity to know, and do experts expect people to absorb too much knowledge that is not useful? Communication research shows that people's interest in something directly relates to how much attention they will give a communicator. "Attention is really key," Baur emphasized. "You cannot really deliver a message very effectively if you do

not have people's attention." She mentioned psychologist Steven Pinker's "culture of knowledge" notion—that experts incorrectly believe others know what experts know. When experts' expectations are misaligned with those of their audience, she explained, people may end up receiving too much irrelevant information. They become confused and, again, rely on prior knowledge, may ignore what experts have told them, and run the risk of being labeled "irrational" or "illiterate."

Baur listed several skills-related questions worth considering. What do experts think people need to do to eat a healthy diet? That is, what are the skills that people need to translate knowledge into behavior? Do people already have these skills, or do they need to develop them? If the latter, who is going to develop them, and how? Baur explained that health literacy research has shown that people tend to underestimate the number and complexity of tasks necessary to follow directions or recommendations successfully. She cautioned that scientifically accurate recommendations can be behaviorally unrealistic, with people being exposed to messages encouraging behaviors in which they are unable to engage. When a large mismatch occurs, she said, people again end up being labeled "nonadherent," "noncompliant," and sometimes even "stupid."

Baur noted that the CDC uses a tool, the Clear Communication Index (www.cdc.gov/ccindex), to help develop behaviorally realistic communication materials. Although communication has many other dimensions besides clarity, she said, such as interest and motivation, the focus of the Index is on clarity because the CDC wants to ensure that, as a sender of information, it is transmitting what is at least a clear message. She illustrated the use of the Index with an example from food safety, in which what would otherwise be a bundle of everyday food safety behaviors is broken down into four separate, simple steps (see Figure 1-2). Each step is a single-word action: (1) clean, (2) separate, (3) cook, and (4) chill. Each of these steps depends on a mix of knowledge and skills that people must use in the appropriate sequence to ensure food safety.

From a health literacy perspective, said Baur, several research and practice questions about food literacy relate to individual, organizational, and social/environmental levels of analysis. At the individual level, what do people themselves need to do to cultivate the knowledge and skills necessary for eating in health-promoting ways? At the organizational level, how can organizations that prepare and deliver messages ensure that their messages are clearly expressed, relevant, accurate, and supportive of skill development with respect to eating in health-promoting ways? At the social or environmental level, how can environments be designed so that people can navigate food choices and eat in health-promoting ways?

In conclusion, Baur raised two general research questions about the intersection of food literacy and health literacy. First, how much does health

FIGURE 1-2 An everyday "bundle" of food safety behaviors broken down into four simple actions.
SOURCES: Presented by Cynthia Baur on September 3, 2015; CDC, 2015b.

literacy contribute to food knowledge and skills? Second, how much do food knowledge and skills contribute to overall goals related to food and healthy eating? Baur also offered a "final recommendation and caution": that health literacy insights should be used to highlight audiences' or end users' perspectives, experiences, and needs rather than to justify another traditional education campaign. The goal, she said, should be to illuminate practical solutions that help audiences understand and use information, not solutions that serve organizational needs. "Please don't use health literacy to justify an overly rational or education-heavy solution," she concluded.

DISCUSSION

Following Baur's presentation, Sarah Roller moderated a panel discussion with Grier and Baur. This section summarizes that discussion.

Nutrition Versus Food Safety Messages: Which Are "Easier" to Communicate?

Roller opened the discussion by asking Baur whether there are differences in the communication challenges associated with messages related to nutrition, diet, and health versus messages related to food safety. Specifically, she asked whether it is easier to communicate messages about food safety than those about nutrition, diet, and health. Based on her own involvement with the writing of recall-related information, she observed that such messages are usually fairly simple. Although they may mention

salmonella or listeria, for example, consumers need not know very much about the contaminant to make a decision or take action.

"I don't think any of it is easy," Baur replied, but some food safety messages may have greater clarity. Recalls usually involve discrete, one-time-only actions, she noted, such as, "throw out x" or "return x." With respect to skills, actions, and behaviors, she suggested, telling people they need to do something only once is easier than telling them they need to perform an action, or several actions, multiple times a day or multiple times a week over a lifetime.

Grier added that the way messages are framed—specifically whether they are framed in terms of disease prevention or health promotion—can have an impact on consumer behavior. People are motivated to respond to food safety messages because they do not want to get sick, she noted, whereas messages about eating for health promotion are more challenging. Baur agreed that food safety messages tend not only to be simpler but also to resonate with consumers. She mentioned a colleague's research findings indicating that people are willing to listen to messages and follow recommended behaviors when the messages relate to protecting their children or families.

Rational Thought, Emotion, and Motivation

An audience member pointed out that billions of dollars are spent on food marketing and that much of this marketing is not aimed at conscious, rational thought. Rather, it is aimed at consumers' feelings, with the goal of eliciting an emotional reaction, not a synthetic understanding of technical information. The audience member wondered whether "we are missing the boat" by focusing on literacy rather than emotion, and asked if there are better ways to reach consumers.

Grier replied that from a food well-being perspective, designing interventions calls for thinking about more than literacy. She reiterated that literacy exists within the broader context of food well-being and stressed the importance of the interaction of the five dimensions of the food well-being model. People's understanding of food is also influenced by food marketing, the availability of foods, and the way a person is socialized at home or by the media, she explained. Thinking about all of those factors in combination will require a multidisciplinary effort, in her opinion. She encouraged researchers to step out of their "comfort zones."

Education, Behavior, and Sending Simple Messages

Tim Caulfield, workshop presenter, asked the panelists whether there are any data on education and food behavior. He noted that the relationship

between education and behavior in other realms, such as complementary and alternative medicine, is complex, and that more education does not necessarily mean more rational behavior. Additionally, he asked whether there are any data supporting the notion that people are more likely to fall back on their own education when messages are complicated. In his opinion, the answer is to send simple, clear messages. But he was curious about what data exist to support that idea.

"I don't want to leave the impression that a simple, clear message is going to carry the day," Baur replied. "There is no magic elixir in a simple, clear message." However, she stated it is difficult to think about other effective communication strategies without having a simple, clear message to send. She observed that often when she deconstructs the pieces of health information, she finds that even the communicators may not be completely clear about the message they are trying to send. She has been involved with a few studies in which she and colleagues have used the CDC's Clear Communication Index to convert health material with multiple messages or with no one clear message into a design that draws attention to a single main message. She said, "We do all these things to make it almost impossible to miss the main message." She noted that preliminary evidence from these studies suggests that design makes a big difference in whether people can actually understand and process the information the communicator intends to send. Even after these various clear communication techniques are applied, however, people are still distracted by other things. "Even when I do my absolute best to design something in the clearest way possible using these science-based criteria," Baur said, "I am not getting 100 percent comprehension in the way that I intend as the sender." With respect to the role of education, she stated that there is a strong correlation between education and health knowledge, but it is not one for one. She suggested being mindful that relying on print to deliver health information challenges people who lack strong literacy skills—a significant portion of the U.S. adult population.

The Role of Commercial Food Marketing in Fostering a Healthy Relationship with Food

Roller asked Grier whether commercial food marketing has a role to play in fostering a healthy relationship with food. "I think so," Grier answered. If not, given the magnitude and scope of commercial marketing, she said, "then we are kind of doomed." The public health infrastructure does not have the resources to reach consumers in the same way, in her opinion. She noted that companies have big data and can use those data to understand smaller segments of the population in ways that allow them to develop better interventions. With their broad reach, moreover, companies

such as Walmart can extend their messaging to people that nonprofit or socially oriented organizations are unable to reach. Food marketing is such a prevalent part of the food environment that if companies do not contribute, Grier suggested, it will be difficult to effect change.

Baur agreed. She emphasized that exposure to messages matters and observed that people are much less likely to be exposed to messages delivered by the CDC, for example, than to those from other sources with which they are more familiar. She said, "I think you could have productive partnerships if you can align the interests."

Considering an Even Broader Context Than Food Well-Being

Kristen Harrison, workshop moderator, mentioned a book by Everett Rogers, *Diffusion of Innovation*, in which the author describes a water boiling campaign in Peru. The goal of the campaign was to reduce the pathogen load in the water. The project was a "terrible failure," Harrison said. It was later discovered that residents in that part of Peru, as in other areas of the world, believed that foods were inherently either cold or hot regardless of their actual temperature. Cold foods were believed to be for hardy people and hot foods for feeble, weak, or recovering people. The boiling of water was believed to turn "raw" water, considered a cold food, into a hot food, even if the water was cooled after it had been boiled. Because of these beliefs, people did not want to drink the boiled water because they did not want to be socially stigmatized. Harrison asked the panelists to take the concept of food well-being one step further and consider its broader "social well-being" context. When social well-being comes into direct conflict with food well-being, as it did with the water boiling campaign in Peru, what can be done to encourage people to make food well-being a priority?

Grier responded that it may not be possible to change people's priorities with respect to food well-being because at the core of the model, food well-being is about people's own goals. "I cannot tell you what your goals are about foods," she said. At the same time, there exists a notion of societal health, along with questions about how individuals can be stewards of societal health. Grier suggested as an important topic for further research identifying interventions that balance individual behavior with societal health.

The Role of Qualitative Research in Gaining a Better Understanding of Food Well-Being

Linda Neuhauser, workshop presenter, asked the speakers about messages that resonate with parents, particularly messages about food well-being. Grier replied that she and her colleagues have not yet done research in that area. She suggested that qualitative research would be the next step

toward understanding how parents perceive food well-being and what type of information they need to make decisions based on that concept. Such research would help in understanding how the concept of food well-being fits in the context of people's lives, as opposed to embedding it in a preconceived context and studying how people relate to it as part of a survey or experiment. Grier suggested further that the same approach might be a helpful way to begin to answer the question raised by Harrison about food well-being in the broader context of social well-being.

Considering the Complexity of People's Lives

Wendy Johnson-Askew, workshop moderator, told of being a dietician many years ago and having a patient say to her, "The only label I read is 'two for a dollar.'" Given the reality of people's complex lives, she asked how messages that resonate can be developed and how the context of people's lives can be measured and captured. She mentioned a study showing that individuals prioritize outcomes according to their immediacy. Something that would kill a child, for example, was considered more important than something like obesity with a long time horizon.

Grier called for multidisciplinary teams of researchers and more cross-cultural thinking. People who live in areas where crime is a major issue, for example, may not be thinking about what they are eating. Grier asserted that communicators need to recognize this reality and understand that their messages may need to differ based on the target audience's context. She suggested that public health experts need to think about segmenting the population, much as marketers do, with respect to literacy, socialization, access, and other factors.

Baur mentioned Daniel Kahneman's *Thinking, Fast and Slow* because it collects 50 years of research on cognitive biases that lead people to make what are often labeled "irrational" decisions. "They are not irrational if you understand why people think about problems the way they do," she said. She reiterated the importance of starting with where consumers are in their perceptions, beliefs, and values. If her presentation had one main message, she said, it is to be realistic, shed expectations, and "meet people where they are." In her opinion, researchers have yet to integrate that way of thinking into their projects. She encouraged researchers to ask more complex questions and develop projects that account for more of the many factors that drive people's decision making.

2

Session 2: Food Literacy and Communications Conveying Scientific Information Concerning Food Safety, Nutrition, or Other Health Matters—Opportunities and Challenges

> "We all have these mental models in our heads. Often they are an inch deep and a mile wide. We construct them based on whatever information we have in order to have some coherent way of managing the world . . . whether that information comes from Gwyneth [Paltrow] or comes from a scientist or it comes from an advertisement."
>
> —William Hallman

> "Consumers are faced with tens of thousands of food-related communications every year. They are literally swimming in a sea of messages."
>
> —Carol Byrd-Bredbenner

Moderated by Fergus Clydesdale of the University of Massachusetts at Amherst, planning committee member, and Sylvia Rowe of SR Strategy, Session 2 had as its goal to explore how scientific information is communicated, including the credibility of the source and of the communicator, the clarity and usability of the information, misconceptions and misinformation, the impact of scientific communication on policy makers, and the role of policy as a macro-level channel of communication. This chapter summarizes the Session 2 presentations and discussion.

The session opened with a presentation by Timothy Caulfield, University of Alberta, on how popular culture, celebrities in particular, influence consumer decisions about food and nutrition. He suggested that what he described as "pop culture nutrition noise" has created a gap between sci-

ence and people's food-related behaviors. For example, an estimated 4.3 million Canadians have gone gluten-free, which he opined was a "remarkable" number "given what the science says." He observed that although celebrities may promote ideas that may have some emerging science behind them, they often cherry-pick the data and push an idea until it builds and is picked up by social media. He believes that many food-related decisions are as much (or more) about identity as about nutrition: people want to be identified in a certain way, and celebrities help create those identities. He expressed hope that knowledge of how celebrities influence decisions can help inform strategies to influence healthier choices.

William Hallman, Rutgers, the State University of New Jersey, described the current state of scientific education in the United States. "Many Americans lack the foundation in basic science to put new scientific information into any kind of context," he suggested. Most nonscientists rely on words or pictures to tell stories, he observed, yet most scientists communicate using numbers, with scientists from different disciplines using different types of numbers. He echoed Grier's and Baur's calls in Session 1 (Chapter 1) to start with the end user, or consumer, and encouraged workshop participants to remember the mantra, "mental models matter." That is, people construct mental models to have some coherent way of managing the world. Hallman explained that whether the information used to construct these models comes from celebrities, science, the Internet, or elsewhere, everyone has them, and communicators need to consider these mental models when thinking about how to translate scientific information into popular thought.

Sally Squires, Powell Tate, suggested that everything discussed thus far in the workshop related to the issue of trust. Twenty years ago, she noted, television and newspaper reporters earned a mix of trust and distrust with regard to communicating risk information related to food. Today, she said, they are among the least trusted authorities, with the most trusted professionals being nurses, followed by doctors. This declining trust, in her opinion, reflects a change in the media landscape. Media have changed more in the past 10 years than at any other time in history, she said. Both digital and social media are growing, and people are paying more attention than ever before to what their friends are saying. Squires's take-home message was that having expertise does nothing for communication unless that expertise is accompanied by characteristics known to be associated with trust. Trusted sources are those that are concerned with public welfare, provide understandable and relatable information, and admit to uncertainties.

The growth of digital and social media has contributed to what Carol Byrd-Bredbenner, Rutgers, the State University of New Jersey, described as a "sea of messages" in which consumers are swimming. Yet even with all

these messages and even though consumers are actively seeking information, she said, people have reported finding it easier to do their taxes than to understand how to eat healthfully. She suggested that what she termed "communication friction" is interfering with effective communication about food and nutrition. Communication friction comes from what she described as "flabby" writing style, that is, writing that is difficult to read and uses unfriendly vocabulary. Inconsistency—whether in terminology, in formatting, or in information itself—also creates communication friction, she noted, while even simplicity can be problematic when it relies on definitive language, which creates skepticism. She listed several additional sources of communication friction and ways to eliminate it.

The sea of messages consumers receive are being delivered not just through digital and social media but also from food products themselves according to Craig Andrews, Marquette University. He described the very difficult communication environment consumers face while shopping, with the multitude of nutrition-related claims and symbols on food packages. Whether nutrition disclosures actually work depends on many factors, he explained, including whether the message being sent is the right one for the audience and what its goal is (e.g., exposure, comprehension, behavior). Disclosure may fail, he said, when a message is not personally relevant or noticed, when consumers are already familiar with the brand, when they lack the necessary nutrition knowledge, or when they become desensitized (e.g., after repeated false alarms or when messages are more extreme than necessary). He emphasized the importance of pretesting messages with the target audience.

Scot Burton, University of Arkansas, reiterated that consumers are exposed to a broad array of nutrition claims, icons, and information on a daily basis, sometimes with ambiguous and unintended effects. Although nutrition disclosures can have positive effects, he expounded on Andrews's observation that a variety of individual and contextual factors impact their overall effectiveness. He described research on the effectiveness of front-of-package disclosures showing that effectiveness depends on the processing task for which consumers are using the information (e.g., evaluating a single brand versus comparing different brands). Additionally, he described a study on calorie labeling at restaurant chains showing that the effect of such labeling varies among different segments of the population and in different contexts.

Jeff Chester, Center for Digital Democracy, began by saying, "We are entering a new era of mass personalized communications. [Companies] are able to track you and target you anywhere, anytime." He described how food and beverage companies are partnering with digital media companies, collecting and using big data, and redefining marketing to shoppers. While collecting data, he said, these companies are also actively engaged in shap-

ing the "shopper journey." He observed that marketing now is not just the sale of a single product but a comprehensive and multichannel effort to promote brand loyalty and continuous consumption. Digital marketers have helped create what they call a "path to purchase" that entails constantly promoting products using an expanding array of data-driven social media, online video, and mobile phone apps. A new generation of YouTube celebrities known as "influencers," for example, are helping marketers integrate their products with entertainment to help trigger brand loyalty among youth. Chester called for a greater understanding of how this new era of marketing is changing the relationship between consumers and scientific and accurate product information.

Vivica Kraak, Virginia Polytechnic Institute and State University, reiterated what several speakers had said previously about the crowded food messaging environment. Exacerbating this problem, she noted, as Chester had, is that many companies marketing to children under 12 years of age have yet to align their brand mascots or licensed media characters with uniform nutrition criteria. Likewise, no food, beverage, or restaurant company has yet pledged to align its celebrity endorsements targeting teens with those criteria. Today's food messaging environment calls for comprehensive, consistent, and smart policies, Kraak said—not necessarily new policies, but revisions to existing policies. Products that are unhealthy need to be disincentivized, she asserted, and healthy products incentivized. She emphasized that both private and public policies play important roles; that policy change is an iterative, not linear, process; and that the decision-making processes of policy makers are very different from those of scientists, with policy makers valuing nonscientific as well as scientific information. She encouraged scientists to be more aware of the cultural differences between science and policy, to ask more policy-relevant questions in their research, and to communicate their findings more effectively to diverse audiences.

In his closing presentation, Joseph Levitt, Hogan Lovells U.S., LLP, described three case studies illustrating the gap between science and public perception. One was the use of Alar in apples in the late 1980s. At the time, the greatest food safety concern was carcinogenicity. Although the U.S. Environmental Protection Agency (EPA) had determined that the use of Alar in apples posed no significant cancer risk, *60 Minutes* aired an exposé on the carcinogenicity of Alar in apples, and Meryl Streep made a series of public appearances offering the same information. The U.S. Food and Drug Administration (FDA) would later call on a consumer communications expert who explained that the real issue underlying the Alar scare was not the science, but the triggering of a series of "consumer outrage" factors: that Alar was intentionally added, that it was hidden, that it was being fed to vulnerable populations (i.e., children), and that the purported risk (i.e., cancer) was considered a serious one. The lesson learned, Levitt said, was

that "science by itself cannot control public perception. There are other factors that come into play." Levitt encouraged a greater understanding of the anxieties underlying public concerns about food.

To close the first day of the workshop, David Freedman, contributing editor of *The Atlantic*, reflected on the information and opinions expressed thus far. He observed that the problem being addressed was how to support the public in receiving and embracing scientifically valid information about healthy eating in a way that will lead to healthier choices, healthier behaviors, and ultimately healthier living. But immediately, just in defining the problem, he said, another problem emerges—which information? Different scientists reach different conclusions about what is causing any given problem, he noted. Even if it is decided that the most immediate problem is obesity, scientists have yet to agree on what exactly needs to be done to combat obesity. And even assuming that they do agree on what needs to be done, yet another problem immediately emerges: What actually can be done? Freedman observed that people are getting caught up in "pop messaging" and locked into beliefs that are not scientifically valid and that end up short-circuiting any effort to deliver accurate information. If someone has decided that calories do not matter, for example, what good does it do to improve at sending messages about calories? And, Freedman continued, even if experts can cross that gap and reach consumers, which message should they send? He encouraged going beyond theory and getting out into the public to determine how to tackle the problem.

BELIEVING SCIENCE-FREE STUFF: NUTRITION PERCEPTIONS AND THE ROLE OF POPULAR CULTURE[1]

In his presentation on the role of popular culture in framing decisions people make about food, Caulfield focused on celebrity influence. He warned the workshop audience that he would be engaging in some speculation in his inferences about the true power and influence that pop culture and celebrity branding exert with respect to consumers' food and nutrition decisions.

Pop Culture Nutrition Noise

Caulfield referred to Sonya Grier's description of the growing discussion in popular culture about nutrition, food, and wellness (see Chapter 1 for a summary of Grier's presentation). He showed a picture of Michael Douglas discussing his gluten-free diet with Jimmy Fallon, when Douglas told Fallon

[1] This section summarizes information presented by Professor Caulfield.

that having gone gluten-free is why he (Douglas) "looks so great." Upon watching the televised interview, Caulfield went on Twitter and tweeted, "Michael Douglas talking gluten-free pseudoscience on @jimmyfallon tonight. Frustrating this health bunk gets this kinda profile. Science!" "This prompted a strong tweeter reaction from gluten-free enthusiasts," he said. Gluten-free diets are an extremely popular trend now, he observed, with an industry study reporting that 4.3 million Canadians have gone gluten-free or tried to reduce gluten in their diets. This is a "remarkable" trend, in his opinion, given what emerging science says about gluten-free diets and nonceliac gluten sensitivity.

As another example of celebrity influence, Caulfield mentioned Gwyneth Paltrow and the "incredible hesitancy" in the general public regarding genetically modified organisms (GMOs). According to a 2015 Pew Research Center study, 88 percent of scientists surveyed said genetically modified foods are safe to eat, but only 37 percent of the public agrees with that view (Pew Research Center, 2015). This represents "one of the biggest gaps between scientists and the general public," according to Caulfield. In his opinion, celebrities have played a role in creating that gap.

Another example of celebrity influence on decisions about food is Katy Perry's focus on cleansing and detoxing and what Caulfield described as the "incredible" rate at which this trend has grown in the past several years. If he had asked 8 years ago how many people in the audience had heard of cleansing and detoxing, he suspected only a handful of hands would have been raised. Today, numerous cleanse and detox books and products are on the market. Some estimates suggest it is a $5 billion industry, according to Caulfield. In one survey of naturopathic physicians, 92 percent of respondents reported using clinical detoxification (Allen et al., 2011). This trend is "scientifically absurd on numerous levels," Caulfield stated. He cited a lack of evidence for the need to detox and suspects that celebrity culture has played a major role in popularizing the trend.

Organic foods are another example of celebrities pushing the nutritional value of certain foods despite what Caulfield said was little evidence indicating that, in this case, organic foods have a nutritional advantage over nonorganic foods (Dangour et al., 2009; Smith-Spangler et al., 2012). Juicing is yet another example. While juicing may not be harmful, there is no evidence suggesting it is "needed," Caulfield remarked, yet again, it is a very large industry. "We could go on and on," he said, with other examples.

Celebrities also are influencing food choices through their direct endorsements of food products. In a well-known study demonstrating the impact of celebrity endorsements, Boyland and colleagues (2013) found that such endorsements increase consumption even when the celebrities do not talk about but are merely associated with food. These endorsements do not have "a constructive impact in general," Caulfield said. He also mentioned

Dr. Oz, who, Caulfield maintained, "says a lot of less than scientifically robust things," but has a major impact on what people eat.

Celebrities are influencing not just food choices but other choices as well, Caulfield observed. He noted that studies consistently demonstrate that celebrities impact people's decisions (Hoffman and Tan, 2015). He cited speculation that humans are evolutionarily predisposed to follow people with prestige or with specific skill sets (Tehrani, 2013). The notion that humans cannot help but follow and that they do so unconsciously builds on Kahneman's work on cognitive biases, he explained. (Cynthia Baur had mentioned Kahneman's *Thinking, Fast and Slow* during the Session 1 panel discussion; see Chapter 1.)

Examples of celebrity influence outside of the realm of food include cancer screening (e.g., Metcalfe et al., 2011) and, back in the 1920s, tanning. Before the 1920s, it was not considered fashionable to have a tan. But when Coco Chanel went on vacation, accidentally got a tan, and came home, then "boom," Caulfield said, tanning was invented. "Despite the health implications of tanning, it is still with us," he said. One of his favorite examples of celebrity influence and, in his opinion, one of the most powerful is cosmetic surgery (Swami et al., 2009). "People are altering their bodies in a semipermanent way based on norms that are almost entirely created by celebrities," he said. The most rapidly growing form of plastic surgery today, augmentation of one's buttocks, was influenced by one celebrity, Kim Kardashian.

The Acceleration of Celebrity Impact Through Social Media

Caulfield cited Katy Perry as an example of how celebrity impact is accelerated through social media. Perry tweets about what she eats, including her 26 supplements per day, Caulfield explained. With 75 million Twitter followers (more than follow President Obama), Caulfield asked, "How can CDC [the Centers for Disease Control and Prevention] compete?" Emerging evidence suggests that with Twitter and other similar platforms, such as Instagram, people feel as though the individuals posting messages are, as Caulfield put it, "just around the cyber corner" and that "they are speaking to us" (Stever and Lawson, 2013).

Additional emerging evidence suggests that social media also are having an influence on food choices through what Caulfield called the "Prius effect," with people making food (or other product) choices as a way to express to the world who they are (in the case of the Prius, that they care about the environment) (e.g., Wansink et al., 2014). Nichter and Thompson (2006) report that people take dietary supplements for health reasons but also for identity reasons, that is, because they relate to what Caulfield described as a "new age kind of approach to life." Von Essen and Englander

(2013) likewise suggest that people who eat organic food do so because they want to indicate, as he put it, "this is who I am." Celebrities play a role in creating these identity packages, he suggested.

Caulfield noted that when something has been categorized a certain way—for example, when eating organic is perceived as a "good" thing to do—this categorization can actually alter the experience of taste. Bratanova and colleagues (2015) found that people who think they are eating organic food, which they perceive as "ethical" food, also think the food tastes better, with the improved taste reinforcing the idea that they should be buying this food. According to Caulfield, blinded studies have provided little evidence that organic foods actually do taste better; indeed, at least one study (Zhao et al., 2007) found that conventionally grown foods taste better. Moreover, he mentioned a study reporting that people who ate organic foods volunteered less time to help a needy stranger (Eskine, 2012). In a similar study, Karmarkar and Bollinger (2015) showed that people who bring their own shopping bags to stores are more likely to buy environmentally friendly items, but they also are more likely to buy junk food. In both studies, the authors speculate that people keep what Caulfield called a "moral balance sheet." If they are doing some things they consider moral, they believe they do not have to worry about doing other moral things, or they can balance their sheet by buying junk food.

Again, in Caulfield's opinion, celebrities have an impact on whether people perceive a food or behavior to be moral. He showed an image of Gwyneth Paltrow carrying a basket of green leafy vegetables and carrots. Even if people do not think of Paltrow as a credible source of scientific information, she is the source of an image, specifically an "old timey, natural" image, he explained. Her image helps people shape their identity packages and reinforces the perceived moral relevance of particular behaviors, he suggested.

Concluding Thoughts

In sum, Caulfield speculated that new ideas about nutrition, which may or may not have some basis in emerging science, become part of an identity package when they gain cultural currency and that celebrities play a major role in creating this identity package. A celebrity identity package is not only picked up by social media, he noted, but also reinforced by commercial marketing, becoming even more powerful. When this happens, he said, it is no longer possible to critique the idea the celebrity is spreading. Even if one critiques the science behind the idea, one is perceived as critiquing the person and the identity package associated with that person. Moreover, said Caulfield, as has been demonstrated with vaccine promotion (Nyhan

et al., 2014), when a concept becomes part of a person's identity package, it becomes very difficult to change the person's mind based on science alone.

Caulfield echoed the comments of other workshop speakers and participants on the complexity of decision making about food. "It's not just about science or facts," he said. "You could have a million studies on the impact or lack of impact of a diet, but when you have Beyoncé looking so fabulous and in shape, who are you going to believe?" Yet while celebrity influence complicates the information people receive about food, he expressed his hope that it can also inform strategies to influence healthier choices.

TRANSLATION OF SCIENTIFIC RESEARCH TO POPULAR THOUGHT[2]

Scientific Education as a Starting Point

"Starting points really matter," Hallman began, echoing Cynthia Baur's earlier call to "meet people where they are" (see Chapter 1). A starting point with many Americans is that they lack the foundation in basic science to put new scientific information into any kind of a context, he explained. For most Americans, formal science education ends at high school. Even then, data collected by the National Math and Science Initiative (www.nms.org) suggest that only one-third of students who graduate from high school are ready for college-level science. Furthermore, most Americans do not have a college degree: fewer than 29 percent of Americans over the age of 24 have a bachelor's degree or higher.

In Hallman's opinion, moreover, colleges do a poor job of science education among the minority of students who do make it to college. According to U.S. census data, he noted, only about 10 percent of Americans graduating from college have a degree in a STEM (science, technology, engineering, and mathematics) discipline (U.S. Census Bureau, 2012). Although non-STEM students often are required to take one or two science courses, most introductory science classes are designed with the expectation that they are the first in a series of science courses the student will be taking and require students to memorize detailed scientific facts (e.g., segments of the Krebs cycle) for use in those later courses. This approach serves to frustrate, humiliate, and alienate many students whose primary interest in taking the required classes is to pass them, leaving the students to conclude, Hallman said, that "science is too hard to understand." After they leave college, he continued, they are unprepared to engage with scientific topics or arguments and lack the skills needed to make decisions as informed citizens.

Therefore, Hallman asserted, most Americans depend on curators and

[2] This section summarizes information presented by Dr. Hallman.

interpreters of scientific information. Celebrities are one such source, he said; others include health professionals, science communicators, authors and journalists, websites and blogs, social media, museums, and interactions with other people. He noted that although many people say they go to their health professionals for information about nutrition, most people in fact do not ask their physicians anything about the subject. And most physicians have little training in nutrition anyway, he added.

Literacy, Graphicacy, Numeracy, and Ecolacy

Hallman referred workshop participants to a book written by Garret Hardin in the mid-1980s, *Filters Against Folly* (Hardin, 1985). Hardin's three "filters of reality" are literacy, numeracy, and ecolacy. Hallman added a fourth, graphicacy, and described each in turn.

Hallman described literacy as the ability to understand written and spoken words and stories and as the way normal people learn and communicate. Most people grow up learning culturally specific stories, anecdotes, examples, metaphors, and analogies.

Graphicacy, Hallman explained, is the ability to understand graphical information, or visual communication through sketches, photographs, diagrams, charts, maps, symbols, and other nontextual formats. As with literacy, he noted, the interpretation of nontextual information frequently is culturally constrained. People often think they can use pictures to communicate to others who cannot read their language or cannot read at all, but symbols do not necessarily have universal meanings, he observed. He showed an image of a skull and crossbones on a bottle. The bottle also had the word "poison" written on it. But the skull and crossbones symbol has no intuitive meaning and is a poor symbol for poison, he said; indeed, children need to be taught that it symbolizes poison. He told the workshop audience how he had showed an image of a skull and crossbones to his 6-year-old daughter and asked her what it was. She replied, "Daddy, that's what pirates drink."

Numeracy is essential to science, Hallman continued. Unfortunately, he said, much of the American public struggles with mathematical concepts, including very small and very large numbers, fractions, proportions (e.g., parts per billion), percentages, and probabilities. He noted that nonscientists and most journalists communicate using stories and often use pictures to illustrate those stories, while most scientists communicate using numbers. The result is a communication barrier, he explained. Additionally, different scientific disciplines use different kinds of numbers, creating another type of barrier.

Finally, Hallman explained, ecolacy is the ability to see "the big picture," to envision both intended and unintended consequence. It is about

"getting it." Figuratively, it is the ability to see both the forest and the trees. People can be extraordinarily literate, graphicate, and numerate, Hallman noted, but that does not automatically make them ecolate. Nor is seeing the big picture a matter of merely observing all the details and adding them together, he suggested. "Simply educating people about scientific details does not lead to a greater comprehension of the big picture or to their ability to necessarily make informed decisions," he said. He also added that underlying all of these ideas is a fundamental issue of trust: as many of the risks and benefits associated with food are invisible, consumers have to trust the information presented without seeing physical evidence.

Mental Models Matter

"If you get nothing else out of this talk," Hallman said, "I hope you remember this mantra: Mental models matter." He reiterated the importance of starting points and knowing how people think about things. "We all have mental models in our heads," he explained. "Often they are an inch deep and a mile wide. We construct them based on whatever information we have in order to have some coherent way of managing the world." Whether that information comes from a celebrity such as Gwyneth Paltrow, a scientist, or an advertisement, he explained, we take it all in and use it to construct mental models.

Hallman used foodborne illness to illustrate the type of food-related mental models many Americans have. A series of studies conducted for the U.S. Department of Agriculture on how to get people to respond better to food recalls and to engage in better food safety practices revealed that most Americans know little about foodborne illness (Cuite et al., 2007, 2008; Hallman and Cuite, 2010; Hallman et al., 2009). People underestimate the incidence of foodborne illness, cannot identify groups of people who are particularly at risk for such illness, cannot identify its symptoms, and do not recognize it even when they personally experience it. The CDC estimates that one in six Americans gets sick every year with a foodborne illness, Hallman reported. Yet, in a 2008 study, he and his colleagues found that only 18 percent of respondents reported ever having been made sick as a result of eating contaminated food (Hallman et al., 2009).

The mental models people have around foodborne illness lack feedback loops, Hallman continued. People usually blame foodborne illness on someone else and do not believe they are the cause of their own illness. Even fewer believe they have made anyone else sick as a result of their poor food safety practices. Many people also believe that symptoms become evident shortly after one has eaten a tainted food, which Hallman said is typically wrong; many symptoms do not appear until 12, 24, or 48 hours or more after the food is ingested. As a result, he noted, people usually do not con-

nect their actions with the consequences. He explained that this disconnect creates a problem when communicating not only with home cooks but also with people who work in food service.

Many people have what Hallman described as "sympathetic magic" mental models concerning food. As an example, he noted that many people believe in "psychological contagion," so that foods that come into contact with or are associated with things viewed as "dirty" become stigmatized even if they have been made clean after the contact. In a study conducted for the CDC about 10 years ago, he and his colleagues asked 1,100 American adults how often they engaged in particular behaviors (Hallman, 2008). They found that very few people who found a stranger's hair in their food would be willing to take the hair out and keep eating. The same is true of finding an insect in one's food; very few Americans would be willing to keep eating the food.

Hallman continued by noting that more than half of those surveyed said they would throw food out after its sell-by date "because of germs." Many people believe that "germs come from other people," he added. He explained that cellophane was first marketed for food products as a way to keep food separate from the "germs" of other people. He noted that people also tend to anthropomorphize germs, particularly when communicating to small children (see Figure 2-1). Based on the same CDC dataset described above, he and his colleagues found that nearly one-quarter of Americans agree that germs can sense when people are nearby, about one-third agree that germs can sense which people are most vulnerable, and more than half agree that germs move to places that make it easier for them to infect people.

Hallman reported that studies on intuitive toxicology have shown that when thinking about the risks of toxins in their food, many consumers fail to take dose into consideration and are unfamiliar with or do not believe in the existence of exposure thresholds. For most people, he said, what matters is whether they are exposed, not the amount of exposure. Additionally, he observed, most people have no idea how toxins cause harm. Many think that all chemicals are poisons; others think that particular ingredients are poisons; and some think everything is dangerous. Hallman showed several images of book covers with titles ranging from *Milk, the Deadly Poison* to *Slow Death by Rubber Duck: The Secret Danger of Everyday Things*. As far as who is doing all this poisoning, he said, "blame is easily placed." He showed more book covers, one title being *The Crazy Makers: How the Food Industry Is Destroying Our Brains and Harming Our Children*.

Finally, Hallman noted that "how to" advice is plentiful, again being the subject of many books. He showed covers of some of the same detoxification books that Caulfield had cited.

FIGURE 2-1 Visual examples of how germs are anthropomorphized.
SOURCES: CDC, 2015a; Fight Bac! and Partnership for Food Safety Education, 2016.

Where Does the Misinformation Come From?

Hallman stated that much of the misinformation that people are using to construct their mental models comes from the Internet. As one example, he showed an excerpt from an article, "The Top Five Cancer-Causing Foods," that was published on a *Natural News* website. The article states, "The truth is that most people give themselves cancer through the foods, drinks and products they choose to consume. In my opinion, over 90 percent of cancers are easily preventable." The author of the article, "the Health Ranger," goes on to say that cancer tumors develop, in part, by

feeding on sugar in the bloodstream. As another example of misinformation on the Internet, Hallman showed the image of a graph titled "Why do you need to detox and cleanse your body?" The graph illustrates a relationship between the consumption of "junk food" and illness. As yet another example, Hallman showed the cover of a book titled *How to Cure Almost Any Cancer at Home for $5.15 a Day*. The book tells readers how they can change their body chemistry from "cancer-friendly acidic" to "cancer-killing alkaline" for "pennies a day." As a final example, Hallman showed an image of Oprah, the "ultimate expert."

Hallman and colleagues conducted a study of FDA-approved qualified health claims versus "common knowledge." They asked respondents how familiar they were with the relationship between certain dietary components (e.g., olive oil) and particular health claims (e.g., prevention of heart disease) (Hallman, 2015). They found that people were as familiar, or more so, with common folk wisdom claims as with FDA-approved qualified health claims. Moreover, people were applying that folk wisdom. Among 1,300 American adults aged 55 and older, for example, 35 percent reported consuming dark chocolate for heart health (Hallman, 2015). It is not just Dr. Oz who is popularizing the idea that dark chocolate can have health benefits, Hallman observed. He showed an image of a WebMD webpage with a list of top "superfoods" offering "super health protection." The American Diabetes Association also lists on its website "diabetes superfoods." "We are getting a confluence of this idea that there are in fact superfoods," Hallman said.

Intuitive Plausibility

People are open to simple heuristics, Hallman said. He mentioned Michael Pollan's book *Food Rules*; examples of these rules include "eat organic" and "whole foods are best." Pollan's is one of many books on food rules, according to Hallman. These rules depend on what he called "intuitive plausibility." For example, the rule "Don't eat breakfast cereals that change the color of the milk" has absolutely no science behind it. "But," Hallman said, "doesn't it sound like it is something that is true?" He recommended that communicators think about the intuitive plausibility of their messages when trying to translate scientific information into popular thought. How does the message connect with where people actually are? How can the invisible be made visible for people?

In conclusion, Hallman stated, "We cannot simply continue to lament lack of knowledge and action. We have to be proactive. The public needs and deserves better science communication about food safety, nutrition, and health. The question is, 'Whose responsibility is it to do that?'" He encouraged workshop participants to consider the role they can play.

CREDIBILITY OF COMMUNICATORS: WHOM DO CONSUMERS TRUST?[3]

Trusted Professionals

"Trust has really been underlying everything that we have been talking about," Squires asserted. She cited findings from what she thought was a very interesting study conducted 20 years ago in the United Kingdom (Frewer et al., 1996). The study, which was government-funded, was conducted by a team of psychologists who examined topics surprisingly similar, she observed, to the topics being addressed at this workshop. One of the central questions investigated was why some individuals and organizations are viewed as trusted sources of risk information related to food, while others are not. The researchers found not only that medical professionals were among the most trusted sources, but also that no one mistrusted them. Scientists also were trusted, although less than medical sources, nor were they mistrusted. Other sources of information were both trusted and mistrusted to various extents. Television and newspapers, while among the most trusted sources of risk information related to food, were also among the most mistrusted. Squires found the combination of great trust and great mistrust in television and newspapers particularly interesting, especially given that this survey was conducted before the rise of social media.

More recently, the 2014 Gallup Poll on Honesty and Ethics found that registered nurses (RNs) are the most trusted professionals (80 percent), followed by doctors (MDs) (65 percent), members of the clergy (46 percent), bankers (23 percent), lawyers (21 percent), advertising executives (20 percent), business executives (17 percent), and car salespeople (8 percent). Scientists were not included in this particular poll. Not only are nurses viewed as the most trustworthy professionals, but they have held that position for the past 11 years, according to Squires. Nurses are considered trustworthy because they are believed to have very high or high standards of honesty and ethics, she explained.

Other Gallup poll data from 2004, 2007, and 2010 showed military officers and grade school teachers to be highly trusted (65 to 74 percent) and day care providers and judges less so (both in the 44 to 53 percent range). Auto mechanics, nursing home operators, television reporters, newspaper reporters, local officeholders, and state officeholders all were cited as trustworthy by less than 30 percent of the surveyed populations. State officeholders held the lowest level of public trust (24 percent in 2004, but only 12 percent in 2007 and 2010). Television reporters were trusted by only 23

[3] This section summarizes information presented by Ms. Squires.

percent in all three survey years, while newspaper reporters were trusted by only 21 to 22 percent.

The Changing Media Landscape

Squires said she could not think of a time when media have changed more than they have over the past decade. "For those of us who were trained to be journalists," she said, "we viewed it as a calling . . . we went into it because we felt it was important in a free society to be that extra [set of] eyes and ears." That situation has changed dramatically in recent years, in her opinion, although she expressed hope that the field is moving forward.

According to 2015 findings from the Pew Research Center, key audience trends include a 5 percent increase in network news viewership and a 3 percent increase in local news viewership. Cable news viewership, in contrast, declined by 8 percent, and newspaper readership by 3 percent. With respect to online traffic, 39 of the 50 news sites included in the survey receive more traffic from mobile devices than from desktop computers, a trend that Squires said was not surprising. However, mobile visitors spend more time than desktop visitors per visit for only 10 of the 50 news sites. With respect to social media, slightly older (2013) data collected by the Pew Research Center (N = 960) indicate that the leaders in use are millennials, with a median of 250 Facebook friends, followed by gen x'ers (200), younger boomers (98), and older boomers (50). The 2015 study found that while growth in Facebook and other social media sites is being driven by millennials, participation among adults aged 55 and older is increasing. "We are paying more attention to what our friends on social media say about things," Squires said.

Harvard University's 2015 Institute of Politics study, much of which was focused on voting, also examined participation in social media platforms (Harvard University IOP, 2015). The researchers found that Facebook continues to drive a large proportion of social media participation (used by 83 percent of respondents), followed by Instagram (44 percent), Twitter (39 percent), Pinterest (34 percent), and Snapchat (33 percent). Of these, Squires said she especially likes Twitter. She noted that it was through Twitter that *NBC News* learned of the plane landing on the Hudson River, after someone on the ferry picking up the plane's passengers tweeted about the incident. Participation in all these social media platforms has become a significant means of conveying messages and obtaining information, she remarked.

Results of a Sullivan Higdon & Sink FoodThink survey on the use of digital and social media to make food choices indicated that 1 in 10 consumers was engaging with grocery-related brands (Sullivan Higdon & Sink, 2014). Squires was surprised that the figure was that high. Twenty-

two percent of fathers reported being engaged in grocery-related brands on social media, followed by 18 percent of mothers, 17 percent of millennials, 13 percent of "good cooks," 7 percent of boomers, and 7 percent of "bad cooks." In Squires's opinion, the higher percentage of fathers following grocery-related brands reflects their growing role as nutritional gatekeepers.

With respect to what consumers are doing with this information, results of the same FoodThink survey indicated that 76 percent of consumers were engaging in some activity on the Internet related to grocery shopping. Squires told the audience that she herself uses her iPad to check recipes and see what ingredients she needs to purchase. Twenty-five percent of the surveyed consumers were checking product prices online, 14 percent were using mobile coupons while shopping, and 11 percent were scanning Quick Response (QR) codes at grocery stores.

Other data from the same FoodThink survey showed that people were using social media to make online restaurant ordering decisions as well, with 42 percent of boomers and 68 percent of millennials accessing nutritional information. Not only were they using the information to help with online ordering, but they also were sharing information with others. Overall, Squires reported, 14 percent of users surveyed were sharing a restaurant experience with others. Twenty-four percent of millennials were sharing restaurant information, and 23 percent were following a restaurant on social media, compared with 8 percent and 7 percent of boomers, respectively. Fathers and mothers were highly engaged as well, Squires explained, with 33 percent of fathers and 17 percent of mothers sharing information and 31 percent and 21 percent, respectively, following a restaurant.

What Fuels Trust and Mistrust?

Squires elaborated on some additional findings from the 20-year-old study that she had mentioned at the outset of her talk. Frewer and colleagues (1996) found that trust was fueled by being responsible, trustworthy, accountable, and accurate; having a good track record; being concerned with public welfare; and having knowledge and facts. Mistrust was fueled by a perceived vested interest, self-protection, exaggeration, and distortion. The most mistrusted information was on natural toxins (e.g., aflatoxin), genetic engineering (i.e., GMOs), and pesticides, while the most trusted information was on high-fat diets, microwave ovens, food poisoning, food irradiation, and alcohol. The conclusions reached by the authors, according to Squires, were, first, that improving scientific literacy is not just a matter of teaching better science. The bar is too high for many people to understand what they need to know in order to evaluate information; moreover, the public lacks the motivation to learn what needs to be learned. Second, trusted independent sources are those that provide information that is

understandable and relatable. Trust also was linked to admitting uncertainties and helping the public understand that science is a process and that scientific knowledge changes.

Take-Home Message

Squires's take-home message was that trust is linked to perceptions of accuracy, knowledge, and concern with public welfare. Having expertise or the freedom to talk does not lead to trust, she said, unless it is accompanied by these other characteristics. Distrust is associated with perceptions of deliberate distortion of information by the source and a history of providing erroneous information, she concluded.

FOOD COMMUNICATIONS: IT'S GREEK TO ME![4]

The Food Communication Environment

Consumers are faced with tens of thousands of food-related communications every year and are "literally swimming in a sea of messages," Byrd-Bredbenner began. The messages are coming from many different places, including educational sources, professional organizations, and media of all sorts. Topping the list is the Internet, which is consulted by three of every four people for health information every year, according to Byrd-Bredbenner. In 2013, there were 40 million downloads of mobile apps related to diet, a figure she suspects is even higher now. According to a 2000 poll conducted by the Academy of Nutrition and Dietetics, in 2000, only 19 percent of those surveyed agreed with the statement, "I actively seek information about nutrition and healthy eating." By 2011, that figure had more than doubled to 46 percent. "People are actively looking," Byrd-Bredbenner said.

In a survey conducted by the International Food Information Council (IFIC), Byrd-Bredbenner reported, 94 percent of respondents reported that they thought about the healthfulness of foods and beverages they consumed, with 48 percent thinking about it "a lot" and 44 percent thinking about it "a little." Eighty-four percent of respondents indicated that they thought about the safety of foods and beverages, with 39 percent thinking about it "a lot" and 45 percent thinking about it "a little." Not only are people thinking about the healthfulness and safety of the foods and beverages they consume, Byrd-Bredbenner explained, but according to this survey, most also are trying to do something about these concerns. Fully 96 percent of respondents indicated that they were trying to control the

[4] This section summarizes information presented by Dr. Byrd-Bredbenner.

healthfulness of their diet, and 94 percent said they were trying to control the safety of foods and beverages they consumed.

In sum, Byrd-Bredbenner said, there is a great deal of interest in the healthfulness and safety of food. But people also receive a multitude of messages about these topics, she observed. According to another IFIC survey, half of the U.S. population believes it is easier to do one's own taxes than to figure out how to eat healthfully.

With the persistence and escalation of high body mass indices (BMIs), high blood pressure, high blood cholesterol levels, and other health-related problems, Byrd-Bredbenner suggested that perhaps all of the messaging about food nutrition and food safety is not having the desired effect. She asked, "What is getting in the way?" The answer, she said, is "communication friction."

Communication Friction

"Friction is anything that slows you down," Byrd-Bredbenner said. Communication friction can cause consumers to "grind to a halt," she asserted, and not pay attention to a message, veer off in a different direction, or use information in a way that does not benefit them. She listed several sources of communication friction, the first being what she described as "flabby and convoluted" writing style.

Flabby Writing

Flabby writing is difficult to read, Byrd-Bredbenner explained. She suggested that consumers are too busy to continue reading writing that is convoluted and unduly complex. This is especially true for the 4 of 10 Americans who have basic or less than basic reading skills, that is, at the third- to fifth-grade level and lower, she noted.

As an example of flabby writing, Byrd-Bredbenner read the first two sentences of a ChooseMyPlate.gov tip for increasing physical activity: "Children and adolescents should do 60 minutes or more of physical activity each day. Most of the 60 minutes should be either moderate- or vigorous-intensity aerobic physical activity." After reading these sentences, she said, "I am tired already. I will bet the average mom that is reading this is going to flip to the next page." In her opinion, the information could be written in a much more readable, user-friendly way, making it more accessible to consumers, and doing so would allow more people to act on the information. She observed that not every page on the ChooseMyPlate.gov website is as difficult to read. More broadly, however, studies have shown that the average reading level required for health and nutrition websites is eighth grade and for printed nutrition education communications is ninth

grade. Byrd-Bredbenner interprets this to mean that a significant number of consumers are being left out when it comes to written communications.

Qualified health claims are another example of flabby or convoluted writing, Byrd-Bredbenner stated. She mentioned that a forthcoming study (at the time of this workshop) on the readability of qualified health claims found that their average required reading level was 12th grade, with one health claim having what would be estimated as a grade 30 reading level (Berhaupt-Glickstein and Hallman, 2015). Fewer than 1 percent of qualified health claims were considered easy to read. Inaccessible qualified health claims cannot achieve the goal of helping consumers do a better job of choosing healthful foods, Byrd-Bredbenner remarked.

Unfriendly Vocabulary

Unfriendly vocabulary is another type of communication friction, Byrd-Bredbenner said, usually taking the form of using terms that are more appropriate for health professionals than for consumers (see Table 2-1). For example, health professionals talk a great deal about the importance of fiber and eating more whole grains. Yet fewer than 10 percent of consumers are familiar with the terms "insoluble fiber," "soluble fiber," and "functional fiber," according to Byrd-Bredbenner, while 65 percent are familiar with the term "fiber." She suggested that perhaps health professionals should just talk about "fiber."

TABLE 2-1 Health Professional "Talk" Versus Consumer Vocabulary

Health Professional Talk	Consumer Talk
soluble fiber	fiber
animal protein	meat
diet	foods you eat
adolescents	teens
females of child-bearing age	women who might get pregnant
dark, green, leafy vegetables	greens
adequate	enough of
complex carbohydrates	starchy foods
cardiovascular	heart
lipids	fat
serum glucose	blood sugar
consume	eat
mean	average

SOURCE: Presented by Carol Byrd-Bredbenner on September 3, 2015.

Inconsistency

Inconsistency is another type of communication friction, Byrd-Bredbenner said. When health professionals write, give presentations, and talk to people, she suggested, they like to use varied language to "keep it interesting." But doing so can backfire, she noted. An example is use of the word "legume." Dietary guidance documents use "legumes" to refer to dried beans as well as dried peas, while consumers know these foods simply as "beans." "We need to be talking about beans if we want them to eat more of them," Byrd-Bredbenner said. The same is true of whole grains, she suggested. Sometimes health professionals talk about "whole grains" and sometimes about "fiber-rich whole grains." When consumers hear these two different phrases, they can become confused. Consistency in terminology is therefore important, Byrd-Bredbenner stated.

Byrd-Bredbenner explained that not only inconsistent terminology but also inconsistent formatting creates communication friction. Nutrition Facts panels have helped improve the consistency with which information on calories and nutrients is presented, in her opinion. But she suggested that a great deal of clutter on food packages gets in the way of people's finding and using that information to make good dietary decisions. She noted that inconsistent formatting is also a problem with qualified health claims. There are 36 different variations in how the 53 currently enforced qualified health claims are presented. Some tell how many studies back the qualified health claims, while others do not; some provide evidence for a claim and then give the claim, while others give the claim and then the evidence. According to Byrd-Bredbenner, this lack of consistency makes it difficult for consumers to know where to look and how to parse the claims.

Changing Story Lines

Changing story lines are another source of communication friction, according to Byrd-Bredbenner. She noted that three of four consumers say they see a large amount of contradictory information. She suggested that consumers become frustrated when they think scientists are changing their minds and begin to believe that scientists do not really know what people need to be eating to stay healthy.

Streamlining

Byrd-Bredbenner asserted that keeping a message simple and streamlining a scientific story can also confuse consumers (Fiscella et al., 1999; Jensen et al., 2011; Nagler, 2014; Vardeman and Aldoory, 2008). When consumers see a headline such as "eat less fat," she noted, they get the

message, but often they end up eating not only more low-fat and nonfat products but also more calories. When this happens, she suggested, either the scientists or health professionals did not tell the full story—that is, that all sources of calories count—or consumers did not stick with the story long enough to hear it in its entirety. Either way, she said, the "eat less fat" message is confusing.

Streamlining also often leads to inadequate context, Byrd-Bredbenner said. She reiterated what earlier speakers had said about how many people do not understand the evolving nature of science. Often, she noted, consumer communications about nutrition present current science but do not put it in the context of the science that preceded it. In these cases, scientists and health professionals miss an important opportunity to help consumers weigh the evidence and adjust their "mental models." (See the summary of Hallman's presentation earlier in this chapter for a discussion of mental models.)

Byrd-Bredbenner observed that streamlining also leads to the use of definitive language, such as "consumers need to do x" or "this study's findings clearly demonstrate x," which introduces skepticism. And skeptical consumers, she suggested, are less likely to make the changes being advocated. She opined that hedging, a linguistic tool, although not used often in scientific communications to consumers, could be helpful. Hedging is conveying caution or tentativeness with respect to one's findings. Scientists use it when communicating to each other in peer-reviewed journals; entire sections of papers may be focused on the limitations of the study being discussed, with warnings to readers that results should be viewed with caution. Yet, Byrd-Bredbenner noted, despite research indicating that hedging improves trustworthiness, it is not used in scientific communications to consumers. She believes that expressing uncertainties would improve the trustworthiness of scientists, which is positively correlated with the likelihood that consumers will pay attention to their recommendations. Hedging reduces the likelihood of what she called "nutritional backlash," that is, consumers backing away from information and saying, "I am just going to eat. You guys go figure it out."

In sum, Byrd-Bredbenner said, "We have to use streamlining cautiously." While tight communication is important, she suggested, it is necessary to tell the whole story and in a way that avoids confusion, skepticism, and backlash. Otherwise, she stated, people will not be able to perform the recommended behavior.

Lopsided Coverage

Another source of communication friction is lopsided coverage (Allen, 1991; Berger and Milkman, 2010; O'Keefe, 1999; Verbeke et al., 2008;

Winter et al., 2015), which Byrd-Bredbenner explained refers to the valence of the presentation, that is, whether it is positive, negative, or neutral. Positive presentations tend to lead to positive attitudes and negative presentations to negative attitudes, she noted, but neutral, or balanced, presentations tend to lead to less skepticism and greater likelihood that consumers will think about the message. Two-sided presentations, she observed, can be presented in two ways: (1) descriptive, with both pros and cons, or (2) refutational, where the positives are presented and then refuted with the negatives. Refutational messages are more powerful and persuasive than both one-sided messages and two-sided descriptive messages, she explained, yet such messages are hardly ever seen in nutrition communications.

Vague Call to Action

Another cause of friction in communication, according to Byrd-Bredbenner, is a vague call to action. Consumers often are unsure what they need to do when they read a nutrition message, she observed. Instead of saying, for example, "Get more calcium," she suggested the more specific call to action, "Have yogurt for a snack."

Out-of-Tune Messages

Some communications are "just out of tune," Byrd-Bredbenner continued. About 8 of 10 consumers want to hear what they should eat, she suggested, not what they should not eat (IFIC, 2015; Martin-Biggers et al., 2015). According to data from the Academy of Nutrition and Dietetics, a declining percentage of people are reporting that it appears they are always hearing information about what not to eat rather than what to eat. Still, Byrd-Bredbenner said, there is much room for improvement in this regard.

Poker-Faced Communications

According to Byrd-Bredbenner, poker-faced communications, that is, those that do not elicit emotion, also can cause friction. Emotion-laden communications get people interested and invested in a topic, she said. She mentioned a study of *The New York Times* articles demonstrating that emotion-laden articles were more likely to be read and shared than articles with neutral tones (Berger and Milkman, 2010). Moreover, articles that were more positive in their content were more likely to be read and shared than those that were negative. In their own research, Byrd-Bredbenner and colleagues have found that mothers of preschoolers are more motivated to read short communications if they elicit emotions related to happiness/fun,

unique/special, and quick/urgent themes (see Figure 2-2) (Martin-Biggers et al., 2015).

Impersonal Messages

Byrd-Bredbenner observed that communication friction can result from impersonal messages—generic messages that are broadcast to a general audience and end up resonating with no one. Picture an audience of women, she suggested. Not only do women differ demographically and by age, she noted, but different women define quality of life in different ways. And it is quality of life, she suggested, that really motivates people to make decisions about their health. "If we want our messages to resonate, we need to do more audience segmentation," she said. She explained that tailored and targeted nutrition messages are more likely to be read and remembered, rated as attention catching, saved and discussed with others, and perceived as personally relevant (Brinberg et al., 2000; Hingle et al., 2013; Kreuter and Wray, 2003; Petty and Cacioppo, 1986).

Inattention to Taste

Messaging needs to take into account that when it comes to food, consumers' highest priority is taste, Byrd-Bredbenner suggested. According to data from the Academy of Nutrition and Dietetics, she noted, the number one reason for not eating healthier foods is that people do not want to give up foods they like.

Personal Benefit

Communications that do not define the personal benefit of a food also create friction, Byrd-Bredbenner observed. Consumers want to know, she said, "What's in it for me?" Consumers consistently report not seeing a personal benefit in messaging. Yet ample research indicates that knowing the benefits of a food correlates with improved diet quality (Aldrich, 1999; Beydoun and Wang, 2009; Byrd-Bredbenner and Finckenor, 2001; Moon et

FIGURE 2-2 Words that motivate consumers to read short communications because of the emotions they elicit.
SOURCE: Presented by Carol Byrd-Bredbenner on September 3, 2015; modified from Martin-Biggers et al., 2015. Reprinted by permission of Taylor & Francis Ltd., http://www.informaworld.com.

al., 2005; Smallwood and Blaylock, 1994). People who know the benefits of a food are more likely to respond in a positive way and to incorporate that food into their diet, Byrd-Bredbenner explained.

Theory and Testing

Finally, Byrd-Bredbenner remarked on the thousands of studies that have shown how the constructs and processes of behavior change theory really do make a difference in whether people accept and make a behavior change. Yet many communications and programs still are not applying those methods, she said, nor are the communications being tested with pilot audiences. She asserted that cognitive testing is essential to determine whether a message will resonate, motivate, or be understood but, she suggested, is done much too infrequently.

Friction-Free Communication

Byrd-Bredbenner closed by suggesting that messaging about food safety and nutrition could be improved by eliminating the above sources of communication friction:

- Create tight, accessible, friendly communications.
- Use consistent terms, formats, and story lines.
- Tell complete stories (create context and use hedging).
- Provide balanced and refutational coverage.
- Include an explicit call to action.
- Be positive and emotive.
- Keep food taste in mind.
- Identify clear personal benefits.
- Make sure the communication is grounded in behavior change theory.
- Road test the message.

She concluded by challenging workshop participants to "try to put these all in your next communication related to food and nutrition."

HOW NUTRITION INFORMATION IS PRESENTED TO AND PROCESSED BY CONSUMERS[5]

Summarizing 45 Years of Experimental Research on Consumers

Consumers often are confronted with a "dizzying array" of nutrition symbols, icons, and facts in stores, Andrews began. First is the wide variety of front-of-package nutrition symbols, including both reductive or nutrient-specific symbols (e.g., Facts Up Front in the United States, traffic lights in the United Kingdom) and evaluative or summary symbols (e.g., Model Front-of-Package Symbol System [IOM, 2012]) (Andrews et al., 2014; Newman et al., 2014). Added to these are three different types of nutrition claims: (1) nutrient content claims, which describe the actual nutrients (e.g., "low-fat," "natural," "gluten-free," "organic," "non-GMO"); (2) health claims, which link a nutrient to a particular health benefit (e.g., "low in saturated fat, reduces coronary heart disease"), 12 of which are backed by significant scientific agreement and have been approved by the FDA in 2015; and (3) structure function claims (e.g., "high in calcium, helps build strong bones"). Added to these front-of-package symbols and nutrition claims is the Nutrition Facts panel, which Andrews noted was undergoing changes (at the time of this workshop). "It can be chaotic for consumers," he said. "It is a very difficult environment."

Andrews then posed the question of whether, in this environment, nutrition information disclosures and claims work. Based on his review of 45 years of research (Andrews, 2011), he said, "It depends." Many factors come into play, including whether the disclosure or claim matches the appropriate communication objectives for the target audience. Is the objective exposure, attention, comprehension of the nutrition information, or behavioral change? Second, what is the message content? Third, what is the message modality? And finally, what are the effects on the receiver (e.g., altering initial beliefs)?

The elaboration likelihood model of persuasion provides a helpful conceptual framework for thinking about the persuasiveness of nutrition information, Andrews suggested. This model accounts for variation in consumers' demographics (e.g., medical condition, age, gender), as well as the initial opinions they can bring to the processing of communications (Andrews and Shimp, 1990; Batra and Ray, 1986; MacInnis and Jaworski, 1989; Petty and Cacioppo, 1986). The key component of the model, Andrews pointed out, is "the receiver's motivation, ability, and opportunity to process the message." For example, he said, motivation, ability, and opportunity to process a message can be limited by many distractions,

[5] This section summarizes information presented jointly by Dr. Andrews and Dr. Burton.

but if the receiver's motivation, ability, and opportunity are all high, there is a strong likelihood that the message will lead to longer-term attitude and behavior change. He noted that another helpful conceptual tool for examining the effectiveness of nutrition disclosures and claims is the communication–human information processing model, which identifies stages of information processing from attention to behavior (Wogalter, 2006).

Andrews reiterated that a key question to consider is whether the goal of communicating nutrition information is exposure, comprehension, and/or behavior change. Most experimental research conducted over the past 45 years has focused on message claims and receiver effects (Andrews, 2011). In Andrews's opinion, much more work could be done on what he termed "destination issues"—for example, whether the type of behavior targeted by nutrition information is focused on prevention or cessation, total or situational use, immediate or long-term effects, and so on.

Information disclosures can fail for several reasons (e.g., Stewart and Martin, 1994), Andrews suggested. For example: (1) people are not paying attention to the disclosures; (2) the information is not personally relevant; (3) consumers are already familiar with the information, and it addresses a routinized purchase; (4) consumers are distracted; and (5) consumers are desensitized after repeated exposures (they say, "I know my brand. I am not going to even look and analyze things.").

Based on his experience, Andrews noted the importance of the Federal Trade Commission's clear and conspicuous standards for televised ad disclosures, established in 1970 (see also Hoy and Andrews, 2004). An important standard, in his opinion, is dual modality, that is, communicating messages via both audio and video. He also underscored the importance of visual communication, especially for children.

Andrews listed several biases that impact whether health and nutrition claims may work. The first is positivity bias, which occurs when consumers give a product a better rating merely because of the presence of a health claim. Second is the halo effect, in which the presence of a health claim induces consumers to rate a product higher on other attributes not mentioned in the claim. For example, when a claim indicates "zero or low cholesterol," consumers may rate the product as having a low fat level as well. Third, Andrews explained, the magic bullet effect is the attribution of inappropriate health benefits to a product. For example, eating a "healthy" Subway sandwich or some other "healthy" food item may be perceived as a magic bullet against "less healthy" foods eaten later. Fourth, interactive effects are judgment biases due to ambiguous information, such as when prior knowledge of nutrition interacts with the information in a health claim. Fifth, truncation behavior is the tendency for consumers to cut short their search for nutrition information (i.e., on the Nutrition Facts panel) when a health claim is provided on the front of a package (Roe et al., 1999). Finally,

Andrews observed, portion size and branding effects occur when people eat more either because of the serving or container size (Wansink and Kim, 2005) or because of the brand's "healthy" claim (the "Subway effect") (Chandon and Wansink, 2007), even when the food does not taste good.

In summary, Andrews reiterated the importance of understanding the consumer's motivation, ability, and opportunity to process nutrition information. In his opinion, opportunity may be where the value of future research lies. "Just look in the stores," he said. Consumers are often stressed and distracted, which limits their opportunity to process nutrition facts and information.

In closing, Andrews shared some research on advertising that he and his colleagues conducted. First, they administered a pretest and rated products based on whether they were perceived by consumers as not nutritious (e.g., "margarine") or nutritious (e.g., "soup"). Then they conducted separate studies on margarine (Andrews et al., 1998) and soup (Andrews et al., 2000). In both cases, they found that consumers overgeneralized nutrient content claims (e.g., "low cholesterol" was overgeneralized to a perception of healthfulness) and that there was a halo effect (e.g., when a "low cholesterol" claim was made, consumers perceived other nutrients, such as fat, also to be at low levels when they were actually high). Andrews reported that these misleading halos were reduced only when the claims were accompanied by an evaluative disclosure (e.g., characterizing a per-serving level of margarine as "high" as evaluated by the FDA). Interestingly, with margarine, the halo effect was reduced when accompanied by an evaluative disclosure regardless of the consumer's level of nutrition knowledge. With soup, however, because people perceive it as being "good for you" even when it contains high levels of a negative nutrient (i.e., salt), Andrews and colleagues (2000) observed the opposite: the effect of evaluative disclosures depended on the consumer's level of nutrition knowledge.

Front-of-Package Nutrition Disclosures

Burton reiterated Andrews's key point that the provision of accurate nutrition information often does not have the unambiguous results desired. He noted that food choices are affected by many variables that differ among individuals (e.g., goals, health consciousness, health knowledge), contextual influences, inferences beyond objective information (e.g., health halos and "health horns"), environmental effects, and other factors. He examined some of these differences for their effects on, first, front-of-package disclosures and, second, calorie labeling in restaurant chains.

A basic research question, according to Burton, is the most effective way to communicate front-of-package nutrition information. As Andrews had mentioned, such information is of two different types: (1) reductive,

also considered objective, in which information from the Nutrition Facts panel is condensed, or reduced, and placed on the front of the package; and (2) interpretive or evaluative, in which information is qualified in some way to indicate the relative healthfulness of the product (see Figure 2-3).

The effectiveness of front-of-package icons depends on whether consumers are engaged in a comparative versus noncomparative task when they view that information, Burton argued. Are consumers comparing the healthfulness of products of different brands, or are they evaluating a single brand? While the goal of the Nutrition Labeling and Education Act (NLEA)—to "provide information that would assist consumers in maintaining healthy dietary practices"—is relevant to both types of tasks, Burton suggested, the nature of the processing involved is very different for these tasks.

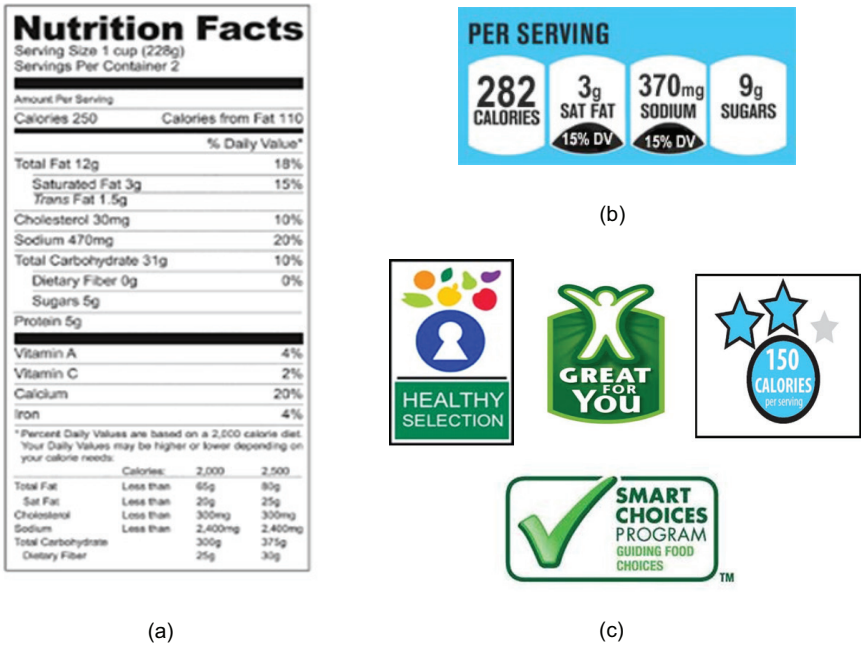

FIGURE 2-3 Different types of nutrition information messaging on food packages. (a) The Nutrition Facts panel, which is usually located on the back of a package. (b) An example of reductive, or objective, front-of-package labeling, with information taken from the Nutrition Facts panel. (c) Examples of interpretive, or evaluative, front-of-package labeling.
SOURCE: Presented by Scot Burton on September 3, 2015.

For comparative tasks, in which a consumer is evaluating several products, Nutrition Facts panels are not very practical, Burton asserted. With respect to front-of-package information, he stated that, based on resource matching theory, an evaluative icon should be a better match for consumers in a comparative processing context, while a reductive icon should be a better match in a noncomparative processing context (Newman et al., 2016). In a pilot study on icon attributes, he and his colleagues asked consumers a series of questions about their perceptions of different types of front-of-package icons. Consumers responded using a 7-point scale. Objective icons, such as the Guideline Daily Amounts (GDAs), were perceived as more detailed, specific, and quantitative than evaluative icons and as more appropriate for single-product evaluations. Conversely, evaluative icons were perceived as more interpretive in nature and more appropriate for product comparisons.

Burton elaborated on the methods used in a nutrition labeling study designed to evaluate different consumer processing contexts (i.e., whether consumers are evaluating a single product or comparing multiple products). In a comparative processing context, he explained, consumers look at different products and evaluate them simultaneously in a comparative manner, and then base their evaluation of the healthfulness of the single objectively healthiest product relative to the set of other products. In a noncomparative processing context, he continued, consumers are shown only the single objectively healthiest product, and their evaluation of the healthfulness of the product is based on their impression of that one product. In both processing context conditions, consumers are shown either reductive or evaluative icons. When conducting this type of study, Burton explained, in addition to gathering information on consumers' perceptions of the objectively healthy product (e.g., "not at all nutritious" versus "highly nutritious," "very unhealthy" versus "very healthy"), researchers can measure processing fluency (e.g., "it is easy to determine how healthy this product is," "information about this product is easy to process") and purchase intentions for the healthy product (e.g., "very unlikely" versus "very likely," "not probable" versus "very probable").

Purchase intention for a more objectively healthy product has been shown to be greater for evaluative front-of-package cues (e.g., Model Front-of-Package Symbol System [IOM, 2012]) in comparative than in noncomparative processing tasks, Burton explained. The effects are reversed with reductive cues (e.g., the GDA icon), with purchase intention for the objectively healthy product being greater when the consumer is engaged in a noncomparative processing task than when engaged in an evaluative task. Again, Burton said, "The nature of the task makes a difference in the performance of the different [front-of-package] cues."

In an expanded experimental design, Burton continued, investigators

can examine product choice more closely by exposing consumers to situations in which they see either no icon, just reductive icons, just evaluative icons, or both types of icons on a set of products. Crowding information on food packages is not desirable, but often is the case in the marketplace today, he noted. What he and his colleagues tend to see when they conduct this sort of study is that the interaction between the evaluative icon and objective product healthfulness has a significant effect on purchase intention. This means that when the objective nutrition level of a product is high, adding an evaluative icon to the front of the package, such as the Model Front-of-Package Symbol System (IOM, 2012), increases overall purchase intention, he explained. The opposite occurs when the objective nutrition level of a product is low: adding an evaluative icon on the front of the package reduces people's purchase intentions.

In summary, Burton said the FDA and other groups are interested in the potential effectiveness of different front-of-package formats (Andrews et al., 2014; Newman et al., 2016). He asserted that the recent research summarized above suggests that processing context should be considered when evaluating these formats: What situation is the consumer in? Is she or he evaluating a single product or deciding among a set of products? Relative to only a Nutrition Facts panel, Burton noted, there appears to be some value in both types of front-of-package icons. Generally, however, as the processing difficulty increases for the consumer, the importance of the evaluative, or interpretive, component becomes greater, he said.

Calorie Disclosures for Restaurant Chains

Burton went on to discuss some of the work he, Andrews, and other colleagues have conducted over the past 10 to 15 years on calorie disclosures for restaurant chains. Since the NLEA was passed, people have been eating away from home more often. According to Burton, American consumers now spend close to 50 percent of their total food budget on food prepared outside of the home, up from 25 percent in 1970.

Burton told the workshop audience how, a number of years ago when his children were young and before information about calories or nutrient levels for foods purchased in restaurant chains was publicly available, he would take his children to a certain restaurant once every 2 or 3 weeks. He would always order nachos from the appetizer section of the menu. He knew that the meal, with its cheese and sour cream, was not healthy. Still, when the nutrition information was made available online, he was surprised to learn that every time he ate his plate of nachos, he was eating 2 days' worth of total fat, 3 days' worth of saturated fat, and 1.5 days' worth of sodium. These figures were far beyond his expectations about just how unhealthy the meal was.

By 2009, a growing number of states and localities were requiring disclosure of calories for restaurant chains. As Burton explained, however, different states and counties wanted different types of disclosures, leading to the 2010 passage of a national menu labeling law that overrode the state differences and established a single set of ground rules. The initiative was strongly supported by the National Restaurant Association, according to Burton, because of the importance of standardization for the industry. As of December 2016, all restaurant chains with more than 20 stores nationwide will be required to comply with this law.

Researchers who study calorie disclosures for restaurant chains consider a number of assumptions, Burton explained. The first is that there is a segment of consumers who want to make healthful food choices when eating outside the home, but there is another, generally larger segment who care little about the calorie and nutrient content of restaurant foods. Another assumption, Burton continued, is that many consumers will misestimate calories for foods they consume away from home, as he did with his nachos. Yet another assumption is that changes to the information environment could have the greatest impact on those consumers who not only are misestimating some items but also are motivated to make more healthful food choices. Finally, and key according to Burton, is that there are many possible interactions between these factors and contextual influences. While many laboratory studies have shown that providing calorie information affects what people say they will purchase, he noted, the actual effects vary among different segments of the population and in different contexts and conditions.

As an example of the type of study design Burton and his colleagues have used in their research on calorie disclosures for restaurant chains, he showed several items pulled from a dinner house restaurant menu. He explained how one group of consumers would see the items with no calorie information, while a second group would see the same menu but with objective calorie information added. A typical finding of this sort of study, he observed, is that people provided with calorie information choose meals that have, on average, about 250 fewer calories overall. However, when these kinds of data are examined using what is known as a health orientation value, the difference in calories in meals ordered does not become statistically significant until the health orientation reaches a value of about 5 on a 7-point scale.

Results from this type of study contrast with what has been observed in marketplaces in cities where menu labeling has existed for a few years (e.g., New York City, Philadelphia, Seattle), Burton explained (e.g., Elbel et al., 2009, 2011; Harnack and French, 2008; Long et al., 2015). This discrepancy is not too surprising, in his opinion, given that calorie labeling should have effects only for some items (i.e., those for which calories are

misestimated), for some people (i.e., those who are health literate, motivated, and knowledgeable), and for some occasions.

Burton used a funnel to illustrate the effect of the many factors that impact consumer food choices and consumption (Burton and Kees, 2012). The consumer segment that is actually impacted in a favorable way by calorie labeling is probably relatively small, he suggested.

In summary, Burton reiterated that many individual-difference variables and contextual factors impact, in this case, what a consumer orders for any particular dining occasion. Motivations for food consumed outside the home differ substantially across consumers, with different people valuing taste, amount or quantity, and convenience to varying degrees (Glanz et al., 1998; IFIC, 2011). According to Burton, low-calorie or health-related disclosures often lead to negative inferences about taste, satiation, and quantity, at least for some consumer segments. Moreover, he suggested, because taste, quantity, and convenience often trump nutrition and health information, calorie disclosures may actually lead to increased calorie consumption for some consumers. He referred workshop participants to Brian Wansink and colleagues' research on sensory, emotional, and normative drivers of food consumption (Wansink, 2014; Wansink and Chandon, 2014). He suggested that, when considering effects of calorie disclosures for restaurant chains, policy makers and health researchers should consider chains' reformulations and new product offerings as part of the aggregate effects of these market changes.

Concluding Thoughts

In conclusion, Burton emphasized, again, that consumers are exposed to a broad array of nutrition claims, icons, and information on a daily basis, resulting in many inferences and questionable conclusions. The effects can be large and not necessarily what is desired, he suggested. While nutrition disclosures and communications have many beneficial effects, he said, a variety of factors impact their overall effectiveness and, ultimately, consumption behavior. In his opinion, given the complicated and dynamic nature of today's marketplace, there is much opportunity for future research.

ACTIVATING CONSUMERS ON THE PATH-TO-PURCHASE: DECODING THE ROLE OF BIG DATA AND DIGITAL MARKETING[6]

Chester began by asserting, "We need to understand the narrative of digital media in our lives. If we are to understand and effectively respond to the dramatic changes that have transformed and will continue to [trans-

[6] This section summarizes information presented by Mr. Chester.

form] how we live our lives in the digital era, including how we decide what products to consume, we need to pay attention to this transformation."

Food and beverage companies are increasingly able to influence consumers throughout the day, both offline and online, according to Chester. Not just product producers but also retail and grocery stores are at the forefront of these changes, he noted. He stressed the global nature of the industry and what he described as the "very powerful" digital communication techniques being used to transform media, marketing, and sales and to trigger and influence brand loyalty and behavioral response. One of his takeaway messages was that this emerging system is growing more powerful and sophisticated every day, with ads targeting individuals based on what is known about their race, their income, where they live, and what they buy.

Chester elaborated on the many ways in which food and beverage companies have evolved to become more than product producers, marketers, and sellers, not the least of which is that they have become what he described as big data specialists. He cited @WalmartLabs, a Walmart spin-off in Silicon Valley, as an example. Its neuroscientists use the latest techniques and tools to better understand how the human mind works and how brands and product messages can be inserted into people's unconscious minds. Food and beverage companies also are increasingly focusing on entertainment and information, Chester noted, specializing in creating experiences, activating individuals, and engaging in storytelling. Many have social media newsrooms with daily programs and, increasingly, online music channels. In Chester's opinion, food and beverage companies are becoming "community organizers" as well, with highly developed social media marketing strategies that take advantage of consumers' mobile and social relationships and locations. Finally, he observed, these companies have become venture capitalists in the new media, investing in startups to ensure that their brands and products are featured in the online apps that people, especially children, use. He also noted that, through their partnerships with the most powerful digital media companies, including Google, Facebook, and others, food and beverage companies have redefined shopper marketing in the 21st century. This reality must be addressed when one is thinking about the kinds of interventions that can help people live healthier lives, he emphasized.

According to Chester, one of the food and beverage companies leading the way is Mondelēz International. He described its 2014 Oreo campaign, which was a finalist for a 2015 Effie Award in advertising and marketing. The goal was to have each customer who bought one pack of Oreos buy a second pack. The ad targeted mothers with children younger than 12. The campaign addressed every touch point along the path to purchase, Chester observed. Mondelēz used social media (including Facebook), digital banner ads, and an online instant win game and promoted the campaign in a

weekly print circular and in digital coupons. It also used in-store sampling. Chester reported that sales grew 7 percent, with 105,000 people visiting the instant win game webpage and with data being collected on almost 67,000 of those visitors. Food and beverage companies are constantly creating new campaigns like this one, he said. They have responded to the growing availability of individualized data by investing significantly in highly sophisticated data management platforms and related services. Moreover, they are recognizing the opportunity to communicate with single individuals regardless of what device they are using. Chester cited Kellogg's client relationship with Krux, a leading data marketing company, as another example of how food and beverage companies are using information about consumers in unique and powerful ways.

Advertising that uses super-fast computers to target individuals using their data profiles is known as programmatic advertising, Chester explained, and represents about 40 percent of the overall digital advertising market. He showed recent media headlines providing a sense of what some food and beverage companies are doing with such advertising: "How Kellogg's Partners with Publishers on Programmatic" (May 2015); "Mondelēz Taps TubeMogul for Programmatic Video" (June 2014); "D3 Studios Is a New Digital Agency Serving Iconic Brands with the Frito-Lay Portfolio" (August 2015); "WFA Releases Programmatic Media Guidelines for Brands and Unveils Coca-Cola, Johnson & Johnson, Boehringer, Mastercard as Part of 'Taskforce' to Drive Take-Up" (September 2014); and "Here's How Unilever Leverages Programmatic Buying for All-Inclusive Mobile Push" (February 2014).

Chester observed that programmatic advertising can be used to either target or reject a consumer in milliseconds based on collected data indicating whether the consumer has shown an interest in a certain product. Children aged 12 and younger are protected by 1998 federal legislation—the Children's Online Privacy Protection Act (COPPA), but sadly, he said, there is no real privacy legislation for individuals aged 13 and over. These new forms of data targeting to sell food and beverage products also are being aimed at Hispanics, African Americans, Asian Americans, and low-income consumers, he noted.

In addition to programmatic marketing, food and beverage companies have invested heavily in what is called "neuromarketing," Chester continued. They are using such techniques as functional magnetic resonance imaging (fMRI), electroencephalograms (EEGs), eye tracking, and galvanic skin responses to ensure that their messages reach the subconscious parts of consumers' minds. The goal, Chester said, is to increase dopamine levels in individual consumers, and he described neuromarketing as a global phenomenon that has taken off in the past 5 to 6 years.

"Social media surveillance" is the term Chester used to describe the

way food and beverage companies are continuously tracking everything consumers say and do on social media sites such as Facebook, Twitter, and YouTube. They are analyzing the flow of information and immediately responding by creating countermessages and strategies to program the social media environment, he explained. Because consumers have become dependent on mobile phones, he said, companies are able to reach them at anytime, anywhere.

Additionally, Chester observed, companies are using their collected data to identify and map consumers' locations and track their movements. They know when a mother goes to school, to the playground, and to the grocery store, he said, and they are using what is known as hyperlocal targeting, or advertising, to send coupons in real time. A woman may be driving down the street, for example, on the way to a competitor's store, and because she has downloaded a particular app on her mobile phone, a company can send her a coupon in real time to encourage her to shop across the street instead. Even inside stores, Chester noted, mobile coupons can pop up and direct a consumer to a certain aisle. "All of this is happening," he said. "None of this is science fiction." Industry use of mobile coupons needs to be addressed, he suggested.

Increasingly, moreover, consumers will be making payments through their mobile devices. When Apple Pay was first introduced, McDonald's was a partner. In the near future, Chester predicted, a consumer will be able to order food at the press of a button such that payment and waiting time will be seamless.

Young people in particular are being targeted by this "incredibly powerful digital marketing machine," according to Chester. As an example, he showed a video of Walmart working with Coca-Cola to target teens through an award-winning campaign that involved the use of digital media. And it is not only teens who are being targeted, he said. When Google launched its YouTube app for children under 5 years of age in early 2015, it was filled with ads, including many for foods and beverages. In fact, Chester said, a whole new generation of YouTube celebrities is promoting fast food and beverages. As an example, he showed a YouTube video in which one of these new celebrities, EvanTube, promotes new flavors of Pringles potato chips (https://www.youtube.com/watch?v=KVDHl26K7yQ [accessed March 17, 2016]). The video is not a 30-second commercial, but a 19-minute segment. According to Chester, companies are not just selling products; they are creating environments that nurture deep brand loyalty. "This is what we are up against now," he said.

In concluding, Chester suggested the need for new rules governing cross-platform marketing to children, policies to protect adolescents, fair marketing practices for the digital era, enforcement of COPPA, and effec-

tive self-regulation enforcement. He stressed, again, "This is something that we really need to address now."

HOW POLICIES CAN PROMOTE HEALTHY FOOD ENVIRONMENTS AND FOOD LITERACY TO BENEFIT POPULATION HEALTH[7]

The *Dietary Guidelines for Americans* (DGA) is one of the major policy documents influencing much of what is done to promote healthy food environments and food literacy in the United States, Kraak began. The DGA in use at the time of this workshop was the 2010 version, with the 2015 version expected to be released by December 2015. Another major policy document influencing the promotion of healthy food environments and food literacy, Kraak continued, is the U.S. Department of Agriculture's (USDA's) MyPlate, which is based on the DGA. MyPlate not only sends about eight different messages, from "make half your plate fruits and vegetables" to "switch to skim or 1% milk," but also is available in several versions, including a Spanish version, a children's version, and a SuperTracker version for people who want to individualize the recommendations. Added to these, noted Kraak, is the Harvard School of Public Health's Healthy Eating Plate version of MyPlate. So just with the DGA and MyPlate alone, she said, "We have a lot of diet-related messages."

In addition to the DGA and MyPlate, observed Kraak, is the wide range of food and beverage product and restaurant menu labeling, plus the Nutrition Facts panel. Not only are there very large numbers of messages, she suggested, but the Nutrition Facts panel is highly numeracy based. The Facts up Front labeling system launched in 2011 by the Grocery Manufacturers Association and the Food Marketing Institute also is a numbers-based system. Yet, Kraak remarked, as Cynthia Baur had discussed (see the summary of her presentation in Chapter 1), a high percentage of U.S. adult Americans struggle with numeracy.

Kraak asserted that the crowded messaging environment is made even more so by the growing number of sustainability, eco-friendly, and ethical food labels as more consumers seek to know who produced their food and how. And added to these numerous different messages and labels in the U.S. food information environment, she continued, are the many brand mascots and media characters being used to market to children. She noted that of the 14 companies examined that participated in the industry self-regulatory program called the Children's Food and Beverage Advertising Initiative (CFBAI), not one has yet pledged to align its brand mascot with uniform nutrition criteria. This is an area in which companies could be

[7] This section summarizes information presented by Dr. Kraak.

pressed to perform better as a matter of corporate responsibility, she suggested. In addition to brand mascots, entertainment companies license their cartoon media characters to food, beverage, and restaurant companies for marketing products to children and teens. While some companies have made voluntary pledges under the CFBAI, the use of these characters on packages and toy premiums in food retail settings is not covered by these pledges, Kraak observed. Again, industry can do important work to improve the healthfulness of the food marketing landscape for young people, she suggested. She described celebrity endorsements of foods and beverages, including restaurant meals, as "the wild, wild west." Again, she said, most companies have made no voluntary pledges to align their celebrity endorsements with healthy criteria that target adolescents in particular.

In Kraak's opinion, the very crowded food and beverage messaging environment calls for comprehensive, consistent, and smart policies—not necessarily new policies, but revisions to existing ones. She stressed the need to disincentivize the marketing of products that are unhealthy and to incentivize and increase the production of healthy food and beverage products.

Public Policy and Food Literacy

What Harold Lasswell said about the difference between politics and policy some 80 years ago still holds true today, in Kraak's opinion. That is, "politics is a process of who gets what, when, and how," while policy is a law, procedure, or standard that dictates and guides how government, businesses, and organizations operate and how citizens live (Lasswell, 1936). Public policy, Kraak continued, is what public officials in government, and the citizens they represent, choose to do or not do about public problems. Importantly, public policy is not a linear process, she emphasized. Rather, it is iterative, with policies sometimes taking one step forward, then two steps back, she explained.

Another important point to keep in mind, in Kraak's opinion, is that most researchers in the field of food and nutrition policy spend their time thinking about the details of the issues (UK Food Ethics Council, 2010): Exactly what happens? Is the problem trans fat? Is it sugar? Is it salt? Is it food insecurity or obesity? Kraak urged more focus on the rules of engagement and the terms of the debate, that is, why and how things happen (UK Food Ethics Council, 2010). She emphasized that there also are many stakeholders at different levels, with different interests in food and nutrition issues and with varying levels of power and influence regarding how funding is used (Bryson et al., 2011).

Finally, Kraak emphasized that both public- and private-sector policies impact food, nutrition, health, and media literacy (see Figure 2-4). Public-sector policies are important, she said, "but we also need to be reaching

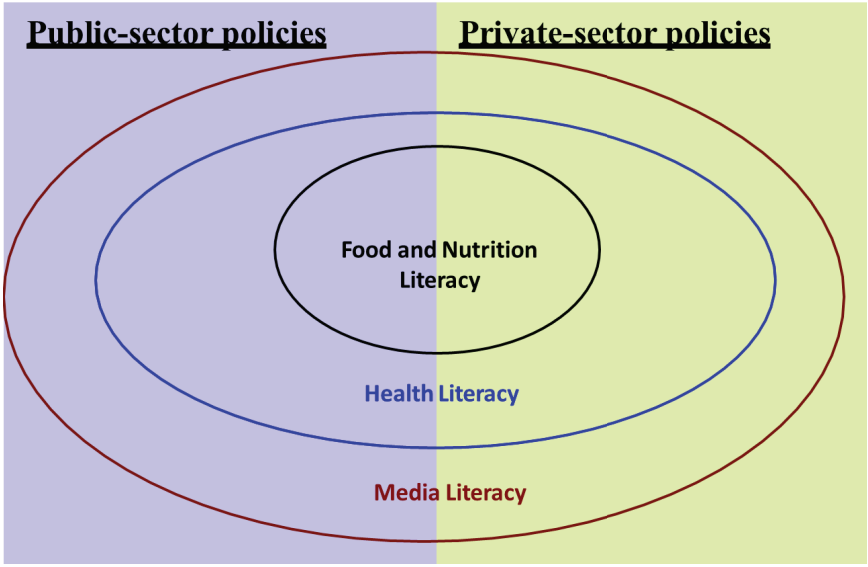

FIGURE 2-4 The food, nutrition, health, and media nexus.
SOURCE: Presented by Vivica Kraak on September 3, 2015.

out to the private sector to say, 'You could be doing a lot more with your voluntary efforts in order to be marketing food and beverage products that support a healthy diet much better than you currently are doing.'"

When Science Clashes with Public Opinion

Kraak posed the question, "What do we do when science clashes with public opinion?" For example, many authoritative bodies—including the FDA; the National Academies of Sciences, Engineering, and Medicine; the European Commission; the World Health Organization (WHO); the American Medical Association (AMA); and the American Association for the Advancement of Science (AAAS)—say that GMO foods are safe to consume. Yet according to a 2014 study conducted by Health Focus International (Watson, 2015), 87 percent of consumers think non-GMO foods are healthier. Although there is some variation in this regard among Americans, Europeans, and Asians, Kraak noted, GMOs still are ranked among the top five issues of concern among global shoppers, and a whole industry has developed around non-GMO-verified labeling. She reported that while 2013 annual sales of foods labeled as non-GMO amounted to just over $3

billion, the sale of third-party-verified products represented about $8.5 billion in annual sales (Mayer, 2015). Now there are even third-party auditors, such as FoodChain ID, that advise on and certify non-GMO food products for companies. Additionally, some food companies use non-GMO food marketing as part of their product marketing profiles, according to Kraak.

The gap between what eight different institutions have said about the safety of GMO foods and the growing industry around non-GMO food products demands attention, in Kraak's opinion. For her, the question is how this disconnect can be addressed with policy. The state of Vermont passed a GMO food labeling law in 2014 that would have required such labeling beginning in 2016. In July 2015, however, the U.S. House of Representatives passed H.R. 1599, the Safe and Accurate Food Labeling Act of 2015, which, if it becomes law, will supersede the Vermont law and give the FDA the authority to mandate labeling for foods with altered nutrition profiles, such as the presence of allergens, and give it the authority not to mandate GMO food labeling. Kraak noted that supporters of the "Just Label It!" campaign call H.R. 1599 the "Denying Americans the Right to Know" (DARK) Act. In her opinion, what is "really" going on, which she said was well expressed in a recent National Public Radio (NPR) editorial (Lowe, 2015), is that GMOs are a proxy for other uncertainties that people have about the food environment. She mentioned local and regional food systems as examples to counter consumer concerns, and urged greater consideration of these concerns.

Cultural Differences Between Researchers and Policy Makers

Political decision making is very different from scientific decision making (Brownson et al., 2006), Kraak explained. She listed the most important things scientists need to know about policy making if they want to be effective in transmitting their messages (Tyler, 2013):

- Formulating policy is difficult, and no policy will ever be perfect.
- Policy makers are not a homogeneous group and can be experts, too. Many have Ph.D.s and other professional credentials.
- Policy decisions are subject to extensive scrutiny, which is why they are sometimes watered down in their final form.
- Developing policies from scratch is rarely an option for policy makers. Usually, they must build on considerable work done by others.
- Economics and law, not health and nutrition, are priorities in policy advice.
- Public opinion matters to policy makers, particularly if they want to get reelected.
- Again, policy and politics are not the same thing.

- Policy and science operate on different time scales (Brownson et al., 2006). Political decision making has a much shorter timeline, during which policy makers must make political judgments and build support so they can get reelected. Scientific researchers work over a much longer timeframe and can look at issues in a very different way.
- As Kraak had mentioned previously, policy making is an iterative, not linear, process.
- Policy making is an evolving art and science.
- Policy makers are not interested in science unless it helps them make better decisions.
- "We need more research" is the wrong answer. That is not what policy makers want to hear, according to Kraak. She said, "You have to give them the best available evidence, not the best possible evidence."

With respect to how policy makers use scientific evidence, Kraak emphasized that they have a different perception of the value of research for informing policy. "We need to be aware of that and appreciate and work with that consideration," she said. Policy makers sometimes may use scientific research, such as systematic evidence reviews, cost–benefit analyses, and modeling, she acknowledged, but they also use a great deal of nonresearch evidence. And while they rely on expert opinions, she said, they also rely on the opinions of the public and their constituents, as well as local knowledge, information about political feasibility, personal stories and anecdotes, and political principles.

Kraak encouraged researchers to understand the diverse roles they can play in the policy process and to take advantage of political windows of opportunity to become involved. She cited qualitative research with policy elites in Australia, in which Haynes and colleagues (2011) found that policy makers use expert advice from researchers to galvanize ideas, clarify and advise on issues, persuade others, and defend positions. Policy makers seek robust dialogue and creative thinking from experts and value expert opinion even when research is limited, the researchers concluded.

Additionally, Kraak encouraged scientists to learn how to communicate policy-relevant information effectively and to cultivate relationships with legislative staffers. She urged that they share their personal experiences and anecdotes; provide brief, 1-page fact sheets, not 20-page peer-reviewed articles; and cultivate political champions. She noted that the retirement of Senator Tom Harkin of Iowa, who served from 1985 to 2015, represented the loss of a champion for promoting nutrition and health. Finally, she urged researchers to ask policy-relevant questions and conduct policy-relevant research.

Kraak listed several ways to track policy-relevant research outcomes and measure their translation into practice (Wilsdon et al., 2015). In terms of dissemination, one can measure the number of times such information is shared through social media or mentioned in the popular press; the number of times it is viewed online, heard through podcasts, or downloaded; and the number of times audience members at events or exhibition viewers engage with the information. Additionally, one can measure how often the research is discussed in public debates; referenced by journalists; cited in reports from government, industry, foundations, and nongovernmental organizations (NGOs); and mentioned in legal arguments or used as evidence in case studies. Finally, one can measure how often such research is used by academics serving on corporate or NGO boards, government advisory committees, or professional organizations; used by researchers engaged in paid or contracted research; and used in teaching materials, taken up by professional organizations, or built on to improve performance.

Concluding Thoughts

To conclude her presentation, Kraak highlighted five key points:

- The current U.S. food environment is highly saturated with diet-related messages. It not only fosters "information overload" but also sends inconsistent messages about healthy, available, and affordable dietary choices.
- Smart, consistent, comprehensive policies are needed to transform unhealthy U.S. food environments and to support food, nutrition, health, and media literacy.
- These policies need to be based on coordinated input from many stakeholders. While it may be the government's role to develop policy, all individuals need to voice their views for policies to be implemented and evaluated.
- Scientists need to be aware that policy makers value both scientific and nonscientific evidence.
- Scientific research can support policy development, implementation, and evaluation.

ROLE OF POLICY: WHY DO WE BASE POLICY ON HOW WE FEEL AND NOT ON SCIENCE?[8]

Levitt presented three case studies of gaps between public policy and public perception. These case studies were based mainly on his experience

[8] This section summarizes information presented by Mr. Levitt.

working with the FDA, which began in 1978. Through the 1980s, he spent most of his time in the FDA commissioner's office. He finished his 25-year tenure as director of the Center for Food Safety and Applied Nutrition (CFSAN).

Alar and Apples

Levitt's favorite case study of the gap between public policy and public perception, he said, is a food safety example involving Alar and apples in the late 1980s. At the time, the greatest safety concern was cancer in the food supply, and the FDA was trying to determine how to implement the Delaney clause.[9] Understandably, Levitt remarked, public anxiety on the subject was high. Alar was a chemical used as a ripening agent to help apples maintain their color and keep them on the tree longer. But it was regulated by the EPA as a pesticide. A *60 Minutes* exposé, followed by a series of public appearances by Meryl Streep telling people to "throw away your apples," fueled growing public concern that Alar was potentially carcinogenic, Levitt noted. In response to this growing public concern, the EPA, which had conducted the usual risk assessments and found that Alar posed no risk, contacted the FDA, which declared, "Apples are safe." But the public did not listen. Instead, there was what Levitt described as "public hysteria" around Alar and apples.

Reacting to this response, the FDA invited Ned Groth of Consumers Union to the commissioner's office. Levitt told the workshop audience how he still remembers Groth's presentation more than 20 years later. Groth talked about Sandman's (1987) "consumer outrage factors." The number one factor contributing to consumer outrage, according to Sandman and as conveyed by Groth, is whether something is intentionally added or naturally occurring. Alar was intentionally added. Groth recalled speaking with an *NBC News* reporter, and being quoted on the *Evening News* by Tom Brokaw as saying that acrylamide occurred naturally as a result of the cooking process. Although Groth spoke with the reporter for about 20 minutes, the show capitalized on that one statement, Levitt said. The public sentiment was, "It occurs naturally . . . we cannot blame anyone . . . there is no victim . . . there is no villain." Acrylamide never triggered massive public outrage.

Levitt explained that the number two factor contributing to consumer outrage, according to Sandman (1987) and as conveyed by Groth, is whether something is transparent or hidden. Because pesticides are used on a farm and not seen by consumers, they are, Levitt said, "on the wrong

[9] The Delany clause, part of the Food Additives Amendment of 1958, bans the use of chemicals in food that are known to be carcinogenic.

side of the ledger." Other factors contributing to the outrage over Alar, he suggested, were the fact that apples are fed to a vulnerable population—children—and that cancer is considered a very serious risk.

The number one lesson for the FDA from the Alar experience, according to Levitt, was that science by itself cannot control public perception; other factors come into play as well.

Shortly after the Alar case, another similar situation arose. Levitt recalled, "We all sat around and said, 'Here we go again. What can we do differently?'" First, the FDA distributed as much information as it could, as quickly as it could. Because of that transparency and because, as Levitt said, "there was nothing diabolical seemingly going on behind the scenes," the public did not display the outrage that characterized the Alar case. Based on this experience, he concluded that consumer outrage factors can be managed with some thought, although sometimes, he said, they "creep up on you," and policy makers need to take them into account.

Food Nutrition Labels in the Early 1990s

Levitt was involved with development of the current Nutrition Facts panel, which is now more than two decades old. Today, the label is viewed as an icon, but it also produced some unintended consequences, he said. He noted that it was based largely on reports by the surgeon general and other experts declaring, in essence, "fat is bad, eat less." The FDA heard that message and tried to implement it through policy by highlighting fat on the Nutrition Facts panel and specifying total fat, saturated fat, and calories from fat. "Miraculously," Levitt said, the food industry responded and developed a large number of low-fat, reduced-fat, and fat-free products. However, he observed, no one had really thought about the consequences of removing fat from foods—that to market those foods, the fat would need to be replaced with something else that would provide full texture and taste. That replacement was carbohydrates, which have a great deal of sugar, and hence calories, so many of the new low-fat products on the market ended up being higher in calories than their high-fat counterparts. As a result, people who were buying low-fat products because they were healthier ended up gaining weight instead.

Based on this history, Levitt reported, the FDA was proposing to change the Nutrition Facts label (at the time of this workshop), placing more emphasis on total calories and providing a more nuanced fat message. So the landscape has shifted, he observed, but the shift has been slow. It has been almost 25 years since the current Nutrition Facts label, with its emphasis on fat, was developed. The lesson learned, Levitt said, is that it is important to think not only about intended consequences but also about potential unintended consequences.

Foods Derived Through Biotechnology

The difference between Alar and food biotechnology, in Levitt's opinion, is that at least a serious potential risk was associated with Alar. But that is not the case with food biotechnology, he said. He stated that virtually every major reputable U.S. scientific organization is convinced that biotechnology-derived foods are safe. But when Europe, with its very different perspective, banned importation of foods derived through biotechnology in around 2000, the issue "mushroomed," he recalled. At the time, he was CFSAN director. Several of Sandman's (1987) consumer outrage factors were at play, he observed. The biotechnology was hidden. It was intentional, as opposed to naturally occurring. And while the associated risk was not considered serious, Levitt noted, an unknown risk can be as bad as or even worse than a known serious risk in people's minds. In addition, he said, foods derived from biotechnology had a dedicated counterforce—environmentalists, who effectively branded them in a negative way, initially as "frankenfoods" and later as "genetically modified organisms." He explained that the FDA conducted some focus group studies and found that people viewed the term "genetically modified organism" as pejorative. Today, a decade later, the term is still used, and in fact has become part of the lexicon.

Levitt explained that the FDA's response to the increased concern about food biotechnology was to begin holding public meetings around the country. "You would be surprised," he said. "You get a lot of public good will just by listening." Many times Sandman's public outrage factors arise because consumers feel that nobody is listening to them, he observed. In addition to the public meetings, the FDA proposed stronger regulation to make the review of any new plant varieties mandatory. A voluntary review system had been in place, but making it mandatory made it perceived as a stronger program, Levitt suggested. The agency also issued draft guidance on voluntary labeling for products that do not contain ingredients derived through biotechnology. Together, these steps "calmed things down," Levitt said, as least for a period of time.

A couple of years ago, however (more than a decade later), public concern again emerged, Levitt continued. Although the scientific community remains confident that food biotechnology is safe, he suggested, consumers want transparency. There has been some state legislation on labeling, he noted, and federal legislation is pending.

Biotechnology in pharmaceuticals, in contrast to that in foods, was popular with the public, Levitt said, as was the case with medical diagnostics. The only difference, in his opinion, is the consumer benefit provided by those products. Pharmaceuticals and diagnostics give consumers something better than what they had before, he said. When offered a life-saving drug,

no one asks, "Was it genetically engineered?" By contrast, Levitt argued, biotechnology in foods provides no consumer benefit (it is viewed as a farmer's tool, not something that improves consumer consumption), so the unknown risk weighs heavily in consumers' minds.

Concluding Thoughts

To conclude his remarks, Levitt emphasized several points:

- Be simple. He recalled that when the FDA was developing the first food nutrition label, there was a great deal of discussion about how the label should be structured and how much information it should offer. Most consumers want something very simple, clear, and direct, Levitt suggested, and while the label that was developed had other issues, it definitely accomplished simplicity.
- It is difficult to explain complex issues. Levitt recalled someone at one of the food biotechnology meetings standing up and asking, "How can you tell me that adding a gene from a bug to my food is good?" There is no 30-second answer to that question, he said, except to say that scientists agree it is safe.
- Try to learn what is really causing the gap between public policy and public perception. Levitt agreed with Kraak that with food biotechnology, other concerns enter the discussion—for example, issues around sustainable agriculture and locally grown foods. He suggested that these other issues make it difficult to identify the real underlying motives driving the anxiety.

PANEL DISCUSSION

Session 2 ended with a panel discussion among all the speakers, with members of the audience invited to ask questions. This section summarizes the discussion that took place. Also included here, in the first section ("The Influence of Celebrity Culture"), is a summary of the brief discussion that took place immediately following Timothy Caulfield's presentation.

The Influence of Celebrity Culture

Following his presentation, Timothy Caulfield fielded many questions from the workshop audience. First, Sarah Roller, a session moderator, asked him about Angelina Jolie's endorsement of breast cancer screening, which Roller considered a "fairly science-based choice" compared with the other examples cited by Caulfield. She asked where the "germ" of an idea begins

when a celebrity decides that he or she is going to take on a particular case. How do celebrities decide that "this" is going to be "my cause"?

Caulfield replied that Angelina Jolie is often perceived as an example of the positive, or constructive, impact that a celebrity can have on decision making. But the data are mixed regarding whether the so-called Jolie effect has been beneficial for women's health. Regarding celebrity endorsement decisions in general, he said, "They are desperate . . . to lose weight, to stay looking young . . . they are under tremendous pressure." In his opinion, that is where it starts—they are willing to try anything. Moreover, he noted, most celebrities have a team around them that reinforces their behavior. Then, he said, "it takes off." Often there may be some data behind whatever it is the celebrities are endorsing. If the science is contested, Caulfield noted, as it has been for nonceliac gluten sensitivity, they "cherry-pick" and "latch on" to that little bit of supportive data.

There is a deliberate infrastructure in the food marketing realm that is spending millions and millions of dollars to influence celebrities to endorse, Chester pointed out. He asked Caulfield whether any researchers have been studying that infrastructure, or network, of specialist companies that are working across platforms to influence celebrities in a deliberate way. Caulfield replied that there is continuum of celebrity endorsements, with some celebrities, such as the actress Shailene Woodley, being genuinely interested in what they are communicating, while others, such as Beyoncé with Pepsi or Kim Kardashian, who was recently promoting a drug on Instagram, are clear endorsers as part of orchestrated industry moves. He agreed with Chester that the power of social media was being increasingly leveraged. A question now, he suggested, is how it can be stopped. Regulation will be difficult, in his opinion.

An audience member remarked on the growing number of pro-science celebrities on social media, such as Bill Nye the Science Guy, and opined that, while a "great start," these personalities are "preaching to the choir" and do not have the same reach that someone like Gwyneth Paltrow has. She asked whether Caulfield agreed with that assessment and what kind of messaging channels and personalities are needed to get pro-science and pro-evidence-based nutrition messages to people who are not already receptive to these messages. Caulfield agreed, noting that he has observed the same trend in Canada. "I wish I had an answer," he said, "but I don't."

Fergus Clydesdale, co-moderator of the session, added that, first, scientists need to agree on which messages to convey. Caulfield concurred and encouraged the scientific community to become involved in social media and to become part of the discussion. If they do not become involved, then the messaging is being left to Dr. Oz and other celebrities, he asserted.

An audience member expressed interest in Caulfield's focus on organic food, which the audience member pointed out does have some environmen-

tal benefits. In his opinion, however, most people would agree that today's biggest public health crisis is obesity. He asked about the celebrity impact on obesity and expressed concern that celebrity endorsements are damaging in the way they encourage widespread consumption of very unhealthful products. He asked how that damaging effect can be counterbalanced and why there is not more focus on what has been driving the obesity crisis, including the celebrity role. Caulfield noted that the examples he had used were simply good examples of the role of celebrity culture. He agreed that celebrity culture has played a role in the obesity crisis through the marketing of sports drinks, pop, and similar products. More important, in his opinion, celebrity culture has had a more subtle impact via its emphasis on short-term solutions, extreme approaches, and aesthetic goals. Preliminary data suggest, he noted, that an emphasis on those kinds of goals, as opposed to working toward wellness or enjoyment or health, is associated with a lower likelihood of success.

Linda Neuhauser commented on the many good experiences she has had working in Hollywood over the past 12 years. She described how she and her colleagues have used celebrities alongside experts and parents in a "seamless" way to present parenting messages that are realistic, interesting to people, and science-based. She suggested studying that kind of successful leveraging of pop culture. It can be done, she said, but "it has to be done in an artful way." Caulfield agreed and noted some interesting research that has shown how a good narrative, for example in a documentary, can have a sustained impact on public perceptions.

More on Celebrity Culture and Obesity

During the panel discussion, an audience member reiterated that the greatest food-related challenge for the Food and Nutrition Board is obesity. Noting that dozens of celebrities speak on behalf of Coke, Pepsi, McDonald's, and other companies, he asked, "Where is the outrage about the fueling of the obesity crisis by celebrities that are pushing those [products]?" In his opinion, some of what has been discussed, particularly organic foods and GMOs, are "straw men." He noted with respect to organic foods that most reputable organizations are not calling for people to eat such foods because they have greater nutritional value; rather, the concern is pesticide residues in conventionally produced foods and a belief that organic food production is more environmentally sound. He said the issue is similar for GMOs: it is not that they are unhealthy to eat, but that because 90 percent of corn and soybeans being grown are GMOs, the use of glyphosate has skyrocketed, and glyphosate was recently listed as a carcinogen. Again, he said, "There is an environmental issue there that does not seem to be recognized." Finally, with respect to Alar, he observed that

the EPA terminated its use in 1989 because its use was found to be associated with an unreasonable risk. A special EPA committee revisited the issue in 1992 and again found that it posed an unreasonable risk. Subsequently, a National Research Council committee issued a report, *Pesticides in the Diets of Infants and Children* (NRC, 1993), concluding that the EPA had not sufficiently protected children from pesticides. "We have spent a lot of time on issues other than the most immediate risks to health, including the obesity issue," he asserted. He asked the panelists how celebrities could be used to address the obesity crisis, rather than setting up strawmen.

Kraak replied that the first step would be to identify which celebrities have endorsement deals with which companies. She observed that few studies of celebrity food and beverage product endorsements have been conducted in the United States. One, from the Rudd Center for Food Policy & Obesity (Connecticut), found that 80 to 90 percent of such endorsements are for sugar-sweetened beverages and fast foods. "We need to do something about that," Kraak said. Additionally, she suggested strengthening the CFBAI. "They need to do much better than they currently are to protect children from the marketing of energy-dense and nutrient-poor food and beverage products," she said. However, she predicted that new legislation or regulation is unlikely in the near future. She suggested pointing out the "good players" and encouraging those companies to make pledges and then their peer companies to make comparable pledges.

Kraak's mention of the CFBAI prompted Chester to point out that getting it to do anything will require political pressure. Instead, he suggested pushing for legislation and conducting studies to expose the "invisible network of influencers" that is working online to promote food and beverage products. As he had elaborated during his presentation, he reiterated that food and beverage companies have engaged the services of specialist companies and have partnered with Google, YouTube, and others to make it appear as though friends and other people are promoting their products when in fact an orchestrated promotion is being conducted. He noted that on the day before this workshop, the Federal Trade Commission had sanctioned a company for engaging in this kind of practice for Xbox on YouTube. "Unfortunately," Chester said, "the answer was 'more disclosure.'" Burton remarked that lessons can be learned from what some federal agencies, such as the CDC and the FDA, have done with celebrities and antismoking efforts.

Kraak added that some celebrity promotions of healthy foods have recently been seen. She mentioned the Fruit and Vegetable Promotion (FNV) campaign, launched in February 2015 by the Partnership for a Healthier America in conjunction with Michelle Obama's Let's Move! campaign. The FNV campaign is using up to 20 celebrities to promote fruits and vegetables to teens and millennial mothers, according to Kraak.

However, that number is small compared with the 90 percent of celebrity endorsers who are promoting sugar-sweetened beverages and fast foods, she acknowledged. She reiterated the need to strengthen industry's self-regulatory efforts and hold it accountable. Additionally, she suggested doing whatever is necessary in the media strategically to change corporate behavior. She also commented on the Got Milk? campaign, which ran for 20 years and featured many iconic celebrities. Yet milk consumption and milk sales went down over that 20-year period—an outcome she found "interesting." She cautioned, "If we are going to be using celebrities for a good cause, we need to make sure we are not sending mixed messages to our target audience."

For Cynthia Baur, the question around obesity is whether it is a food literacy or health literacy issue. She suggested that while knowledge and skills may play a part, other factors are likely at play, including an emotional component, that are not typically topics of research but are clearly important to people's experiences. She encouraged examining these other factors.

The discussion of obesity, and Baur's comment in particular, led Sonya Grier to add that one factor often missing from discussions of food literacy is critical analysis. There is a great deal of discussion of knowledge, but less about that knowledge can be used in a critical way, she observed. When celebrities endorse a product, consumers need to know how to interpret that endorsement. For example, does that celebrity really drink five sodas a day while staying so thin? Part of being food literate, Grier suggested, is being able to analyze things that do not seem reasonable and truthful and to make more informed decisions.

Celebrity Culture and the Consumer

Craig Lefebvre responded to the celebrity issue by saying, "Throw the celebrities out the window." He compared focusing on celebrities to chasing butterflies. In his opinion, the research question is, "Who are the people who listen to celebrities and respond to celebrities?" Marketers know the answer to this question, he said, and that is why they use those celebrities. The challenge is not to identify what cues celebrities are using or how many Twitter followers they have, but which people are following the celebrities and then themselves advocating for a ban on GMOs, low-fat diets, or whatever the trend may be.

Funding for Food Literacy Interventions

An audience member observed that the hyperlocal targeting described by Chester during his presentation looked "incredibly labor- and cost-intensive." He asked Chester whether policy makers or anyone in the

National Institutes of Health (NIH) or any other government agency is working on developing counterstrategies and if so, whether they will need to partner with corporations to acquire the funding necessary to implement such strategies.

Chester reiterated that none of what he had described regarding the use of data and social media marketing was new. Food and beverage companies have been using these techniques for 4 or 5 years, he noted. In his opinion, the field could be doing a better job of tracking such developments and should have intervened earlier. He warned that the capacity to influence consumers to the extent that Coca-Cola and Mondelēz do requires a considerable amount of money. That said, the technologies these companies are using are "off the shelf" and relatively inexpensive. Chester suggested that counterstrategies could be developed, and that more research into the use of social media by these companies is needed to better understand how they are employing the technologies and determine the best set of counterstrategies. He would like to see the Federal Trade Commission subpoena food and beverage marketers to provide their data so researchers can study them and understand the marketers' networks of influence, including who is being targeted and why. He reiterated that the "YouTube celebrity" is a "whole new version of celebrity," some having millions of followers.

Additionally, Chester urged thinking about more holistic counterstrategies, that is, strategies that would counter not just what food and beverage companies are doing, but also what credit card, pharmaceutical, and other companies are doing. "It is the same system, same set of forces, at work," he said.

An audience member questioned whether the digital marketing taking place is really new. "I think back to the old West," she said, "and the guy that is out there selling the snake oil from the back of his carriage." He knew where he could make a sale and was targeting communities in the same way. In response, Chester replied that although there is a continuum, today's marketing is "a different kind of marketing." He noted that many of the technologies being used by marketers are the same as those being used by the National Security Agency. The system, he said, "follows you wherever you go. It observes what you do with your friends and what they do with you. It analyzes you. It targets you everywhere, and it makes decisions about your future in milliseconds without allowing you to participate. It immerses and embeds you in a marketing commercial system that we have never seen before." He referred workshop participants to a website, www.digitalads.org, that is based at the Berkeley Media Studies Group in Berkeley, California. This website catalogues what food and beverage companies have been doing with digital marketing over the past 10 years.

Thinking More Holistically

Hallman observed that one of the impressive things about the workshop thus far was that the various speakers had addressed the food literacy issue from slightly different perspectives, but that no one had contradicted anyone else. He asked, "Why don't we have a more holistic perspective?" The answer, he said, is "because [the issue] is really complicated." The easiest thing for a researcher to do is experiment with individual decisions, he noted, not environmental changes. Not only is it more difficult to change and evaluate environments, he suggested, but it also is more expensive. Indeed, sometimes evaluating whether an environmental change intervention has worked is more expensive than the actual intervention. To illustrate, Hallman mentioned a farmers' market at Rutgers University, which he helped start and which is funded by Johnson & Johnson, that adds value to Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) vouchers. Whether the added value is an effective incentive in terms of changing behavior is unclear. To answer that question, he said, would cost more than the actual intervention. He and his collaborators would rather spend that money on purchasing more fresh fruits and vegetables for their clients.

Research on Food Well-Being

Clydesdale commented on the outstanding studies on the effects, or lack thereof, of front-of-package labeling, described by Andrews and Burton. However, he wondered why researchers are not spending more time examining food well-being. Grier replied that consumers respond to the notion of food well-being and that it should be promoted. She noted that, as Burton had stated during his presentation, different consumers have different goals, and a food well-being framework accommodates that variation. Andrews agreed that food well-being is a good model to keep in mind, but he cautioned that operationalizing it and understanding how it can be most effective will be challenging. He suggested that the number of factors involved makes the concept highly complex. Burton added that developers of the Nutrition Facts panel faced the reality that cues, formats, and the panel itself have different effects on different populations—the panel helps some people, but not everyone, he said.

Starting Where the Audience Is

Referring to the emphasis of several speakers on the importance of "starting where your audience is," Lefebvre commented that many people want to eat healthy foods so as to be energetic. "I don't hear us talking

about energy," he said. When he raised this issue in the past with federal government agencies, the immediate response was that there is no science behind the claim that people are more energetic when they eat healthier foods. In his opinion, it is an "interesting conundrum" that consumers want to eat healthier foods to be more energetic, yet "the system" does not allow for any discussion of the issue because the relevant research has not been funded.

Health Communication

Lefebvre referred to Andrews's observation during his presentation that people sometimes misinterpret messages about "healthier" foods, and recalled reading recently in the newspaper that Campbell's was making healthier soups by reducing sodium, but was unable to gain any traction in sales from this effort. He compared the situation to what happened with the Got Milk? campaign. He asked the panelists how they would advise Campbell's on ways to increase sales of their healthier soups.

Kraak observed that Campbell's is the parent company for Bolthouse Farms, which has been highly innovative in promoting fruits and vegetables and fruit and vegetable drinks. While Campbell's appears to be reorganizing and rebranding itself as a producer of healthier foods, it also has been subject to pressure from its board of directors to generate more revenue. That its low-sodium soups are not great sellers creates an argument, in Kraak's opinion, for a more aggressive national salt reduction initiative in the United States. She noted that England and Australia have made great progress in getting their industry players to meet specific salt-reduction guidelines voluntarily. If Campbell's is the only company reducing sodium levels in soups, people will not want to buy that brand. "They are going to stick with the brands that taste good," she said. Such change needs to be made across the board, in her opinion, with an accountability mechanism in place to ensure that companies that fail to participate pay some sort of penalty.

Burton acknowledged that, not just with sodium but with other nutrients as well, taste has been a challenge for many years for companies trying to sell healthier products. Based on a previous study (Burton et al., 2014), he added that in general, people significantly underestimate sodium levels in restaurant meals. While some special populations are aware of and concerned about the issue, it does not resonate with most consumer segments. Burton suggested that when something like a low-sodium product is being marketed and there are no other interventions to encourage people to be aware of the issue addressed by the product and its consequences, the company doing the marketing needs to think about how to combine that message with others that do resonate with consumers.

Family, Community, and Organizational Influences on Food Literacy

Neuhauser observed that most of the workshop discussion thus far had focused on either individual- or macro-level (e.g., public policy) responses and barriers to food literacy. She asked the panelists about their thoughts on the influences of family, community, and trusted organizations (e.g., schools, health care organizations, faith-based organizations). She was particularly curious about how those influences might be effective with respect to interventions.

Grier stressed the importance of understanding the self-interest of these organizations and using that understanding to engage them in promoting messages or participating in interventions. Faith-based organizations have very different self-interests from, for example, those of mothers' blogger groups. A mistake people often make when trying to get organizations to collaborate or partner, she suggested, is not understanding their needs and how an intervention can help them, not just how their collaboration or partnership can help the intervention. She mentioned having recently heard about a mothers' blogger group with more than 12,000 members exerting a great deal of power in Washington, DC, in terms of promoting or shaming products. If an intervention beneficial to children also satisfies the goals of an organization, as it would such a blogger group, collaboration will be more viable and sustainable for both partners, she suggested. The same is true, in her opinion, in working with companies.

The blogger group Grier mentioned is called MomsRising, Squires noted. She suggested that a lesson to be learned from political campaigns is that seniors, people with type 2 diabetes, or any other group can do what MomsRising is doing. "That's the beauty of the Internet," she said. One can share information through social media and "galvanize around anything." Additionally, Squires mentioned SparkPeople.com and its 14 million unique users who are focused on losing or keeping weight off. Joining is free, its users are having online conversations, and they are really helping each other, she explained. She mentioned that she herself uses a Fitbit, and while the company that makes Fitbit probably has a great deal of information about her that she wished it did not have, the way its product is quantifying what users are doing for physical activity provides reinforcement or helps them change their behavior in a positive way.

Byrd-Bredbenner agreed that social networks are important and observed that they can be large, like MomsRising, but they also can be very small—for example, within a family unit. According to Byrd-Bredbenner, good data indicate that such networks do influence behaviors. Thus they represent, in her opinion, an opportunity for health communicators to provide accurate information to be shared within the networks. She mentioned

some recent work with school wellness policies and how that information has helped advance nutrition.

More generally, Byrd-Bredbenner agreed with Neuhauser that health communicators need to think more about the environments in which people live. "For too long, we have put the onus on the individual to make the changes," she said. In her opinion, although health communicators are beginning to think about environmental factors, they have many opportunities to pay even more attention to such factors and to provide the information individuals need to make more informed decisions.

Chester remarked that stores nationwide are installing beacons that can track individuals' movements—walking across the street to a McDonald's, for instance, or inside a Walmart. He encouraged seizing the opportunity to go to churches, stores, and other neighborhood gathering places and explain to young people and others that they are going to be targeted in this way and can have a voice to "rewire this system in a different direction."

An audience member questioned why more is not being done in schools to encourage health literacy and strengthen what she called "STEM acumen." Baur responded that, although national health education standards exist, many health professionals do not know about or use them. Those standards, she noted, were designed to help develop skills, as opposed to specific topical knowledge, recognizing that teaching children "a bunch of facts" would not be helpful in the long run. Another part of the problem, she said, is that health education has been crowded out of the K–12 curriculum. Education is a local issue, she observed, and communities need to place a high value on health education and decide how their K–12 curricula can be used to deliver health education. People need to express a demand for their children to have a certain skill set with regard to their health and their bodies, she argued. "That has not happened," she said. Baur suggested that this might be a good topic for a future National Academies of Sciences, Engineering, and Medicine workshop.

Hallman remarked that he frequently is asked to present talks on many different subjects at scientific conferences and that regardless of the subject, someone in the audience always asks why schoolchildren do not know more about it. The answer, he said, is also always the same: "We need to get this in the curriculum." But that is a difficult thing to do, he suggested, requiring the will to give up something else in the curriculum. He agreed that health education is being crowded out of the K–12 curriculum, and even when it is included, food is not necessarily a priority.

"Is there a way we can dovetail what we want to teach?" Byrd-Bredbenner asked. Given that health education often is crowded out but science is still taught, she suggested using food and nutrition as examples when communicating about scientific concepts. She mentioned working on

a project in which she has been talking to editors of science textbooks to encourage them to do that.

Reflecting on what Squires had discussed about trust during her presentation, an audience member asked how nonprofit organizations can get their audiences to trust the information they are communicating. She asked whether it was better to get that information into the hands of doctors or to use social media as a platform for connecting directly with one's audience. Squires replied that, sadly, nutrition education in medical schools has been lacking for several decades. However, she has worked with a number of different medical groups, including doctors, nurses, and pharmacists who are seeking continuing medical education (CME) credits, and has found that working with those groups is an effective way to inform health professionals. She suggested that educating these "point people," especially nurses, may be a way to get this information out. Additionally, social media could be used to amplify messages through different communities.

FEEDBACK ON THE DAY FROM A MEDIA PERSPECTIVE[10]

To close the first day of the workshop, Freedman was invited to share his reflections on the presentations and discussions that had taken place thus far. He began by suggesting that, if asked to define the problem workshop participants were trying to solve, he would define it as follows: "Figure out ways to support the public in receiving and embracing scientifically valid information about healthy eating in such a way it would lead to them making healthier choices and having healthier behaviors and, of course, ultimately being healthier." Yet, he observed, immediately upon defining the problem, another problem emerges—what information? While most people attending this workshop would probably agree that the goal is to shift the public toward scientifically valid thinking, there would probably be much disagreement about just what science has actually "proven." As reflected in scientific journals, scientists have come to very different conclusions, or conclusions that at least appear to be different, regarding what is causing the problem.

This is the case just with regard to obesity, Freedman argued. He agreed with other speakers that obesity is such a "killer" that it "swamps everything else." Yet, he said, "we cannot come to any sort of agreement on exactly what it is that science says we should be doing about it."

Freedman suggested pretending for a moment that experts can agree on a message. But then another problem arises: What can be done about it? Many people refer to the case of tobacco use and argue that something can be done about obesity because something was done about that problem.

[10] This section summarizes information presented by Mr. Freedman.

Freedman pointed out, however, that in 1950, 40 percent of the American public smoked. Today, even after 60 years of the U.S. government, scientists, activists, and others sending the single, strong message that "smoking will kill you," 20 percent of Americans still smoke. Smoking remains the single greatest behavioral killer, according to Freedman, although obesity has just about caught up and will probably surpass it. So even if experts can reach agreement on what message to send about obesity, he predicted it will take another 60 years of sending that message before the proportion of the American population that is overweight or obese can be reduced from two-thirds to one-third. "I think we really ought to plan on doing much better than that," he said. In his opinion, what was done with tobacco is not a role model for what should be done with healthy eating.

The problem is highly complex, Freedman continued. He said he liked Grier's discussion of the embeddedness of food in people's lives and the many factors that cause them to make poor eating choices. The socialization element is particularly challenging, he said. As several speakers had discussed, decisions about food are not based solely on information, logic, cognition, or evidence; what he called the "lizard brain aspect" plays a role as well. If the problem is going to be solved, he suggested, it will need to be attacked from many different angles, including at the societal level.

Nor is the problem simply that people are making bad decisions that lead to unfortunate beliefs and choices, Freedman continued. As Baur had pointed out, the battle is against not just bad decisions but also no decisions. "A lot of people out there," Freedman said, "could not care less about changing their food habits." Those are the people who need the help, he suggested. He told the workshop audience that people who approach him for advice about eating are almost always people who are already healthy.

If what Byrd-Bredbenner had said about people actively seeking information is true, Freedman continued, "that is a good start." Unfortunately, as several speakers had discussed, when people do seek information, they are more likely than not to encounter "some silly belief" based on pop messaging, marketing, or bad journalism. As Hallman had pointed out, the American population is poorly educated in general. The vast majority of Americans do not have a college degree, let alone a STEM education. Freedman referred to Kraak's discussion of GMOs and how people get lost in the crowded messaging environment and end up with beliefs that directly conflict with science: while most scientists say that GMOs are safe, most people think they are deadly. "You could not have a more stark example," Freedman stated. Moreover, he asserted, people become "locked into" these silly and scientifically invalid beliefs. He described these beliefs as "incredibly tenacious," even "religious." Based on his experience, this is especially

true with beliefs about food and health. He has found it easier to question people about their religious beliefs than about their food beliefs.

These beliefs and their tenacious nature "short circuit" efforts to provide good, useful information, Freedman explained. He noted that Baur had discussed how most people could not make sense of nutrition labels, and that Burton had described challenges associated with communicating calorie information on nutrition labels. But if someone has decided that calories do not matter, he asked, "What good does it do for us to get really good at giving out messages about what has more calories than something else?" The same is true with exercise, he suggested. If someone does not believe exercise matters, what good does it do to communicate solid information about ways to start and maintain an exercise program? The problem is not just that experts cannot help consumers win the race toward making healthy decisions, Freedman observed. It is much worse than that, in his opinion. It is not even clear yet how to get consumers into the stadium where the race is taking place. "That is how far behind we are on this right now," Freedman said.

The question for Freedman is how credentialed experts—not just scientists, but others as well—can attack this problem. As Caulfield had elaborated, pop culture is winning the war right now. Celebrities such as Katy Perry and Michael Douglas are more influential than any of the credentialed experts who attended this workshop. This means it may not really matter what credentialed experts say, Freedman argued. As Baur had asked during her presentation, how can the gap between what experts say and what the public believes be bridged? Freedman suggested pretending for another moment that experts knew how to bridge that gap. But again, which message, and which experts?

Yet another problem, Freedman noted, is that consumers often treat journalists as experts. Many journalists are good at sounding what he described as "very sciency." But, he suggested, if one looks at *The New York Times*, for example, and what some of its leading writers have written about science topics for *The New York Times Magazine* in particular, much of it is "delusional." He mentioned Gary Taubes, Michael Pollan, Michael Moss, Tara Parker-Pope, and Mark Bittman. According to Freedman, Taubes has made such claims as "calories don't matter." Pollan has written such statements as "all processed food is obesogenic and toxic." Moss has written about food companies plotting to addict the public chemically to food. Parker-Pope has written about the biological impossibility of sustained weight loss. And Bittman has claimed that a McDonald's salad will kill a person, but home-cooked bacon is healthy. These messages are "absolutely swallowed up" by the *Times*' readers, Freedman said. They sound rational and hit people emotionally. They resonate, and people love them. They have the intuitive plausibility Hallman had discussed, and they have none

of what Byrd-Bredbenner had called communication friction. These writers are "masters at lubricating stories," Freedman said.

Freedman reiterated that the problem is big, important, and widespread, and it will be very difficult to fix. Even if one breaks off a small piece of the problem—for example, by examining nutrition claims on packages, as Andrews and Burton have done—a "minefield" of effects take place. Kraak had described the multiple versions of MyPlate, and even if the MyPlate message were simple, clear, and loved by everyone, it would still get lost in the food information environment. If one tries to break off a bigger piece of the problem—for example, food company marketing—the challenge is even greater, Freedman observed. "Regulation is so against most of what America believes," he said, "it is almost silly to talk about that as a solution." He suggested competing directly with industry messaging. He warned, however, as Chester had shown, that the food and beverage industry is extremely good at what it does, and competing with those companies will be difficult.

Freedman suggested further that the widespread notion that intense food marketing is "bad" is a flawed assumption. He mentioned having heard someone at this workshop recommend, as an alternative strategy that he views as brilliant, doing what is necessary to get food companies on the "right" side of the problem so that they are producing healthier options and then "turn[ing] them loose with all their marketing magic."

In conclusion, Freedman emphasized that whatever message experts decide to send must be clear. It was sobering for him to hear Byrd-Bredbenner say that people think it is easier to do their taxes than to make healthy eating decisions. But again, even with a clear message, how far can one get with people who are not open to receiving that message? People are being bombarded at all times and from all directions with "silly" but understandable, intuitively plausible, and frictionless information, Freedman argued. While sending a single, clear, strong, understandable message may get one into the competition, he said, "it does not help you win it." He also wondered whether sending such a message might corrupt science in the process. Levitt had touched on this issue in his discussion of the low-fat message, which was simple and clear and worked, but was wrong.

Despite the complexity of the food literacy problem and its challenges, Freedman believes it will be possible to agree on a message and propagate it in such a way that it actually makes a difference. He suggested that the workshop presentations and discussions thus far had done a good job of characterizing the nature of the problem. He expressed his hope that the second day of the workshop would focus on tools that can be used to attack the problem, and he encouraged moving beyond theorizing and beginning to develop hands-on approaches.

3

Promoting Food Literacy: Communication Tools and Strategies

"If you want to catch a fish, first learn to think like a fish."

—R. Craig Lefebvre

"The journey is not to some place [consumers] have not been. The journey is to get them to where they already are."

—Tom Nagle

Moderated by Wendy Johnson-Askew, Session 3 considered a range of communication and marketing tools and strategies for supporting the public in receiving and embracing scientifically valid information about healthy eating in a way that can lead not only to healthier decisions but also to healthier behaviors. This chapter summarizes the Session 3 presentations and discussion.

To begin the session, Rebecca Ratner, University of Maryland, College Park, explored the effectiveness of guidelines for everyday actions, the *Dietary Guidelines for Americans* (DGA) being a prime example. Effective guidelines have two key characteristics, she explained. First, they are memorable, not just immediately after having been exposed but also months later. Second, they are actionable. That is, they are understandable, such that people know what to do and when to do it. Ratner compared the memorability and actionability of the original DGA Food Guide Pyramid, the revised MyPyramid, and the more recent MyPlate; discussed the research that led to MyPlate; and identified key underlying features, such as simplicity, that make a guideline memorable and actionable. Additionally, she stressed the importance of testing messages with target audiences.

R. Craig Lefebvre, University of South Florida, emphasized the need for researchers to think about population-level interventions, not just individual behavior change interventions, and argued that diffusion theory is a helpful conceptual framework for doing so. He explained that the diffusion-of-innovation model segments the population into innovators, early adopters, the early majority, and laggards, each having different

characteristics and motivations. In his opinion, only when researchers think about the different ways people acquire new behaviors will they be successful in effecting population-level changes with respect to food literacy. He encouraged researchers to go into the field and, rather than confirming a priori hypotheses, tap into people's shared "mental models." "If you want to learn how a lion hunts," he said, "you have to go the jungle, not to the zoo." Additionally, he emphasized focusing not on the middle of a distribution, which is what researchers typically do, but on the tail ends, that is, the people who are behaving the way one would like them to behave. Focusing on the middle helps describe a problem, he said, but it does not help in understanding how to change behavior. In sum, he said, the question "How can we make practice more science-based?" needs to be turned around. The real question is, "How can we make science more practice-based?"

In her presentation on social norms, Jennifer Bauerle, University of Virginia, echoed the calls of Lefebvre and other speakers to start with the end user or consumer, or, as she put it, meet the audience where they are and say, "Come along with us." The goal of a social norms approach to changing behavior, she explained, is to reduce the gap between what people are doing and what they think their peers are doing by finding the social norm, holding it up as a mirror, and giving people the space to respond. People learn social norms, such as how to behave when entering an elevator, by watching and listening to other people, she noted. She described the social norms strategy as a positive, inclusive, and empowering approach. In the panel discussion at the end of the session, when asked by moderator Johnson-Askew how a social norms approach could be used to address obesity given that obesity is becoming the norm, Bauerle replied that when the majority of the population is not doing something one wants them to be doing, one should start instead by holding the attitudinal norm up as a mirror (i.e., most people have healthy attitudes) and using it to spur movement on the social norm.

Tom Nagle of Statler Nagler LLC began his presentation by lamenting the very concept of food literacy because it is premised on what he sees as a "wrong-headed" notion that a well-informed citizen will do the right thing—a notion, he argued, that is widely and repeatedly disproved by people's lifelong behaviors in doing things they know not to be the best or healthiest choices. Elaborating on the complexity of decision making about food alluded to by Sonya Grier (see Chapter 1) and other previous speakers, he observed that people make decisions based on emotions and values, not just rationality and information. He used his company's "Cans Get You Cooking" marketing campaign as a case study to illustrate how effective messaging does not change people's values; rather, it puts the desired behavior change in the context of values the consumer already has. Additionally,

he emphasized that effective messaging is not just about the message, but requires what he called a "full marketing architecture."

In the final presentation of the workshop, Linda Neuhauser, University of California, Berkeley, promoted participatory design as a way to close the gap between the experts who are sending science-based messages about food and nutrition and the consumers who are living complicated lives. As so many other speakers had similarly expressed, she cautioned that communicators will not get far if they fail to engage consumers and learn what they are feeling. Participatory design does just that, she said. She explained that, unlike traditional research, which typically involves defining a single problem and then generating and testing a single solution to that problem, participatory design is a user-centered, iterative process involving the constant and simultaneous defining of problems and generating and testing of ideas. Also unlike traditional research, participatory design involves not the study of what is but the study of being in the future: how to think about the future, how to create that future, and how to evaluate it. Using the "A Cafeteria for Me" project in San Francisco to illustrate effective participatory design, Neuhauser emphasized the importance of thinking big, generating ideas "fearlessly," and prototyping and testing.

MEMORABLE AND ACTIONABLE HEALTH GUIDELINES[1]

Ratner's presentation was based on a 2014 review paper that she and Jason Riis prepared as part of the 2013 Arthur M. Sackler Colloquium titled "The Science of Science Communication II" (Ratner and Riis, 2014). The focus of the article and her presentation was on what makes for an effective health guideline. First, Ratner described what she meant by "guideline." A guideline, she explained, is information one wants other people—that is, target individuals—to have on actions they need to take repeatedly over time and without having a written checklist in front of them. She clarified that the actions she was talking about were ones that all consumers take every day when making diet-related decisions without consulting a list. Additionally, they are actions that align with what consumers already believe. For example, Ratner said, most people likely believe they should be eating more fruits and vegetables and do not need to be persuaded that this is something they need to do. She explained that the purpose of a guideline is to help them act on that existing belief.

Effective health guidelines have two important features, according to Ratner: (1) memorability and (2) actionability. As she explained, consumers who intend to eat a healthful diet throughout the day need, first, to

[1] This section summarizes information presented by Dr. Ratner.

remember what to do (memorability) and, second, be able to actually do it (actionability).

The Memorability and Actionability of the *Dietary Guidelines for Americans*

Ratner cited the DGA as an example of a health guideline that was memorable but not actionable when first introduced in 1992. The first DGA was communicated in the form of a food pyramid. Ratner observed that most Americans can remember the gist of that food pyramid. They can remember that it included "horizontal things." With respect to the parts of and numbers on the pyramid, however, research has shown that the information presented was confusing to consumers. Many did not know what a serving was, for example, or how to interpret the recommended ranges of servings (e.g., "3 to 5 servings"). In fact, Ratner explained, the ranges covered all ages, both sexes, and various levels of exercise. A range of 6 to 11 servings per day, for example, did not mean that an individual should eat between 6 and 11 servings per day. Rather, it meant that some individuals, depending on age, sex, and activity level, should eat 6 servings and others as many as 11.

Based on extensive research, a new DGA, the personalized MyPyramid, was introduced in 2005. To use this guideline, Ratner explained, consumers needed to go to www.mypyramid.gov and enter their age, sex, and typical daily exercise level. Upon entering that information, they would find out precisely how much of each food group they should be eating.

When the MyPyramid DGA was introduced, Ratner and Riis, both trained social psychologists, found it interesting that, despite its being tailored to consumers' varying sizes, shapes, and ages and being more precise with regard to nutrition, consumers were critiquing the new guideline as being too confusing. She and Riis decided to test, first, MyPyramid's memorability. Study participants would enter their age, sex, and typical amount of daily exercise and then receive their MyPyramid recommendations based on the entered information. They were asked to study the recommendations well enough so that they would be able to tell them to someone else. Although they were given an unlimited amount of time, the average study time was 30 seconds. Then, just a couple of minutes later, participants were given memory tests and asked to recall what they had just studied. Ratner and Riis found that only one in five participants was able to recall all of the information. When they followed up 1 month later and again asked participants to recall what they had studied, very few people—fewer than 1 percent—were able to recall all the information correctly. "It is a hard task," Ratner said.

However, the MyPyramid guideline was critiqued more for its lack

of actionability than for its lack of memorability, Ratner recalled. Many consumers did not know, for example, what an ounce was or what an ounce of grain looked like. Consumers also were confused by food items such as pizza and burritos and how to deconstruct them into grains, fruits, vegetables, and other food groups. The most challenging component of the MyPyramid guideline, Ratner explained, was keeping track over the course of a day, for example, of whether one had eaten one's daily recommended 3½ cups of vegetables. Keeping a running tally is challenging, she said, given what social psychologists know about cognition and memory.

Ratner and Riis set out to see what a more memorable and actionable food and nutrition guideline would look like. They borrowed a plate-based guideline idea from Porter Novelli, a public relations firm in Washington, DC, which had developed the original food pyramid as well as the revised MyPyramid and had been testing plate-based messaging in focus groups. One of the things they liked about plate-based guidelines in terms of actionability was that because most people see plates during meals at least twice per day, the image of plate serves as a "memory trigger" of sorts. Ratner and Riis tested a plate-based guideline that they believed captured one of the more complicated components of MyPyramid. Their half-a-plate guideline instructed individuals to fill half their plate with fruits and vegetables at every meal.

Ratner and Riis conducted a test similar to the one they had used with the MyPyramid guideline. They showed people the half-a-plate guideline, asked them to study it, and then tested their recall both a few minutes later and 1 month later. When participants were tested immediately after studying the guideline, 85 percent were able to recall it. Some people might question why, with such a simple guideline (i.e., fill half your plate with fruits and vegetables at every meal), the recall rate was not 100 percent. Ratner explained that some participants recalled the gist of the guideline (e.g., "eat lots of fruits and vegetables each day"), but not the literal guideline. When the researchers followed up 1 month later, a majority of participants still were able to recall the guideline. Ratner found it interesting that the half-a-plate guideline, being less precise and less comprehensive than the MyPyramid guideline, created all sorts of potential worries with respect to what consumers would put on the other half of the plate, while the MyPyramid guideline was so comprehensive and complete that consumers were unable to absorb it completely. Creating a half-a-plate guideline would require some difficult decisions about which information to omit. Ratner explained that this is an empirical question, one that would require testing to see what people do. For example, are they filling half their plate with fruits and vegetables but the other half with cookies? That would be a problem, Ratner said.

In addition to being memorable, Ratner and Riis found the half-a-plate

guideline to be actionable. People understand what "half" means, Ratner said. It is not as complicated as ounces, and they can see it visually. Also, they do not need to keep a running tally of what they eat over the course of a day. Each meal is a fresh start.

In addition to examining the memorability and actionability of the MyPyramid versus half-a-plate guidelines, Ratner and Riis examined the motivation of consumers to follow the guidelines. They found that overall, the half-a-plate guideline was more motivating than MyPyramid. Even participants who were identified as being interested in nutrition found the MyPyramid guideline complicated and did not really know what to do with it, Ratner noted. In contrast, even people who were identified as not being particularly interested in nutrition were motivated to follow the half-a-plate guideline.

Together, these findings led Ratner and Riis to conclude that the MyPyramid guideline was not, Ratner said, "going to get us where we want to get in terms of consumer behavior change." The half-a-plate message appeared to be better in many ways.

When the Obama administration decided to revamp the federal government's food messaging, it reached out to Chip Heath, who knew of Ratner and Riis's work. As a result, in 2011, the U.S. Department of Agriculture (USDA) introduced a plate-based message. It was similar to the plate-based graphic that Porter Novelli had developed several years earlier and sent a more complex message than Ratner and Riis's half-a-plate graphic. But it was better in many ways than MyPyramid, in Ratner's opinion, including that it relied on the plate as a visual retrieval cue.

What Makes Guidelines Memorable and Actionable?

Ratner listed several characteristics of memorable and actionable messages. First, messages need to be simple. Examples of simple message are "Got Milk?," "Stop, drop, and roll," and "Just do it." Messages like these have been tested in for-profit settings, and they need to be tested in nutrition settings as well, Ratner argued. She observed that simplicity is important not just because it makes an action more memorable but also because it makes the message less overwhelming and therefore more actionable. She described a study in which she and her colleagues showed one group of people an ad with the message, "How will you stay active today? These running shoes are ready for your toughest workouts every day." They showed another group the same ad, but it read "toughest workouts every week" instead of "every day." The researchers found that the "toughest workouts every week" ad was more motivating. Too many consumers felt they could not work out every day. "If something does not seem feasible to individuals," Ratner said, "they are just not going to be interested."

Another key characteristic of memorable, actionable messages, Ratner explained, is that the action is easy to visualize. She mentioned a study in which the number of participants who actually took their vitamin (i.e., vitamin C) almost doubled when they received a message indicating when they were to take it (i.e., in the morning) instead of a message that lacked what social psychologists call an "implementation intention" (Sheeran and Orbell, 1999; see also Gallo and Gollwitzer, 2007).

Memorable, actionable messages also have embedded triggers, Ratner noted. Again, she said, the plate in plate-based messages serves as a trigger. When consumers see a plate, it reminds them to think about the guideline. Ratner described a study in which one group of students at Stanford University was shown the message, "Live the healthy way. Eat five fruits and vegetables every day." Another group was shown the message, "Each and every dining hall tray needs five fruits and vegetables a day." The researchers found that the first message had no impact on fruit and vegetable consumption, whereas the second significantly increased fruit and vegetable consumption, but only in the dining halls where students ate off trays. The trays needed to be present to remind them of the message, Ratner explained.

Concluding Thoughts

Ratner concluded her presentation by encouraging experts who want to send a message to think about whether their message meets the two criteria of memorability and actionability. She emphasized further the importance of testing messages. "Do not just rely on your own intuition," she advised. She suggested that those wishing to communicate a guideline test it on their target audience and see whether people can recall it soon afterward, as well as after a delay, and whether the guideline is easy to use.

MARKETING TO EXPAND THE PRACTICE OF BEHAVIORS ASSOCIATED WITH FOOD LITERACY[2]

Trained as a clinical psychologist, Lefebvre began thinking about how to change the behavior of populations, as opposed to individuals, when he was a postdoctoral fellow and was taking his first public health course (in nutrition epidemiology). Thinking about populations led him to think about marketing, which in turn led him to co-create what is now known as "social marketing."

Too often, in Lefebvre's opinion, inadequate attention is paid to what sociologists and others call the "the micro-macro problem," that is, the notion that changing the behavior of every individual, one by one, will

[2] This section summarizes information presented by Dr. Lefebvre.

eventually result in 100 percent of the population doing the "right" thing. "That is absolutely wrong," he said. Changes occur at multiple levels, and the properties that emerge are not simply the accumulated actions of individuals. Applying the micro-macro problem to food literacy, Lefebvre cautioned against thinking only about how to change the behavior of individuals. He said, "Social change programs need to consider more than one scale of reality at a time."

Lefebvre explained how diffusion-of-innovation theory is a helpful model for thinking about behaviors associated with food literacy. The theory categorizes the population into five groups: innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003). Any behavior usually follows a normal distribution, Lefebvre explained, with a few being innovators, slightly more being early adopters, about one-third of the population being early majority, another one-third being late majority, and the remainder being laggards (Rogers, 2003). With respect to food literacy behaviors, he said, the goal is to get the percentage of people who are engaging in healthy food behaviors as close to 100 percent of the population as possible.

Lefebvre emphasized the importance of keeping in mind the unique characteristics of each of these segments of the population when thinking about the people being served by programs designed to improve food literacy. What changes the behavior of an early adopter, for example, is not the same as what changes the behavior of an early majority individual. Innovators are venturesome, Lefebvre explained. They are already exploring ways to be more food literate and to eat more healthfully. "Innovators you never need to worry about," Lefebvre said. Early adopters are respected and have the resources and risk tolerance to try new things, he noted. They also are well connected socially and locally. The early majority are deliberate. They are very engaged in their peer networks. They rely on personal familiarity before adoption—they have to see it to believe it. Most important, Lefebvre said, they ask the question, "How does this help me?" The late majority are usually quite skeptical of new things, he noted. And the laggards are traditionalists. Lefebvre remarked that he was focusing on early adopters and the early majority because the relationship between these two groups is a problem most people engaged in population behavior change efforts fail to understand.

All individuals ask themselves five questions when they receive messages about food literacy and nutrition behaviors, Lefebvre explained. First, how is this better than what I currently do? Too often, Lefebvre said, people sending messages forget that members of their target audience are already doing certain things with respect to food and are usually pretty comfortable, if not happy, with doing them. Therefore, he argued, communicators and marketers need to ask themselves how what they are offering is better

than what people are already doing. Second, how is this relevant to the way I go about my everyday life? Third, is it simple enough for me to do? Fourth, can I try it first? And finally, can I watch others and see what happens to them when they do it? While these questions seem simple, Lefebvre said, he questioned how many interventions actually answer them.

The differences between early adopters and the early majority and the "innovation chasm" created by those differences are what drive large-scale campaigns, Lefebvre observed (see Figure 3-1). Using adoption of a new technology, as opposed to a food behavior, as an example, he explained that with most technology innovations, when about 18 to 25 percent of the population is using the technology, one of two things happens: either people stop using the technology and it disappears, or the technology catches fire and takes off. When a technology disappears, he continued, the diffusion curve turns into what is known as a "fad curve"; when it takes off, the curve becomes what is known as an "accelerating curve." Bridging the chasm between early adopters and the early majority is what makes the dif-

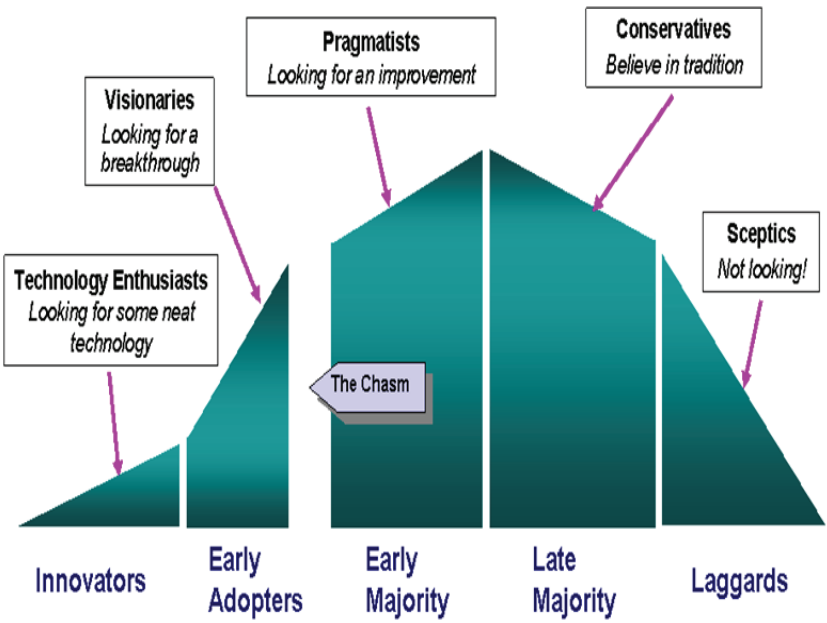

FIGURE 3-1 The "innovation chasm" between early adopters and the early majority in the adoption of a new technology.
SOURCE: Presented by Craig Lefebvre on September 4, 2015; adapted from Moore, 2014. Copyright (c) 1991 by Geoffrey A. Moore. Reprinted by permission of HarperCollins Publishers.

ference, he said. He underscored the unique characteristics of early adopters versus the early majority. The early majority is watching the early adopters to see whether the innovation, or the behavior in the case of food literacy, is worth trying and whether the early adopters are having success with it.

"It is not until we begin segmenting and thinking about people in terms of the characteristics people have to acquire new behaviors that we are going to be successful at big population change with respect to food literacy," Lefebvre argued. This means, in his opinion that experts in the field of food literacy need to change the way they think. "If there is a takeaway from this presentation," he said, "it is that if we want to improve food literacy and we want to reduce obesity, we have to change ourselves first."

Changing the Way Researchers Think

Instead of bringing people into experiments, as public health researchers tend to do, most consumer researchers go out into the field and watch people, Lefebvre noted. He remarked that one of his favorite market research sayings is, "If you want to learn how a lion hunts, you have to go to the jungle, not to the zoo." But even market researchers out in the field usually have certain things in mind, he observed. He showed a cartoon image of a man inside a kitchen washing dishes, trying to scrape food off a plate, and a consumer researcher outside the window watching. The man has a thought bubble filled with the image of a drill and chisel, while the consumer researcher has a thought bubble filled with the image of a bottle of liquid detergent. In this situation, Lefebvre explained, the consumer researcher is trying to come up with ways to sell the bottle of soap to someone who is obviously having a problem cleaning his plate. But the man does not want a stronger dishwashing solution; he wants a power tool or chisel. His problem is not that he wants cleaner dishes; his problem is that he wants to get the food off his plate. This difference between what the consumer and the researcher are thinking is important, Lefebvre said. If the problem people are trying to solve with food literacy cannot be identified, he argued, efforts to sell different kinds of behaviors around nutrition will not be successful.

Motivation is key, Lefebvre stated. Consumers' motivations need to be understood, he said, as do the values that current and proposed behaviors might create for them. Based on his experience as a psychotherapist, he believes it is rare to be able to change people's motivations as much as one would like. Perhaps in individual counseling, over the course of months or years, it is possible, he said. But otherwise, he asserted, for the most part one cannot change motivations; rather, one must figure out how to tap into existing motivations. He speculated that most workshop participants who had visited the MyPyramid website had not done so to learn how to

eat more healthfully. "Most of you went there because you were curious," he said, and that is a different motivation. He stressed the importance of understanding the motivations of people out in "the jungle." Once those motivations are understood, he suggested, researchers need to generate possible solutions to help people meet their needs, solve their problems, or achieve their dreams.

Another problem with much research, Lefebvre continued, is what is called "the depth deficit." Many consumer researchers have found that people in focus groups or in experiments lie about their thoughts and experiences—not deliberately, but because they cannot explain why they do what they do. This phenomenon, explained Lefebvre, creates a gap between the way people experience and think about the world and the methods used by most researchers to collect information.

Yet another problem with focus groups and interviews, according to Lefebvre, is that researchers with a priori hypotheses are essentially "leading the witness." He referred to Sonya Grier's discussion of the importance of understanding the emotional context of food well-being (see Chapter 1) and stressed that researchers need to assess the emotional, as well as rational or functional, value that people place on specific products, services, and behaviors. Yet in very few focus groups, he observed, do people cry or laugh; most such groups are remarkably flat in tenor, he suggested.

Lefebvre noted that consumer researchers also have identified what is known as the "say-mean gap." He urged researchers to use methods that allow people to tap into their unconscious processes—"that second level" or automatic level of thinking that guides much of what people do. Additionally, he called for a greater understanding of shared mental models and the context in which people think about food. What are the stories? What are the archetypes? He told the workshop audience how much of his current work involves sending people out with cameras to capture everyday life. Then in focus group discussions, they discuss why they took the pictures they took, what the pictures mean, why certain things are in the pictures, what was not in the frame, and so on. Lefebvre suggested that this is a way to get people to talk about things they normally would not verbalize when asked a question about their motivation (e.g., why they eat the foods they do).

With respect to helping to solve the problem of food literacy, Lefebvre pointed out that the key for consumer researchers is not to confirm hypotheses; rather, the key is to generate insights into consumers and to discover things about them that were not known before. He tells his students that every research project should rock their world and that in the end, they should be thinking about the problem very differently from when they first considered it. The same is true if one wants to change people's behaviors with respect to food, he suggested. The first thing one must be able to do is

think as they do. "If you want to catch a fish, first learn how to think like a fish," Lefebvre said.

Understanding the Consumer's Point of View

Lefebvre suggested that one way to gain insight into the consumer's point of view is by focusing on positive deviants, that is, the people who are already doing things the way one would like the rest of the population to be doing them. Some people might call these positive deviants the innovators, he noted. They are the people who have figured out for themselves how to make healthy eating part of their normal daily routine. Too often, Lefebvre said, researchers conduct population surveys and try to understand the distribution of a behavior by focusing on individuals who fall within the 95th percentile confidence interval; in other words, they focus on the middle. But the middle provides no insight into how to change behavior, in his opinion; it only helps describe what the problem is. Someone who has not eaten a fruit or vegetable for the past 10 years, he argued, can reveal much more about why people do not eat fruits and vegetables than can someone in the 50th percentile. The same is true of someone who has been eating fruits and vegetables since early childhood, he suggested. Yet these are usually the groups excluded from research. As long as the focus remains on the middle of the distribution, Lefebvre emphasized, researchers are not going to gain insight into how to change behaviors. Only when they start talking to positive deviants, he believes, will they be able to start pushing the diffusion curve.

Once researchers begin to understand what positive deviants are doing "right," they need to think about not individual but social network interventions, Lefebvre continued. He described obesity as a social disease, with people who are obese clustering together. "Forget the celebrities," he said. "Let's talk about groups. . . . People learn by watching other people, not by listening to messages." As an example of a social network intervention, he cited Koehly and Loscalzo's (2009) use of peer networks and family support mechanisms to address adolescent obesity.

To illustrate what can be learned from a positive deviant, Lefebvre pointed to Brett Arends, a columnist for *The Wall Street Journal*, who lived for 6 weeks as though he was participating in the Supplemental Nutrition Assistance Program (SNAP) and had only $4.30 per day to spend on food. "It seemed impossible until I worked out the trick," Arends wrote in one of his columns. "Then it became surprisingly manageable." Lefebvre explained how Arends did not eat out, did not eat packaged or processed foods, did not eat energy bars, avoided cheap carbohydrates (e.g., white bread and noodles), and did not purchase coffee. He ate large amounts of peanuts and peanut butter (which cost around $2.50 per pound), eggs (20

cents each), legumes, a cup of milk per day, healthy carbohydrates (e.g., oatmeal, whole-wheat bread that he made at home), bananas, frozen mixed vegetables, and a daily multivitamin. According to Lefebvre, Arends actually gained weight over the course of the 6 weeks. One of Arends's favorite places to shop for food ended up being the food aisles of drugstores, where what was on sale was on the menu that night. Arends spoke with a nutritionist, but otherwise, no communication campaign helped him do this. The take-home message is that Arends learned a great deal, and others can do so as well, Lefebvre said. Arends wrote, "My experience has changed how I eat. I am amazed at how cheaply one can eat well—and mortified at how much I have spent needlessly over the years."

Concluding Thoughts

In addition to collecting the kind of information he discussed and putting it together as social marketers do, Lefebvre emphasized the importance of understanding the competition—not just the food companies, but those who send all the other nutrition messages consumers receive. He mentioned a recent *Health Affairs* study that found that people had not been shopping at a new supermarket built in a low-income, "food desert" neighborhood, leading the researchers to conclude that complementary initiatives were needed to encourage adoption of the new store (Cummins et al., 2014). Lefebvre said, "In my world, we call that marketing." Other researchers have concluded likewise (Wakefield et al., 2010). In closing, Lefebvre quoted Green and colleagues (2009): "We conclude from this review that applied health sciences research would have a much enhanced probability of influencing policy, professional practice, and public responses if it turned the question around from how we can make practice more science based to how can we make science more practice-based?"

THE SOCIAL NORMS APPROACH: CHANGING BEHAVIOR THROUGH A PARADIGM SHIFT[3]

Successful interventions express empathy, offer no argumentation, support self-efficacy, and recognize the discrepancy between individuals' behavior and the normative behavior in the population, Bauerle began. She focused on the last characteristic—the discrepancy, or perception gap, between what people are doing and what they think their peers are doing. She pointed to alcohol use among college students as an example. A 2014 National College Health Assessment (NCHA) Web survey (N = 79,266) showed that individual college students had consumed, on average, 3.39 al-

[3] This section summarizes information presented by Dr. Bauerle.

coholic drinks the last time they "partied" or socialized, compared with the 5.57 drinks they thought a typical student at their school had consumed. Similar gaps in perception have been reported in nutrition and with many other public health applications, according to Bauerle.

Bauerle explained how shrinking the gap between perception and reality can be achieved by focusing on the norm. Elevator behavior is a good example of a social norm, she said. When one gets to an elevator, one presses a button, the door opens, one waits for others to exit, one enters, and one again pushes a button. Nobody learns elevator behavior by being taught, Bauerle said. The behavior is an unspoken social rule that people understand by watching, listening, and talking with others. Bauerle suggested that an amusing social experiment is to enter an elevator and, instead of pressing a button, just turn one's back to the door and stand there. "You will watch everybody get off on the next floor," she said. "I promise you."

"We are social beings," Bauerle continued. She mentioned a landmark study by Solomon Asch, who presented participants with "Exhibit 1," a drawing of a single line, and "Exhibit 2," a drawing of three lines, including the line in Exhibit 1. He asked the participants to tell him which of the three lines in Exhibit 2 matched the line in Exhibit 1. This is a fairly simple task, Bauerle observed. But Asch "planted" people in the room to give the wrong answer and then watched what other people would do upon hearing the "plants" give their wrong answers. Often, they would respond with the same wrong answer.

Perceptions of norms thus are important, Bauerle said. Sometimes they can be right, but sometimes they can be wrong, and such misperceptions can be quite damaging. Bauerle suggested that misperceptions occur because whatever stands out is what people focus on. She observed that this reaction is "deep in our biology" because when humans were hunter-gatherers, they evolved to notice something "amiss," such as when a predator was present. She played a 90-second "selective attention test" video that showed several people wearing either white or black, moving around and passing basketballs to each other (www.youtube.com/watch?v=vJG698U2Mvo [accessed March 17, 2016]). She asked the workshop participants to keep track of how many times the players dressed in white passed a basketball. After the video ended, the participants called out numbers. The correct number was 15. She asked whether anyone had seen anything else—specifically, whether they had seen, in the middle of the video, the person dressed in a gorilla costume walking into and through the group of people passing basketballs. The expectation was that viewers would be so focused on the people in white passing the basketballs that they would not see the gorilla. This exercise, Bauerle explained, demonstrates that whatever one focuses on expands. If what one is focusing on is a perception, regardless of whether it is a correct perception or a misperception, that perception expands.

A social norms approach to intervention involves focusing on people who are doing the things one wants people to be doing, Bauerle explained, and then expanding that perception. The approach involves collecting information to identify the norm, and then holding the norm up like a mirror and giving people the space to make their own choices. It represents a paradigm shift—a new way to bring about behavior change. Instead of assuming, lecturing, or "terrorizing," Bauerle said, a social norms campaign persuades people by telling them, "This is what we are actually doing. Come along with us."

As an example of a social norms campaign, Bauerle described a high school's campaign to prevent driving after drinking on prom night. Instead of the image of a crashed car, students chose the image of a horse-drawn carriage and text that read, "Even Cinderella used a designated driver" (see Figure 3-2). Bauerle explained that not only did the campaign highlight positive behavior, but it also was based on input from all students, including both the high-risk drinkers and those who drank responsibly. She agreed with Lefebvre that, in her words, "you need everybody in your sandbox."

Bauerle showed another example of a drinking and driving behavioral norms campaign poster, this one for the state of Montana. It shows a group of young adults playing on an inner tube in the snow, all of them smiling

FIGURE 3-2 Poster designed by high school students as part of a social norms campaign developed in consultation with Jennifer Bauerle to prevent drinking and driving on prom night.
SOURCE: Presented by Jennifer Bauerle on September 4, 2015.

and looking as though they are having fun, with text that reads, "MOST Montana young adults (4 out of 5) don't drink and drive." Bauerle did not elaborate, but listed several studies on the use of a social norms approach in the area of food literacy (Burger et al., 2010; Fellner et al., 2009; Goldstein et al., 2008; Higgs, 2013; Mollena et al., 2013).

Bauerle noted that a social norms campaign can be run even when the behavior to be expanded is not the majority behavior, but instead of expanding a social norm, the campaign focuses on and expands an attitudinal norm. The example Bauerle showed was a poster with the image of ice hockey players and text that read, "74% of HWS Student-Athletes believe tobacco use is never a good thing to do." She noted that studies have shown that social norms campaigns based on attitudinal norms do work. In one study, her research team showed that first-year college students exposed to an attitudinal norms campaign that corrected misperceptions of campus drinking had 24 percent lower odds of having a blood alcohol concentration greater than or equal to 0.08 ($p = 0.024$) and 22 percent lower odds of suffering at least 2 of 10 possible negative consequences (e.g., injury, fighting, forced sex, unprotected sex) ($p = 0.002$).

In conclusion, Bauerle emphasized that the most important feature of the social norms approach is that it focuses on being positive, inclusive, and empowering. It is a way to meet an audience where they are and to have them "come along." Additionally, Bauerle emphasized the importance of experts communicating with each other and learning from each other's failures. "It's important to know what does not work so that we don't redo it," she said. She also emphasized the importance of making sure that "the message you are giving is the message that they are getting."

VALUES AND VITTLES: A COMMERCIAL MARKETING PRACTICES CASE HISTORY[4]

Nagle began by declaring that he "detests" the concept of food literacy because it is premised on the "wrong-headed" notion that a well-informed citizen will do the right thing (despite centuries of evidence to the contrary). That said, people do behave in reasonably understandable ways, in his opinion. He mentioned Dan Ariely's book *Predictably Irrational*, which makes the point that people operate on multiple levels that are not about rationality or information (Ariely, 2008). "That is probably at the heart of what I want to talk about today," he said. He would be talking about values-based messaging, he told the audience, focusing on the case history of a canned food campaign conducted by his firm, Statler Nagle, LLC, which designs marketing programs mainly for industry groups. For

[4] This section summarizes information presented by Mr. Nagle.

him, Sonya Grier's food well-being construct (described in Chapter 1) is a "brilliant" way to encapsulate much of what he believes is important for effective marketing.

Nagle explained that while *Consumer Reports* is a great magazine for helping consumers decide what kind of toaster to buy, with its descriptions of all the attributes and costs of different brands, it is not the way humans make decisions about health and other important matters. Taking the example of buying a house, a great deal of rational thinking goes into the process, but, he suggested, none of it has any relevance. "You are looking at houses," he said. "You are walking through neighborhoods. You walk in a house and, in my case, your wife says within 11 seconds, 'We will live here.'" His wife, he said, may not have been making a fact-based decision but is a smart woman who was making the right choice. When she made that decision, she was operating at a subconscious level of values and emotion in which facts may play a role, but are not determinative. Nagle referred to another book, David Brooks's *The Social Animal*, which delves into the subconscious decision-making process and the science behind it (Brooks, 2011). Facts may persuade, Nagle explained, but it is emotions and values that motivate decisions and behavior, and they are a key entry point into effective messaging.

"Cans Get You Cooking" was a campaign that Statler Nagle ran for manufacturers of metal cans for food. Can sales had been in decline for some time, and their continued decline was anticipated, Nagle recalled. Consumer research had revealed that consumers perceived canned foods as being full of preservatives, dull and tasteless, unhealthy, and backward. Consumers also showed high levels of cynicism regarding food labels and ingredient statements indicating that canned foods were preservative-free. An interesting finding from focus group research, Nagle said, was the way consumers responded to being told that home canning was what their grandmothers used to do. That message in particular helped change negative perceptions of canned foods.

Nagle described the "very powerful force" revealed by the values study of canned foods that he and his team conducted. Values studies link the attributes and benefits of, in this case, canned foods, to the target audience's emotions and personal values (see Figure 3-3). The target audience in this case was primarily mothers. According to Nagle, the marketers concluded that, from a consumer perspective, the links among the attributes, benefits, emotions, and personal values around canned foods could be described as follows: "Cans seal in foods' fresh, natural goodness, retaining the flavorful taste, quality and important nutrients [i.e., the attributes] that enable me to prepare quick, convenient home cooked meals that bring my family together for fun times [i.e., benefits], which enables me to feel like a caring parent who delivers wholesome times while guarding what they eat [emo-

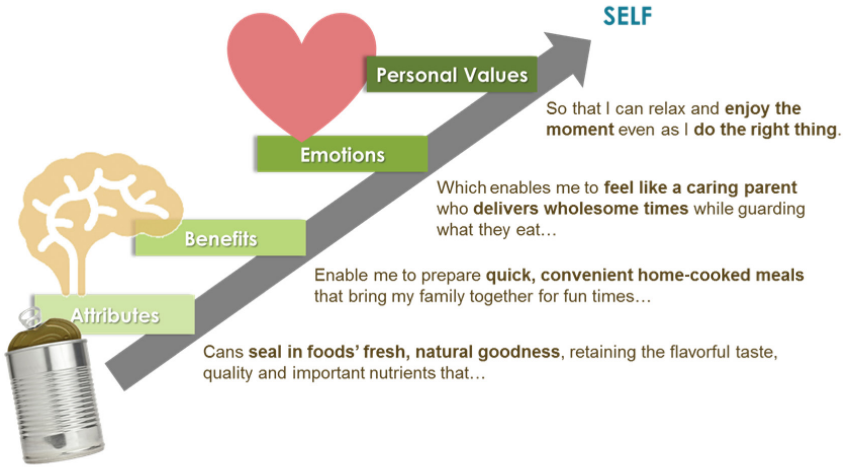

FIGURE 3-3 Results of a values study that connected the attributes and benefits of canned foods to the target audience's emotions and values.
SOURCE: Presented by Tom Nagle on September 4, 2015. Reprinted with permission.

tions] so that I can relax and enjoy the moment even as I do the right thing [personal values]."

The mistake many marketers make, Nagle said, is that they design their campaigns based only on emotions. While he agrees that emotions are important, all four rungs of the "ladder" illustrated in Figure 3-3 need to be communicated, although not necessarily explicitly. They can be communicated in context, such as in pictures. The "magic," Nagle explained, comes from linking all these different rungs of the ladder so consumers can make the full journey up the ladder, successfully connecting the different layers of benefits to the relevant values. Importantly, he said, "The journey is not to some place they have not been. The journey is to get them to where they already are." He continued, "We are not changing people's values. We are not changing people's emotions. We are putting what we want in terms of behavior change in the context of the values and the emotions they already have."

The essence of the "Cans Get You Cooking" campaign was helping women be successful mothers and derive the emotional and value benefits that are inherently important to them. In all the consumer research Nagle and others have done, parents have reported feeling better when they prepare home-cooked meals for their children. But preparing home-cooked meals for children 7 days per week is difficult, Nagle pointed out, and using

canned foods makes it easier. Canned foods equal less worry, less guilt, and more enjoyable family time, and give people the ultimate benefit of doing the right thing and being successful parents, he stated.

The initial primary messages of the canned soup campaign were that (1) cans seal in freshness, flavor, nutrition, confidence, and approval; and (2) cans are an ideal tool for creating more—and more successful—meal occasions. These messages were disseminated through multiple avenues, including paid, earned, and owned media; social media; and outreach to nutritionists and grocery store chains. Nagle noted that when his team reached out to registered dieticians, the response was very positive with respect to both the nutritional and "easy solution" aspects of canned foods that were being promoted. On social media, he reported, the increased volume of positive messaging around canned foods was reflected in a dramatic tripling of total mentions and doubling of positive mentions of canned foods.

To determine whether the campaign changed behavior—that is, whether people actually were eating more canned foods—Nagle and his team conducted a tracking survey. They asked consumers not only whether they had heard the message about canned foods, but also whether they had eaten more canned food in the past 6 months. Indeed, the team found what Nagle described as a "marvelous" positive correlation between exposure to outlets for the message and greater reported use of canned foods. Additionally, they found that use of canned foods increased following initiation of the campaign.

Nagle clarified that although social media have made it less expensive to achieve certain communication goals, use of social media is not a strategy. "It is just a tactic," he said. Still, the results of the survey question related to sharing opinions about canned foods, either online or in person, were interesting, in his opinion. Twenty percent of respondents reported that they had shared an opinion about canned foods in the past 6 months, and among those who had shared, most had positive opinions (81 percent) rather than neutral (9 percent) or negative (10 percent) opinions.

Concluding Thoughts

To conclude his remarks, Nagle discussed what is known in marketing as "the Got Milk? fallacy." People have the idea that the perfect message, well crafted and well delivered, will change the world. That is wrong, Nagle asserted. He believes the message alone is not enough. Rather, it must be sent all the way through the value chain, with retailers and other value chain participants being engaged in the campaign. For its canned food campaign, Statler Nagle worked not just with the makers of metal cans but also with retailers to change their in-store messaging. Instead of the typical "10 for $10," Statler Nagle told retailers they needed to send a different canned

food message tied to the benefits ladder, and to deliver that message in as many places as possible—in their aisles, on their shelves, in their circulars, and in their frequent shopper communications and emails. In Nagle's opinion, this type of full marketing architecture is entirely applicable to public health. The value chain and players may be different, he said, "but at the end of the day, it cannot just be messages."

USING PARTICIPATORY DESIGN TO IMPROVE LARGE-SCALE FOOD LITERACY[5]

Mauritania: A Case Study in Participatory Design

Neuhauser listed three ways to advance food literacy: (1) set a big goal; (2) use participatory design; and (3) focus on parents and young children. The emphasis of her presentation was on participatory design, specifically a type of participatory design known as design thinking. Her own interest in participatory design emerged during what she described as a transformative period in her life. When she was awarded her doctorate in nutrition, she was highly enthusiastic about being a nutrition educator and "changing the world." But she quickly realized that few clients wanted her science-based advice. Her colleagues would tell her just to talk louder, that it was "our job as experts to tell people the best scientific knowledge" and "their job to follow through with it." Neuhauser began to wonder whether people were unable to connect with that scientific knowledge not because the experts were not persistent enough, but because people live such complicated lives. "We have messages to send, but people have lives to live, and we don't often bridge the two," she said.

Neuhauser became so frustrated with not being able to connect with the public that she quit her new career as a nutritionist within 6 months of starting it. She joined the U.S. Department of State (in the area of foreign aid) instead and went to Mauritania in West Africa. At the time, Mauritania had been trying to establish a national vaccination program. Tens of thousands of people had been dying every year from vaccine-preventable diseases, despite the efforts of experts from the U.S. Centers for Disease Control and Prevention and the World Health Organization to promote vaccination. Even though Neuhauser and her new colleagues knew what a good vaccination program was supposed to look like, they did not how to develop one that would fit within the complex reality of the lives of people living in Mauritania. Again, she said, she was facing another failed career within 6 months of starting.

In desperation, Neuhauser decided to do something that changed her

[5] This section summarizes information presented by Dr. Neuhauser.

life. She decided to "stop being an expert" and go out and rely on the people to say, "Here is how this program could be made to work." She and her colleagues started traveling around the country and soliciting proposed solutions from people.

Place by place, people began to solve seemingly intractable problems, Neuhauser reported. One important technical problem remained: how to develop a way to keep vaccines cool enough in the Sahara Desert. It was the camel drivers who ended up having the answer (using a network of special veterinary refrigerators), she told the workshop audience—but no one had ever asked them. So after 20 years of failure, diverse population groups redesigned the program so that it successfully covered the vast majority of the country in just 2 years. At that point, Neuhauser said, she decided to devote the rest of her career to learning about and applying participatory design. Today, user-centered design is the focus of the Health Research for Action center at the University of California, Berkeley (where Neuhauser serves as co-principal investigator).

Neuhauser explained that participatory design, in its simplest terms, is an active process in which users transform current conditions into an improved future (Simon, 1996). The emphasis, she said, is on "users," "transform," and "future." Researchers do not always focus on users or the future, in her opinion, and they do not always set the bar high enough to pursue transformation. She explained that participatory design is rooted in the design sciences, a branch of scientific inquiry that emerged in the 1960s within the purview of architects, engineers, and people in other sociotechnical fields. Its epistemological foundation is quite different from what underlies most of the work done by researchers trained in the social and health sciences, she noted. She observed that participatory design is not the study of "what is," which is what most researchers examine most of the time. "That is how we are trained," she said. Rather, it is the study of "what might be"—of how to be in the future, how to create that future, and how to evaluate that future.

Typically, Neuhauser continued, researchers define problems based on the literature and then devise an intervention they think relates to those problems. They obtain funding for the proposed intervention, implement it, and finally evaluate it. These interventions are typically effective only half of the time, according to Neuhauser. "This is a very low bar in terms of success," she opined. The participatory design process is very different (Roschuni, 2012), she noted. It involves two interlocking, simultaneous and ongoing activities: constantly defining and looking for problems, and constantly generating and testing solutions. Neuhauser described the process as highly iterative and user-centered. It is users who are defining the problems, generating the solutions, and constantly redoing both over time.

Design Thinking

Although there are many types of participatory design, one that Neuhauser believes is especially powerful and that has been "taking the world by storm" is design thinking. Developed by David Kelley, who founded the Stanford Design School, or d.school, as well as the spin-off company IDEO, design thinking was first used by engineers, architects, and computer scientists, although businesses have rapidly adopted it. Neuhauser mentioned that Steve Jobs was one of Kelley's first clients and that the two worked together for many years, using design thinking processes. That collaboration is credited with helping to develop what has become one of the most successful companies in the world, she noted. Today, she observed, design thinking is slowly making its way into the research community. All Stanford University students are required to take a course in design thinking, for example, and she requires all of her students to learn it.

Neuhauser characterized design thinking as a fearless, radical collaboration to create a vision and make it happen. It is a "no holds barred" type of process, she said, involving a number of steps that are taken more or less simultaneously. As defined by the Stanford d.school, the first step is to have empathy, which she described as "actually getting into someone's shoes." It means really observing, as an anthropologist does, and understanding what someone is feeling about a particular problem or solution. If one cannot do that, Neuhauser said, one "cannot proceed beyond that first stage." While this is not the bar that researchers typically set, she noted, it is the bar that design thinkers set. "You have to get to the emotional level," she emphasized. The second step is to define a big vision based on the kinds of issues being raised by users. The third step is to ideate, that is, generate as many ideas as possible in a fearless way, regardless of how wild or weird they may seem. Neuhauser observed that wild and weird ideas often emerge during this part of the process, but it is such ideas that in the end are most transformative. The next steps are to prototype, then test, and continue to do that until the users are satisfied.

A Cafeteria for Me

Neuhauser described an example of the use of design thinking in the food literacy world: "A Cafeteria for Me" (www.IDEO.com), a school lunch project developed when the San Francisco Unified School District approached IDEO with what it described as a "real problem." Participation in the district's school lunch program was poor, she noted, with both students and teachers being dissatisfied, nobody learning anything about food and nutrition, and the school district losing millions of dollars per year. IDEO accepted the challenge and set a vision for a "student-centered, financially

stable system that engages kids in eating good food." This is an example of a big vision, Neuhauser remarked.

Neuhauser reported that IDEO engaged approximately 1,400 people in its design thinking process, including students, teachers, administrators, local farmers, chefs, entrepreneurs, parents, politicians, and media professionals. All of these people were involved as users in what she described as a "cauldron" of ideas. At the time of the workshop, they had been working together for about 2 years. Neuhauser said she was "absolutely blown away" by some of what was discovered in those first 2 years. For example, as part of their prototyping, the team designed model lunchrooms so that users could have an actual feeling for such a place. The models made what was being proposed seem real, Neuhauser noted, rather than something abstract that existed only on paper. One of the solutions for elementary school lunchrooms was to create family-like situations that allowed for discussion. So instead of the "free-for-all" that existed before, students in some schools now sit down at tables and are served courses (see Figure 3-4a). Additionally, as a result of students saying they did not like waiting in lines because it took up much of their lunch time, some schools now have a system in place whereby the students can pre-order their food (on tablet computers) so that it is ready for pickup at lunchtime (see Figure 3-4b). Additionally, the students designed a mobile cart so their lunches could be delivered to the playground, greatly increasing participation in the lunch program in just a few weeks, according to Neuhauser.

Neuhauser explained that before the school district engaged IDEO, the school lunch program was a failing system, one that people had been trying unsuccessfully for years to improve. But by applying a little design thinking, removing the limits on people's dreaming, and having them live in the future, "bingo," she said, "they did it."

Neuhauser provided workshop participants with several references on participatory design and design science (Neuhauser and Kreps, 2014; Neuhauser et al., 2007, 2009, 2013a,b; Simon, 1996). Additionally, for more information on the "A Cafeteria for Me" program, she referred the participants to https://www.ideo.com/stories/a-cafeteria-designed-for-me (accessed March 17, 2016).

Parenting Education

Neuhauser briefly addressed the third way to advance food literacy mentioned at the beginning of her talk—focusing on parents and young children. "Unless we start really early with parents and young children, we are never going to change anything," she said. She noted that studies show that because it is very difficult to change behaviors among adults, even teenagers, the best "return on investment" is with young children (Heckman

(a)

(b)

FIGURE 3-4 Changes in a school lunch program that resulted from a design thinking study. (a) Family-style meals, with food being served in courses. (b) The ability for students to pre-order their food, eliminating their wait time.
SOURCE: Presented by Linda Neuhauser on September 4, 2015; figures courtesy of IDEO (www.IDEO.com).

and Masterov, 2004). She mentioned an intervention study with which she was involved that had a goal of reaching 500,000 new Californian parents every year with an information kit (on parenting) and then expanding the program to other states (Neuhauser, 2010; Neuhauser et al., 2007). She and her collaborators used what she called a "very deep participatory design" process, one that involved constantly making changes based on input from thousands of parents. The program achieved an 87 percent usage rate in California, with significant improvements in parents' knowledge and behavior (Neuhauser et al., 2007). In addition to being expanded to Arizona, where it has also been highly successful, the program was being expanded to other states and had been adapted for use in Australia.

Neuhauser mentioned another ongoing parenting education initiative with the ambitious goal of reaching 10 million parents in the United States with children aged 0 to 5 years. Again, she and her collaborators are using participatory design. They are learning that parents not only want more information about early brain development, prenatal care, nutrition, and the like, but also want that information communicated via short videos on the Internet, on phone apps, on YouTube, and through other "new media" avenues. In addition to talking with parents, providers, and other users and stakeholders, Neuhauser's team is working with partners in Hollywood. She described the collaboration as a "big tent" and invited any interested people to "come and design with us." The expected launch date is late 2016.

PANEL DISCUSSION

Following Neuhauser's presentation, she and other Session 3 speakers were invited to participate in a panel discussion. Audience members asked a range of questions about communication tools and strategies for promoting food literacy. This section summarizes that discussion.

Studying Population-Level Interventions

Lefebvre had emphasized during his presentation the importance of working with populations as well as with individuals. Johnson-Askew asked him how researchers would design a study of a population-level intervention, given that they tend to be reductionist in their thinking. Would it require a collaborative effort, or could a single study examine both individual- and population-level phenomena? Lefebvre suggested designing a study that would randomize by communities or by media markets, assuming an unlimited budget. In his opinion, there has been very little research demonstrating that segmentation works or that it is critical. He suggested running a classic media campaign in, say, five randomized communities, and then segmenting another five randomized communities. In the

latter communities, the focus in the early months of the campaign would be on the innovators and early adopters and then, about 8 months into the campaign, it would shift to the early and late majorities, with the message changing accordingly. As outcomes, Lefebvre suggested that the study could examine not only whether people being exposed to the two different campaigns received and heard messages differently, but also whether they were behaving differently.

Shifting the Social Norm of Obesity

Johnson-Askew asked Bauerle how she would propose shifting the social norm of obesity. In Johnson-Askew's opinion, as obesity becomes prevalent, people also are becoming accustomed to seeing fat people. Bauerle explained that if the majority of the population is doing something one does not want them to be doing, one can still conduct a social norms campaign, but with the focus on an attitudinal norm, not the behavioral norm. As she had noted, most people have healthy attitudes. So one can focus on and expand those healthy attitudes, she suggested, which will push against the behavioral norm (in this case, obesity) to get that behavioral norm moving. At least that is what she would recommend as a first step. She commented on the "complicated" nature of the "big answer."

Upon hearing Bauerle express how complicated it will be to shift norms around obesity, Johnson-Askew reminded the workshop audience that too often, researchers look for a quick answer when the time horizon for solving many such problems is much longer than that for research study funding. Baurle responded that she and her colleagues at the University of Virginia like to tell people, with respect to their social norms research results, "We are a 10-year overnight success."

Self-Efficacy and Success

In addition to its impact on actionability, Johnson-Askew asked Ratner whether self-efficacy, or an individual's belief that he or she can do a thing, might also have some impact on memorability. Ratner was unaware of any research on the effect of self-efficacy on memorability, but it made sense to her that this would be the case. She pointed out, however, that some work has been done on what is known as the self-referencing effect, showing that thinking about how something applies to oneself makes it more memorable.

Johnson-Askew opined that feeling like a success, the importance of which Nagle had emphasized during his presentation, is a little different from feeling as though "I can do it." If the goal of a marketing campaign is to make people feel that they are a success—as was the case with the canned food campaign, which aimed to make mothers feel that they were

doing a good job preparing foods for their families—she asked Nagle what public health experts should be leveraging with their messaging that they are not currently using.

Nagle pointed out that values around success are deeply rooted culturally. The goal is not to change people's values, he said. Rather, the goal is to connect the behavior to values "they come to the game with" so that individuals see the behavior as a pathway to actualizing their own values. Johnson-Askew suggested then that the goal in public health would be to connect the behavior to people's willingness to be healthy. But experts in public health do not make that connection very often, she observed. Instead, they devise interventions that entail what they think people should do.

Lefebvre emphasized the importance of understanding not what public health experts' aspirations are for people but what people's aspirations are for themselves. In his opinion, people do not aspire to be healthy; people want to be healthy only so they can do all the other things that are important in their lives. He believes that only when public health experts step back and start asking how they can help people be successful in their lives, in whatever way people define success, will public health messages be successful. Asking how to help people live more fulfilling lives is very different from asking how to help them live healthier lives, he suggested. "I don't buy into aspiring to have a healthier America," he said.

Funding Participatory Design Research

The "A Cafeteria for Me" program described by Linda Neuhauser was "unbelievable," in Johnson-Askew's opinion. She asked Neuhauser about funding for participatory research, given the length of time it takes to build relationships and develop an understanding of a community's needs. Neuhauser suggested reframing the question and observed that in fact, failure costs much more than success. "We spend billions failing," she said. In her opinion, design thinking is helping to reframe the confidence funders have in where they put their money. She noted that funders are becoming confident that with design thinking, the outcomes will be transformative. And participatory design attracts many partners, she observed. The "tent" is big, she said, so funding is not as great a problem in her experience.

People Value the Present More Than the Future

A challenge for economists with respect to behavior change, Helen Jensen observed, is that people discount the future. This phenomenon is known as "present value bias." Jensen cautioned that, when thinking about programs and the choices being offered, it is important to keep in mind that

people value the present more than they do the future. She asked the panelists how future benefits can be brought into present choice more effectively.

Neuhauser reiterated that most traditional research is situated in the present, with people thinking about the way things are now. She suggested that little can be gained by going into a school lunchroom and asking students whether they would like to eat a healthier lunch. But if one asks those students to design something to achieve their "dream lunch," one gets them to live in the future. And when they live in the future, Neuhauser said, "they will design things that are extraordinary." She noted that she had only touched the surface of the "A Cafeteria for Me" program and mentioned how the students in that program had also designed ways to work with their local communities to improve food security. They had come up with designs that would actually bring money back into the school. In Neuhauser's opinion, design science provides good guidance for conducting research with a "future mindset."

Taking a different perspective, Ratner agreed that most people are not good at valuing the future and suggested that successful interventions are therefore those that focus on present benefits. She suggested that a mobile technology-based social norms approach might be helpful. She imagined using mobile technology to give people feedback about what their neighbors are doing, or eating.

Lefebvre said he has wondered ever since mobile technologies emerged how they can be used to "make the future present." However, "not everyone future discounts," he observed. In his opinion, the real question is how to design interventions tailored specifically to those people who do future discount.

Promoting Fruits and Vegetables

Public health experts across the United States have been working for more than 30 years to promote fruits and vegetables, Vivica Kraak, workshop presenter, observed. In fact, she noted, international programs have been modeled on the U.S. "5 a day" program, which is now the "Fruits & Veggies—More Matters" initiative. She asked what can be done to make those messages more meaningful to people and inspire them to eat more fruits and vegetables.

Lefebvre expressed disappointment with how the "5 a day" campaign has evolved. He described what Israel has done with its version of a "5 a day" campaign and how that campaign has been successful. The campaign revolves around what he described as the "food heaven" culture of the birthday party. Through YouTube videos, other social marketing, and other means, the health ministry in Israel campaigned to turn birthday parties into healthy birthday parties, with fruits and vegetables always

present and with less alcohol. According to Lefebvre, the health ministry recently issued a 1-year report indicating that the campaign was probably the most successful it had ever conducted. It was successful, he explained, because of its combined participatory design and social norms approach. Parents and others were invited to help design the campaign and "dream" about their future. The campaign was designed to fit with people's reality, Lefebvre said. "It was not just a bunch of experts sitting in a conference room saying, 'Here is how a birthday party should look.'" Plus, Lefebvre continued, it was big. "If you want have a big effect," he said, "then you have to have a big campaign."

Educating the Next Generation of Food and Nutrition Communicators

An audience member commented on the new generation of health professionals, including dieticians, physicians, Ph.D.s, and nurses, who have grown up using social media but have not necessarily been trained in how to communicate with the general public or to the media. She wondered how health professionals can be educated in effective communication and how social media connectivity can be leveraged to get messages out.

Nagle observed that it is difficult to tell dieticians and others that they need to stop talking about the facts and start talking to people about "how to be successful in the context of their own personal values." That takes training of a different sort than nutrition or medicine, he suggested. Bauerle said, "I think we need to step out of our own way because we are not always the best vehicle for the message." She mentioned a heart health campaign that relied not on health professionals but on hairdressers talking to their clients about heart health. She noted that it was an extremely successful campaign because people were hearing the message from each other. Nagle said to Bauerle, "My guess is, it wasn't much of a science message from the hairdressers." "Correct," Bauerle replied.

In Lefebvre's opinion, academic programs need not be adding social media or other communication courses to their curricula. What they can do, however, is remind their students that they were people before they became nutritionists or biologists. Lefebvre suggested asking instructors to include graded social media assignments in their courses—for example, have students in a nutrition course start blogs, with part of the course grade being based on how many readers they attract to their blog over the course of a semester. The goal of these assignments, he said, would be not simply to produce blogs, but to build readerships and begin to develop a community of people who are learning how to talk about nutrition in a way that people understand.

4

Food Literacy: Next Steps

> "I think every single presentation has focused on the fact that you have to start where people are with the lived reality of their lives and then build whatever it is you want to do from there."
>
> —Cynthia Baur

The workshop ended with a final panel discussion among speakers from all of the sessions. This chapter summarizes that discussion. Panelists considered a range of topics, from the challenge of addressing taboo issues such as obesity to opportunities for designing whole communication environments as opposed to sending single messages.

A lively discussion was triggered by co-moderator Sarah Roller's hypothetical case involving two consumers and her question about which of the two qualified as food literate. She asked, "What does a food literate consumer look like? That is, how do we measure 'food literacy'? How do we determine who qualifies as 'food literate'?" Several speakers agreed that asking whether a person is food literate without considering the specific context of his or her personal goals would not be asking the right question. For Cynthia Baur, the question illuminated what she thought was a significant take-home message from the workshop, as conveyed in the above quote.

The importance of starting with the "lived reality" of people's lives resurfaced later during the discussion when co-moderator Kristen Harrison described the very busy lives of people and asked panelists how communicators can tell science-based truths about food such that the messages they are sending are interpreted as "gifts," not "chores." Again, several panelists highlighted the importance of focusing on the goals and needs of individual consumers. Carol Byrd-Bredbenner described an obesity prevention program with young adults in which she and her colleagues intended to discuss nutrition until they learned that stress, not nutrition, was the biggest problem facing these young adults. So they had to change their messaging.

She said, "I think we have to keep what is really important to the person in mind and then go from there."

WHAT DOES FOOD LITERACY SUCCESS LOOK LIKE?

Roller opened the session by asking the panelists to consider a hypothetical case involving two consumers, consumer A and consumer B, and asking whether either of the two would qualify as "food literate." Consumer A was a physician who did not like or eat vegetables, except for a single red delicious apple every now and then at lunchtime, but who knew the *Dietary Guidelines for Americans* (DGA) by heart and was able to communicate about nutrition to her patients. She did her best to compensate for her restricted diet by taking supplements containing essential vitamins, minerals, and dietary fiber. Consumer B was an 8-year-old boy who consumed his daily recommended amount of fruits and vegetables by eating mandarin orange slices and baby carrots, not because he knew about nutrition but because his grandmother had warned him that he needed to eat those foods to retain his eyesight. He had been playing the violin since the age of 3 years and was worried that unless he ate oranges and carrots every day, he would not be able to read his violin music. He grew to enjoy eating the little packs of baby carrots and cute little mandarin orange slices and even started collecting cartoon stickers from the mandarin orange food packages to trade with his friends in the school orchestra. Roller asked, "Do either or both of these consumers qualify as food literate? . . . What does a food literate consumer look like, and how do we make that determination?"

The question prompted considerable discussion. Tom Nagle questioned the very definition of food literacy. The ultimate measure of food literacy, in his opinion, is not knowledge but "reasonably better behavior than before." The physician, he observed, clearly had tremendous knowledge. The boy, on the other hand, while he did not have that same knowledge, was "doing some reasonably good things." He said, "The concept of food literacy should really be a result-based, behavior-based metric. I would vote for him." When Roller asked Nagle if he was suggesting that the boy was food literate but the physician was not, Nagle reiterated that he did not care for the notion of food literacy. The goal is not for people to understand why they are behaving correctly, he argued. "We just need them to behave a little better within the framework of their own values."

Craig Lefebvre stated that the question posed by Roller is not the right one to be asking. For him, the question is whether people around either consumer are indicating that her or his behavior is acceptable. Judging individual behavior by itself does not take into account the social context in which people are living their lives and consuming food, he explained. A

food literate future, in his opinion, is one in which people are taking care of each other with respect to food.

Sonya Grier agreed that Roller's question is not the right one. People are not either food literate or not food literate, she explained. In the case of the physician, without knowing her goals and what she wants from her life, it is not really possible to say whether she is food literate. With the violinist, while his goal is to protect his eyes and while he is motivated to achieve that goal, he does not have full knowledge or a complete understanding of how food can help him reach his goal. Grier views food literacy as a continuum, with an objective of this workshop being to gain a better understanding of where consumers are on this continuum and how to help them move along it.

In response to Grier's notion of food literacy as a continuum, Vivica Kraak opined that the boy appears to be on a better trajectory, early in life, toward food well-being, with his grandmother influencing that journey. He is highly motivated by his music and well connected socially. She suggested that the doctor could learn from the boy through intergenerational education.

Roller wondered whether the panelists' responses would be different if, instead of being about whether either consumer was food literate, the question were about food literacy with respect to consumption of fruits and vegetables in particular. Roller asked whether it is possible that the physician is in fact food literate if she is satisfied and feels that she has developed a solution (dietary supplements) for a problem she has faced for a long time—that she "is not friends with the plant kingdom."

"Again," William Hallman said, "I think you are asking the wrong question." It is either that, or the goal is not being properly defined. Is the goal for both consumers to be doing what "we" think they should be doing, which is consuming more fruits and vegetables? Or is the goal for them to be not just literate but also, using terminology Hallman had defined during his presentation, ecolate? That is, should they be able to adapt what knowledge they do have to new situations? Is there a way for a boy to better understand healthy eating than what his grandmother told him about mandarin oranges and carrots?

Asking whether someone is food literate or not is a "dead end," Cynthia Baur stated, joining those expressing disapproval with the question. "I think every single presentation has focused on the fact that you have to start where people are with the lived reality of their lives and then build whatever it is you want to do from there," she stated.

Roller was curious how success is defined in the field of health literacy. She asked Baur how she and her colleagues in the area of health literacy know when they are achieving progress. Do they count health literate people? Baur explained that some of her colleagues do count health

literate people. But they are often disappointed, she said, because there are far fewer health literate people than they want. In Baur's experience, effectively changing health literacy requires intervening at the community level, not the individual level. She is in agreement with Craig Lefebvre in that respect. "Focusing on the individual has not proved to be very effective," she said.

EDUCATING PHYSICIANS AND OTHER HEALTH CARE PROFESSIONALS ABOUT NUTRITION

Linda Neuhauser expressed disinterest in what Roller's hypothetical consumer A, the physician, did personally, but found it important that the physician understood food and nutrition and was communicating with her patients in a way that helped advance their food literacy. Neuhauser noted that several workshop discussions had revolved around the lack of education in food and nutrition among physicians and other health care professionals. Given that an estimated 8 of every 10 chronic diseases are related primarily to food and nutrition (a statistic Neuhauser recalled hearing from someone at the workshop), such education should be a central part of the allied health curriculum, in her opinion. She called for "some kind of movement" among groups of professionals who organize to determine board licensure. Additionally, she noted that this has been an issue of discussion for probably 20 years or so, yet she has not seen much progress.

The Culinary Institute of America in Sonoma has been running a program for about the past 8 years that teaches physicians how to cook, Sally Squires noted. She described it as "a wonderful engagement," but it covers only a very small group of people. She views cooking as a way to integrate nutrition more generally into science curricula, not just for physicians but for all students.

EARLY CHILDHOOD EDUCATION

Panelists revisited the importance of intervening early in a child's life. Based on his experience with the canned food marketing campaign, Nagle said, "Whatever is happening in the first 5 years or 10 years of a person's life [probably] is determinative in a much broader, longer term than we think." Neuhauser mentioned just having completed a national study of parenting of children aged 0 to 3 years. Both parents and providers reported knowing little about nutrition but wanting to know more. Many parents are "adrift," Neuhauser said. An audience member suggested that those not adrift may actually be the more difficult problem because they likely are operating on the basis of a decades-long habit that is probably unhealthy.

LANGUAGE OF EXPERTS

Baur cautioned that experts need to be careful about the language they use, their own positions on these issues, and the approach they take. Thinking that "we are the experts" and "we know best" is a problematic stance, in her opinion. When experts are not respectful toward the people they are trying to engage, she suggested, people instantly pick up on that and will not pay attention or participate. She observed that she had heard that kind of language—the language of "barriers" and "intervention"—over the course of the workshop and cautioned workshop participants to try to avoid it.

Lefebvre agreed. He also cautioned against use of the term "behavior change." "We are not trying to change people's behavior," he said. Rather, the goal is to "create opportunities for people to learn different ways of being food literate." Lefebvre noted that 90 percent of what people learn is acquired by watching and then doing. However, he said, what experts call "interventions for behavior change" are not about watching and doing, but usually involve doing something to people, somehow forcing them to do things differently or nudging them in certain ways. He encouraged researchers to shift their language away from, "We are going to fix these people." Instead, they should think about creating environments that allow people to see other options.

Neuhauser agreed that when one "unleash[es] people's creativity," one creates those environments. She noted that parents surveyed in the national study she had mentioned previously said to the surveyors, "Don't preach to us." They wanted their learning to be fun, emotional, and playful, Neuhauser said.

DELIVERING KNOWLEDGE TO PEOPLE WHOSE LIVES ARE TOO BUSY FOR THEM TO TAKE ON ANY MORE "CHORES"

Kristen Harrison described the busy lives of many people for whom obesity is a "distal threat"; they have other, more immediate fears. She shared a personal story about her own busy life and how she had, over the course of 2 years, stopped exercising and started eating "nothing but jelly beans." She gained 30 pounds during that time. She kept asking herself, "What's wrong with you? Why can't you 'rational choice' your way back to good health?" But she could not change her behavior. In addition to the weight gain, she developed prediabetes and high insulin resistance. While she had always thought that insulin resistance was a result of weight gain, in her case it was the opposite: it started from stress and then, because insulin resistance creates extreme fatigue, she started eating jelly beans to "bump up the energy." The stress, she explained, came from taking care

of her three children, one a 9-year-old daughter, the other two 6-year-old twins, both autistic. One of the twins had many health problems and was constantly on the move. The number one cause of death among children with autism, according to Harrison, is that they wander. She found herself in a situation in which the value of healthy eating and exercise was in direct conflict with the value of being alert and awake enough on a daily basis to make sure that her 6-year-old who wandered did not die. In her case, she knew everything she needed to know, and she wanted to resume her healthy eating lifestyle. But for her, during that period, obesity was a distal threat. Her more immediate concern was making sure that her child was still alive at the end of the day.

"The point of all this," Harrison said, "is when there are these priorities bumping up against each other, what looks to be lack of knowledge, lack of commitment, lack of discipline, and so on may actually be somewhat heroic parenting, family care, or self-care among people who have so many chores in their lives at that moment that it is like a sinking ship. Things have to be thrown out." She referred to a book, *No Sweat*, by Michelle Segar, which differentiates between chores and gifts. For Harrison, what used to be a gift—exercise—had become a chore. Segar recommends that one way to turn a chore into a gift is to think about what feels good. Harrison considered exercise to be an intensely sensory experience. She described putting on shorts and going running and feeling her thighs chafe together as "one of the worst sensory experiences." Eating is an intensely sensory experience for her as well. The challenge, in her opinion, is to find ways to help people turn their chores, such as exercise and healthy eating, into activities that are pleasurable and that will sustain them throughout the day. She asked the panelists how to resolve the tension between, on the one hand, conveying the science-based "truth," which she said can be "theoretically empowering," and the risk of inadvertently turning could-be gifts into chores.

Nagle reiterated the importance of focusing on the goals, or reasons for change, that are important to the person making the change. He said, "That notion of finding the things that motivate people to act differently on their terms is different than making sure they have the food literacy to understand the scientific and factual reasons why they should change their behavior." For some people, a body of knowledge about science and nutrition may be what motivates them, he explained, but others do not need to know why they feel great after having done something. "You don't really need to know physiology and nutrition," he said, "to say, 'I feel really great when I finish running if I just wear long pants.'" He suggested focusing on what is important to people. It might be the sensory nature of the experience, as it is for Harrison, but it could be any number of things.

Grier added that in her community-based participatory research, she

and her colleagues do not design interventions without having included the consumer's voice as part of the process. But they do not just conduct focus groups, she remarked. They use multiple qualitative methods, such as sending people out with cameras to gather in-depth data so as to better understand what consumers need and what will be realistic in their lives given all their competing priorities.

Kraak agreed with Harrison that eating is a highly sensory experience and suggested that communicators create messages about healthy food and beverage products that elicit the entire sensory experience (sight, touch, smell, sound, and taste) (Lee, 2013). "I don't think we have really gone there in the design world," she said, "and we should."

Baur observed that Harrison's story is a good example of a case in which equating food literacy primarily with [scientific] knowledge would be "wrong." She suggested that many different levels must be addressed in order to effect a behavior change or, in Harrison's case, "get [her] off the jelly beans."

As another example of the tension between knowledge and other levels of experience, Harrison mentioned some work she had done with one of her doctoral students on patient–provider communication in a pediatric context. They found a positive correlation between parents liking their pediatrician in their child's first year and children eating more obesogenic foods in their second year. The researchers suspected that because so many chores are associated with new parenthood, parents like pediatricians who tell them that everything is fine and they do not need to worry. Parents react to pediatricians who provide too much information by becoming overwhelmed and wanting to find a new pediatrician. This is an example of what Harrison perceives as the ongoing challenge between emotional and informational needs.

Squires suggested that best practices from people in real situations, such as Harrison's, be shared to empower others who are encountering similar circumstances. She observed that this is what is being done with technology in some offices, with younger workers who are familiar with newer technologies but unfamiliar with office settings being paired with older workers for whom the reverse is true. It is a "win-win" situation, she said. She could imagine the same thing being done with food. This would be a way to invite people to share their solutions instead of telling them what to do, she explained.

Carol Byrd-Bredbenner echoed other calls to figure out what is important to the individual, suggesting that the question is, "How do they define what is important to them?" She described an obesity prevention program involving young adults in which she and her colleagues intended to discuss nutrition until they learned that stress, not nutrition, was the greatest problem facing these people. Thus, they had to change their mes-

saging and address stress. Likewise, in a project with mothers, the women did not want to hear about health but wanted to know "how to make their families happier." Byrd-Bredbenner said, "I think we have to keep what is really important to the person in mind and then go from there."

SENDING A SINGLE MESSAGE VERSUS DESIGNING A COMMUNICATIONS ENVIRONMENT

Lefebvre referred to Nagle's finding that greater behavioral change around consumption of canned foods was related to the number of media channels through which consumers had heard the message about such foods. Lefebvre reached a similar conclusion in his own work when "5 a day" nutrition messages were being delivered to fifth graders through seven different channels, including Disney public service announcements and in-class curriculum. His research team found that behavior change was directly correlated with the number of channels through which the children remembered hearing the message. He encouraged communicators to think more about "media multiplexity" and how to vary messages and surround people with messages coming from different media.

Additionally, Lefebvre encouraged communicators to think about "layering" messages, that is, sending multiple messages, each with a different layer of information. Rather than trying to gain consensus on a single message, he suggested thinking about a more nuanced communication strategy with multiple messages. "It is not about a message anymore," he said. "It is about a communications environment."

THE PROFITABILITY OF MARKETING HEALTHY FOODS

There was a brief discussion about the lack of easy access to healthy foods and a question from an audience member about how to change the food environment to make healthier choices easier and more obvious. She commented on how she had taken the train into Washington, DC, to attend this workshop and wanted to purchase breakfast on the train. But the only options were sweet baked products, sodas, sweetened yogurt, and bananas. "If that is what we have available to people on an everyday basis, it is really hard to say what messages resonate and don't resonate," she said.

Nagle replied that the food environment is a capitalist's construct and that capitalists sell "what people want to buy." Regulating people's choices, in his opinion, counters the core values of much of the U.S. population. When Byrd-Bredbenner suggested that the environment could be changed so that consumers could at least make a healthy choice, Nagle stated that the only way to change the inside of that train car would be to alter the capitalist's construct.

Lefebvre pointed out that one way the marketplace inside a train could be changed is by consumers demanding something different. He mentioned that part of the "5 a day" campaign involved encouraging major grocery stores to put their fruit and vegetable sections up front instead of in the back of the store. There are few big supermarket chains anymore in which consumers walk in and fail to encounter fruits and vegetables pretty quickly, he said. So it is possible to make some of those changes, in his opinion, but doing so requires focus.

In Nagle's opinion, making these changes is a matter of "quid pro quo." With the canned food campaign, he and his team approached retailers and told them that they were running a campaign to get people to buy more canned goods. The retailers said they would display the canned goods better. Nagle described their response as, essentially, "If you create the market, we will sell whatever people want to buy."

Roller described the "end game" as, "It has to be profitable to market healthy food." Otherwise, in her opinion, there are too many obstacles, even if the messaging is "correct."

Kraak suggested a systematic nudge approach. She mentioned that she had been working on a nudge study of the entire restaurant sector in the United States to evaluate how extensively restaurants have used systematic nudge strategies to promote healthier options to children and adolescents. Nudges include such strategies as changing the music, atmosphere, or lighting. Baur noted that couponing is another form of nudging. She observed that she buys a great deal of fruits and vegetables but never receives coupons for apples or avocadoes. Given people's everyday realities, she said, perhaps nudging them with "little offers" would help to alter their behavior.

OBESITY AS A TABOO TOPIC

People are very uncomfortable talking about some issues, Baur observed, and their discomfort can affect approaches to dealing with these issues. Researchers have a difficult time asking questions about topics that are considered unacceptable to discuss. Baur mentioned a conversation she had had with Byrd-Bredbenner during the workshop about Byrd-Brenner's research with mothers who do not want to talk about weight and being overweight and about the fact that weight is considered a "taboo" topic. Baur asked, "If there are some taboo areas, what are they? Are they important? Do they matter to the overall approach?" She remarked that public health has a history of dealing with difficult topics for which the social norms are such that those topics have been labeled "unapproachable." A lesson learned from this history, she suggested, is that identifying "taboo" topics is an important first step toward talking about what approaches to take.

Byrd-Bredbenner mentioned a focus group study with families in Arizona and New Jersey and the "tremendous pushback" she and colleagues encountered when they used the word "obesity." She said, "They just did not want to hear that word." The researchers tried to find other words to use, such as "too much weight" and "heavy kids," but they still received pushback. Byrd-Bredbenner said, "It is the elephant in the room. We have to figure out how we can talk about this in a way that is not offensive and keeps them listening."

Wendy Johnson-Askew agreed that use of the word "obesity" can make parents feel like failures. She described how she and her colleagues have achieved some success in a community-based obesity intervention study. The study is being conducted in two cities: Newark, New Jersey, where the obesity rate for children aged 2–5 is 27 percent, which is eight times the national average; and Birmingham, Alabama. In both cities, the researchers have been running the program through parenting centers. Johnson-Askew described parenting centers as places where people can go to get information because they want to be better parents. The programmatic approach has been to tap into the value system around wanting to be good parents. At the time of this workshop, 165 families in Newark and another 132 in Birmingham had graduated from the program. "It is all about what is important to the persons that we reach," Johnson-Askew said. Additionally, the parents are being provided with resources to help them be successful. Johnson-Askew said, "You cannot just give people the tools and not have an environment that is supportive of it." She mentioned that she had entered the food industry from the field of public health because she was "tired of nudging and pushing individuals." She said, "I wanted to change the food environment." She suggested that "people who do public health from an industry side" might be a good topic for a future National Academies of Sciences, Engineering, and Medicinee workshop.

References

Aldrich, L. 1999. *Consumer use of information: Implications for food policy.* Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Allen, J., M. Montalto, J. Lovejoy, and W. Weber. 2011. Detoxification in naturopathic medicine: A survey. *Journal of Alternative and Complementary Medicine* 17(12):1175-1180.

Allen, M. 1991. Meta-analysis comparing the persuasiveness of one-sided and two-sided messages. *Western Journal of Speech Communication* 55(4):390-404.

Andrews, J. C. 2011. Warnings and disclosures. In *Communicating risks and benefits: An evidence-based user's guide*, edited by B. Fischhoff, N. Brewer, and J. Downs. Silver Spring, MD: U.S. Food and Drug Administration. Pp. 149-161. http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/Reports/UCM268069.pdf (accessed November 16, 2015).

Andrews, J. C., and T. A. Shimp. 1990. Effects of involvement, argument strength, and source characteristics on central and peripheral processing of advertising. *Psychology & Marketing* 7(3):195-214.

Andrews, J. C., R. G. Netemeyer, and S. Burton. 1998. Consumer generalization of nutrient content claims in advertising. *Journal of Marketing* 62(4):62-75.

Andrews, J. C., S. Burton, and R. G. Netemeyer. 2000. Are some comparative nutrition claims misleading? The role of nutrition knowledge, ad claim type and disclosure conditions. *Journal of Advertising* 29(3):29-42.

Andrews, J. C., C.-T. J. Lin, A. S. Levy, and S. Lo. 2014. Consumer research needs from the Food and Drug Administration on front-of-package nutrition labeling. *Journal of Public Policy & Marketing* 33(1):10-16.

Ariely, D. 2008. *Predictably irrational: The hidden forces that shape our decisions*. New York: HarperCollins Publishers.

Batra, R., and M. L. Ray. 1986. Situational effects of advertising repetition: The moderating influence of motivation, ability, and opportunity to respond. *Journal of Consumer Research* 12(4):432-445.

Berger, J., and K. Milkman. 2010. *Social transmission, emotion, and the virality of online content*. Working Paper Series 2010, Report No. 10-114. Cambridge, MA: Marketing Science Institute. http://cn.cnstudiodev.com/uploads/document_attachment/attachment/61/msi-virality.pdf (accessed February 22, 2016).

Berhaupt-Glickstein, A., and W. K. Hallman. 2015. Communicating scientific evidence in qualified health claims. *Critical Reviews in Food Science and Nutrition*. http://dx.doi.org/10.1080/10408398.2015.1069730 (accessed February 8, 2016).

Berkman, N. D., S. L. Sheridan, K. E. Donahue, D. J. Halpern, and K. Crotty. 2011. Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine* 155(2):97-107.

Beydoun, M., and Y. Wang. 2009. How do socio-economic status, perceived economic barriers and nutrition benefits affect quality of dietary intake among US adults? *European Journal of Clinical Nutrition* 62(3):308-313.

Block, L. G., S. A. Grier, T. L. Childers, B. Davis, J. E. J. Ebert, S. Kumanyika, R. N. Laczniak, J. E. Machin, C. M. Motley, L. Peracchio, S. Pettigrew, M. Scott, and M. N. G. van Ginkel Bieshaar. 2011. From nutrients to nurturance: A conceptual introduction to food well-being. *Journal of Public Policy & Marketing* 30(1):5-13.

Boyland, E. J., J. A. Harrold, T. M. Dovey, M. Allison, S. Dobson, M. C. Jacobs, and J. C. Halford. 2013. Food choice and overconsumption: Effect of a premium sports celebrity endorser. *Journal of Pediatrics* 163(2):339-343.

Bratanova, B., C.-M. Vauclair, N. Kervyn, S. Schumann, R. Wood, and O. Klein. 2015. Savouring morality. Moral satisfaction renders food of ethical origin subjectively tastier. *Appetite* 91:137-149.

Brinberg, D., M. Axelson, and S. Price. 2000. Changing food knowledge, food choice, and dietary fiber consumption by using tailored messages. *Appetite* 35(1):35-42.

Brooks, D. 2011. *The social animal: The hidden sources of love, character, and achievement*. New York: Random House.

Brownson, R. C., C. Royer, R. Ewing, and T. D. McBride. 2006. Researchers and policymakers: Travelers in parallel universes. *American Journal of Preventive Medicine* 30(2):164-172.

Bryson, J. M., M. Q. Patton, and R. A. Bowman. 2011. Working with evaluation stakeholders: A rationale, step-wise approach and toolkit. *Evaluation and Program Planning* 34(1):1-12.

Burger, J. M., H. Bell, K. Harvey, J. Johnson, C. Stewart, K. Dorian, and M. Swedroe. 2010. Nutritious or delicious?: The effect of descriptive norm information on food choice. *Journal of Social and Clinical Psychology* 29(2):228-242.

Burton, S., and J. Kees. 2012. Flies in the ointment? Addressing potential impediments to population-based health benefits of restaurant menu labeling initiatives. *Journal of Public Policy & Marketing* 31(2):232-239.

Burton, S., A. Tangari, E. Howlett, and A. Turri. 2014. How the perceived healthfulness of restaurant menu items influences sodium and calorie misperceptions: Implications for nutrition disclosures in chain restaurants. *Journal of Consumer Affairs* 48(1):62-95.

Byrd-Bredbenner, C., and M. Finckenor. 2001. The dietary fiber and fat intake, dietary fat avoidance patterns, and diet-disease knowledge of college women. *International Electronic Journal of Health Education* 4(1):79-84.

CDC (Centers for Disease Control and Prevention). 2015a. *Disease database*. http://www.cdc.gov/bam/diseases/immune/disease_database.html (accessed February 19, 2016).

CDC. 2015b. *Food safety: Information for consumers*. http://www.cdc.gov/foodsafety/groups/consumers.html (accessed January 4, 2016).

Chandon, P., and B. Wansink. 2007. The biasing health halos of fast-food restaurant health claims: Lower calorie estimates and higher side-dish consumption intentions. *Journal of Consumer Research* 34(3):301-314.

Cuite, C. L., S. C. Condry, M. L. Nucci, and W. K. Hallman. 2007. *Public response to the contaminated spinach recall of 2006*. New Brunswick, NJ: Rutgers, the State University of New Jersey, Food Policy Institute.

Cuite, C. L., S. D. Schefske, E. M. Randolph, N. H. Hooker, M. L. Nucci, and W. K. Hallman. 2008. *Public response to the salmonella Saintpaul outbreak of 2008*. New Brunswick, NJ: Rutgers, the State University of New Jersey, Food Policy Institute.

Cummins, S., E. Flint, and S. A. Matthews. 2014. New neighborhood grocery store increased awareness of food access but did not alter dietary habits or obesity. *Health Affairs* 33(2):283-291.

Dangour, A. D., S. K. Dodhia, A. Hayter, E. Allen, K. Lock, and R. Uauy. 2009. Nutritional quality of organic foods: A systematic review. *American Journal of Clinical Nutrition* 90(3):680-685.

Elbel, B., R. Kersh, V. L. Brescoll, and L. B. Dixon. 2009. Calorie labeling and food choices: A first look at the effects on low-income people in New York City. *Health Affairs* 28(6):1110-1121.

Elbel, B., J. Gyamfi, and R. Kersh. 2011. Child and adolescent fast-food choice and the influence of calorie labeling: A natural experiment. *International Journal of Obesity* 35(4):493-500.

Eskine, K. J. 2012. Wholesome foods and wholesome morals? Organic foods reduce prosocial behavior and harshen moral judgments. *Social Psychological and Personality Science* 4(2):251-254.

Fellner, G., R. Sausgruber, and C. Traxler. 2009. *Testing enforcement strategies in the field: Legal threat, moral appeal and social information*. Max Planck Institute for Research on Collective Goods, Working Paper 31. http://www.coll.mpg.de/economix/2009/Traxler.pdf (accessed February 22, 2016).

Fight Bac! and Partnership for Food Safety Education. 2016. *BAC character graphics*. http://www.fightbac.org/free-resources/logos-and-graphics/bac-character-graphics (accessed February 19, 2016).

Fiscella, K., P. Franks, C. Clancy, M, Doescher, and J. Banthin. 1999. Does skepticism towards medical care predict mortality? *Medical Care* 37(4):409-414.

Frewer, L. J., C. Howard, and D. Hedderley. 1996. What determines trust in information about food-related risks? Underlying psychological constructs. *Risk Analysis* 16(4):473-486.

Gallo, I. A., and P. M. Gollwitzer. 2007. Implementation intentions: A look back at fifteen years of progress. *Psicothema* 19(1):37-42.

Glanz, K., M. Basil, E. Maibach, J. Goldberg, and D. Snyder. 1998. Why Americans eat what they do: Taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *Journal of the Academy of Nutrition and Dietetics* 98(10):1118-1126.

Goldstein, N. J., R. B. Cialdini, and V. Griskevicius. 2008. A room with a viewpoint. Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research* 35(3):472-482.

Goodman, M., R. Finnegan, L. Mohadjer, T. Krenzke, and J. Hogan. 2013. *Literacy, numeracy, and problem solving in technology-rich environments among U.S. adults: Results from the Program for the International Assessment of Adult Competencies 2012: First look* (NCES 2014-008). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Green, L. W., J. Ottoson, C. Garcia, and H. Robert. 2009. Diffusion theory and knowledge dissemination, utilization, and integration in public health. *Annual Review of Public Health* 30:151-174.

Grier, S. A., J. Mensinger, S. H. Huang, S. K. Kumanyika, and N. Stettler. 2007. Fast-food marketing and children's fast-food consumption: Exploring parents' influences in an ethnically diverse sample. *Journal of Public Policy & Marketing* 26(2):221-235.

Hallman, W. K. 2008. Communicating about microbial risks in foods. In *Microbial risk analysis of foods*, edited by D. W. Schaffner. Washington, DC: American Society for Microbiology Press. Pp. 205-262.

Hallman, W. K. 2015. *Translation of scientific research to popular thought*. Presented at the Food Forum Workshop, Washington, DC.

Hallman, W. K., and C. L. Cuite. 2010. *Food recalls and the American public: Improving communications*. New Brunswick, NJ: Rutgers, the State University of New Jersey, Food Policy Institute.

Hallman, W. K., C. L. Cuite, and N. H. Hooker. 2009. *Consumer responses to food recalls: 2008 national survey report*. New Brunswick, NJ: Rutgers, the State University of New Jersey, Food Policy Institute.

Hardin, G. 1985. *Filters against folly: How to survive despite economists, ecologists, and the merely eloquent*. New York: Viking Penguin.

Harnack, L. J., and S. A. French. 2008. Effect of point-of-purchase calorie labeling on restaurant and cafeteria food choices: A review of the literature. *International Journal of Behavioral Nutrition and Physical Activity* 5:51-56.

Harvard University IOP (Institute of Politics). 2015. *Survey of young Americans' attitudes toward politics and public service*, 27th ed. http://www.iop.harvard.edu/sites/default/files_new/IOPSpring15%20PollTopline.pdf (accessed November 16, 2015).

Haynes, A. S., J. A. Gillespie, G. E. Derrick, W. D. Hall, S. Redman, S. Chapman, and H. Sturk. 2011. Galvanizers, guides, champions, and shields: The many ways that policymakers use public health research. *Milbank Quarterly* 89(4):564-598.

Heckman, J., and D. Masterov. 2004. *The productivity argument for investing in young children*. Working Paper 5, Invest in Kids Working Group, Committee on Economic Development. http://jenni.uchicago.edu/Invest/FILES/dugger_2004-12-02_dvm.pdf (accessed November 16, 2015).

Higgs, S. 2013. Social norms and their influence on eating behaviours. *Appetite* 86:38-44.

Hingle, M., M. Nichter, M. Medeiros, and S. Grace. 2013. Texting for health: The use of participatory methods to develop healthy lifestyle messages for teens. *Journal of Nutrition Education and Behavior* 45(1):12-19.

Hoffman, S. J., and C. Tan. 2015. Biological, psychological and social processes that explain celebrities' influence on patients' health-related behaviors. *Archives of Public Health* 73(1):3.

Hoy, M. G., and J. C. Andrews. 2004. Adherence of prime-time televised advertising disclosures to the "clear and conspicuous" standard: 1990 versus 2002. *Journal of Public Policy & Marketing* 23(2):170-182.

IDEO.com. 2013. *A cafeteria for me project*. https://www.ideo.com/stories/a-cafeteria-designed-for-me (accessed February 29, 2016).

IFIC (International Food Information Council). 2011. *Food and health survey*. http://www.foodinsight.org/Content/3840/2011%20IFIC%20FDTN%20Food%20and%20Health%20Survey.pdf (accessed November 16, 2015).

IFIC. 2015. *What's your health worth?* Washington, DC: IFIC. http://www.foodinsight.org/sites/default/files/2015-Food-and-Health-Survey-Full-Report.pdf (accessed January 5, 2016).

IOM (Institute of Medicine). 2012. *Front-of-package nutrition rating systems and symbols: Promoting healthier choices*. Washington, DC: The National Academies Press.

Jensen, J. D., N. Carcioppolo, A. J. King, J. K. Bernat, L. Davis, R. Yale, and J. Smith. 2011. Including limitations in news coverage of cancer research: Effects of news hedging on fatalism, medical skepticism, patient trust, and backlash. *Journal of Health Communication* 16(5):486-503.

Karmarkar, U. R., and B. Bollinger. 2015. BYOB: How bringing your own shopping bags leads to treating yourself and the environment. *Journal of Marketing* 79(4):1-15.

Koehly, L. M., and A. Loscalzo. 2009. Adolescent obesity and social networks. *Preventing Chronic Disease* 6(3):A99.

Kraak, V. I., and M. Story. 2015. Influence of food companies' brand mascots and entertainment companies' cartoon media characters on children's diet and health: A systematic review and research needs. *Obesity Reviews* 16(2):107-126.

Kreuter, M., and R. Wray. 2003. Tailored and targeted health communication: Strategies for enhancing information relevance. *American Journal of Health Behavior* 27(Suppl. 3):S227-S232.

Kutner, M., E. Greenberg, Y. Jin, and C. Paulsen. 2006. *The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy* (NCES 2006-483). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Lasswell, H. D. 1936. *Politics; who gets what, when, and how*. New York: Whittlesey House.

Lee, J. 2013. *Design for all 5 senses*. https://www.ted.com/talks/jinsop_lee_design_for_all_5_senses?language=en (accessed February 22, 2016).

Long, M. W., D. K. Tobias, A. L. Cradock, H. Batchelder, and S. L. Gortmaker. 2015. Systematic review and meta-analysis of the impact of restaurant menu calorie labeling. *American Journal of Public Health* 105(5):e11-e24.

Lowe, P. 2015. "GMO-free" is a boon for companies chasing "health halo" profits. *NPR Morning Edition*. http://www.npr.org/sections/thesalt/2015/08/19/432774389/gmos-are-becoming-a-proxy-for-bigger-concerns-about-the-food-system (accessed November 16, 2015).

MacInnis, D. J., and B. J. Jaworski. 1989. Information processing from advertisements: Toward an integrative framework. *Journal of Marketing* 53(4):1-23.

Maibach, E. W., L. C. Abroms, and M. Marosits. 2007. Communication and marketing as tools to cultivate the public's health: A proposed "people and places" framework. *BMC Public Health* 7:88.

Martin-Biggers, J., K. Beluska, V. Quick, M. Tursi, and C. Byrd-Bredbenner. 2015. Cover lines using positive, urgent, unique language entice moms to read health communications. *Journal of Health Communication* 20(7):766-772.

Mayer, A. 2015. How your food gets the "non-GMO" label. *National Public Radio*. http://www.npr.org/sections/thesalt/2015/01/20/378361539/how-your-food-gets-the-non-gmo-label (accessed January 5, 2016).

Metcalfe, D., C. Price, and J. Powell. 2011. Media coverage and public reaction to a celebrity culture diagnosis. *Journal of Public Health* 33(1):80-85.

Mollena, S., R. N. Rimalb, R. Ruitera, and G. Koka. 2013. Healthy and unhealthy social norms and food selection. Findings from a field-experiment. *Appetite* 65:83-89.

Moon, W., S. Balasubramanian, and A. Rimal. 2005. Perceived health benefits and soy consumption behavior: Two-stage decision model approach. *Journal of Agricultural and Resource Economics* 30(2):315-332.

Moore, G. A. 2014. *Crossing the chasm: Marketing and selling high-tech products to mainstream customers*, 3rd ed. New York: HarperCollins Publishers.

Nagler, R. 2014. Adverse outcomes associated with media exposure to contradictory nutrition message. *Journal of Health Communication* 19(1):24-40.

Neuhauser, L. 2010. *Bridging the "know-do" gap: Knowledge brokering to improve child wellbeing*. Edited by G. Bammer, A. Michaux, and A. Sanson. Australian National University Press.

Neuhauser, L., and G. L. Kreps. 2014. Integrating design science theory and methods to improve the development and evaluation of health communication programs. *Journal of Health Communication* 19(12):1460-1471.

Neuhauser, L., W. L. Constantine, N. A. Constantine, K. Sokal-Gutierrez, S. K. Obarski, L. Clayton, M. Desai, G. Sumner, and S. L. Syme. 2007. Promoting prenatal and early childhood health: Evaluation of a statewide materials-based intervention for parents. *American Journal of Public Health* 97(10):813-819.

Neuhauser, L., B. Rothschild, C. Graham, S. Ivey, and S. Konishi. 2009. Participatory design of mass health communication in three languages for seniors and people with disabilities on Medicaid. *American Journal of Public Health* 99(12):2188-2195.

Neuhauser, L., G. L. Kreps, and S. L. Syme. 2013a. Community participatory design of health communication programs: Methods and case examples from Australia, China, Switzerland and the United States. In *Global health communication strategies in the 21st century: Design, implementation and evaluation*, edited by D. K. Kim, S. Singhal, and G. L. Krebs. New York: Peter Lang Publishing. Pp. 227-243.

Neuhauser, L., G. L. Kreps, K. Morrison, M. Athanasoulis, N. Kirienko, and D. Van Brunt. 2013b. Using design science and artificial intelligence to improve health communication: ChronologyMD case example. *Patient Education and Counseling* 92(2):211-217.

Newman, C. L., E. Howlett, and S. Burton. 2014. Shopper response to front-of-package nutrition labeling programs: Potential consumer and retail store benefits. *Journal of Retailing* 90(1):13-26.

Newman, C. L., E. Howlett, and S. Burton. 2016. Effects of objective and evaluative front-of-package cues on food evaluation and choice: The moderating influence of comparative and non-comparative processing contexts. *Journal of Consumer Research* 43. http://dx.doi.org/10.1093/jcr/ucv050 (accessed November 16, 2015).

Nichter, M., and J. J. Thompson. 2006. For my wellness, not just my illness: North Americans' use of dietary supplements. *Culture, Medicine and Psychiatry* 30(2):175-222.

NRC (National Research Council). 1993. *Pesticides in the diets of infants and children*. Washington, DC: National Academy Press.

Nyhan, B., J. Reifler, S. Richey, and G. L. Freed. 2014. Effective messages in vaccine promotion: A randomized trial. *Pediatrics* 133(4):e835-e842.

O'Keefe, D. 1999. How to handle opposing arguments in persuasive messages: A meta-analytic review of the effects of one-sided and two-sided messages. *Communication Yearbook* 22:209-249.

Petty, R. E., and J. T. Cacioppo. 1986. The elaboration likelihood model of persuasion. In *Advances in experimental social psychology*, Vol. 19, edited by L. Berkowitz. San Diego, CA: Academic Press. Pp. 123-205.

Pew Research Center. 2015. *Public and scientists' views on science and society*. http://www.pewinternet.org/files/2015/01/PI_ScienceandSociety_Report_012915.pdf (accessed November 16, 2015).

Ratner, R. K., and J. Riis. 2014. Communicating science-based recommendations with memorable and actionable guidelines. *Proceedings of the National Academy of Sciences of the United States of America* 111(Suppl. 4):13634-13641.

Roe, B., A. S. Levy, and B. M. Derby. 1999. The impact of health claims on consumer search and product evaluation outcomes: Results from FDA experimental data. *Journal of Public Policy & Marketing* 18(1):89-105.

Rogers, E. 2003. *Diffusion of innovations*, 5th ed. New York: Simon and Schuster.

Roschuni, C. N. 2012. *Communicating design research effectively*. Ph.D. dissertation. http://escholarship.org/uc/item/75f0z49v?query=roschuni (accessed January 4, 2016).

Sandman, P. M. 1987. Risk communication: Facing public outrage. *EPA Journal* 13:21-22.

Sheeran, P., and S. Orbell. 1999. Implementation intentions and repeated behaviour: Augmenting the predictive validity of the theory of planned behaviour. *European Journal of Social Psychology* 29(2-3):349-369.

Simon, H. 1996. *Sciences of the artificial*. Cambridge, MA: MIT Press.

Smallwood, D., and J. Blaylock. 1994. Fiber: Not enough of a good thing. *National Food Review* 17(1):23-29.

Smith-Spangler, C., M. L. Brandeau, G. E. Hunger, J. C. Bavinger, M. Pearson, P. J. Eschbach, V. Sundaram, H. Liu, P. Schirmer, C. Stave, I. Olkin, and D. M. Bravata. 2012. Are organic foods safer or healthier than conventional alternatives?: A systematic review. *Annals of Internal Medicine* 157(5):348-366.

Stever, G. S., and K. Lawson. 2013. Twitter as a way for celebrities to communicate with fans: Implications for the study of parasocial interaction. *North American Journal of Psychology* 15(2):339-354.

Stewart, D. W., and I. M. Martin. 1994. Intended and unintended consequences of warning messages: A review and synthesis of empirical research. *Journal of Public Policy & Marketing* 13(1):1-19.

Sullivan Higdon & Sink. 2014. Feeding a digital world. *Sullivan Higdon & Sink FoodThink*, http://shsfoodthink.com/wp-content/uploads/2014/07/shsfoodthink-feeding-a-digital-world.pdf (accessed January 5, 2016).

Swami, V., R. Taylor, and C. Carvalho. 2009. Acceptance of cosmetic surgery and celebrity worship: Evidence of associations among female undergraduates. *Personality and Individual Differences* 47(8):869-872.

Tehrani, J. 2013. Viewpoint: Did our brains evolve to follow celebrities? *BBC News Magazine*. http://www.bbc.com/news/magazine-23046602 (accessed November 16, 2015).

Tyler, C. 2013. Top 20 things scientists need to know about policy-making. *The Guardian*. http://www.theguardian.com/science/2013/dec/02/scientists-policy-governments-science (accessed November 16, 2015).

UK Food Ethics Council. 2010. *Food justice: The report of the food and fairness inquiry*. http://www.foodethicscouncil.org/uploads/publications/2010%20FoodJustice.pdf (accessed November 16, 2015).

U.S. Census Bureau. 2012. *Employment statistics of college graduates*. http://www.census.gov/people/io/publications/table_packages.html (accessed January 5, 2016).

Vardeman, J., and L. Aldoory. 2008. A qualitative study of how women make meaning of contradictory media messages about the risks of eating fish. *Health Communication* 23(3):282-291.

Verbeke, W., F. Vanhonacker, L. Frewer, I. Sioen, S. De Henauw, and J. Van Camp. 2008. Communicating risks and benefits from seafood consumption: Impact on Belgian consumers' perception and intention to eat fish. *Risk Analysis* 28(4):951-967.

Von Essen, E., and M. Englander. 2013. Organic food as a healthy lifestyle: A phenomenological psychological analysis. *International Journal of Qualitative Studies on Health and Well-Being* 8:20559.

Wakefield, M. A., B. Loken, and R. C. Hornik. 2010. Use of mass media campaigns to change health behaviour. *Lancet* 376(9748):1261-1271.

Wansink, B. 2014. *Slim by design*. New York: William Morrow and Company.

Wansink, B., and P. Chandon. 2014. Slim by design: Redirecting the accidental drivers of mindless overeating. *Journal of Consumer Psychology* 24(3):413-431.

Wansink, B., and J. Kim. 2005. Bad popcorn in big buckets: Portion size can influence intake as much as taste. *Journal of Nutrition Education and Behavior* 37(5):242-245.

Wansink, B., A. Tal, and A. Brumberg. 2014. Ingredient-based food fears and avoidance: Antecedents and antidotes. *Food Quality and Preference* 38:40-48.

Watson, E. 2015. *87% of consumers globally think non-GMO is "healthier." But where's the evidence?* http://www.foodnavigator-usa.com/Manufacturers/87-of-consumers-globally-think-non-GMO-is-healthier (accessed November 16, 2015).

Wilsdon, J., L. Allen, E. Belfiore, P. Campbell, S. Curry, S. Hill, R. Jones, J. Hill, R. Kain, B. Johnson, S. Kerridge, J. Tinkler, M. Thelwall, P. Wouters, and I. Viney. 2015. *The metric tide: Report of the Independent Review of the Role of Metrics in Research Assessment and Management*. Project Report. London, UK: Higher Education Funding Council for England. http://sro.sussex.ac.uk/55372 (accessed November 16, 2015).

Winter, S., N. Kramer, L. Rosner, and G. Neubaum. 2015. Don't keep it (too) simple: How textual representations of scientific uncertainty affect layperson' attitudes. *Journal of Language and Social Psychology* 34(3):251-272.

Wogalter, M. S. 2006. The Communication-Human Information Processing (C-HIP) model. In *Handbook of warnings*, edited by M. S. Wogalter. Mahwah, NJ: Lawrence Erlbaum Associates. Pp. 51-61.

Zhao, X., E. Chambers IV, Z. Matta, T. M. Loughin, and E. E. Carey. 2007. Consumer sensory analysis of organically and conventionally grown vegetables. *Journal of Food Science* 72(2):S87-S91.

A

Workshop Agenda

Food Literacy:
How Do Communications and Marketing Impact Consumer Knowledge, Skills, and Behavior?

September 3–4, 2015
National Academy of Sciences Building, Lecture Room
2101 Constitution Avenue, NW, Washington, DC

DAY 1: September 3, 2015

9:00 AM **Welcome and Opening Remarks**
Sylvia Rowe, Food Forum Chair, SR Strategy, LLC, Washington, DC
Sarah Roller, Planning Committee Chair and Food Forum Member, Kelley Drye, Washington, DC

9:05 **SESSION 1: Food Literacy and the Role of Communications Relating to Food Safety, Nutrition, and Other Health Matters**

Session goal: To describe the current state of the science concerning the role of consumer education, health communications and marketing, commercial brand marketing, health literacy, and other forms of communication in affecting consumer knowledge, skills, and behavior with respect to food safety, nutrition, and other health matters.

Session Moderator: Sarah Roller

Food Literacy as a Path to Food Well-Being
Sonya Grier, American University

A Health Literacy Perspective on Consumers' Food Education, Skills, and Behavior
Cynthia Baur, Centers for Disease Control and Prevention

10:00 **DISCUSSION**

10:30 **BREAK**

11:00 **SESSION 2: Food Literacy and Communications Conveying Scientific Information Concerning Food Safety, Nutrition, or Other Health Matters—Opportunities and Challenges**

Session goal: To explore how scientific information is communicated, including the credibility of the source and of the communicator, the clarity and usability of the information, misconceptions/misinformation, and the impact of scientific communication on policy makers and the role of policy as a macro-level channel of communication.

Session Moderators: Fergus Clydesdale, Planning Committee Member, University of Massachusetts at Amherst, and Sylvia Rowe

Believing Science-Free Stuff: Nutrition Perceptions and the Role of Popular Culture
Timothy Caulfield, University of Alberta

Translation of Scientific Research to Popular Thought
William Hallman, Rutgers University

Credibility of Communicators: Who Do Consumers Trust?
Sally Squires, Powell Tate, Washington, DC

Food Communications: It's Greek to Me!
Carol Byrd-Bredbenner, Rutgers University

How Nutrition Information Is Presented and Processed by Consumers
Craig Andrews, Marquette University
Scot Burton, University of Arkansas

Activating Consumers on the Path-to-Purchase: The Role of Big Data and Digital Marketing
Jeff Chester, Center for Digital Democracy

How Policies Can Promote Healthy Food Environments and Food Literacy to Benefit Population Health
Vivica Kraak, Virginia Tech

Role of Policy: Why Do We Base Policy on How We Feel and Not on Science?
Joseph Levitt, Hogan Lovells (formerly of the Center for Food Safety and Applied Nutrition [CFSAN], FDA), Washington, DC

(LUNCH at ~12:00)
(AFTERNOON BREAK at ~3:00)

5:00 PM **Feedback on the Day from a Media Perspective, with Discussion**
David Freedman, The Atlantic

5:30 **ADJOURN**

DAY 2: September 4, 2015

8:30 AM **Review of Day 1**
Sarah Roller

8:40 **SESSION 3: Promoting Food Literacy: Communication Tools and Strategies**

Session goal: To explore the current state of the science concerning how food literacy can be strengthened through communications tools and strategies.

Session Moderator: Wendy Johnson-Askew, Planning Committee Member, Nestlé Nutrition

Memorable and Actionable Health Guidelines
Rebecca Ratner, University of Maryland

Marketing to Expand the Practice of Behaviors Associated with Food Literacy
R. Craig Lefebvre, RTI International

The Social Norms Approach: Changing Behavior Through a Paradigm Shift
Jennifer Bauerle, University of Virginia

Values and Vittles: Applying Commercial Marketing Practices to Food Literacy
Tom Nagle, Statler Nagle LLC

Using Participatory Design to Improve Large-Scale Food Literacy
Linda Neuhauser, University of California, Berkeley

11:00 **Concluding Session**

Session Moderators: Sarah Roller and Kristen Harrison, Planning Committee Member, University of Michigan

12:00 PM **ADJOURN**

B

Abbreviations and Acronyms

AAAS	American Association for the Advancement of Science
AMA	American Medical Association
BMI	body mass index
CDC	Centers for Disease Control and Prevention
CFBAI	Children's Food and Beverage Advertising Initiative
CFSAN	Center for Food Safety and Applied Nutrition
CME	continuing medical education
COPPA	Children's Online Privacy Protection Act
DARK (Act)	Denying Americans the Right to Know
DGA	*Dietary Guidelines for Americans*
ELM	Elaboration Likelihood Model
EPA	U.S. Environmental Protection Agency
FDA	U.S. Food and Drug Administration
FNV	Fruit and Vegetable Promotion Campaign
FTC	Federal Trade Commission
GDA	Guideline Daily Amount
GMO	genetically modified organism

HRSA	Health Resources and Services Administration
IFIC	International Food Information Council
NCHA	National College Health Assessment
NGO	nongovernmental organization
NIH	National Institutes of Health
NLEA	Nutrition Labeling and Education Act
QR	quick response code
SNAP	Supplemental Nutrition Assistance Program
STEM	science, technology, engineering, and mathematics
USDA	U.S. Department of Agriculture
WHO	World Health Organization
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

C

Speaker Biographical Sketches

J. Craig Andrews, Ph.D., is professor and Charles H. Kellstadt chair in marketing, Marquette University. His research focuses on advertising and public health issues. Dr. Andrews recently served with the U.S. Food and Drug Administration (FDA) in Washington, DC, as a social scientist (Center for Tobacco Products) and as a senior scholar (Center for Food Safety and Applied Nutrition); he served previously as a member of the FDA's Risk Communication Advisory Committee. He also has served on the National Youth Anti-Drug Media Campaign; as editor of the *Journal of Public Policy & Marketing*; and as a consumer research specialist in the Federal Trade Commission's (FTC's) Division of Advertising Practices, earning the FTC's Award for Meritorious Service. Dr. Andrews's work has appeared in the *Journal of Marketing*, *Journal of Marketing Research*, *Journal of Consumer Research*, *Journal of Public Policy & Marketing*, *Journal of Advertising*, *Journal of International Business Studies*, *Journal of Retailing*, and *American Journal of Public Health*, among others. He has received multiple best article and reviewer awards from the *Journal of Public Policy & Marketing*. He is the co-author (with Terence Shimp) of *Advertising, Promotion, and Other Aspects of Integrated Marketing Communications*, 9th ed. (2013). Dr. Andrews received his Ph.D. and M.B.A. from the University of South Carolina.

Jennifer Bauerle, Ph.D., is director of the National Social Norms Institute at the University of Virginia (UVA) and was an assistant professor in the School of Public Health from 2006 through 2013. Previously, she worked as social norms marketing coordinator for UVA, focusing on be-

havior change for the university's undergraduate population. Dr. Bauerle has served on several boards, including the UVA Alcohol Advisory Board and the MOST of Us board. She gives keynote presentations and workshops on social norms marketing nationally and internationally and is now working in the corporate wellness field, bringing about behavior change among large workforces. Dr. Bauerle received a master's degree and doctorate from UVA.

Cynthia Baur, Ph.D., is senior advisor for health literacy and senior official for the Plain Writing Act, Office of the Associate Director for Communication, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS). She chairs the CDC Health Literacy Council and manages the agency's health literacy website and blog. Also, she was one of the developers of the CDC's Clear Communication Index and its online health literacy training courses for health professionals. Dr. Baur is co-chair of the HHS Health Literacy Workgroup and of the Healthy People 2020 Health Communication and Health Information Technology Workgroup. She is lead editor of the *National Action Plan to Improve Health Literacy*. Dr. Baur was HHS liaison to the U.S. Department of Education for the development of the first-ever health literacy component of the 2003 National Assessment of Adult Literacy. From 2006 to 2010, she was director, Division of Health Communication and Marketing, National Center for Health Marketing, CDC. In 2015, Dr. Baur received the Health Literacy Hero Award from the Institute for Healthcare Advancement for championing health literacy and advocating for its inclusion in the national health care dialogue. In 2013, she received the Cecilia and Leonard Doak Health Literacy Champion Award from Health Literacy Missouri. In 2013, the American Medical Writers Association awarded her the McGovern Award in recognition of her leadership in the areas of health communication, health literacy, and risk communication. Dr. Baur holds a Ph.D. in communication from the University of California, San Diego.

Scot Burton, Ph.D., is distinguished professor and Tyson chair in food and consumer products retailing, Department of Marketing, Sam M. Walton College of Business, University of Arkansas. His current research interests include consumer health and welfare, effects of disclosures and warning information on consumer attitudes and choices, and public policy concerns. He has published more than 100 articles in journals in the fields of marketing, psychology, and health, including the *Journal of Marketing*, *Journal of Marketing Research*, *Journal of Consumer Research*, *Journal of Public Policy & Marketing*, *MIS Quarterly*, *Journal of Business Ethics*, *Journal of Applied Psychology*, *Organizational Behavior and Human Decision Processes*, *Social Psychology Quarterly*, *American Journal of Public Health*,

American Journal of Health Promotion, *Journal of Retailing*, *Public Opinion Quarterly*, and others. He has received outstanding article awards from the *Journal of Public Policy & Marketing*, *Journal of Advertising*, and *Journal of Consumer Affairs*. Findings from his research have garnered substantial interest from the media and have been discussed in diverse business outlets, including the *Wall Street Journal*, (Bloomberg) *Business Week*, *U.S. News & World Report*, National Public Radio (NPR), MSN, Yahoo, and scores of other health and business journals. Dr. Burton serves as a special external consultant to the FDA's Risk Communication Advisory Committee. He received his Ph.D. in marketing from the University of Houston.

Carol Byrd-Bredbenner, Ph.D., R.D., F.A.N.D., is professor of nutrition and extension specialist in the Nutritional Sciences Department at Rutgers, the State University of New Jersey. Her research focuses on elucidating the role of cognitive and environmental factors in nutrition behaviors and health outcomes and developing recommendations for nutrition communications and health promotion interventions. She has authored numerous books; computer software packages; and theory-driven, behaviorally focused nutrition curricula. She has published more than 200 articles and presented more than 200 research papers. Currently, Dr. Byrd-Bredbenner is leading the innovative obesity prevention program Home Styles, which motivates parents of preschool children to make quick, easy, no-cost changes in their home environment and lifestyle practices. Her research has been funded by the U.S. Department of Agriculture, HHS, the National Food Safety Initiative, and the New Jersey Department of Health & Senior Services. Dr. Byrd-Bredbenner serves on the Expert Panel for the development of Guidelines for the Diagnosis and Management of Food Allergy, National Institute of Allergy and Infectious Disease, National Institutes of Health. She received teaching awards from the American Dietetic Association, Society for Nutrition Education, and U.S. Department of Agriculture. She also was a fellow of the World Health Organization at its Collaborating Center for Nutrition Education, University of Athens, Greece. Dr. Byrd-Bredbenner completed her undergraduate work at Florida State University and received her doctorate from Pennsylvania State University.

Timothy Caulfield, B.Sc., LL.B., LL.M., is a Canada research chair in health law and policy and a professor in the faculty of law and the School of Public Health at the University of Alberta. He has been research director of the Health Law Institute at the University of Alberta since 1993. Over the past several years, he has been involved in a variety of interdisciplinary research endeavors that have enabled him to publish more than 300 articles and book chapters. He is a fellow of the Trudeau Foundation and principal investigator for a number of large interdisciplinary projects exploring the

ethical, legal, and health policy issues associated with a range of topics, including stem cell research, genetics, patient safety, the prevention of chronic disease, obesity policy, the commercialization of research, complementary and alternative medicine, and access to health care. Mr. Caulfield is and has been involved with a number of national and international policy and research ethics committees, including the Canadian Biotechnology Advisory Committee; Genome Canada's Science Advisory Committee; the Ethics and Public Policy Committee, International Society for Stem Cell Research; and the Federal Panel on Research Ethics. He has won numerous academic awards and is a fellow of the Royal Society of Canada and the Canadian Academy of Health Sciences. Mr. Caulfield writes frequently for the popular press on a range of health and science policy issues and is author of *The Cure for Everything: Untangling the Twisted Messages About Health, Fitness and Happiness* (2012) and *Celebrities Are Wrong About (Almost) Everything: How the Famous Sell Us Elixirs of Health, Beauty & Happiness* (2015). He received his B.Sc. and LL.B. from the University of Alberta and his LL.M. from Dalhousie University.

Jeff Chester, M.S.W., is executive director of the Center for Digital Democracy (CDD), a Washington, DC, nonprofit. For more than two decades, he has tracked, analyzed, and addressed the turbulent and cutting-edge developments in online media and their impact on the health and well-being of children, youth, and at-risk consumers. He has written and co-authored a series of reports and journal articles examining the transformation of food and beverage marketing to young people, including the growing role of sophisticated, big data-driven practices that can now target individuals anywhere and anytime. A former investigative reporter and filmmaker, Mr. Chester helped direct the successful campaign conducted during the 1980s to establish the Independent Television Service (ITVS) for public television. In the 1990s, he co-founded the Center for Media Education, spearheading an effort that led to passage of the 1998 Children's Online Privacy Protection Act and Federal Communications Commission rules requiring children's educational programming for broadcast television. Mr. Chester launched CDD in 2001 with the help of a "Public Interest Pioneer" grant from the Stern Family Fund. His book *Digital Destiny: New Media and the Future of Democracy* (2007) was hailed by journalist Bill Moyers as one of the most insightful examinations of the changes roiling the U.S. media environment. Mr. Chester's work at CDD has spurred a series of decisions by the FTC to protect the public, especially children, in the digital arena. He is currently co-investigator on a number of initiatives designed to empower the public in the new "connected" health, financial, and retail sectors.

Fergus M. Clydesdale, Ph.D., is currently distinguished university professor, Department of Food Science, University of Massachusetts at Amherst, and director of the University of Massachusetts Food Science Policy Alliance. From 1988 to 2008 he was head of the Department of Food Science, which was ranked the top department in the university in student satisfaction when he stepped down and recently was ranked the top department in the country by the National Academies of Sciences, Engineering, and Medicine. Dr. Clydesdale is a fellow of five premier societies in the field of food science and nutrition and editor of *Critical Reviews in Food Science and Nutrition*, and has published some 375 scientific articles and co-authored or edited 20 books. He has held professorships and has given invited presentations around the globe, in addition to being an invited speaker in the Distinctive Voices series of the Academies. He also has served on or chaired numerous committees of the Institute of Food Technologists (IFT); the FDA; the International Life Sciences Institute (ILSI); the International Food Information Council (IFIC); and the Academies. He has served on the IFIC Foundation Board of Trustees, the Food and Nutrition Board of the Academies, the Dietary Guidelines 2005 Scientific Advisory Committee, and the Board of Trustees of the ILSI, North America. He is the recipient of a number of awards, including IFT's highest honor, the Nicolas Appert Award; the University of Massachusetts at Amherst Distinguished Teacher Award; and the Distinguished Faculty Award from the University of Massachusetts Alumni Association. He was named Sterling B. Hendricks Memorial Lecturer by the Agricultural Research Service, U.S. Department of Agriculture, for 2008. The University of Massachusetts at Amherst has established the Fergus M. Clydesdale Professorship (2014) and in 2011 dedicated the Fergus M. Clydesdale Center for Foods for Health and Wellness in his honor.

David H. Freedman is a contributing editor at *The Atlantic*, a contributor to *Scientific American*, and a consulting editor for Harvard-affiliated Brigham & Women's Hospital. He is the author of five books, the most recent of which is *Wrong*, focused on the problems with the published findings of medical scientists and other experts. Much of his current work is related to the roles of policy, industry, and journalism in addressing obesity, nutrition, and health-related behavior change, as well as to the improvement of health care systems globally. Mr. Freedman received a bachelor's degree in physics from Oberlin College.

Sonya Grier, Ph.D., M.B.A., is associate professor at the Kogod School of Business, American University, where she conducts interdisciplinary research on topics related to target marketing, race in the marketplace, the social impact of commercial marketing, and social marketing. Her current research is focused on the relationship between marketing activities and

consumer health, with an emphasis on obesity. She has published her research in leading marketing, psychology health, and health policy journals. Dr. Grier has policy experience based on 2 years at the FTC, and also has practical industry experience in market research, brand management, and marketing consulting. She is currently director of food marketing research for the African American Obesity Research Collaborative Network. Dr. Grier also serves on the editorial board for the *Journal of Public Policy & Marketing*, and is a member of the Academies Food Forum. She previously served as a member of the Board of Scientific Counselors for the CDC's National Center for Health Marketing and on the advisory boards for Transformative Consumer Research, the Villanova Center for Marketing and Public Policy, and the Ph.D. Project. Dr. Grier received her Ph.D. in marketing, with a minor in social psychology, from Northwestern University, and also holds an M.B.A. from Northwestern University, with an emphasis on marketing, nonprofit management, and international business.

William K. Hallman, Ph.D., is professor and chair of the Department of Human Ecology and former director of the Food Policy Institute at Rutgers, the State University of New Jersey. His current research projects include studies of consumer perceptions of agricultural biotechnology and labeling of genetically modified foods; public acceptance of food nanotechnology; Americans' understanding of health claims made for food products; consumer responses to food recalls; and the food safety risks associated with fresh meat, poultry, game, and seafood products purchased online. Dr. Hallman has served as a member of several National Research Council committees focused on food safety and served as chair of the FDA's Risk Communication Advisory Committee. He is a member of the graduate faculties of psychology, nutritional sciences, and planning, and public policy at Rutgers. Dr. Hallman is an expert in risk perception and risk communication, and has written extensively on issues of food safety, food security, and public perceptions of controversial issues concerning food, technology, health, and the environment. He earned his Ph.D. in experimental psychology from the University of South Carolina.

Kristen Harrison, Ph.D., is professor of communication studies and head of the media psychology program at the Research Center for Group Dynamics at the Institute of Social Research, University of Michigan. She has been studying effects of mass media on children since 1992. Her research focuses on health outcomes of child media exposure, primarily media and marketing effects on the spectrum of weight disorders, from disordered eating to obesity. Dr. Harrison was co-founder of the STRONG Kids Program, a transdisciplinary research initiative engaged with media, marketing, and family predictors of early childhood obesity within the home, community,

and cultural contexts. She helped secure funding for the Illinois Transdisciplinary Obesity Prevention Program at the University of Illinois, where she held an affiliation with the Division of Nutritional Sciences. Dr. Harrison's work has received funding from the William T. Grant Foundation, the Illinois Department of Human Services, the Illinois Council for Food and Agriculture Research, and the U.S. Department of Agriculture. She received her Ph.D. in communication arts (major) and psychology (minor) from the University of Wisconsin–Madison.

Wendy Johnson-Askew, Ph.D., M.P.H., is vice president of corporate affairs at Nestlé Healthcare Nutrition, Inc., immediate past chair of the food and nutrition section of the American Public Health Association, and a recognized public health researcher. She is known for her focus on diverse communities and ensuring that parents have the information and resources they need to give their children a great start. Dr. Johnson-Askew sits on the program board for Let's Move Newark, a program that works with families and community partners to bring awareness to and prevent childhood obesity. Let's Move Newark is part of First Lady Michelle Obama's Let's Move! Campaign, aimed at reducing national childhood obesity. Dr. Johnson-Askew received her Ph.D., M.P.H., and B.A. from the University of North Carolina at Chapel Hill.

Vivica I. Kraak, Ph.D., R.D., is assistant professor of food and nutrition policy in the Department of Human Nutrition, Foods and Exercise at Virginia Tech in Blacksburg, Virginia. She has more than 25 years of professional experience combined in academia and nongovernmental organizations. She has co-authored more than 40 publications on promoting healthy lifestyles and preventing obesity and noncommunicable diseases through population-based approaches, enhancing government and corporate accountability for healthy food environments, improving the food industry's marketing practices to promote a healthy diet and achieve health-promotion targets for children and adolescents, and making translational research relevant to policy makers and decision makers in different contexts. From 2010 to September 2013, Dr. Kraak worked as a research fellow at Deakin University's World Health Collaborating Centre for Obesity Prevention in Melbourne, Victoria, Australia. From 2007 to 2010, she was nutrition and physical activity advisor for Save the Children's U.S. after-school obesity prevention program, serving rural children in 12 states. From 2002 to 2006, she staffed several expert consensus committees convened by the Academies Food and Nutrition Board. From 1994 to 2000, she worked as a research nutritionist in the Division of Nutritional Sciences at Cornell University, where she coordinated several domestic and international food policy and community nutrition research projects. Dr. Kraak is a member

of the Academy of Nutrition and Dietetics, the American Public Health Association, the American Society for Nutrition, the UK Nutrition Society, and the World Obesity Federation's Policy and Prevention Scientific and Technical Advisory Network. She earned a Ph.D. in population health from Deakin University, an M.S. degree in nutritional sciences from Case Western Reserve University, and a B.S. degree in nutritional sciences from Cornell University. She completed her dietetic internship at the University Hospitals of Cleveland.

R. Craig Lefebvre, Ph.D., is lead change designer at RTI International and research professor at the University of South Florida. He has been developing communication and marketing programs to address public health and social issues for more than 25 years. Among the food and nutrition intervention programs he has designed and evaluated are the Pawtucket Heart Health Program, a National Institutes of Health cardiovascular disease prevention research and demonstration project; the National Cancer Institute's 5 A Day for Better Health program; the U.S. Department of Agriculture's Team Nutrition; and projects for state and national health and nutrition agencies, as well as several ministries of health. Dr. Lefebvre has produced more than 100 publications in social marketing, social and mobile media, and public health. He is a recipient of the Phillip Kotler Social Marketing Distinguished Service Award and the William D. Novelli Award for Innovations in Social Marketing. He is a founding director of the International Social Marketing Association and a senior fellow in the Society of New Communications Research, and serves on the editorial boards of the *Social Marketing Quarterly*, *Journal of Social Marketing*, and *Journal of Services Marketing*. He authored *Social Marketing and Social Change: Strategies and Tools for Improving Health, Well-Being and the Environment* (2013) and edited a six-volume series on *Social Marketing* (2013). Dr. Lefebvre received his Ph.D. in clinical psychology from North Texas State University.

Joseph Levitt, J.D., is a partner at Hogan Lovells US LLP, in Washington, DC. He is a 25-year veteran of the FDA, and served as director of the FDA's Center for Food Safety and Applied Nutrition (CFSAN) for 6 years. Mr. Levitt counsels numerous food companies and trade associations in food safety, labeling, and compliance matters and how to work effectively with the FDA. He is a recognized expert in the Food Safety Modernization Act, including all phases of its development and implementation. While serving as CFSAN director, Mr. Levitt led successful efforts to modernize food safety regulation and enhance the security of the U.S. food supply. He also initiated a revitalization of the FDA's nutrition program. During his earlier FDA tenure, while in the Office of the Commissioner, Mr. Levitt helped streamline the new drug review process and launch the agency's food label-

ing initiative. Additionally, he served as deputy director for regulations and policy at the FDA's Center for Devices and Radiological Health. Mr. Levitt began his FDA career in the Office of Chief Counsel. He has received a Top Tier ranking from Chambers for food and beverage lawyers. While at the FDA, he received numerous honors and awards, including three Presidential Executive Rank Awards. More recently, he received the FDA Distinguished Alumni Award. Mr. Levitt received his bachelor's degree, magna cum laude, from Cornell University and his J.D. degree, cum laude, from Boston University School of Law.

Tom Nagle is a long-time marketing leader and innovator whose firm, Statler Nagle LLC, focuses on developing programs that transform markets and drive positive business outcomes for industry groups. He has worked in market research firms and at advertising agencies, and before launching Statler Nagle was head of marketing for the U.S. "Got Milk?" campaign. Statler Nagle consults with a broad array of industry groups in areas ranging from food to finance, energy, health care, recreation, and other issues salient to cooperative and multistakeholder campaigns. Mr. Nagle possesses a wealth of knowledge in marketing management and strategy, leadership, multistakeholder governance, and program measurement and evaluation.

Linda Neuhauser, Dr.P.H., M.P.H., is clinical professor of community health and human development at the University of California (UC), Berkeley, School of Public Health. Her research, teaching, and practice are focused on translating research findings into improved programs and policies. Originally trained as a nutritionist, she incorporates issues of food and nutrition into large-scale programs concerning health and wellness that reach people in their social contexts. Her primary approach is to use highly participatory strategies to co-create, implement, and evaluate health programs with the users who are intended to benefit from them. Dr. Neuhauser is especially interested in adapting participatory design methods from engineering, computer science, and other fields to improve public health initiatives. She also heads the UC Berkeley Health Research for Action center, which works with diverse groups to co-design, implement, and evaluate health, social, and environmental programs in the United States and globally (http://www.healthresearchforaction.org). Dr. Neuhauser is a frequent advisor to HHS on health communication and was a founding member of the FDA's Risk Communication Advisory Committee. Currently, she is developing a national parenting education initiative intended to reach millions of parents with health, nutrition, and other information. She received both her Dr.P.H. and M.P.H. from UC Berkeley.

Rebecca Ratner, Ph.D., is assistant dean for academic affairs—undergraduate programs and professor of marketing at the Robert H. Smith School of Business, University of Maryland. Previously, she was assistant professor and associate professor at the University of North Carolina at Chapel Hill. Dr. Ratner's research explores factors underlying suboptimal consumer decision making and focuses on variety seeking, motivation, and the influence of social norms. Her research has appeared in marketing, psychology, and decision-making journals, including the *Journal of Consumer Research*, *Journal of Personality and Social Psychology*, *Journal of Experimental Psychology*, and *Organizational Behavior and Human Decision Processes*. Dr. Ratner has taught courses on marketing management, marketing research, and consumer behavior to M.B.A. students, undergraduate students, and executives. She currently serves as co-editor of the *Journal of Marketing Research*. She received a Ph.D. in social psychology from Princeton University.

Sarah Roller, J.D., R.D., M.P.H., is a partner in the Washington, DC, office of Kelley Drye & Warren LLP and chair of the firm's Food and Drug Law practice. For more than 25 years, her practice has focused on the representation of U.S. and global companies and industry trade organizations involved in the manufacture, labeling, and marketing of foods, including conventional foods and beverages, dietary supplements, foods for special dietary use, and medical foods. Ms. Roller advises clients on regulatory policy, compliance, and enforcement matters involving the FDA, the FTC, and other agencies, and advises clients on litigation matters in which product safety, labeling, or advertising is challenged under federal or state law. She has extensive experience counseling companies and industry trade organizations with respect to health claims, nutrient content claims, structure function claims, and other types of benefit claims for use in food labeling and advertising. Ms. Roller is a registered dietitian and received her B.S. degree from the University of Wisconsin–Madison and her M.P.H. degree from the University of Minnesota. She received her J.D. degree from the George Washington University. Ms. Roller is a member of the Academies' Food Forum.

Sylvia Rowe, M.A., is currently president of SR Strategy, which addresses the continuum of science to communications to policy on a broad range of global health, nutrition, and food safety and risk issues. She is also an adjunct professor at the University of Massachusetts at Amherst and Tufts Friedman School of Nutrition Science and Policy. Previously, Ms. Rowe served as president and chief executive officer of the International Food Information Council (IFIC) and IFIC Foundation. During her 11-year tenure, IFIC established itself as a leader in consumer research and consumer-based communications in nutrition, food safety, and health. Ms. Rowe has served

on several boards and advisory committee, including as a member of the Academies' Roundtable on Obesity Solutions. She is also a member of the International Women's Leadership Forum and the National Press Club, among other professional groups. Her background in media and expertise in issues management are reflected in her professional history as a producer and on-air host of several television and radio talk shows covering social, political, and economic and consumer issues. She also previously held positions in public relations, marketing, and membership development for several diverse associations. Ms. Rowe received a bachelor's degree from Wellesley College and a master's degree from Harvard University.

Sally Squires, M.S., is senior vice president-management supervisor at Powell Tate, the Washington, DC, office of Weber Shandwick. She also leads the Food, Nutrition and Wellness practice there. She works with a wide range of government, nonprofit, academic, trade association, and corporate clients on a broad array of nutrition, food, and public health issues. Ms. Squires is a former, award-winning *The Washington Post* health writer and nationally syndicated columnist, as well as an author and documentary filmmaker. She is a member of many professional groups, including the National Association of Science Writers and the Academy of Nutrition and Dietetics. She serves on the advisory board of the Krasnow Institute at George Mason University and is a former adjunct professor at American University and the Tufts Friedman School of Nutrition Science and Policy. Ms. Squires holds two master's degrees in nutrition and journalism from Columbia University.