Wided Batat *Editor*

Design Thinking for Food Well-Being

The Art of Designing Innovative Food Experiences

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Preface

In this edited book, the invited authors revise and advance food design thinking. The trend of food experiences and the expected increasing urgency of food problems ask for innovative approaches to create healthy and pleasurable experiences for food well-being. Previously, food design thinking adopted a limited view of food experiences, restricting them to products. This edited book builds on the extant literature on food well-being and design thinking to promote healthy eating behaviors among consumers. In this book, contributors question how design thinking can help food designers, food marketers, institutions, public policy, and the food industry to design healthy, pleasurable, and innovative food experiences, including meals, space, delivery, or services. A design thinking approach can provide valuable insights to understand and address a wide range of issues comprising relationship to food, self-control, or food sustainability—but, until recently, there have been few attempts to develop and implement a design thinking approach for food innovation and well-being focusing on the whole food experience.

The food experiences included in this book involve different sectors such as luxury gastronomy, consider different perspectives and criteria (e.g., age perspective), and cover various disciplines. The holistic exploration included in each chapter will help us shed light on the way designers and food marketers can solve problems and offer innovative and pleasurable health food experiences by adopting a comprehensive and integral perspective on the problem rather than a one-sided approach to food design. Accordingly, an integrated team of design thinking scholars, designers, consumer behavior researchers, and community members—each bringing different areas of expertise and different sets of skills—has more significant potential to address food issues than any one of these groups working alone. This edited book aims to deliver a comprehensive framework to examine how the experiential aspects of food modify the research agenda of scholars investigating the role of design thinking in food innovation to help consumers achieve their food well-being.

The first part of this book includes five main chapters. The opening chapter in this book provides the reader with a conceptual introduction to the concept of "Experiential Design Thinking" as a new paradigm by shifting the focus from "product design" to "experience design" and thus contributes to consumer food

well-being. This chapter examines how the Experiential Design Thinking (EDT) perspective on food innovation may offer critical insights onto new approaches to promote healthy and pleasurable eating behaviors among contemporary societies. In this chapter, the author, Wided Batat, identifies and discusses how the EDT process works and what steps design thinkers, foodservice actors, and the food industry can follow to create innovative and pleasurable food experiences that help consumers achieve their food well-being.

Chapter 2, written by Caroline Graham Austin, deals with the history of design thinking and its contributions to food experiences and well-being. The author examines the relationships between three complementary paradigms: food experiences, food well-being, and design thinking. All three are holistic approaches to improving individual and community well-being—herein, food well-being is the goal, food experiences are the mechanism, and design thinking is the tool. This chapter first defines concepts, which are all relatively new to academic inquiry. Next, it traces the history of design thinking from its roots in twentieth century mechanical and industrial engineering to its modern incarnation of rethinking our approach to practical problem-solving. The chapter simultaneously examines the evolution of food design during the same timeframe, noting when and how food experiences have received greater and less attention from designers and consumers. Then, the author explains how a design thinking approach can be used to examine and improve food experiences and to increase food well-being. Finally, because food experiences and food well-being are, to date, underrepresented in the portfolio of design thinking contexts, the author concludes by emphasizing how food-related research can and should be put into practice by applying design thinking, thus increasing our understanding of the utility of all three concepts.

In Chap. 3, Matthew Rothe and Debra Dunn introduce a conceptual model for understanding food choice. It can provide a way for designers to identify the various elements and forces that influence consumer food choice and behavior and to determine strategies and approaches for understanding the forces among specific consumers. The abilities of designers, especially learning from others and synthesizing information, are useful in understanding the elements and forces that influence food choices and behaviors. From a design thinking perspective, a designer's primary objective is to identify unmet implicit needs among consumers. Solutions that solve these needs increase the likelihood of consumer adoption and, accordingly, the ability to influence healthy food choices. Thus, a framework and methodology that identifies cognitive dissonances between a consumer's idealized "food identity" and their "food reality" provides a useful way of identifying unmet implicit needs. The ability of a designer to use this framework and method is dependent on their skills of learning from others and synthesizing information. Through applied use of the framework, the authors developed a specific process, method, and set of tools that make the framework useful in identifying unmet implicit needs among consumers. Chapter 4, written by Monica Mendini, Leandro Bitetti, and Paula C. Peter, offers insights into how evident and hidden value co-creation can help companies and public policymakers promote and enhance healthy eating behaviors among vulnerable populations. Specifically, the authors review vital insights in value co-creation

and open innovation (what we call evidence value co-creation) and Jobs to Be Done theory (what we call hidden value co-creation). Authors emphasize how both sides can be relevant for design thinkers in creating and delivering pleasurable, healthy, and sustainable food experiences. With current and global examples, the perspective introduced by authors in this chapter encourages the reader to co-create value in the food sector together with those who are incapable of protecting their interests, such as those who are elderly, homeless, economically disadvantaged, children, and immigrants. In Chap. 5, Mike Atassi argues that employing the principles of design thinking—precisely the concept of empathy—will maintain a healthy balance between commercial success and a healthy consumer—a benefit that is equally spread over the entire supply chain to create shared values.

The second part of this book includes six chapters and introduces design thinking implementation for food experience innovation and well-being. In Chap. 6, written by Matt Johnson, Rob Barlow, and Prince Ghuman, the authors argue that adopting a design thinking approach to food creation has a broader impact than previously thought. Authors suggest that this approach can not only lead to the development of new cuisines and culinary experiences but also transform how consumers perceive the taste of the food itself. This chapter reviews current design thinking practices and illustrates the psychological mechanisms by which this transformation may occur, with an emphasis on unconscious mental modeling, empathy, and storytelling. Given that many such mechanisms can be targeted through self-conscious design, the aim of this chapter is not only to extend the current understanding of design thinking in the culinary world but also to further empower food designers to reshape the relationship between consumers and food. Chapter 7, by Francine E. Petersen and Cara de Boer, integrates scientific knowledge on consumers' responses to food experiences from diverse theoretical perspectives into a food experience design framework. The goal is to design food experiences that will help consumers make healthier choices that will make them happier. Authors propose that food experiences enhanced by the ambiance and food design promote emotional responses that can facilitate healthy eating choices. The goal of this chapter is to outline a way for food experience design to motivate consumers to eat more healthily and enjoy their healthy choices more.

In Chap. 8, Sinem S. Atakan and Isabella Soscia examine the role of emotions in designing innovative food experiences for consumer well-being. The authors argue that food experiences go beyond nutrition and simply alleviating hunger. They affect and are affected by both physiological and emotional states. To fulfill consumer needs and produce innovative food experiences that enhance consumers' well-being, designers should account for the impact of emotions on the experience and the potential impact of the experience on emotions no matter how challenging the process may be. The chapter discusses the role of emotions in all stages of food design thinking and the challenges that designers may face while integrating emotions into food experience designs. Chapter 9, by Giulia Miniero, Marta Pizzetti, Angelo Baccelloni, and Francesco Ricotta, examines an adolescent language perspective on design thinking for food well-being. In this chapter, the authors follow the first two steps of the design thinking process, problem definition and needs'

identification, to understand how adolescents frame and perceive concepts related to food well-being. More specifically, in order to better assess the problem and to synthesize needs, adolescents' language is explored. Using a quantitative content analysis conducted with LIWC software, three trajectories of food well-being development are identified. First, the role of school, which is detrimental to the development of social interaction needed for adolescents and their nutritional behavior; second, the importance of the idea of home, in which adolescents seem to prefer consuming meals and taking time for themselves; and third, the relevance of friends and peers in shaping both adolescents' opinions and thoughts and their social processes.

Chapter 10, written by Nabanita Talukdar, explores luxury foodservices and how the design thinking approach can contribute to food well-being. Big luxury companies are utilizing the growing trend of "experiential luxury." Luxury brands are, in particular, venturing into gastronomic experiences. Luxury marketers, such as Gucci, are converging restaurants or cafes with their retail spaces. Since the two industries, food and retailing, satisfy two very different customer needs, namely eating and shopping, the author argues that luxury marketers should adopt a design thinking approach to create innovative and holistic food experiences at their restaurants and cafes. Using marketing tactics from food marketing to promote food well-being is a significant challenge. The design thinking approach can be a potential game-changer, and luxury marketers can use this approach to their advantage. Putting the customer at the center will enable luxury marketers to gain a deeper understanding of consumer needs. Luxury marketers can use this knowledge to design marketing-based interventions, which can improve consumer food choices in favor of individual and societal well-being. In Chap. 11, Jane Machin and Brooke Love explore the meaning of food well-being among undergraduate students in North America. Ensuring affordable, healthy, and pleasurable food practices in higher education are critical for academic success. Innovative campus dining experiences are also crucial for college administrators seeking to recruit and retain students in an increasingly competitive global market. Throughout a semester-long creativity class, students implemented design thinking practices to generate digitally inspired solutions in the five domains of food well-being: food availability, food literacy, food marketing, food socialization, and food policy. Findings can help educational institutions, and the commercial foodservice industry, improve the food experiences of this tech-savvy generation.

The third part of this book, which relates to the future challenges facing design thinking for innovative food experiences and consumer well-being, includes five main chapters. In Chap.12, Sara Beckman, Anne Fletcher, and Ricardo San Martin examine the critical role of design imperatives. Authors argue that plant-based foods, particularly those that simulate physicochemical and sensory attributes associated with animal-derived foods such as milk, eggs, and meat, are growing in popularity, especially in developed Western countries. The industry's narrative promotes that plant-based foods reduce the world's dependence on animal products, mitigate animal suffering, improve human health, and decrease our environmental footprint. Whether these foods fulfill desires consumers have for their food consumption

experience, however, is another question. The technology and design choices that plant-based food designers make depend upon how the desired consumer outcomes are integrated with health and sustainability outcomes in the design imperatives that drive the food design process. This chapter outlines the importance of design imperatives and their evolving composition in food design. Leveraging work done by students in the Alt. Meat Lab at the University of California, Berkeley, unpacks the significant mismatch between the plant-based foods industry narrative and the demonstrable benefits of products that have been developed to date in how they fulfill consumer preferences as well as health and sustainability outcomes. It closes with recommendations for creating an improved understanding of consumer food preferences for plant-based foods and the interactions of those preferences with other desired outcomes, and for embedding that understanding in food design efforts.

Chapter 13, written by Lia Zarantonello and Bernd Schmitt, introduces an experiential view of food design thinking by expanding consumer centricity for food well-being. This chapter aims to evolve the concept of consumer centricity in food design thinking by providing a well-established theoretical background rooted in consumer experience and happiness studies. Authors argue that food design thinking needs to adopt an "experiential view" for consumer centricity. Such a view, in marketing and consumer research, has focused on understanding how consumers relate to products, services, and brands through their experiences. The experiential view has also shown how experiences can contribute to consumer happiness. Applying the experiential view to design thinking can help companies to design prolonged and articulated consumer experiences that improve consumers' life, rather than merely focusing on product interactions at the point of purchase and their usage that satisfy a need. An expanded model of consumer centricity is proposed to evolve the current concept, and differences compared to the traditional view of consumer centricity are shown. Theoretical and practical implications are discussed at the end of the chapter. In Chap. 14, Laurette Dubé, Dilip Soman, and Felipe Almeida introduce the concept of "Precision Retailing" (PR) as a gateway to societal-scale food well-being by bridging cutting-edge theories and analytic models from behavior to those of real-world contexts. This chapter first reviews the critical behavior components of the PR framework that anchor convergence insights, analytics, and innovation. It then specifies how PR brings together and extends the current design thinking methods to inform the dynamic, multi-modal, and multi-scale facets of food products, experiences, and systems. Finally, in this chapter, authors sketch ways forward for business and other organizations as drivers of behavioral change and ecosystem transformation for lasting societal-scale food well-being.

Chapter 15, written by Sonia Massari, Marta Antonelli, Ludovica Principato, and Carlo Alberto Pratesi, examines how design thinking can engage consumers in achieving zero waste food experiences. Based on the fact that digital solutions are an excellent way to minimize consumer food waste, this chapter presents an analysis of the "Too Good To Go app." The app is helping, encouraging, and motivating users to engage in food waste reduction, while persuading a smaller group to start

taking concrete action to reduce waste. Nevertheless, to increase the impact on food waste reduction, additional action and broader engagement on the part of businesses are strongly needed. In this context, this chapter introduces a new framework (CEASE) that deploys design thinking to reduce food waste while aiming to build a community of conscious consumers that actively engage in food waste prevention actions. Authors argue that the use of the CEASE framework will inform an improved understanding of how empathy and creativity, two main determinants of the design thinking approach, can be used to promote healthier and sustainable food behaviors and at the same time reduce food waste and improve individuals' well-being by designing groundbreaking food experiences. Finally, Chap. 16, by Nina Veflen and Øydis Ueland, introduces the shift from food production to food experience design. In this chapter, the authors argue that design thinking can help to promote and enhance healthy food consumption experiences among vulnerable groups. Authors utilize three core elements of design thinking: empathy, visualization, and collaboration. Authors argue that by conducting participative observation studies, designers can learn about the reasons for peoples' behavior.

This book was part of an excellent editorial and human experience involving experts working on the topics related to design thinking, food experiences, and food well-being from different perspectives. I would like to thank the authors who have contributed to this edited book with very insightful and inspiring chapters. Thanks!

Paris, France Wided Batat

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Author Biography

Wided Batat is a Marketing Professor and an internationally renowned expert and speaker on experiential and digital marketing specialized in the fields of food, luxury, well-being, design, retail, youth cultures, generation Z&Y, millennials and postmillennials, and tourism. She has published dozens of books in English and French, and articles in top-tier academic journals that have received several awards. Professor Batat introduced an innovative and disruptive approach to the global and digital customer experience by providing a strategic framework of the customer experience offline and online and the new experiential marketing mix (7Es). Entrepreneur, Professor Batat is also a bilingual (French and English) International Professional Trainer and the Founder of B&C Consulting Group, an innovative market research and consumer insights company specialized in global and digital customer experience design, buying behavior, and consumer trends.

Contributors

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Marta Antonelli (Ph.D.) serves as Head of Research at the Barilla Foundation. She brings 11 years of experience as researcher, lecturer, consultant, and journalist in the fields of sustainable food production and consumption, water management and policy, and sustainable diets. Her experience includes positions, among others, at the University of Roma Tre, the University IUAV of Venice, the University of Siena, Venice International University, and the Swiss Federal Institute for Aquatic Science and Technology. She has also consulted for business, NGOs, and start-ups. Marta is the Research Manager of the Su-Eatable Life project, aiming at reducing carbon and water footprints through the promotion of sustainable and healthy diets in universities and companies' canteens across the United Kingdom and Italy. She also currently serves as Senior Research Associate at the Euro-Mediterranean Centre on Climate Change (CMCC), focusing on food sustainability. She holds an M.Sc. in International Economics (La Sapienza University of Rome), M. SC. Development Studies (SOAS, University of London),

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Sinem S. Atakan is an Assistant Professor of Marketing in the Department of Marketing at Siena College since the fall of 2019. Dr. Atakan received her B.A. from Bogazici University (2001) and her M.B.A. from Koc University (2005) in Turkey. She received her Ph.D. in Marketing from University of Michigan in 2011. Before joining Siena, Dr. Atakan was a Faculty Member at Ozyegin University (Istanbul, Turkey) and also worked as a Researcher at Cornell University. She is an experimental researcher and studies consumer behavior. Her research interests lie in the broad area of food consumption, self-concept, emotions, and cross-cultural differences. Dr. Atakan has published in journals including the *International Journal of Research in Marketing*, *Psychology & Marketing*, and *International Journal of Consumer Studies*. Dr. Atakan has taught undergraduate, M.B.A., E-M.B.A., and Ph.D. courses as well as management trainee (M.T.) programs.

Mike Atassi is a Senior Information Technology and Management Consulting Leader supporting US Federal government agencies and Fortune 500 companies delivering enterprise systems and strategic, mission-critical solutions. Mr. Atassi studies the implications of delivering enterprise solutions through human-centered design, system thinking, and user experience to increase adoption and optimize benefits. Mr. Atassi earned his Master of Science (MSc) degree in Geophysics from Missouri University of Science and Technology (MS&T). He is a certified Project Management Professional (PMP) and holds Lean Six Sigma Green Belt, Northrop Grumman's Position-to-Win, and Leadership Certifications.

Caroline Graham Austin is a Professor of Marketing at Montana State University, in Bozeman, where she's been on the faculty since 2007. She received a B.A. in History and an M.A. in American Studies before receiving her Ph.D. in Marketing (focus on consumer behavior) from the University of Georgia in 2008. In her work, she employs both qualitative and quantitative research methods, and her projects focus on "strategic empathy," that is, developing solutions for real-world problems in user- and community-centered ways. As a result of her increasing embeddedness in local and regional food and agricultural communities, her current research, teaching, and service work focus on food, well-being, and entrepreneurship. For example, in 2015, she co-developed and began teaching an award-winning course in which interdisciplinary student teams use design thinking to develop value added agriculture-based products. More recently, she has conducted a qualitative exploration of craft brewers' decision-making and motivation as entrepreneurs. In addition to using design thinking to help other people create innovative food experiences which are healthy, satisfying, and pleasurable, she enjoys gardening, cooking, and eating with her family.

Angelo Baccelloni is a Ph.D. student of Marketing at Sapienza University. He earned his Master's degree in Marketing from Luiss University where he works as a Junior Research Fellow at X.ite Research Centre on Technology and Behavior. His main research interests are related to Social Influence and Algorithms. He is Lecturer at Luiss Business School.

Rob Barlow is a Professor of Ethics and Corporate Responsibility at Hult International Business School, where he teaches courses in business ethics, design thinking, and the social sciences in the undergraduate and postgraduate degree programs. He received a Ph.D. in Political Science from Stanford University in 2017. Rob's research is broadly focused in the area of business ethics, where has written on a wide range of subjects, including the beneficial effects of deliberation within international multi-stakeholder initiatives, the declining deliberative quality of shareholder proposal engagements, the factors affecting consumer perception of manipulative marketing, and the history of impact investing.

Sara Beckman (Ph.D.) has spent her years as a boundary spanner at UC Berkeley where she has held faculty appointments in both the Haas School of Business and the Department of Mechanical Engineering. She served as Chief Learning Officer for the newly formed Jacobs Institute of Design Innovation and facilitated the creation of a multi-disciplinary Certificate in Design Innovation. She teaches courses such as Collaborative Innovation which integrates Art Practice, Theater, and Dance Performance Studies and Business perspectives on both collaboration and innovation. Before joining UC Berkeley, Sara worked in the Operations Management Services group at Booz Allen Hamilton and ran the Change Management Team at Hewlett-Packard. Sara received B.S., M.S., and Ph.D. degrees in Industrial Engineering and Engineering Management and an M.S. in Statistics from Stanford University.

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Cara de Boer is a Postdoctoral Candidate at HEC Lausanne, University of Lausanne. De Boer's research currently focuses on increasing the well-being of consumers in the areas of self-regulation, sustainability, and scarcity. With her research, she aims to understand the pitfalls of consumer behavior as well as explore ways to promote long-term well-being on an individual and societal level. She holds a Ph.D. from the Catholic University and has taught several courses there as well as courses at the University of Gent. Experimental research and design, social marketing, marketing, marketing communication, and corporate communication are her areas of expertise. In addition, she has been conducting applied social research.

Laurette Dubé is Full Professor and James McGill Chair of Consumer and Lifestyle psychology at the Desautels Faculty of Management, McGill University. Her research focuses on the study of affects, behavioral economics, and neurobehavioral processes underlying consumption, lifestyle, and health behavior. She is Founder and Scientific Director of the McGill Centre for the Convergence of Health and Economics, a unique initiative to push the boundaries of science to tackle societal and economic challenges and foster individual and collective health and wealth.

Debra Dunn is a long-time Faculty Member at the Hasso Plattner Institute of Design and Co-founder of the FEED Collaborative. Debra also works as a highly regarded advisor to business start-ups and social ventures around the world. Previously, Debra worked as a Business Executive at Hewlett Packard. Her 22 year career at HP spanned diverse roles including Sr. VP Corporate Affairs & Global Citizenship, VP Strategy & Corporate Operations, Division General Manager, Marketing Manager & Manufacturing Manager of Video Communications Division, and Human Resource Manager of Stanford Park Division. Debra holds a Bachelor's degree in Comparative Economics from Brown University and an M.B.A. from Harvard University. She serves on the Boards of the Skoll Foundation, B Lab, and IDEO.org.

Anne Fletcher has devoted her career to understanding what people want and to creating ethical, sustainable designs that meet their needs. After graduating from Stanford University's Product Design Program in 2007, Fletcher spent several years in product design before returning to Stanford as an Educator in the same field in addition to pursuing many of her own ventures as a design researcher, product designer, and entrepreneur. She currently teaches at UC Berkeley and runs Orta Kitchen Garden, a small business dedicated to helping people grow their own food.

Prince Ghuman'S journey into marketing started during his studies at the University of California at San Diego. His first startup, Potenza, was the first of its kind, a brand of caffeinated water. He went on to be the Founding Head of Marketing at BAP, one of the first digital automotive platforms and current leader in the automotive e-commerce space. Most recently, he held dual roles as the US Director of Consumer Marketing and the Global Director of B2B Marketing at OFX. He was named one of the Shakers and Movers by the San Francisco Chronicle in 2015, and he is currently Professor of Marketing, Entrepreneurship, and Communications at Hult International Business School. He is the Co-founder of the Consumer Neuroscience blog, PopNeuro, and the co-author of *Blindsight: The (mostly) hidden ways marketing reshapes our brains* (BenBella Press, May 2020).

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Sonia Massari is a Professor and Senior Researcher on Design Methods for the agri-food sector. Her scientific research aims to critically and empirically evaluate the evolution and the role of design in the cultural transmission of food practices and sustainable innovations. She teaches "Futures & Food Design" at SPD Milan, "Sustainability Design Thinking" at Roma Tre University, and "Sociology of Change - Food Systems Design" at ISIA Design School. For the last 10 years, she has designed and coordinated more than 50 academic programs on food and sustainability for prestigious US universities and international institutes. Sonia is currently the Academic Director of the Food Studies Programs at the University of Illinois Urbana-Champaign in Rome and she collaborates with important research centers and universities, as well as public and private

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Part I
Design Thinking for Food Well-Being: Foundations and Origins

Chapter 1
From Design Thinking (DT) to Experiential Design Thinking (EDT): New Tool to Rethink Food Innovation for Consumer Well-Being

Wided Batat

1.1 Introduction

In this chapter, I revise and advance the traditional design thinking process applied to food innovation. The widespread of food experiences and the expected increasing urgency of food problems ask for an innovative approach to create healthy and pleasurable food experiences for consumer well-being. Indeed, today's food consumption has evolved from the focus on products to a focus on experiences, and design thinking as, nowadays, applied to food does not emphasize enough the design of experiences according to the different stages of the experiential food journey (Batat et al. 2019) that lead consumers to achieve their food well-being. I argue that the current design thinking as an approach to food innovation and problem-solving does not embed food consumption within the changing experience of consumers and thus has a narrow vision and a limited perspective, which does not focus on the whole food experience and consumer well-being as both a driver and an outcome throughout the experiential food journey.

I propose a new framework, "experiential design thinking" (EDT), defined as an integrative and holistic design thinking process to help consumers achieve their individual and social well-being that integrate both healthy and pleasurable aspects of the experiential journey. EDT builds on my prior research on customer experiences, food well-being, and design thinking. The EDT framework is proposed as a six-step approach that is exploited at different food experiential journey stages (contemplation, connection, and creation). The framework employs a more comprehensive approach to food, highlighting the adoption of design thinking to create new food experiences, not just new food products. Insights and consequences both for marketing managers and policymakers are discussed to help them in improving and

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achieving higher levels of individual and collective food well-being while focusing on food innovation.

In this chapter, I answer the subsequent questions: What are the limits of the traditional design thinking method? And why should companies consider an "experiential approach" to their innovation process? This chapter is structured as follows. First, I present a multidisciplinary review of design thinking, starting from its rise to its application to food innovation. Second, I describe the EDT framework and its application to food innovation. For each EDT stage and step, I first define and discuss the main features, and then explain how each step helps create innovative, healthy, and sustainable food experiences that enhance food well-being and food pleasure.

1.2 Design Thinking: From Design Studies to Food Innovation

Design thinking, a term first introduced by Buchanan in 1992 in design studies, uses the designer's methods to match people's needs with what is technically feasible and commercially viable (Brown 2008). It has been defined as "a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid prototyping, and concurrent business analysis" (Lockwood 2009). During the last 10–15 years, design thinking has evolved from thinking among engineers when designing industrial products to become a prevalent innovation technique among scholars focusing on innovation management (Olsen 2015).

Design thinking is not a new concept; its rise can be traced back to the 1950s. Besides, the concept has covered different disciplines and definitions, ranging from the focus on tangible objects to intangible services. As a reflection of this shift, the terminology around the process continues to evolve, moving from "design science" to "design thinking" to "human-centered design" to "participatory design" (Szczepanska 2017). It has been introduced under the concept of "Design Science," with Buckminster Fuller as its most prominent champion. Design science emerged from the field of engineering/industrial design and focused on developing tangible objects in the most sustainable and efficient ways possible (Cross 1982). While these products were meant for human use, the focus was more on the objects than on the users.

Then, the democratization of design influenced the field and practitioners' and proponents' way of thinking from that point onward. In 1991, David Kelley, Bill Moggridge, and Mike Nuttall merged their companies to create the design firm IDEO. Their guiding principles were that design, regardless of context, should be human-centered and multidisciplinary (Brown and Wyatt 2010). The "human-centered approach" was born. During the same period, design thinking experienced another significant shift toward services and addressed big, complex problems that modern humans face (Buchanan 1992), giving rise to the "participation-centered

approach." As a result, the portfolio of contexts where design thinking has been successfully applied now includes branding, digital spaces, the natural environment, services, and experiences (IDEO fact sheet 2019).

The adoption of design thinking in the food industry is strongly linked to the evolution of innovation. Indeed, in the food industry, innovation has always been a critical ingredient for strategies related to health (e.g., obesity) and sustainability (e.g., food waste), but how it has been implemented evolved through a three-step evolutionary process. Traditionally, in the past, innovation was run according to product orientation principles. Only food experts were in charge of innovating food, resulting in not genuinely new products and with a high rate of failure (Costa and Jongen 2006). Such traditional food innovation focused on product features and engineers' expertise (Grunert et al. 1995). The food industry is traditionally and firmly product-oriented (Olsen 2014).

Recently, the innovation process in the food industry has slowly started to change, and design thinking promises an alternative path to innovate and design creative food for consumer well-being (Batat et al. 2019; Scott and Vallen 2019; Bublitz et al. 2019; Block et al. 2011). The bridge between food and design thinking was finally built and covered, and food design thinking has emerged as "the process by which food designers transform knowledge and ideas derived from food science, food psychology, and food culture into creative solutions" (Zampollo and Peacock 2016, p.204). Lately, consultancy firms and nonprofit organizations have started to adopt food design thinking to innovate in the food domain (Olsen 2015; 2014) concretely. Universities have acted as one of the leading players in this newly developing field, especially in California, where the Stanford University and the University of California at both Davis and Berkeley have become the cradle of food design both at professional level via IDEO and at scholar level via the d.school (Olsen 2014). However, a long way remains to be done because concrete cases are still few compared to the promised benefits (Porcini 2018; Porcini 2009), and concrete applications of food design thinking are still quite marginal, although design thinking is an increasing trend in the food industry.

Despite the levels of application, the stakeholders, and specific goals, design thinking applied to food innovation has always been adopted by designers to innovate radically new products in an attempt to generate higher levels of customer satisfaction. Although design thinking is a consistent approach to food innovation, it does not focus on designing the experiential aspects of food consumption (Batat et al. 2019). With no focus on customer experiences, design thinking cannot reach transformative solutions for the individual and collective well-being. Advancing design thinking, the experiential design thinking (EDT) framework promises to put individuals and their evolving personal food experiences in the next future at the center as recommended by the customer-centricity approach, and it brings together the full range of different relevant stakeholders in a very participative approach, to innovate solutions able to impact individual preferences.

1.3 The Experiential Design Thinking (EDT) Framework for Well-being

The conceptual framework of EDT proposes a complementary approach to transforming food innovation by using design thinking in the food industry to create healthy, satisfying, and pleasurable food experiences that drive consumer habits and enhance their overall food well-being. Thus, EDT promises significant benefits to anyone playing in the food industry. EDT fosters cost-effective, impactful food educational programs, and food innovation that can be implemented and utilized. Figure 1.1 describes the EDT and its three stages, drivers, steps, and outcomes, resulting in positive contributions to consumer well-being. I define and explain each stage in the sections that follow.

1.3.1 Experiential Design Thinking Drivers

The main drivers of innovation in the EDT framework are mainly focused on an "experience-centric innovation" (Batat 2019a) approach that considers a shift in the paradigm from "product design" to "experience design."

By focusing on customer experiences and integrating an "experience-centric innovation" approach as a driver of innovation, I define EDT as a holistic and integrative process to help marketers, designers, and policymakers to design food experiences for consumer well-being that integrate both healthy and pleasurable aspects of the experiential food journey. I propose EDT as the critical thinking process that practitioners, scholars, and policymakers could apply in designing healthy, pleasurable, and innovative food experiences, aiming at generating individual and collective food well-being (Scott and Vallen 2019; Block et al. 2011). As for the traditional design thinking applied to food, the EDT is a process articulated into significant sequential steps (Table 1.1).

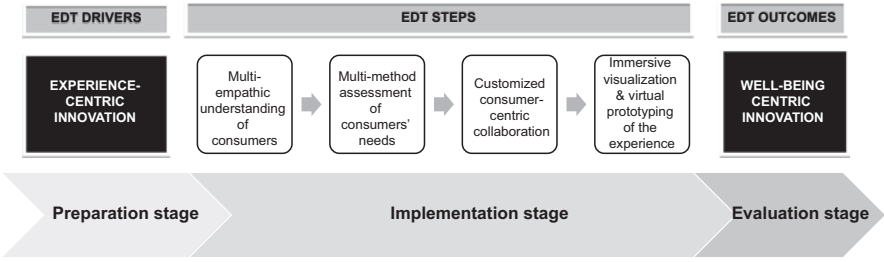

Fig. 1.1 The experiential design thinking (EDT) framework

Besides, in contrast to the traditional design thinking process applied to food innovation, the EDT framework also includes three levels of food experiences that have been identified by Batat et al. (2019), namely, contemplation, connection, and creation. For Batat and colleagues, food experiences are an integral part of social and culturalties. By enabling food contemplation through sensory and contextual factors, food connection to family and society in general, and food creation with leveraging its links to a particular culture, food experiences contribute to the construction of social identities and individual and collective well-being. Thus, the high symbolic dimension of food asks for a holistic investigation of customer experiences, and an experience-centric innovation approach to design food experiences that are unique, can generate pleasure, and are focused on the well-being of individuals.

1.3.2 Experiential Design Thinking Steps

The experiential design thinking implementation process encompasses four significant steps: (1) Multi-empathic understanding of consumers, (2) multi-method assessment of consumer needs, (3) customized consumer-centric collaboration, and (4) immersive visualization and virtual prototyping of the experience. Companies and design thinkers can implement these steps to design valuable and ethical experiences that are innovative and integrate the individual and collective well-being of consumers. The four EDT steps are detailed in the section below.

1.3.2.1 Multi-Empathic Understanding of Consumers

Empathy has always been a relevant concept that supports designers in creating reasonable solutions since it helps them to reveal and understand the tacit needs and emotions of the users they are designing solutions for (Olsen 2014). However, a more in-depth investigation by Batat (2019a) of the concept of empathy underlines its multidimensional aspect that provides a holistic interpretation of design thinking by considering a customer-centric perspective instead of a good-centric approach of innovation.

Table 1.1 Traditional design thinking vs. experiential design thinking

Traditional design thinking	Experiential design thinking
Empathize	Multi-empathic understanding of consumers
Define	Multi-method assessment of consumers' needs
Ideate	Customized consumer-centric collaboration
Prototype	Immersive visualization and virtual prototyping of the experience
Test and implement	Well-being centric innovation evaluation

Batat's experiential perspective advances the empathy step in the traditional design thinking process by identifying different types of contextualized empathies design thinkers should consider in the innovation process. Following this new perspective, the EDT framework starts with the multi-empathic understanding step. This understanding should be embedded within customers' experiences, which meanings are shaped by a particular sociocultural setting. An overview of previous literature on empathy shows that the concept is comprehensive due to the multidisciplinary interest on the topic, lack of unique definition, and the involvement of cognition and emotions.

Considering Cuff et al. (2016), there are 43 different definitions of empathy, and much confusion exists between sympathy and empathy as separated but related constructs. The definition provided by Cuff et al. (2016) that refers to empathy as better care for well-being is probably the most inclusive of all the different facets of empathy, which could be capitalized considering food experience design and well-being. Therefore, food innovation processes need to capture and integrate the different typologies of empathy and adapt them to the consumers' food experiential journey. Design thinkers should shift from a traditional to a more experiential design thinking approach by deploying the EDT framework, which is more suitable to the experience-centric innovation approach. By incorporating a multi-empathic understanding of consumers, design thinkers can design sustainable, ethical, and innovative food experiences that help consumers develop and adopt healthy and pleasurable eating behaviors and achieve their individual and collective food well-being.

Batat (2019a) identifies six different empathies that can be used to design experiential marketing policies to serve consumers and their employees optimally. They are emotion contagion (feel and share emotions), empathic accuracy (identify and understand emotional states), emotion regulation (ability to understand, regulate, and work with their own emotions), perspective taking (emotion projection), concerns for others (ability to care, compassion and concern), and perspective engagement (act in skillful ways based on empathy). Differently from other kinds of experience, food experiences constitute a specific context in which talking about empathies is more accurate than empathy. Based on these recent studies, I propose that the entire range of empathies play a role in the food experiences, and thus they should drive the EDT framework.

By adopting these six empathies, companies can decode the hidden needs and emotions of consumers and go beyond the concepts of attractiveness, viability, and sustainability of a product or service by becoming customer-centric with an eye for the customer's well-being. In EDT, different empathies and different usages can be identified. In contrast to design thinking, EDT integrates, beyond merely the use of empathy in design thinking, the use of an embedded multi-empathic understanding of the consumer and his/her food experiences that include different types of empathy. These empathies are specific to each level of the experiential food journey ranging from contemplation and creation to connection (Batat et al. 2019) to help design innovative food experience for consumer well-being:

– At the *contemplation level*, which integrates sensory aspects focused on food and environment, the consumer's multi-empathic understanding should focus on sensation and personal food experiences embedded within particular food culture. This logic allows designers to use three main typologies of empathy: emotion contagion (feeling and sharing emotions related to food), empathic accuracy (identify and understand emotional states related to foods), and emotion regulation (ability to understand, regulate, and work with emotions elicited by food) to connect with consumers, their food culture, and their perception of their own experiences. For example, the design of new foods and new food consumption-experiences imply an ability to recognize an essential emotional reaction experienced by the consumption of the new food (emotion contagion) and a correct understanding of the specific emotion experienced (empathic accuracy). An alternative food consumption (Batat et al. 2017; Batat 2016) scenario, for example, insect made snack, is about feeling the emotion experienced by the consumer being exposed to the new food and accurately recognizing the emotions evoked (e.g., disgust). The goal is to find marketing solutions to reposition the alternative food based on emotion regulation strategies (e.g., brand/food product name evoking positive emotions).
– At the *connection level*, which includes sharing and sociocultural appreciation aspects focused on food socialization, an embedded multi-empathic understanding of the consumer should focus on exploring the way individuals appreciate and share their food experience. For example, in the design process of insects and inset-based foods as a social and pleasurable experience for food well-being, the realization that Asian countries have adopted insect-based foods for a long time might promote their trial and consumption in Western societies.
– Finally, at the *creation level*, food symbolism and storytelling are the main focus in terms of empathic understanding of the consumer food experience. Empathy in this stage is then related to two aspects: concerns for others (ability to care, compassion, and concern) and perspective engagement (skillful about empathy). For example, the ability to correctly promote the new food (e.g., insect made snacks) is based on the understanding of sociocultural forces that might help the formation of a positive attitude toward the new product and its consumption.

1.3.2.2 Multi-Method Assessment of Consumers' Needs

In its second step – that is, the problem assessment – the traditional design thinking process identifies the problem as a result of the observations of users run in the first stage in an attempt to increase an outcome variable, which is typically represented by the amount of food purchased or consumed. The EDT framework challenges both the starting and the ending points, especially when designing innovative food experiences. Indeed, food is highly symbolic and needs to be holistically examined from different methodological and disciplinary perspectives to improve the full range of experience results.

Regarding the multi-method assessment of consumers' needs, stating the problem is an essential step of the whole process because the designer must focus on solving it. In EDT, setting the problem is still the main activity of the second methodological step, but it requires a holistic multidisciplinary definition of the problem. Since food experiences are a specific context because of their high symbolic nature, only adopting a transformative research approach, the problem can be properly identified in food consumption. Regarding the final point, EDT aims to improve the whole food experience regardless of whether it directly and immediately reveals itself with higher food consumed or purchased. Innovative food experiences, like any other experience, can drive many different outcome variables and, during other extended periods, as studies on customer engagement show (Brodie et al., 2011).

The adoption of EDT as a new framework for food innovation allows design thinkers to reach the above two goals and proposes a shift away from "food as weight and physical health" toward "food as well-being" (Batat et al. 2017; Block et al. 2011). The EDT new framework recognizes food consumption experiences as holistic drivers of emotional, social, physical, and mental well-being. Therefore, EDT advances traditional food design thinking by (1) proposing a transformative research approach that includes both interpretative and experimental tools, and (2) applying the latter at all of the three levels of the experiential pleasure of the food journey.

While focus groups and surveys can be useful, these methods simply ask consumers what they think they want or need. To gain even more precious insights, researchers can observe consumer behaviors to gain clues about their range of unmet needs (Beckman and Barry 2007; Brown and Wyatt 2010). The EDT process puts the individual as well as cultural, environmental, and legal factors that shape healthy, responsible, pleasurable, and meaningful eating behaviors at the center of the innovation process. Interpretative work from anthropology and sociology indicates that ethnicity, history, religion, and social status have shaped food choices and consumption experiences throughout history. In order to understand both the individual and societal factors and to design innovative food experiences, by way of the transformative research approach, EDT integrates both experimental and interpretative approaches while combining qualitative or quantitative data-based work on food. In advancing the traditional design thinking, EDT focuses on designing experiences that should encompass three fundamental approaches (Tussyadiah 2014):

- Holistic experience concept. It addresses human experiences through naturalistic inquiry. Interpretative research gathers information and observes user behaviors in natural experience settings and real-life situations while taking into consideration the relevant sociocultural contexts. Data-based quantitative and qualitative work on food informs our understanding of individual consumers' experiences and how they react to their surroundings, enabling the human-centered design approach.
- Human-centered design. At the same time, data-driven quantitative and qualitative work on food enables human-centered design. The design experience should start with an in-depth understanding of the users and the vast multitude of com-

plex factors influencing them and how they react to the surrounding environments. Indeed, the transformative research approach identifies consumers' attitudes and behaviors, and highlight the full range of factors that shape food consumption experiences, including the physiological (e.g., the body type of consumers and waitresses in a restaurant), psychological, contextual (e.g., music, colors, and temperature), and social factors (e.g., the presence of others).
– The iterative designing process, especially experimental work, can be beneficial during the iterative design process to improve the quality and functionality of innovative food experiences. Indeed, experimental work informs the iterative designing process as it enables various testing variables that shape the food experience. The evaluative research processes are essential parts of the iterative design process, and experimental studies may provide the feedback necessary to adjust the system.

Findings from different methodologies (interpretative, data-based qualitative, or quantitative) inform distinctive levels of the experiential pleasure of the food journey, namely, contemplation, connection, and creation. Each level of the journey asks for specific methodologies, whether experimental or interpretative, qualitative or quantitative:

– At the *contemplation level*, the sensorial aspects of food might be well investigated through experimental research, as marketing studies have clearly shown, even if their attempts were focused on improving the amount of food consumed or purchased.
– At the *connection level*, holistic multi-method research and especially interpretative research can help design thinkers investigate and identify the relevant communities in food, which are much more heterogeneous, and thus design innovative and healthy food experiences that focus on the collective and social aspect in different food cultures.
– Finally, at the *creation level*, EDT takes into account the interactions among different actors and activities throughout the food experience where the meanings and values emerge and change regularly. This implies that EDT incorporates the sociocultural context for food consumption. Thus, interpretative work from sociology and anthropology can help design thinkers understand the sociocultural context, that is, how food and eating are experienced given the complex interplay of biological needs, social and cultural meaning structures, and corporal arrangements.

1.3.2.3 Customized Consumer-Centric Collaboration

To create successful, fruitful, and innovative experiences, involving, collaborating, and focusing on the consumer are essential. A consumer-centric approach in food experience design and development has shown to be a successful strategy for firms and design thinkers alike (Batat 2019b). EDT puts customers at the beginning of the innovation process, as required to develop truly new experiences. In incorporating

consumers in the design process, their unique problems can be understood, and enduring consumption experiences can be developed to enhance well-being. The consumer-centric collaboration also leads toward highly customized pleasurable experiential food offerings. Consumer orientation is a crucial feature of EDT, surpassing the more traditional market orientation by placing customers at the center of any experience interaction.

Different from market-orientation, consumer-orientation transforms customers into the main characters of designing food experiences. In the EDT framework, the goal is to design food experiences instead of food products, as a way to increase food well-being, not food health. Indeed, wherein the traditional design thinking approach companies typically entrust their most innovative efforts to experts within or outside their borders but always adequately trained experts and professionals, the EDT framework prefers to start from the voice of consumers.

In contrast to the traditional design thinking that focuses on value-in-use (Ramaswamy 2008), EDT adopts a co-creation logic that focuses on value-in-experience (Batat 2019b). For example, employing a customer-centric approach to solve overconsumption and sustainability issues resulted in the conception of mindful consumption, which may help firms encourage less waste among their consumers (Sheth et al. 2011). Focusing on the consumer made it apparent that specific sustainability goals cannot be reached without customer involvement; thus, reframing the issue from the consumers' viewpoint created the opportunity for more successful sustainability efforts. Thus, engaging food experiences are the new frontier of offerings in a context. Engaging customers in superior food experiences defines the competitive grounds for any food offerings, aiming at positioning based on a secure connection between individuals and food: Developing high levels of consumer engagement with food is a new trend that is widespread globally and quickly.

Therefore, traditional collaboration designer-consumers should be revised and extended to cover the entire food experience fully. EDT, with its consumer-centric approach and its focus on value-in-experience, is an ideal tactic to create innovative food experiences suitable to each level of the experiential food pleasure journey to help consumers achieve their food well-being. To better illustrate these benefits, we can refer to the case of designing an innovative solution as a way to increase well-being via more healthy behaviors throughout the three stages of the experiential food journey:

- At the *contemplation level*, through customized consumer-centric collaboration, the previous individual experiences highly appreciated for the sensory aspects of the food experience can be visualized. Also, consumers can share detailed stories about their previous engaging food experiences by way of the sensory aspects of the food and environment, such as the smell and taste of the food and the conversation held over the meal. For example, consumers can share a cooking experience that was particularly creative and engaging in which they were overwhelmed with the pleasure felt through the multisensory experience.
- At the *connection level*, consumers' collaboration is precious in testing prototypes of experiences to better evaluate how consumers react to experience in

differing cultures. The most compelling experiences in enhancing pleasure in certain cultures emerge, with useful insights in designing the most engaging experiences. By testing storyboards of experiences with consumers from differing cultures, cultural differences creating barriers to a food experience that prevent the food experience from enhancing pleasure and food well-being can be identified.

– At the *creation level*, the goal is to visualize food experiences using consumers' stories of traditional food experiences to identify food experiences that are particularly influential to consumers and re-create those experiences to enhance food well-being is a valuable strategy. Consumers visualize a healthy food experience, rooted in tradition, such as cooking family meals together as a child, which has carried over to their adult life such that family dinners are now the norm. These visualizations can be used to develop food experiences that encourage families to cook together, like delivery meal services that make family cooking easy and accessible.

1.3.2.4 Immersive Visualization and Virtual Prototyping of the Experience

The last step of EDT revises and advances the critical final step of traditional design thinking, that is, visualization and rapid prototyping. The latter focuses on the consumer's ability to visualize in order to create prototypes that can be quickly and cost-effectively changed. However, such a step is affected by two main weaknesses that EDT solves: (1) it involves end-users only at the end of the prototyping, investigating their final reactions; (2) it focuses only on food products, not on food experiences. To solve these two weaknesses and fully leverage the critical resource of consumer imagery, EDT adopts immersive and virtual technologies in its last step.

Instead of only focusing on visualization and rapid prototyping (focused on the product features) as the final phase in the design thinking process (Olsen 2015), EDT uses immersive technologies, which focus on both tangible and intangible features of the experience to design innovative food experiences aiming at enhancing and improving consumer well-being.

In traditional design thinking, prototyping is devoted to visualization and rapid prototyping involving traditional charts and graphs, storytelling, experience journeys, business concept illustrations, and the use of metaphors and analogies. At the same time, ideas are captured on post-it notes or whiteboards or through computer-aided technologies, then shared and developed jointly (Liedtka 2015) with end-users and not only experts (Olsen 2015). Despite the high relevance of this phase, traditional design thinking explores visualization and rapid prototyping only very limitedly for two key reasons.

First, traditional design thinking does not involve end-users in prototyping, but it only asks for their reactions only after the products have been designed. Visualizing innovative food experiences and how they could contribute to well-being has potential advantages in the design thinking approach as end-users are involved not only

in the acceptance/adoption of the food innovation as a consumer response but also in the co-creation of the innovation itself (Olsen 2015).

Rapid prototyping, which is considered to be the moving force of projects adopting a design thinking approach, should trigger innovative ideas at the early stages of research development by breaking down the problem into multiple models that every member of the team can collaboratively work upon (Seidel and Fixson 2013). Despite such a relevant benefit, there is a dearth of research on the role of rapid prototyping and visualization in innovative food experiences and food well-being.

Rapid prototyping and visualization in restaurants takes place as the chief cook could be seen as the innovator, preparing a menu of various food options that aim to deliver aesthetically pleasing food and experience, along with thinking about the status of the restaurant, design, and atmosphere (Frøst and Jaeger 2010). The chief cook tries various food options via a trial and error process, but usually, this process does not involve end-users/restaurant visitors but expert opinions, that is, the chief cook (Olsen 2015). Second, traditional design thinking limits prototyping to the products, totally neglecting the entire food experiences. Nevertheless, not much has been investigated in the context of food experience and well-being.

Advancing the traditional design thinking, the proposed EDT, thanks to the continuous collaboration with consumers, fully explore consumers' imagery thanks to the use of immersive and virtual technologies. Imagery is a better and more useful information delivery method than verbal communication more generally (Aydinoğlu and Krishna 2012). Therefore, pictures in magazines or billboards are believed to have a significant persuasive power (Aydinoğlu and Cian 2014), which can be explained by the positive effect of visualization on the persuasion, altering consumers' attitudes.

By adopting the immersive and virtual technologies, EDT can leverage the vital resource of consumer imagery. Indeed, EDT integrates additional tools that are part of more integrative approaches and immersive technology to make food experience easy to feel and visualize by consumers in order to design innovative experiential food protocols that help consumers to achieve and improve their food well-being according to the three stages of the experiential pleasure of the food journey. Thus, in EDT, immersive technologies such as virtual reality and augmented reality can help designers in making consumers feel the emotions of the food experience they are designing.

The literature provides evidence that immersive technologies and tools, such as information acceleration (IA) and virtual reality (VR), have been applied in the visualization and rapid prototyping of products (Urban et al. 1997). For example, IA enabled the recreation of a virtual car showroom, where consumers could examine vehicles using tactile, olfactory, visual senses, and seek advice from a salesperson. Virtual reality was used to model and simulate rapid prototypes in virtual systems, based on specific physical parameters of an object.

The advantage of immersive technology in visualization and rapid prototyping development was confirmed by the commercial success of prototyped products, demonstrating consumers' acceptability (Urban et al. 1996). While past research discusses the advantages of immersive technologies for visualization and rapid

prototyping, there has been limited research into the impact of technology on the user experience of food consumption. Therefore, designers can then apply EDT by using immersive technologies to design protocols to design food experiences for consumer well-being following the three levels of the experiential pleasure of the food journey:

- At the *contemplation level*, the use of different tools and technologies for visualization and prototyping is recommended (e.g., traditional charts and graphs, business concept illustrations, metaphors and analogies, and immersive technologies). These tools can help designers to create healthy and enjoyable sensory food experience, as the health aspect is challenging. Healthy can mean different things in terms of the food experience: for example, healthy food, to clean looking surroundings, to visuals of green colors, and so on, for example, the experience of eating in the dark could be visualized/prototyped by switching the lights off and eating something. Elements that were not considered due to the focus on visuals come to our attention, and other senses are heightened in regards to how it feels to eat in the dark.
- At the *connection level*, storytelling, and photos as well as experience journeys, can help consumers project themselves in the social dimension of their food experiences. Socializing, by itself, is a healthy living concept, which includes the socialization process for experiences. Thus, how some consumers enjoy crowded restaurants as a sign of popularity, often referring to quality, while others see more expensive, less crowded restaurants as a sign of uniqueness and status. Socialization would have a detrimental effect on visualization and prototyping for experiences of food (more than the food itself), we can take the example of how eating in the dark makes consumers feel more connected to those around them – trust the people and waiters for their well-being.
- At the *creation level*, storytelling, photos, and experience journeys are also useful for creating a healthy and enjoyable cultural and meaningful food experience. For example, eating in the dark could symbolize risk-taking and open to experiences for Western societies.

1.3.3 Experiential Design Thinking Outcomes

Well-being centric innovation is the first and core outcome of the experiential design thinking process. In contrast to the traditional design thinking logic, which is focused on innovation as an outcome of the process, EDT encompasses an ethical design thinking logic centered on individuals' evolving experiences, their well-being, the meanings they assign to their consumption practices that are shaped by codes and norms in different sociocultural settings. In EDT, ethical design thinking is integrated from the start of the food innovation process by focusing on the individual and collective food well-being. Ethical design thinking is then the only sustainable and advanced innovation method that allows designers to include and not

exclude vulnerable populations (e.g., low-income consumers, invalid) in designing, products, or experiences that help them to achieve their well-being while enjoying innovative and pleasurable consumption experiences.

Well-being centric innovation as an outcome of the EDT process integrates ethical design methods and tools and encourages designers to develop creativity based on users' vulnerability instead of product features. By increasing the relevance of ethical issues within the food domain, food well-being has recently become the ultimate goal of any food solution. If, in the past, price and availability were the key drivers of consumers' food choices, in today's contemporary societies, they have been replaced by food well-being (Batat 2019b; Bublitz et al. 2019; Scott and Vallen 2019). Food well-being dimensions expand the scope of food solutions to embrace the psychological, physical, emotional, and social consumer reactions within food experiences.

Consequently, the ethical design of food experiences that can enhance food well-being will become a top priority within both marketing and public policy fields. Depending on how it is designed and implemented, a conventional food experience can produce a wide range of unintended consequences (e.g., obesity, poor food choices, malnutrition) that may harm the well-being of consumers. That is why it is crucial to address the food experience issue through an ethical framework that promotes and enhances the personal and collective well-being of individuals.

In order to provoke and support ethical food experience designs, the EDT framework provides decision-makers with a consumer-centric approach to assess the context-specific unintended consequences in the foodservice field and ethical implications of their food experience design choices to achieve social outcomes. This new framework for food innovation expands the current literature on the traditional design thinking process by placing the consumer and his/her functional, emotional, symbolic, social, and ideological needs, at the heart of the design process. The new extended perspective sheds light on the importance for future research to integrate the growing literature on the food experience research (Batat 2019b; Addis and Holbrook 2019; Batat et al. 2019) with food ethics and design studies and replies to calls for further research on a more holistic and ethical process to design experiences that integrate the consumer and his/her collective and individual well-being throughout the conventional innovation process with a product-centric logic (Zampollo and Peacock 2016).

Thus, the EDT framework's outcomes suggest several guidelines for adopting an ethical and innovative design to offer pleasurable and healthy food experiences that promote well-being.

1.4 Conclusion

This introductory chapter proposes a revision and advancement of the traditional design thinking applied to food innovation by interpreting food as an experience for individual and collective well-being rather than as health. In this chapter, I

discussed and exemplified how a holistic and experiential perspective on design thinking can contribute to innovation in the food services and industry to help designers create innovative and pleasurable experiences and products that focus on the well-being of consumers.

The experiential design thinking (EDT) framework here proposed should stimulate thinking about well-being in the food sector and beyond as a priority for individuals, companies, and policymakers. Increasing individual and collective well-being is already a principle inspiring policymaker – for example, it is one of the sustainable development goals (SDGs) of the EU for the next decade – but practical tools should be developed to support future investments. EDT aims at becoming one of these supporting tools.

This chapter focuses only on one of them, whose adoption is expected to increase in the next future due to the growth of the urgency of food problems asking for innovative and sustainable food solutions. I believe that an EDT framework applied to food innovation can help designers, food marketers and industry, as well as public policy to design suitable food experiences that help consumers to improve and achieve their food well-being through their food experiences, and via that to a higher individual and collective well-being.

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Chapter 2
The History of Design Thinking and its Contributions to Food Experiences and Well-Being

Caroline Graham Austin

2.1 Introduction

For those who have not encountered it before, the term "design thinking" might conjure an image of a closed circle of sophisticates having rarefied conversations in a stark, white office space located in a chic neighborhood in a cosmopolitan city. In fact, the opposite is true – design thinking is inherently democratic. The design thinking approach incorporates questions, resources, and suggestions from everyone who might be a stakeholder in a human-built system and focuses on continuously improving people's lives. It is built on the idea that empathy is essential to design. Design thinking is "deeply human," combining intuition and rationality (Brown and Wyatt 2010, p.33). Its approach to interdisciplinarity is described as *integrative* (e.g., Buchanan 1992). As a method, it has been thoroughly vetted across myriad academic disciplines, surfacing questions and providing frameworks for solutions (e.g., Dym et al. 2005; Beckman and Barry 2007). In the most straightforward way of thinking about it, design thinking is simply a human-centered approach to solving problems, large and small.

There are four major areas that are consciously designed by people for people: symbolic and visual communication, for example, advertising, packaging; material objects, for example, buildings, furniture; activities and organized services, for example, religious communities; and complex systems or environments for living, working, playing, and learning, for example, neighborhoods, corporations, sports leagues, and educational systems (Buchanan 1992). The aggregate of these four areas is essentially the fabric of modern life. Each of these areas comprises multidisciplinary elements, and all of them interact with each other. This includes but is hardly limited to tangible objects, infrastructure, educational systems, offices spaces

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and processes, and foods (Kolko 2015). In essence, everything we encounter and interact with on a daily basis is designed.

When thinking about the main areas where design has been emphasized, it is easy to see how design has been applied in the context of food. Symbolic and visual communication design techniques are obviously used to create consumer appeal in food packaging and advertising. They are also used in the creation of foods themselves, for example, breeding for beautiful apples that will appeal to buyers (Cliff et al. 2002). Design for material objects in the context of food includes creating packaging that focuses on safety, freshness, and convenience. Processed foods are also engineered as material objects that consistently perform in certain desirable ways, both during preparation and consumption, for example, a cheese that melts smoothly and tastes both creamy and tangy (Chen and Englen 2012). Activities and organized services designed for food include shopping and dining experiences at shops and restaurants. They also include institutional food preparation and distribution protocols, serving large numbers of people in schools, hospitals, and military contexts. Finally, in Western economies, large-scale, diversified food supply chains are critical, complex systems designed to enable modern modes of living, working, playing, and learning. However, as ecological, social, and economic concerns have mounted about the long-term viability of such supply chains, there has been a push to design sustainable, resilient local and regional food systems (Francis et al. 2003; Wezel et al. 2009; Fernandez et al. 2013).

In this chapter, we examine how design thinking has evolved over time, how these design principles have been applied to the production of foods themselves and food experiences, and how these designs have been intended to benefit consumers as individuals and in larger communities. As such, we look at the recent history of intentional food design through the lenses of food well-being (Block et al. 2011) and food experiences (Batat et al. 2019).

Food well-being (FWB) is defined as "a positive psychological, physical, emotional, and social relationship with food at both the individual and societal levels" (Block et al. 2011, p.9). There are five dimensions of FWB: food availability, food socialization, food literacy, food marketing, and food policy. Each of these dimensions can present challenges and opportunities for designers (i.e., all of us) as we think about issues related to food. These issues can be large or small, long- or short term, individual or community-based (Bublitz et al. 2019; Scott and Vallen 2019).

It is fairly obvious to see how design principles can be applied to enhance FWB at micro and macro levels. For example, discussing the disconnect between people in cities and the realities of food production for large, concentrated populations, Pothukuchi and Kaufman (1999) point out that, "Despite its low visibility, the urban food system nonetheless contributes significantly to community health and welfare; to metropolitan economies; connects to other urban systems such as housing, transportation, land use, and economic development; and impacts the urban environment" (p.213). These are not trivial concerns; in 2016, Michael Bloomberg, the former mayor of New York City, gave a talk at Oxford University in which he said, "I could teach anybody…to be a farmer. It's a [process]: you dig a hole, you put a seed in, you put dirt on top, add water, up comes the corn" (Saïd Business School

2016, 42:01). His implication was that farming is straightforward and not particularly intellectually demanding – misunderstandings that have serious implications when considering educational, fiscal, and environmental policies. These observations about how city dwellers (mis)understand food at a basic level illuminate opportunities for design thinking for FWB to be applied at the community scale to enhance food availability, marketing, and policies, in order to support sustainable local and regional food systems that feed people in metro areas. It also points out a huge design opportunity to educate urban eaters (i.e., food literacy) about everything from where their food comes from, to who grows it, to how big an impact agriculture has on nearly everything they do.

A major component of food experiences is the experiential pleasure of food (EPF), defined as "the enduring cognitive (satisfaction) and emotional (i.e. delight) value consumers gain from savoring the multisensory, communal, and cultural meaning in food experiences" (Batat et al. 2019, p.393). It is easy to see how design principles have been applied to create pleasurable food experiences, as in the creation of quasi-addictive salty snack foods. While such foods may be highly palatable, they violate the definitions of both EPF and FWB, by encouraging overeating (which can lead to obesity and diet-related disease) and by disconnecting food from notions of community and culture (Gearhardt et al. 2011). Given these outcomes, one may conclude that simply applying design to foods is not sufficient to develop FWB and EPF, and in fact, may undermine eaters' desire and ability to eat in ways that support such goals. Thus, we argue that design *thinking* (rather than simply design) is necessary and must be applied to foods, food systems, and food experiences, in order to achieve holistic well-being.

The design thinking approach is meant to genuinely improve consumers' lives by prioritizing human experiences as we collaboratively create the fabric of human life (Papanek 1971; Kolko 2015; Brown and Wyatt 2010; Cross 1982). When executed well, design thinking accounts not only for individual people's physical, intellectual, emotional, and spiritual needs, but for the expanded needs of their communities and natural environments as well. Ideally, in the context of food, and everything else, the products and systems that emerge from the design thinking process should satisfy people's needs and wants, both utilitarian and emotional (Brown 2008).

The modern design thinking approach is not a monolith nor is it linear, but the process generally follows these basic steps (Fig. 2.1):

When engaging in defining the problem and ideation around a solution, design thinking teams will engage in divergent thinking (i.e., generating multiple possible avenues to try), followed by convergent thinking (i.e., selecting one of these possibilities as the "best guess"). All design thinking processes are iterative, with teams investigating ideas by using their understanding of individual and community

Fig. 2.1 The modern design thinking process

stakeholders, and looping back to revisit their thinking and decision-making when they do not work. The shorthand for these processes is "Designing the right thing" followed by "Designing the thing right" (e.g., Ball 2019).

Design thinkers find the process most effective when they rely on empathy, tolerate ambiguity, encourage multiple perspectives, embrace iteration throughout the process, accept failure, and maintain confidence and optimism that a workable solution will eventually emerge. Over the past 30 years or so, the world has seen a widespread shift in thinking and practices toward explicitly interdisciplinary, human- and community-centered design. Design thinkers keep social, environmental, and economic impacts in mind as they tackle problems alongside community members where they work (Szczpanska 2017).

In this chapter, we briefly look at the history of design thinking and how design has been applied to foods, food experiences, and food systems. Essentially, all design thinking efforts today, including in the context of food, embrace the values of sustainability, community focus, and individual well-being. The current focus is on systems and environments, as well as on tangible goods (Szczpanska 2017). As Tim Brown, CEO of IDEO writes, "[design thinking] principles turn out to be applicable to a wide range of organizations, not just to companies in search of a new product offering. A competent designer can always improve upon last year's widget, but an interdisciplinary team of skilled design thinkers is in a position to tackle more complex problems" (Brown and Katz 2011, p.381).

2.2 The Evolution of Design Thinking and its Applications to Food

Design thinking can be seen in three different ways: as a theory of practice, as an organizational resource, and as a mindset (Kimbell 2011). While it did not start out as such, the current consensus seems to be that everything is designed, and everyone designs things (Cross 2011). Everyday people are encouraged to participate in design processes not just as consumers of products and systems, but as designers in their own right, in order to make problem-solving "more intelligent and meaningful" (Buchanan 1992, p.8). As a reflection of this shift, the terminology around the design thinking process is continuously evolving, moving from "design science" to "human-centered design" to "participatory design" (Szczpanska 2017).

This evolution has expanded the notion over time of who is a designer and what can be thought of in terms of design. In terms of the process model presented above, the historical progress of design thinking looks like this (Fig. 2.2):

Fig. 2.2 The historical progress of design thinking

1. Design Science (1950s): Prototyping and testing consumer goods for convenience and efficiency – product focus.
2. Human-Centered Design (1960s–1970s): From an ethical standpoint, correctly identifying both problems and solutions – user focus.
3. Participatory Design (1990s–present): Striving to understand the tangible and intangible needs of individuals and communities to promote well-being – holistic focus.

We explain each step below.

Design thinking as we currently conceive of it began in the 1950s, championed by prominent engineers Buckminster Fuller, who called it *design science*, and John Arnold, who preferred the term *comprehensive design* (Arnold and Clancey 2016). Fuller's approach emerged from the field of mechanical engineering and focused on developing tangible objects for human use in the most sustainable and efficient ways possible (Cross 1982). In 1963, Fuller wrote, "A designer is an emerging synthesis of artist, inventor, mechanic, objective economist and evolutionary strategist" (Fuller 2009, p.116). Fuller's focus was on the designer, and the products he created, but by the mid-1950s, Arnold had extended the concept by emphasizing the holistic, humanistic aspects of design. Furthermore, in a big step forward, Arnold brought to light how important it is, when trying to solve a problem, to first understand and accurately identify what the problem actually is (Arnold and Clancey 2016). Thus, by 1960, the current understanding of design thinking as a way of seeing and interacting with the world had been articulated. However, the dominant paradigm of the time was focusing on new food products for consumers to buy and consume, rather than on including consumers in the process of creating new foods for themselves.

A classic example of a consumer-focused food innovation from the 1950s is the frozen Swanson TV Dinner, introduced in the United States in 1954 by Swanson & Sons ("No Work," 2014). While the food in TV Dinners was not particularly tasty or nutritious, the product was simultaneously comforting (e.g., turkey and mashed potatoes) and exciting (served on a futuristic aluminum tray). Best of all, preparing TV Dinners required neither cooking nor cleaning, providing an extremely convenient way for busy women to perform their roles as homemakers who were primarily responsible for feeding their families (Gust 2011). Other food innovations from the 1950s that were designed to provide more convenient dining options for busy consumers include commercially canned foods and drive-through restaurants.

During the 1960s, the Scandinavian concept of cooperative design became globally prominent. This movement promoted the idea that design should incorporate all stakeholders' perspectives, rather than being walled off as the province of professional engineers and designers. Understanding the democratic nature of design changed practitioners' and proponents' way of thinking from that point onward. Another Scandinavian innovation of the time focused on improving workplace operations, in addition to tangible consumer goods (Bjerknes and Bratteig 1995). These advances in the 1960s were subtle but crucial developments in design thinking overall – they expanded people's understanding of who can participate in design

(i.e., everyone) and what types of issues design can address (i.e., systems and services, as well as products).

An example from the 1960s is the democratization of gourmet cooking, exemplified by the first celebrity chef, Julia Child. Child introduced the possibility of cooking traditional French dishes at home to American audiences via cookbooks and a television program called *The French Chef*. While she was highly accomplished in the kitchen, a great deal of Child's success lay in the fact that she was professionally trained but had no professional cooking experience (Child 2006). When she made a mistake or encountered an obstacle during taping, she improvised and showed audience members how a dish might be saved…or not (Nilsson 2012). It was not exactly peer-to-peer teaching, but Child emboldened American home cooks to explore basic ingredients and learn cooking techniques on their own. In 1966, she was the subject of the cover feature story in *Time* magazine, which stated,

> Amid an avalanche of new cookbooks—206 last year alone—Julia Child's five-year-old *Mastering the Art of French Cooking* has grown to be the new bestseller in the field, with close to 300,000 copies sold at $10 apiece. But what really makes her just about everybody's chef of the year—and the most influential cooking teacher in the U.S.—is that her specialty, French cuisine, is the central grand tradition for the growing multitude of home gourmet cooks. It is an enthusiasm that is also cascading into the U.S. kitchen, turning it into the most scientific, colorful and savory room in the house, a combined work area and show place ("Everyone's," 1966, para. 3).

In a move that engendered increasing multidisciplinarity, social scientists joined the field during the 1960s and 1970s, researching and writing about design from the human standpoint, leading to *human-centered design*. In his seminal design text, *The Sciences of the Artificial*, Herbert Simon wrote, "the proper study of mankind is the science of design, not only as the professional component of a technical education but as a core discipline for every liberally educated man" (Simon 1969, p.83).

In 1971, anthropologist Victor Papanek wrote a scathing assessment of the design field, asserting that designers have the utmost ability to shape people's lives, yet do not assume the "social and moral responsibility" that should accompany such power (Papanek 1971, p.ix). Despite (or maybe because of) this critique, Papanek's book became an international best seller, teaching designers how to incorporate anthropological perspectives into their work in order to be more human-centered and socially responsible. Papanek revealed how designers' accountability (or lack thereof) had been a huge, unacknowledged factor in supporting (or undermining) individual and community well-being. When they are not held to account for the unintended consequences of their designs, designers have much less reason to care about the outcomes of their work.

In terms of food, 1971 was a watershed year for socially and environmentally responsible design thinking, and not just because of Papanek. The early 1970s saw Americans beginning to understand the total costs of a postwar "modern" diet based on mass-produced convenience foods. In 1971, Frances Moore Lappé (Lappée 1971) published *Diet for a Small Planet*, a bestselling book that advocated for vegetarianism as a way to conserve food resources and combat world hunger (Aubrey 2016). The same year, Alice Waters, a nonprofessional chef like Julia Child,

co-founded the revolutionary Chez Panisse in Berkeley, California. Like Child, Waters translated eating experiences from time she spent in France to create the American farm-to-table restaurant concept. As a restauranteur, she helped create a vibrant regional food economy by building relationships with farmers and small-scale processors (e.g., bakers, cheesemakers) and using local, seasonal ingredients to create Chez Panisse's daily menu (Lastoe 2019).

However, in the United States, with divorce on the rise and mothers entering the workforce in record numbers (Pew Research Center 2015), the late 1970s and 1980s also ushered in a flood of food design focused primarily on convenience for busy families. This was a move back toward product-centricity in design, similar to what American consumers had experienced in the 1950s. Examples of widely adopted food innovations from the 1980s include Capri Sun self-contained drink pouches, which were virtually unbreakable and required no refrigeration (Lazarus 1991), Wal-Mart Super Centers that combined grocery and discount stores under a single roof, allowing for one-stop shopping (O'Connell 2020) and the microwave oven, which went from a novelty item (<10% of households) to a kitchen staple (>90% of households) during the decade (Thompson 2012).

Thus, the philosophy of human-centered design thinking about food waned during this period, but in the late 1980s and early 1990s, there was renewed interest in design thinking as a general approach to design inquiry and practice. In 1991, designers David Kelley, Bill Moggridge, and Mike Nuttall created the IDEO (IDEO 2019), now one of the world's preeminent design firms. Their guiding principle was that design, regardless of context, should be human-centered. In addition, the founders committed themselves to employing a diverse range of knowledge and talent, so from the beginning, IDEO's design teams have been purposely multidisciplinary and inclusive of stakeholders, that is, *participatory design* (Brown and Wyatt 2010). In addition to re-thinking tangible goods, design thinking expanded to include macro-level systems, for example, food supply chains, that comprise the modern landscape (Buchanan 1992). As a result, the portfolio of contexts where design thinking has been successfully applied now includes tangible goods, services, branding, digital spaces, organizations, experiences, and the natural environment (IDEO, 2019).

In conjunction with the focus on community participation for community well-being, one growth area in contemporary food design thinking has been in the development of local and regional food systems. Generally speaking, these smaller scale food systems improve communities by increasing their sustainability and resilience, considering health and nutrition, ecological, economic, and sociocultural impacts (Francis et al. 2003; Wezel et al. 2009). Examples of participatory design for food systems include projects underway at IDEO that range from urban farms to school cafeterias to home kitchens ("How Can We," 2020). On the academic side, universities have added food/design coursework to their curricula, such as the University of Utah's "Introduction to Design Thinking: Food Systems" course (ULibraries 2020), and researchers have started publishing work investigating this topic (e.g., Ballantyne-Brodie and Telalbasic 2017; Zampollo 2016).

2.3 How Design Thinking Can Contribute to Food Experiences

It is important to note the difference between food products and food experiences, noting that the two are separate concepts that are entirely intertwined. Food products are straightforward – what we, as literal consumers, put in our mouths. These are the items that we chew and swallow to provide our bodies with energy, nutrition, flavor, texture, and so on. In contrast, food experiences comprise everything that surrounds and accompanies the acts of chewing and swallowing, before, during, and after we eat. As Batat et al. write, "Food experiences involve the anticipation of food events and food practices, purchasing, consumption, and remembering" (Batat et al. 2019, p.393). Food products are just one piece of the food experience.

As illustrated in the previous section, design principles, and even design thinking principles, have been easy enough to apply to the creation of food products. However, we argue that it is impossible to create true, widespread food well-being without applying design thinking principles to food experiences, because of the holistic nature of food experiences and FWB. There are myriad factors that influence our perceptions of food experiences, the most intuitive of which is food's sociocultural dimension. For example, Airbnb, the global travel behemoth, launched a new service in fall 2019 called Airbnb Cooking Experiences, which fosters explorers' connections to places through people and food. In launching the program, the firm wrote,

> Through Airbnb Cooking Experiences, we are presenting a new way to understand culture through food. Unlike typical cooking classes, which can feel intimidating or time-consuming, at the heart of every experience is human connection; people coming together to make and share a meal. Hosted by families, farmers, pastry cooks and more, local hosts can now highlight the deeper meaning behind the food you eat, teaching traditional recipes and sharing stories in intimate settings around the world (Airbnb 2019, para. 2).

This program is designed to encourage human understanding through food experience, emphasizing that eating the planned meal is merely one element in this curated cultural exchange. In keeping with the design thinking ethos of participatory design, many hosts for these experiences are not professional chefs, but rather, people who simply want to share food experiences with travelers. Titles of co-created experiences include, "Traditional Uzbek Home-Cooking," "Handmade Pasta with Grandma," "Make Japanese Street Food with Mom," and "Home-Cooked Flavors of Singapore" (Airbnb 2019, para. 10). Given the language of the press release, it is safe to presume that these courses have been iteratively prototyped – another element of design thinking – incorporating participants' wants, needs, limitations, and other perspectives in order to co-create experiences that have tangible and intangible benefits, promoting FWB through cultural exchange.

Food cultures and food experiences incorporate not just sociocultural elements, but local ecology, technologies, and economic and political histories as well (e.g., Kingsolver 2007). All these elements interact to create an expanded "human terroir" (Austin 2010, 28:25). It might seem obvious that the combination of food,

community, history, and culture within specific spaces create positive food experiences in Tuscany, Paris, or southeast Asia; there is encouraging empirical evidence demonstrating that these elements can also have meaningful, reinforcing experiential effects in thoughtfully designed institutional settings.

For example, military dining has a long-standing, global reputation as being highly utilitarian: low quality, flavorless, and joyless. The product design focus has been on maximizing nutrition, economy, and ease of preparation, which are certainly important considerations when feeding soldiers three times a day, but not conducive to experiential pleasure or food well-being. Carins et al. (2020) conducted a study in which they changed the atmosphere of an Australian military canteen to more closely resemble a casual café. Based on prior consumer-based research on military dining experiences, they holistically redesigned the layout, aesthetics, variety, and presentation within the dining room. In the previously drab, stiff environment, they changed the servicescape by improving the table layout, lighting, and décor. They reduced congestion and queueing and increased opportunities for both community and autonomy, depending on diners' needs. These changes resulted in diners' increased satisfaction with the food experience in terms of their perceptions of the food quality and variety, and their overall enjoyment of eating in the canteen; the authors conjecture that by increasing satisfaction, such changes can ultimately increase the nutritional status (and therefore, the overall FWB) of the military personnel who eat there.

Adapting institutional food experiences to include learning how to grow and prepare food, one can look to school communities as another beneficiary of holistic design thinking interventions. In her book *Animal, Vegetable, Miracle,* Barbara Kingsolver writes,

> [A positive, experiential food movement] engages schoolchildren and teachers who are bringing food-growing curricula into classrooms and lunchrooms…. It includes the kids who get dirty in those outdoor classrooms planting tomatoes and peppers at the end of third grade, then harvesting and cooking their own pizza when they start back into fourth" (Kingsolver 2007, p.20).

In keeping with the notion of participatory design, this type of farm-to-school educational innovation requires the commitment of teachers, parents, and students alike in order to be successful. For example, teachers' input is integral to deciding what they want to grow and what they are capable of growing. If the garden fails (from poor soil, pests, neglect, etc.), teachers can learn, alongside their students, what went wrong and how to improve their yield the following growing season. Kingsolver writes that this type of educational programming also "owes a debt to parents who can watch their kids get dirty and not make a fuss…. to countenance the ideas of 'food' and 'dirt' in the same sentence" (Kingsolver 2007, p.20). In addition to the pleasures of playing in the dirt and eating fresh food they have grown themselves, these experiences can help even very young children understand the technological, economic, ecological, ethical, and even political dynamics that affect what, how, and why we eat (e.g., "Summer Camps," 2020).

2.4 How Design Thinking Can Contribute to Food Well-being

As noted above, when attempting to create products, programs, or systems that engender holistic food well-being (FWB), it is imperative that design team leaders include the perspectives and insights from the communities they are attempting to serve. This conception of design thinking aligns with the research approach known as community-based participatory research, or CBPR (NIH 2018). In CBPR, researchers work *with* (rather than *for*) community members and other stakeholders to identify issues that need to be addressed, devise research projects that will generate meaningful results, and make collaborative decisions for interventions that will benefit the community.

For example, Hinrichs and Kremer (2002) describe a project designed to benefit low-income families by subsidizing their participation in a local community-supported agriculture (CSA) program. The project was intended to increase poor families' access to fresh, high-quality, nutritious foods, thereby reducing the FWB gap that exists between consumers with high/low socio-economic status. Unfortunately, the researchers discovered that while the program did help people with lower incomes, these consumers also had access to other food resources, unlike the "truly poor" who remained excluded from access and participation in this high-quality local food system (Hinrichs and Kremer 2002, p.83). In retrospect, Hinrichs and Kremer (2002) recognize this error in their program's design, writing, "we hope to encourage reflection about the meanings and mechanisms of social inclusion in such endogenous development projects, and particularly about *the potential difference between nominal and more substantive social inclusion*" (p.85, emphasis added). Even though they did not approach their project using either "design thinking" or "food well-being" to describe their process or their intended outcome, Hinrichs and Kremer (2002) demonstrate commendable intuitive awareness of both. In assessing their attempt to improve on all five elements of FWB (i.e., food availability, food socialization, food literacy, food marketing, and food policy), they recognize the need to first generate genuine empathetic understanding of the lives of the people they are trying to help with this type of effort (rather than making shallow, incorrect assumptions), and rethink their approach in order to improve future outcomes of such well-intentioned programs.

This leads to one of the key lessons to applying a design thinking approach to a systemic issue such as food well-being: Design thinking embraces the power of human insights, while remaining focused and logical (Cross 1982), that is, an inductive approach to problem-solving. During the design thinking process, problems and solutions often emerge simultaneously from ambiguous contexts as the team works through multiple design iterations. The most dedicated design thinkers engage in dialectical inquiry, revisiting their questions, their data, their analytical lenses, and their conclusions until they arrive at valid and meaningful solutions with their target users. Holistic thinking is baked into the design thinking approach – "[It]

is an essential tool for simplifying and humanizing. It can't be extra; it needs to be a core competence" (Kolko 2015, p.70).

Consider another example, cook-at-home meal kit services such as Blue Apron and HelloFresh that deliver precise portions of fresh, wholesome ingredients and instructions to subscribers' doorsteps. (The recipients prepare and eat the meals they create at home.) On one hand, consumers' experiential satisfaction and pleasure with the food itself is very high – they genuinely enjoy discovering well-curated ingredients and recipes, the dishes are well designed (i.e., tasty, nutritious, not too challenging), and the home chefs feel well-earned pride in their own competence in the kitchen, as in the Julia Child example from the 1960s ("HelloFresh," 2020). At the individual level of the FWB dimensions of food access, literacy, socialization, marketing, and policy, meal kits are succeeding. However, the programs are not an unalloyed success, because they have ignored (at their peril) many societal aspects of FWB, especially when it comes to sustainability. In short, many consumers are concerned about the transportation footprint of home-delivered meal kits. In addition, the large amounts of coolant that are required to provide safe, fresh ingredients to customers' doorsteps diminishes people's satisfaction with the service and the overall experience (Ray 2017). If these firms want consumers to truly experience food well-being as a result of subscribing to the service, they will empathize with their customers' perceptions and concerns about the entire meal-kit experience, beyond what happens in the kitchen. While there have been some efforts toward educating the public about how these programs are not as wasteful as they might seem (e.g., Botkin-Kowacki 2019), a design thinking approach would advocate collaborating with consumers to learn what would be genuinely meaningful steps to addressing this question that has both practical and ethical implications.

2.5 How Food Experience and Well-being Can Contribute to Food Design Thinking

The term "design thinking" has experienced a resurgence in the past decade or so, and as such, has experienced a backlash as the concept has shifted and been diluted. People see the term used so often in so many contexts that it has become faddish (Woudhuysen 2011). This is not an unsubstantiated critique, as much of what is termed "design thinking" is often simply product-focused design of consumer products. Nonetheless, the basic notion that empathetic user-focused design takes a holistic approach when creating and evaluating new ideas has stood the test of time. Such principles have been successfully applied to goods, services, systems, processes, and more, as described above. Legitimate design thinking embraces the "emotional value proposition" as the basis for understanding, and solving, the problems we face (Kolko 2015).

However, while food products have received attention, the areas of food experiences and, especially, food well-being have been overlooked by design thinkers.

This creates a remarkable opportunity, as there is a continuum of foods and food experiences that can (and should) be examined through the overlapping lenses of design thinking, food experiences, and food well-being. It has become clear that corporate food designers' focus on creating profitable products that emphasize immediate pleasure and convenience, while minimizing attention to culturally attuned food experiences has generated "big picture" consequences, resulting in the opposite of FWB (Scott and Vallen 2019). As Kingsolver writes:

> Food cultures concentrate a population's collective wisdom about the plants and animals that grow in a place, and the complex ways of rendering them tasty…. A food culture is not something that gets *sold* to people. It arises out of a place, a soil, a climate, a history, a temperament, a collective sense of belonging. Every set of fad-diet rules is essentially framed in the negative, dictating what you must give up. Together they've helped us form powerfully negative associations with the very act of eating" (Kingsolver 2007, pp.16–17).

In modern Western society, enjoying eating – focusing on the experiential pleasure of food (Batat et al. 2019) – is perceived to be gluttonous by people who unthinkingly wolf down huge amounts of empty calories. We are awash in calories and deficient in food well-being (Scott and Vallen 2019). It is truly a conundrum, but one that can be addressed by design thinking.

When thinking about how FWB and food experiences can become part of the design thinking revolution, it may be helpful to examine the component dimensions of food experiences, as marketers do when assessing the strategic marketing environment. Food well-being is more likely to be achieved if design thinkers – especially those employed in the standard commercial food industry – will take into consideration the sociocultural, technological, economic, ecological, political, legal, and ethical dimensions of food experiences they are working to design or improve, that is, the STEEPLE approach (e.g., Armstrong n.d.). As a holistic approach to examining the environment, STEEPLE is complimentary to all three frameworks and can be applied by design thinkers in service of creating positive food experiences and FWB.

Micro-level notions of convenience, pleasure, virtue, value, health, integrity, wholesomeness, community, creativity, and self-determination are all relevant to all three areas of inquiry (FWB, food experiences, and design thinking). Macro-level economic and legal policies around food issues can and should be reconsidered within a multidimensional, stakeholder-oriented frame of reference. All of these ideas have been illuminated in the FWB literature and are ideally suited to increasing our understanding of how and when design thinking can be successfully applied. Everything from growing, harvesting, and preparing one's own food at home to eating commodity-grade mass-produced foods from a set menu at a specific time of day in a public school cafeteria can be examined – and likely improved – in light of the three complimentary paradigms. The concepts of food experiences and FWB already inform each other; projects based on these ideas that are focused on creating a better food system and greater FWB will be a welcome addition to the design thinking portfolio.

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Chapter 3
How Design Thinking Can Influence Food Choices and Healthy Eating Experiences Among Consumers

Matthew Rothe and Debra Dunn

3.1 Introduction

It may be helpful to begin this chapter by framing its title as a question: how can design thinking influence food choices and healthy eating experiences among consumers? It may be further helpful to think about this question as being composed of two inter-related problems. The first is, "how can we influence food choices," and the second is, "how can we design healthy eating experiences." The core value of design thinking, to be thought of here as a set of tools and methods to solve problems, is almost always in the practitioner's ability first to identify the right problem to solve. While this may sound trivial, or perhaps pedantic, arguably one of the most important causes of diet-related illness due to the "standard American diet" is precisely because innovators across the food system have been solving the wrong problem.

Over the last many decades, food companies and the professionals who have sold, marketed, and advertised their products have primarily focused on only solving the problem of influencing consumer food choice. For their part, food scientists, technologists, and ingredient companies have responded to this problem with an endless array of innovations designed to heighten the sensory experience of consuming food by manipulating its organoleptic qualities. Generally speaking, an increase in the consumption of food products resulting from these innovations has led to poorer health outcomes for consumers. In reaction to foods causing these outcomes, nutritionists and other health professionals have tended to frame the general pleasure of eating foods that provoke the senses as indulgent, and thereby problematic to their objectives of promoting and influencing healthier eating behaviors.

It is our view that this standard definition of the problem around the sensory aspects of food is misguided and misses essential other elements in consumers'

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food decision processes that offer essential opportunities for all innovators to contribute to better health outcomes among consumers. To the extent every problem has a specific and unique potential solution set, we argue that to change current outcomes, we need to start by redefining the problem to be solved. In this regard, this chapter will focus on designing healthy eating experiences and will present a framework for solving this problem which utilizes the methods of design thinking.

3.2 Background and Context

Before proceeding to the meat of this chapter, it is worth describing the bone and sinew that make it useful. To follow are descriptions of the tools, abilities, and theoretical frameworks that form the basis of our applied methods of influencing food choice and designing healthy eating experiences.

3.2.1 Design Abilities

The frameworks, methods, and tools in this chapter are mainly based on the theoretical underpinning, and the practical application thereof, in the general curriculum at Stanford University's Hasso Plattner Institute of Design. Known on campus and among its broader community as the "d.school," its buff sandstone exterior belies the emergent properties of creativity that reside in its interior and regularly advance the art and practice of design thinking. One of the most important recent advancements in the d.school's pedagogy was an intentional shift from describing design thinking as a "process." In place of a linear way of framing and organizing design thinking, Carissa Carter, the d.school's Director of Teaching and Learning, and her colleagues developed a framework for describing design thinking as a set of "design abilities." This reframing naturally follows from a preceding series of logical connections: design thinking describes how designers think; the designer's thought processes manifest in the design of things; the quality and utility of things produced by designers are the results of the designer's abilities; the designer's abilities are a set of discrete skills which can be taught, learned, practiced, and honed.

The frameworks, tools, and methods in this chapter involve two of the eight design abilities described by Carissa and the d.school. The first is *learning from others* (people and contexts). "This ability includes the skills of empathizing with different people, testing new ideas with them, and observing and noticing in different places and contexts" (Carter 2016). The second is *synthesizing information*. "This is the ability to make sense of information and find insight and opportunity within" (Carter 2016).

The methods described in this chapter that utilize these abilities include various forms of ethnography and sense-making methods and frameworks.

3.2.2 Healthy Eating Experiences: The Experiential Pleasure of Food

The definition of what constitutes a "healthy eating experience" in our framework is based on the concept, "experiential pleasure of food" (EPF) (Batat et al. 2019). Two elements of this concept, especially, inform our framework. The first involves the definition of healthy eating. By traditional standards, healthy eating is defined by the food a person eats and how healthy it is compared to other foods. While useful in some ways, this definition tends to position food options in a binary decision-making matrix for consumers, when in reality, many variables define the extent to which a given food item contributes to a person's health and well-being. Relatedly, traditional standards of defining healthy eating behaviors tend to position the pleasure of eating food as being in opposition to one's health, which limits a more holistic approach to thinking about the relationship between people and their diets.

Conversely, Batat et al. (2019) describe "food pleasure as a positive pathway to well-being." Positioning food pleasure in this way shifts the focus of health from being a relationship between different food options to a more direct and inclusive relationship between a person and the contexts in which they eat food. Healthy eating, defined in this way, is consistent with both our conceptual model for food choice and our practical understanding of how people make food choices. In our observation, people's food choices are made as the result of a diverse set of negotiations between their ideals, values, and contextual influences on those ideals and values. Designing for pleasurable outcomes across these negotiations provides an opportunity to improve the overall health and well-being of a person's relationship to food. We describe this relationship in our framework as one's "food identity."

The second element of EPF that informs our framework, which relates to the first, is in its definition: "the enduring cognitive (satisfaction) and emotional (i.e., delight) value consumers gain from savoring the multisensory, communal, and cultural meaning in food experiences," Batat et al. (2019). Our framework likewise encompasses the communal and cultural influences in food choices and is designed to identify unmet implicit needs as they relate to the emotional value associated with a person's food identity. Assuming well-being as the objective, interventionary solutions that solve these types of needs necessarily result in healthy eating experiences.

3.3 A Conceptual Model for Understanding Food Choice

The theoretical basis of our applied methodology for influencing food choice is largely derived from the academic paper, *Food Choice: A Conceptual Model of the Process* by Furst et al. (1996). As illustrated in Fig. 3.1, the model works by assuming that a given individual makes food choices in the context of several influences, including ideals, personal factors, resources, social framework, and food context.

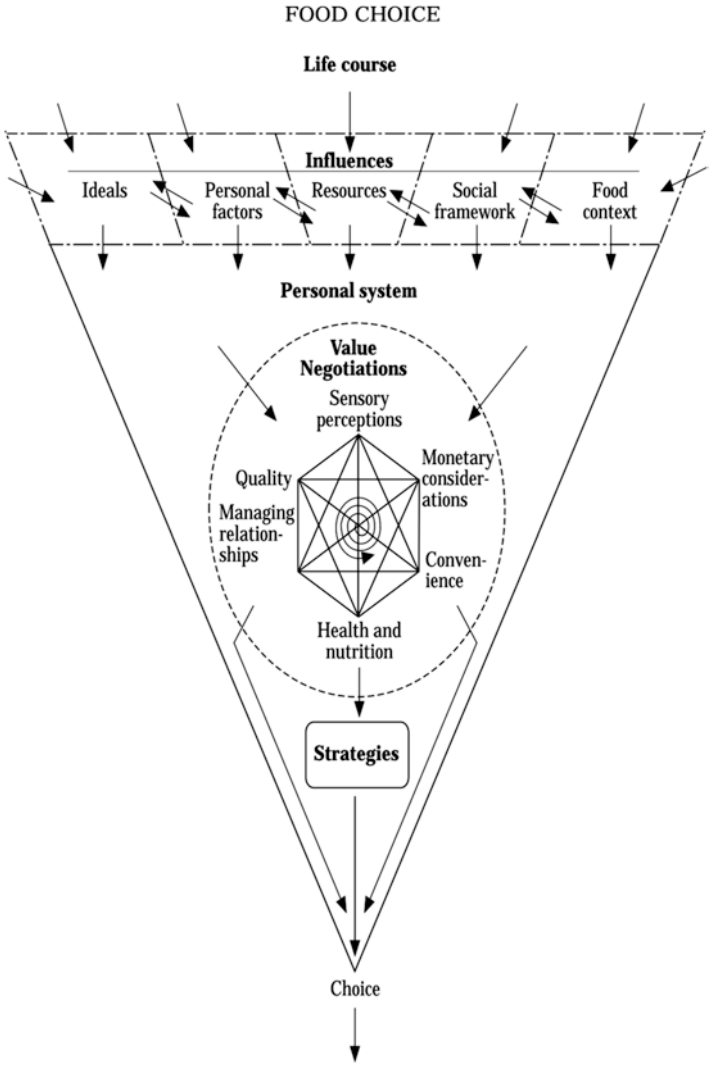

Fig. 3.1 A conceptual model of the components in the food choice process. (Furst et al. 1996)

Taken together, these influences define what the authors call a "personal food system." One's personal food system involves "value negotiations" among sensory perceptions, monetary considerations, convenience, health and nutrition, quality, and relationships. These value negotiations result in decision-making strategies (or heuristics, as we describe them later), which ultimately result in specific food choices.

While this model forms the basis of our applied methodology for influencing food choice, we have discovered that as a design framework, it is deficient in one important way. The authors note, "Perhaps the most pervasive influence is that of

ideals," and we certainly agree with this statement. We have observed, in addition to this, that there is often a strong tension, or set of negotiations that occur between one's ideals and other contextual influences in one's food decision process (personal factors, resources, social framework, and food context) such that this tension must be accounted for by way of separate treatment. Moreover, we believe that understanding this tension is critical to designing solutions that can effectively influence consumers' food choices. We will discuss this in more detail later.

3.3.1 Transitions in Personal Food Systems

The food choice framework described above is useful for understanding people's personal food systems as they exist today. The reality is that most people's food systems transition over time in response to significant changes in the influences on their personal food systems, which occur through the subjective experience of people growing, learning, and moving from location to location in their lifetimes. We tend to orient much of our work around these transitions, for a couple of reasons. First, and very practically speaking, identifying transitions in people's personal food systems is a useful way to direct and optimize ethnographic inquiry. As a mostly qualitative technique involving direct engagement with, or observation of people in context, the total amount of "data" that can be collected by practitioners using this technique in an economically viable manner is relatively limited. Thus, targeting these transitions in the design of one's research plan can be quite helpful in optimizing for meaningful and actionable insights.

Second, and more importantly, these transitions are ripe for designing powerful and impactful solutions and interventions to influence food choice. As people reform or redefine their personal food system during these transitions, they necessarily form new decision-making heuristics (described above as strategies), in light of the new contextual influences associated with the transition. From experience, we know that these heuristics are both long lasting and often are imperfect, ill-informed, and overly/temporarily influenced by various factors in ways that lead to a dissonance between an individual's ideals and the actual outcomes and impact of their decisions about their health. Thus, the ability to intervene in the process of heuristic formation is an opportunity for designers to both help align people's ideals with their choices and, importantly, influence the food choices that a person will likely make over a long time.

Based on the sum of our work, we believe there are six general food transitions that people experience and that represent significant temporal opportunities for designers to influence food choice: eating solid foods, eating at school, eating at college, eating independently, cooking for children, and eating to regain health. To follow is a brief description of each:

- *Eating solid foods* describes the transition that infants make from consuming primarily breast (or formulated) milk to consuming primarily prepared foods.

- *Eating at school* describes the transition that children make from consuming food primarily at home to regularly consuming some of their food away from home, especially in new social settings.
- *Eating at college* describes the transition that young adults make from consuming food in which they have less agency in decision-making to consuming food in which they have full agency in decision making.
- *Eating independently* describes the transition that adults make from consuming food, which is, in some part, subsidized financially to consuming food for which they are entirely financially responsible.
- *Cooking for children* describes the transition adults make from orienting their "food lives" primarily around themselves to orienting their food primarily around their family.
- *Eating to regain health* describes the transition any person makes from consuming food as part of their "normal" diet to consuming food as part of a diet intended to support, or improve one's health.

It is important to note that one's food decision-making heuristics do not always or even necessarily change during transitions in their personal food systems. The reality in our experience is that the formation of heuristics is an extremely dynamic process due to the multitude of influences that shape a person's food identity. As dynamic and challenging as they may be to parse, the value of focusing on transitions is precisely because of this dynamism. The expression of existing heuristics in conflict with new contextual influences is at its peak during these transitions. During these peaks, people are more aware of the contextual influences that are manifesting the conflict, which from a designer's point of view, makes them easier to observe, understand, and, ultimately, useful in informing the design of food choice interventions.

It is also important to note that there is a body of peer-reviewed research that addresses the importance of several of these transitions in establishing healthy eating behaviors. Though a full literature review is beyond the scope of our work as educator-practitioners, a notable example from the literature is the demonstrated relationship between introducing a wide variety of taste experiences to infants and the healthy eating behaviors that result in later life (De Cosmi et al. 2017).

3.4 A Designer's Framework for Influencing Food Decisions and Designing Healthy Eating Experiences

If the prior section can be thought of as the ingredients in our applied methodology for designing healthy eating experiences, this section should be thought of as the recipe. This recipe will be brought to form by both describing it in general terms and in the subsequent section by using examples from work conducted by the Food Entrepreneurship, Education, and Design (FEED) Collaborative at Stanford University.

For context, the FEED Collaborative is an academic program focused on sustainable food system education and innovation. Originally launched from the Stanfordd.school, the program resides within Stanford's School of Earth, Energy, and Environmental Sciences, where it provides interdisciplinary support to the School's Sustainability Science Practice and Earth Systems programs. The program engages with students across the University and provides them opportunities to learn the abilities of design and to apply these abilities to real-world problems focused on designing healthy and sustainable eating experiences. The problems, or "design challenges," on which students work are supplied by thought-leaders, entrepreneurs, and organizations who are similarly aligned in their pursuit of affecting better human and planetary health outcomes in the food system.

Since its beginning in 2013, the FEED Collaborative has partnered with dozens of external project partners and has offered over 200 discreet teaching and learning opportunities to more than a thousand students, executives, and University fellows. The framework described herein is, therefore, the iterative result of scores of applications to many different problems, in often radically different contexts. In this regard, it is a general tool, which can be modified and wielded in many different ways. That being said, the objective of this framework is fairly singular and the outcomes of its use depend on the intent of its user. We designed this framework to support innovators in their pursuit of designing healthy eating experiences for consumers. Our hope is that those who might find utility in the framework will do likewise with it.

3.4.1 Overview of the Framework

The primary objective of the framework we use is to identify unmet needs among consumers. Generally, these needs can be thought of as having two dimensions. We describe one dimension as being explicit. These types of needs tend to be obvious, are often easily identified, and can often be expressed by the people who possess them. In simple terms, they are generally identified as a need to be able to do something that cannot be done currently. In our practice, they are typically described by filling in the blank to the sentence, "They need a way to…"

The second dimension of needs consists of those that are implicit in nature. These types of needs tend to be socially, emotionally, or psychologically oriented and can typically be described by filling in the blank to the sentence, "They need a way to feel…" Implicit needs are more challenging to identify, in large part because people do not typically express their needs in this way. Therefore, these types of needs generally require a degree of abductive reasoning or the designer's best guessing to identify and define. Necessarily, our framework is biased toward uncovering these types of needs, as any solution that does not solve for both explicit and implicit needs is likely to be under-optimized, if not destined to fail. The discovery of unmet implicit needs among consumers requires an understanding of three general aspects

of their food choice process. The first is an understanding of their ideals. As described by Furst et al. (1996):

> Perhaps the most pervasive influence is that of ideals: expectations, standards, hopes, and beliefs that provide points of reference and comparison by which people judge and evaluate their food choices. Ideals are rooted in and derived from cultural and symbolic factors.
>
> Food choices can symbolize social status and are often expressed by tacitly understood, unexamined cultural criteria for food choice; for example, eating "well," or selecting food that seems "normal."
>
> Ideals underlay the scripts individuals develop to describe how things should or could be and reflect aspirations, values, and sense of identity.

Understanding a person's ideals provides a foundation for describing what, in our framework, we call their "food identity." We define this as an idealized representation of the value and meaning of food to an individual and the role that food plays in their life. Often, it should be noted, this idealized representation is aspirational in nature and needs to be parsed in terms of distinguishing the extent to which the aspiration is motivated by internal and/or external factors. Methods for distinguishing between the two, as well for understanding all three aspects of the framework, will be discussed in the case study to follow.

The second aspect is to gain an understanding of an individual's actual behaviors and choices. We describe this as an individual's "food reality." It reflects actual, recent purchase and consumption behaviors and choices. The third aspect is to gain an understanding of the contextual influences on an individual's food choices. Furst et al. (1996) described personal factors, resources, social framework, and food context:

Personal Factors

Personal factors shape the boundaries of food choices that a person is willing to make and include likes/dislikes, individual food styles, food centeredness, and emotions, as well as characteristics like gender, age, health status, sensory preferences (or taste sensitivities) and state of hunger.

Resources

Resources are tangible, such as money, equipment, and space, as well as intangible skills, knowledge, and time. Resources are perceived as available or unavailable depending on individual outlooks and situations, and these perceptions demarcate the boundaries in food choice situations.

Social Framework

People are influenced by the composition and dynamics of their social framework, which often raises conflicting priorities, including power issues. Families and households provide one of the most critical sets of interpersonal relationships influencing food choice. Other types of interpersonal relationships important to food choice occur when entertaining, being entertained, or in the workplace. [Author's note: The rise of social media has also come to play a critical role in influencing people's social framework, food identity, and food choices.]

Food Context

Food context encompasses the physical surroundings and social climate of the choice set and specific food supply factors in the environment, such as types of food, food sources, and availability of foods in the food system, including seasonal or market factors. A given food context can offer expanded or constrained choice possibilities or establish a tone or ambiance that becomes part of the food choice process.

In the service of identifying unmet implicit needs, these three aspects—food identity, food reality, and contextual influences—can be pulled together to tell a simple story about a person's food choices. Typically, the story reads something like this: "This person says they idealize X, but they choose Y, and the likely reason for this discrepancy is because of [an identified influence], or combination of [identified influences]. Because of this, it seems like they need a way to feel [unmet implicit need] to resolve the discrepancy." In the language of design thinking, this type of statement is commonly referred to as a "point of view" or "need/problem statement." In essence, it is a hypothesis for what a user, person, or group of people might need. Practically speaking, it provides useful guidance for developing, testing, and iterating solutions to test the validity of and/or to refine one's hypothesis, as well as to test whether a particular solution is valuable to the user(s) who possess the need identified in the hypothesis.

What is more valuable than the construction of a hypothesis in this format, though, is what is fundamentally captured within it. Specifically, the discrepancy between what people say they idealize and the demonstration of what they value by way of their actual choices reveals a significant cognitive dissonance, or what is also known as a "say-do gap." Represented in this cognitive dissonance is a tension between people's idealized selves and their actual selves, and the structure of connecting these aspects provides an elegant way to define an implicit need that relates to the tension.

Though this tension is not necessarily felt or experienced by people, it represents a significant opportunity to design solutions that people will find meaningful—when given the opportunity, nearly all people choose to embody their idealized selves. Solutions that allow people to embody their idealized selves in situations and circumstances in which when they were previously unable to, vastly improves the likelihood that a person will find the solution desirable and, thus, be more likely to adopt it. This aspect of the framework is where the crux of its value resides, to the extent that our framework is geared toward influencing food choices and designing healthy eating experiences.

In addition to identifying cognitive dissonances, structuring a hypothesis in this way also helps to identify potential solution sets to the need. To the extent that identified influences are at least partially causing a dissonance, they can guide further ethnographic inquiry, as well as useful direction to the process of solution ideation and conceptualization.

3.4.2 The Framework in the Context of Design Abilities

As discussed earlier, there are two design abilities on which a useful application of this framework depends. Understanding people's "food identities," "food realities," and the contextual influences that create dynamics between the two are the primary methods for understanding how these aspects relate to learning from others. Generally speaking, the goal of learning from others is to form empathy with the people for whom one is designing a solution. In the context of our framework, the formation of empathy is typically achieved using various forms and associated methods of qualitative ethnography. However, there is certainly room and opportunity for quantitative methods, from ethnography or other disciplines, to play a useful role.

The process of forming a hypothesis based on observations and insights derived from engaging and learning from others is dependent on the ability to synthesize information. This ability is fundamentally predicated upon the ability to reason abductively, which is both essential to discovering unmet implicit needs and, in our observation, is the most underdeveloped design ability that people possess. We therefore highly encourage people new to design thinking to invest their time in developing this ability, primarily. For those motivated, an articulate and useful book on this subject that plays a significant role in our pedagogy is *Exposing the Magic of Design: A Practitioner's Guide to the Methods and Theory of Synthesis*, by Jon Kolko.

The framework is only as useful as the strength of the abilities of those who use it, to the extent that our framework is dependent on these abilities. As with most abilities—the ability to write, to ride a bike, or to solve an algebraic equation—the abilities of design are possessed and accessible to nearly everyone. It is, then, merely a matter of practicing them to become competent in using them.

3.5 A Case Study of the Framework in Practice

An ongoing and central theme of the FEED Collaborative has been a focus on encouraging plant-forward food choices and eating behaviors by designing interventionary healthy eating experiences for consumers. As our objectives are inclusive of both human and planetary health, this focus has presented a singular opportunity to address both. Our approach is to work collaboratively with other organizations that are similarly focused, including most notably, and over several years, with the Culinary Institute of America (CIA) and their Menus of Change initiative.

In 2012, The CIA and Harvard T.H. Chan School of Public Health launched the initiative, officially called Menus of Change: The Business of Healthy, Sustainable, Delicious Food Choices. At its core are a set of principles designed to "provide chefs and foodservice leaders with menu and recipe guidance related to health and

sustainability, along with business strategies that integrate both environmental and nutrition science imperatives" (Menus of Change 2017). Central to these principles is the design of plant-forward cuisine, which they describe as: "a style of cooking and eating that emphasizes and celebrates, but is not limited to, plant-based foods – including fruits and vegetables; whole grains; beans, other legumes (pulses) and soy foods; nuts and seeds; plant oils; and herbs and spices – and that reflects evidence-based principles of health and sustainability" (Menus of Change 2017).

As part of the initiative, the CIA has developed several culinary and menu strategies to encourage and enable plant-forward menu design. The intended audience for these strategies is primarily chefs and other food professionals who develop menus and/or prepare food. By way of the initial scoping of the initiative, these strategies do not necessarily engage eaters in the food choice process nor do they necessarily attempt to inform and educate eaters about the importance and relative ease of adopting a plant-forward diet. Our collaboration with the CIA, therefore, has primarily focused on engaging with consumers to identify insights that might inform additional and complementary strategies for influencing consumer choice and preference for plant-forward menu options.

Many interesting and valuable insights have precipitated from this work. However, to the extent that much of this work has been conducted by teams of students in many different classes and various consumer contexts, we have not attempted to synthesize the sum of this work into a meaningful and codified whole. For the purposes and benefit of this chapter, we will focus instead on the methods we have designed and used to put our framework to use. These are demonstrated below by commentary on excerpts from project briefs and homework assignments from our courses, as well as descriptions of the specific tools and methods we use in our practice. To illustrate how one might put our framework to use, they are organized in a way that represents the process of our approach.

3.5.1 Scope the Design Challenge

The scoping of a design project is an art of defining which constraints to impose on a project and how narrowly or broadly to define those constraints. Significant constraints to consider include the intent of the project, the subset of consumers on whom to focus, the context of their consumption, and the potential solution sets desired. To follow is an example of a project we did in collaboration with the CIA and Stanford Dining:

> Your challenge is to design healthy eating experiences that shift the food choices [intent] of a specific user, or "eater," archetype in Stanford's dining halls [consumer and consumer context] towards more plant-forward menu offerings in which meat acts in a supporting role [intent and potential solution set].

3.5.2 Identify Potential Transitions in Personal Food Systems

As described earlier, identifying potential transitions in personal food systems within the scoping of a design project can be an efficient way to guide initial ethnographic inquiry. Continuing the example from the CIA and Stanford Dining project, we identified freshman eating in the dining halls, first-time residents of Stanford's communal "row houses," and students living off-campus for the first time, as people likely to be forming new food decision heuristics as the result of new sets of contextual influences on their decisions.

3.5.3 Identify "Extreme Users"

In nearly every project, as part of our research plan, we identify what are known as "extreme users." Extreme users are outliers in a normal distribution of people sharing otherwise common demographic and/or psychographic characteristics. Compared to others, they have a stronger point of view, opinion, or perspective on the design project's subject. Identifying extreme users can be an effective and efficient way to identify early insights in ethnographic inquiry insofar as (a) both their explicit and implicit needs are often more deeply felt and/or amplified in outward expression, thereby making them easier for the designer to observe and understand and (b) the "design hacks" and heuristics they develop to satisfy their needs are also often easier to identify and observe. These hacks can serve as inspiration and input into solution ideation and conceptualization, it should be noted. In a recent design project, for example, we described potential extreme users as "people on a specific diet, competitive athletes, fitness enthusiasts, first-time parents with picky eaters, and 'woke' foodies."

3.5.4 Learn from Others

The primary methodology we use for developing empathy for people are ethnographic interviews. Typically, this involves a combination of arranged, 1–2 hour 1:1 engagement with people who fall within the scope of the design project (e.g., freshmen), or shorter intercept interviews with people in the "consumer context" of the design project (e.g., freshmen in line at a dining hall buffet). As the discipline and practice of ethnography is quite well understood and documented, rather than provide an overview of it, we will highlight and briefly describe here a couple of ethnographic tools that work particularly well in concert with our framework.

One such tool is known as a "card sort." In our use of the tool, we produce a set of 25, approximately 2″ × 2″ cards, on each of which is printed a specific food item. In aggregate, the cards represent a wide variety of foods. The designer then uses the cards as a way to engage with interview subjects to accurately understand and gain insight into the subject's food identity, food reality, and potential contextual

influences that explain differences between the two. The ultimate intent is to uncover and understand dissonances/say-do gaps in the subject's behavior. In simplified terms, the exercise works as follows:

1. The designer asks the subject to create a pile of cards that represent their ideal diet.
2. The designer takes note of the cards in a pile.
3. The designer then asks the subject to create another pile, using all cards available (including those from their ideal diet), that represents what the subject ate for breakfast, lunch, and dinner yesterday (the key here is to identify eating occasions that are both specific and recent).
4. The designer then asks some questions of the subject that are intended to understand why the observed consistencies and discrepancies between their idealized diet and their actual diet exist.

Another tool that works particularly well in concert with our framework is described as "menu scenarios." This tool involves selecting actual menus from a variety of restaurants, which represent a diversity of cuisines. Similar to the card sort, the designer uses the menus to gain insight into the subject's food decision-making process in different contexts, as a way to understand how the various influences in those contexts lead to different food choices. The skills of ethnographic interviewing play a more prominent role when using this technique than when using card sorts, especially in crafting questions to illuminate contextual influences on food choice. To follow is a stylized example of how a designer might introduce the menu in the context of interviewing a subject:

> Designer to the subject: "Imagine you and a group of close friends (social context) decided to eat at a vegan-only restaurant (food context, personal factors) for dinner on a Friday night (social context). Here's a menu from the restaurant. Walk me through your thought process about what you might order…"

3.5.5 Synthesize Information

As with ethnography, so too is there an established canon on the theory and practice of design synthesis. Thus, our goal here remains to simply highlight a couple of specific tools for synthesizing information that work well in achieving the objectives of our framework. Before proceeding to this task, however, it is worth outlining some critical notes about the process of synthesizing information. First, the computer science adage, "garbage in, garbage out," is as relevant for analyzing and synthesizing qualitative data derived from ethnography as it is for analyzing and synthesizing large volumes of quantitative data. Put otherwise, there is a strong correlative relationship between the quality of ethnography conducted and the value of insights derived from it. The importance of this is reflected in the incorporation of personal food system transitions and extreme users in our research planning process.

Second, the actual process of synthesizing information is far more complicated than describing how to do it. This owes, in part, to the observation shared earlier regarding the generally under-developed ability in many people to comfortably and capably utilize abductive reasoning processes. This discomfort tends to lead to a superficial and hasty application of synthesis tools when rigor and patience are required. That being said, shared below is the primary process we use for synthesizing ethnographic data in support of our framework.

For each 1:1 interview or sets of in-field intercept interviews, the designer works thoroughly and sequentially through the following questions, typically capturing observations from the interview(s) by way of short phrases on a whiteboard or sticky notes, in order to make the "data" visible. Note that a bias towards capturing more rather than less is essential here, as is resisting the temptation to judge what might define "interesting." If something stands out in any way, it is important to call it out and write it down. Also, making the data visible is vital for identifying themes and patterns across all of one's ethnographic work.

1. What did they say, say they do, or actually do that might be revealing of their ideals and values generally? With respect to food specifically?
2. What did they say, say they do, or actually do that might be revealing of important influences in their life generally? With respect to food specifically?
3. What *might* be inferred (abductively reasoned) from 1 and 2 about the meaning and role of food in their lives?
4. What *potential* tensions and conflicts between their values and the influences in their life *might* exist? Did they reveal anything that suggests they say they do, or prefer one thing, but actually do something else?
5. What important assumptions are we making in our inferences?
6. What questions do we need to ask to understand better the assumptions we're making underneath the inferences?

Throughout the process of conducting interviews and subsequently synthesizing them, a series of themes and patterns will begin to emerge, as will new questions, to which answers will be increasingly insightful. There is an admitted art to knowing when one has enough data. Generally speaking, between six and ten interviews conducted within an appropriately scoped design project and conducted with people who resemble an appropriately defined user archetype is sufficient. Regardless of the number, the more important metric is confidence in one's hypothesis about a meaningful dissonance between a user archetype's food identity and food reality, sense for the contextual influences that cause the dissonance, and an identified implicit need that, if solved for, would remove the dissonance.

Where our work has advanced the art of practice is in our use of narrative structures and storytelling as specific tools for design synthesis. The initial insight that inspired the development of our method was derived from an understanding that stories are a primary tool that humans use to make sense and meaning of the world. This is, effectively, the same objective of applying synthesis tools to ethnographic data.

As noted above, we describe the construction of a hypothesis as being a story about a person. The generalized construct we use is:

> This person says they idealize X, but they choose Y, and the likely reason for this discrepancy is because of [an identified influence], or combination of [identified influences]. Because of this, it seems like they need a way to feel [unmet implicit need], to resolve the discrepancy.

We use various other narrative structures to synthesize ethnographic data, and, to the extent that we often use them to create stories to share with clients and project partners, to follow is one we use specifically for this purpose. Note that stories using this method emerge from answers to prompts and that the prompts are designed in a way to create a narrative arc.

Set the Context

Who is this person? What do they care about? What's unique and interesting about them? What's surprising about them?

Set the Scene

Describe the specific scenario in which they experience their need? Where are they? Why are they there? What are they doing? Whom are they with?

Illuminate the Conflict

What events and combinations of contextual influences result in their conflict? What makes their conflict obvious? How do they feel at the moment of their conflict?

Describe the (Potential) Transformation

What implicit need do they have in their moment of conflict? How would they feel instead if this need were solved? Why does solving this need matter to them? What does solving this need allows them to do that they could not before? How would solving this need achieve the intent of the design project?

As we have articulated a couple of times already, design synthesis is both essential to identifying the kinds of insights that lead to innovative solutions, and it is tough to do well without practice and certainly without intention. Though the frameworks we have described may feel pedantic in their descriptions and uncomfortable in their use, hundreds of iterations and variations in the service make design synthesis accessible and useful. In the words of Jon Kolko, their use is where the "magic" of design happens.

3.6 Practical Implications of the Framework for the Food Industry

At the time of writing, perhaps the most significant opportunity for our framework to be put to good use is by innovators focused on supporting and developing new plant-based and alternative meat and dairy products. On the one hand, this emerging new category of food holds enormous promise for delivering better health outcomes

to people and the planet. As evidenced by their recent meteoric sales growth, consumers are clearly drawn to various aspects of this potential. However, if the history of food innovation is any indicator of the future, this new category is likely to become a trend that came and went, and that will one day reside in the annals of food innovation alongside other well-intentioned, but poorly designed consumer product segments.

Should this be its fate, we would argue its story went something as follows: Consumer insight and market intelligence researchers framed their inquiry of consumers primarily around the question, "how can we influence consumers to purchase alternative meat and dairy products." In turn, their research focused mostly, or only, on the value negotiations that consumers make in their food decision process (see Fig. 3.1, primarily sensory perceptions, monetary considerations, and convenience). Insights derived from this research were then translated to product development teams as "make it tasty, cheap, and convenient." Deft marketers and advertisers then crafted compelling but wholly inauthentic stories about the fantastic promise of these products. Moreover, consumer buzz about these products kept the flywheel of food trends in motion. Until one day, the promise of these products was realized to be as empty as their calories, the flywheel slowed, and another trend came along to take their place.

Admittedly, this is a satirical and exaggerated story about the product development process for consumer-packaged goods, but it is informed from direct experience teaching and providing consulting services to the characters within it. It is also a dim view on (American) food culture, and it gives short shrift to humanness, which makes other aspects of food culture "sticky."

Here we get to the point of the story. Humans are unique creatures on Earth because of their desire and ability to seek and find meaning in things. This includes, perhaps, as much as anything, the food we grow, eat, savor, and share in the company of others. Consuming food that has deep and authentic meaning is at the core of what defines a healthy eating experience and, indeed, is ultimately the deciding factor in what foods assimilate over the long term into our recipes, routines, and rituals.

The framework we have presented here is designed to discover what consumers find meaningful and to design eating experiences that fulfill the promise of meaning to them. This begins not with understanding the value negotiations they make but with understanding their ideals and the influences in their life that make it hard to actualize these ideas. With this understanding, it is then the designer's responsibility to design solutions that make it easier. So doing, from the perspective of our experience, will lead to both stickier solutions and healthier eating experiences among consumers.

3.7 Conclusion

The FEED Collaborative emerged from an early collaboration between its cofounders, in which a class of students focused on reducing meat consumption in Stanford's dining halls. Using the abilities of design, the class discovered a fascinating array of interesting insights about the perceived role that food plays in the lives of many student diners. Based on these insights, the class designed several potential interventionary solutions to influence the consumption of less meat and more whole grains, pulses, fruits, and vegetables by students.

One intervention from the class was ultimately implemented in the form of a formal research study led by food behavior scientists at the Stanford Prevention Research Center. The results from the study were both unequivocal and unexpectedly promising. Over the spring quarter of 2012, meat consumption in the test dining halls dropped by 10% compared to meat consumption in the control dining halls, with a corresponding increase in plant-based foods (McClain et al. 2013). Thus was born our quest to expand the reach and impact of using the abilities of design to influence food choice and to design healthy eating experiences for consumers.

The framework shared herein is the result of this quest, and it emerged from an ongoing process of experimentation and iteration. This process also involved actively seeking, adopting, and adapting tools and methods from other practitioners and other disciplines. In light of this, we are indebted to the many designers and scientists who have so generously contributed to the creative commons, from which several methods that inform various aspects of our framework have been adapted. It is our intention, therefore, to contribute likewise to the commons, and our aspiration is that this framework will be liberally borrowed, adopted, adapted, and evolved by those in the design community and beyond, with but a single caveat.

The power and potential for design to influence human behavior is significant, as evidenced in our work and in the similar work of others. It is our view that the powers of design necessarily encumber those skilled in the art of its practice with specific responsibilities. Chief among them is a responsibility to the health and well-being of the people for whom solutions and interventions are designed. It is our request, then, to those who may find utility in our framework, that they put it to such responsible uses.

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Chapter 4
How to Use Co-Creation in Design Thinking to Promote and Enhance Healthy Food Experience Among Vulnerable Populations

Monica Mendini, Leandro Bitetti, and Paula C. Peter

Creativity is imagination, and imagination is for everyone.
–Paul Arden

4.1 Introduction

One of the most important aspects at the core of design thinking is collaboration. As Olsen (2015) suggested, a milestone in the design-thinking approach always has been collaboration, viewed as an attempt to expand the innovation ecosystem and search for new opportunities for co-creation of value. Design thinking aims to guarantee a more participative and collaborative approach to new products, service creation, and development, implying a close collaboration between companies and consumers.

In the past, Brown (2008), CEO of IDEO, a leading design and innovation firm based in Silicon Valley, observed that design thinking needs to shift from a passive relationship between the consumer and producer to active engagement, in which everyone helps to create valuable, meaningful, and productive experiences. Moreover, Saguy (2011) emphasized how a paradigm shift, referred to as "sharing is winning," also is needed within the food industry, veering away from the old system of closed innovation within the firm and toward a new system in which openness and participation must be sought, and collaboration among different actors of every kind must be facilitated. This chapter focuses its attention on exactly this, specifically emphasizing the role that every consumer of every kind plays in design thinking as it pertains to food, including vulnerable consumers.

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Several studies within consumer research (see Hamilton et al. 2015, for a review) have been addressing market-vulnerability contexts, especially those concerning vulnerable segments of society. Visconti (2016) defines *consumer vulnerability* as a market condition that exposes one or more individuals to risks in obtaining limited utility from market transactions, with implications for their well-being. Brenkert (1998) defines a *vulnerable population* as one that is more susceptible to harm by others, such as the elderly, economically disadvantaged, and children. Vulnerable consumers are important to consider during the design-thinking process, as they provide key information for fostering and enhancing healthy eating behaviors that are pleasurable, sustainable, and accessible (Addis and Holbrook 2019; Batat 2016, 2019; Batat et al. 2017, 2019; Block et al. 2011).

But how can customers become involved in the collaboration stage of design thinking? We consider Brown's (2008) view on collaboration and identify two different approaches: first, an "explicit and evident" collaboration between companies and consumers, in which companies "seek help outside," and second, a "hidden" collaboration with consumers, in which companies try to capture customers' behaviors, needs, expectations, and preferences to develop new solutions via direct observation through a "human-centered approach." On one side, we have classical *value co-creation* and *open innovation* (Chesbrough 2003), which focus on an evident and explicit collaboration among vulnerable consumers and companies (*evident value co-creation*).

On the other side, we examine the *Jobs to Be Done theory* (Christensen et al. 2007), which focuses on carefully analyzing vulnerable consumers' behaviors (*hidden value co-creation*).

This distinction between different co-creation types offers new and interesting possibilities to increase collaboration and create more value within the food industry, with particular consideration for vulnerable consumers. Through several examples, this chapter offers an overview of the two fields of study that belong to value co-creation, namely, what we define as a more *evident* and *hidden* value co-creation. By defining both elements that characterize value co-creation, the chapter aims to enable companies to promote and enhance healthy eating behaviors and well-being among vulnerable populations.

4.2 Food Experience: What It Is and What It Is Not

When individuals consume any kind of food, they are not only looking for ingredients and functional elements of the product. The principal reasons behind a food choice can be found in emotional values – both social and individual – that the food is delivering to individuals, such as comfort, affection, and pleasure (Block et al. 2011). Consumers aim to achieve pleasure and pleasurable experiences (Schmitt 1999), as pleasure is viewed by Simpson and Weiner (1989) to be the opposite of pain.

Cornil and Chandon (2016) noted how food pleasure became important in epicurean eating, an emotional pleasure characterized by food value perceived through our five senses. Nevertheless, food pleasure does not derive only from sensory elements (Krishna 2012). In fact, Batat et al. (2019, p.393) extended the epicurean pleasure idea by developing the concept of *experiential pleasure of food* (EPF), defined as "the enduring cognitive (satisfaction) and emotional (i.e., delightful) value consumers gain from savoring the multisensory, communal, and cultural meaning in food experiences." Various scholars have described a three-stage journey on the experiential pleasures of food, highlighting that the food experience is a process that starts with contemplation and finishes with memories of what has been tasted. Moreover, Batat (2019) provided experiential food pleasure's core factors, namely, (1) food aestheticism, (2) food socialization, (3) food sharing, (4) food storytelling, (5) food memory and nostalgia, (6) food symbolism, and (7) food taste and sensation.

Emotional experiences with food, also known more generally as *hedonic consumption* (emotional experiences with products; Hirschman and Holbrook 1982) has been growing in importance in the food industry, as consumers nowadays increasingly are attracted to pleasurable experiences with food (Mendini et al. 2019). For instance, in the context of alternative food consumption (Batat et al. 2017), experiences should be satisfying both at the emotional and functional levels, that is, addressing both ethical and health needs.

To promote and enhance healthy eating behaviors, firms and policy makers need to understand the whole food-consumption experience that consumers perceive. This task is particularly difficult because even if consumers actively engage in providing feedback, they may struggle to describe their actual needs (Bettencourt et al. 2014; Ulwick 2002, 2005). Moreover, experiences encompass the entire customer journey, that is, a progression of events that customers make, starting with information gathering about a solution, then progressing to consumption and after-consumption behaviors (Norton and Pine 2013).

In the following sections, we focus on identifying and assessing collaborative marketing activities that may help firms and policy makers co-create pleasurable and healthy food-consumption experiences among vulnerable consumers.

4.3 Vulnerable Populations Experiencing Food Consumption

Within consumer research (see Hamilton et al. 2015, for a review), a burgeoning field of study has been addressing vulnerable consumers. *Consumer vulnerability* is defined as "a state of powerlessness that arises from an imbalance in marketplace interactions or from the consumption of marketing messages and products. It occurs when control is not in an individual's hands, creating a dependence on external factors (e.g., marketers) to create fairness in the marketplace. The actual vulnerability arises from the interaction of individual states, individual characteristics, and external conditions within a context where consumption goals may be hindered and the

experience affects personal and social perceptions of self" (Baker et al. 2005, p. 134). Visconti (2016) defined *consumer vulnerability* as a market condition that exposes one or more individuals to the risk of obtaining limited utility from market transactions, with implications for their well-being. Brenkert (1998) defined a *vulnerable population* as one that is susceptible to harm by others for any of the following reasons (pp. 13–14):

- They suffer from at least one of the following vulnerabilities, which separates them from the normal adult population: (a) physical vulnerabilities (e.g., allergies, sensitivity to chemicals); (b) cognitive vulnerabilities (e.g., cognitive immaturity, senility); (c) motivational vulnerabilities (e.g., serious illness, grief); and/or (d) social vulnerabilities (e.g., poverty).
- These vulnerabilities are due to factors largely beyond their control.
- These vulnerabilities make them more susceptible to harm by others than normal adults.

Consumer vulnerability might originate from many different factors, including the following: (a) permanent subjective conditions, such as chronic diseases (Mason and Pavia 2015) and disabilities (Beudaert et al. 2016; Mason and Pavia 2006); (b) potentially transient subjective conditions, such as economic poverty (Blocker et al. 2013; Hill 2002) or transient environmental factors, such as economic downturns (Kamakura and Du 2012) and natural disasters (Baker et al. 2007); or (c) different forms of oppression, including those involving gender and religious minorities (Visconti et al. 2014; Walters and Moore 2002).

Thus, *vulnerable population* refers to (but is not limited to) those who are incapable of protecting their own interests, for example, pregnant women, children, the elderly, homeless people, fetuses, prisoners, the physically handicapped or mentally challenged, economically disadvantaged people, institutionalized and very sick patients of any kind, racial and ethnic minorities, immigrants, obese people, and people living in remote communities (Fisk et al. 2018; Vohora 2018).

As several studies have indicated, the effects from consumer vulnerability can be particularly damaging, leading to feelings of self-diminishment (Hill 2001), isolation (Paugam 2009), and shame (Chase and Walker 2015), which can lead to dysfunctional market experiences (Stearn 2015). Despite being judged differently, vulnerable consumers might be particularly important to the process of design thinking, especially in a co-creation scenario.

4.3.1 Evident Value Co-Creation: The Open Innovation Paradigm in Food Design Thinking

One of the principal, traditional growth strategies involves entry into new markets (Ansoff 1957). This strategy is particularly challenging because a firm's knowledge is based on mental structures created from previous experiences, and these cognitive

schemata may not apply to new markets, requiring different logics (Prahalad and Bettis 1986). Firms may develop new markets, with opportunities that are difficult to identify alone, through collaborations with different partners throughout the entire innovation process, from ideation to commercialization (Muller and Hutchins 2012; West et al. 2006).

Moreover, evidence from the food industry highlights that single firms struggle to meet evolving customers' needs and that these firms also benefit from sharing investments in new products and technologies (Sarkar and Costa 2008). Therefore, collaboration may help companies with this task. This is one of the principal ideas behind the open innovation paradigm, coined by Chesbrough (2003). *Open innovation* is the practice of opening up a firm's boundaries to involve customers, users, suppliers, research institutes, startups, and competitors, with the goal of producing innovative products, services, and even business models (Chesbrough 2003; Baldwin and Von Hippel 2011).

For instance, in the food industry, firms may build an open innovation ecosystem with the goal of exchanging knowledge with chefs and scientists (Frøst and Jaeger 2010), or with academia in the form of knowledge transfer (Braun and Hadwiger 2011). In the end, the output from this knowledge exchange may yield new products, new packaging, and even new business models, such as in the cases of companies like General Mills, Kraft Foods Group/Mondelez International, and Procter and Gamble (Saguy and Sirotinskaya 2014). In extant open innovation literature, interactions and collaborations between producers and customers are studied extensively (Enkel et al. 2005; Gambardella et al. 2017; Romero and Molina 2011). In fact, Piller et al. (2011) suggested that customers become actively involved in companies' innovation processes to develop new products and services. Tardivo et al. (2017) reported on a few case studies on Italian small and medium-size firms (SMEs) in the food industry, in which consumers have been engaged in both co-creating and co-assessing new products, such as mineral water, and starters.

Today, innovation processes increasingly are iterative and less linear (Dodgson et al. 2006; Gassmann et al. 2010; West and Bogers 2014). Still, extant innovation-management literature identifies key steps in innovation processes, such as search, select, implement, and capture (Tidd and Bessant 2018). Most companies that engage in outside-in open innovation (i.e., they leverage inventions, ideas, and the knowledge of others, e.g., consumers) open up the "fuzzy front end" of innovation, characterized by high levels of uncertainty and less knowledge about potential outcomes (Tidd and Bessant 2018). Moreover, in open innovation settings, collaborations may happen during all the steps in innovation processes. The most common activities in open innovation with customers are ideation contests (Gatzweiler et al. 2017; Hofstetter et al. 2018; Piller and West 2014), co-creation sessions (Bilgram et al. 2011; Martinez 2014), and living labs (Bergvall-Kåreborn and Ståhlbröst 2009; Jespersen 2010; Nyström et al. 2014). Marcos-Cuevas et al. (2016) examined open innovation practices with customers at Unilever Food Solutions, which range from co-ideation, co-valuation, co-testing, and co-design, to co-launching practices.

The adoption of an open approach to innovation produces several outcomes. In the food industry, it minimizes risks, increases firm competitiveness, and often

produces better financial performance (Bigliardi and Galati 2013). Bae and Chang (2012) determined that open innovation exerts a positive effect on both efficiency (i.e., minimizing costs to achieve the same output) and efficacy (i.e., effectively meeting innovation goals) in innovation. Further evidence shows that open innovation enhances customer satisfaction (Chesbrough 2011; Chesbrough and Brunswicker 2013; Lee et al. 2012).

Table 4.1 provides an overview of the key elements of open innovation's value.

4.3.2 *Hidden-Value Co-Creation: The Jobs to Be Done Theory in Food Design Thinking*

To improve offerings and develop new solutions, field observation increasingly is becoming important, as it provides answers that customers cannot provide to firms when asked (Christensen et al. 2016a). As simple as it may seem, understanding customers' needs from observation is a significant shift in marketers' thinking, from asking, "Who is our customer?" to "What does the customer do with our products?" (Christensen et al. 2016b; Hankammer et al. 2019; Ulwick 2002), which can be considered *hidden co-creation* and is the basic principle of the Jobs to Be Done (JTBD) theory, developed by Christensen et al. (2007).

Several researchers have discussed the link between JTBD theory and design thinking (Diderich 2020; Lewrick et al. 2018). In fact, JTBD theory is viewed as a core characteristic (Glen et al. 2015) and focus (Devitt et al. 2017) of design thinking. In particular, the combination of JTBD theory with design thinking facilitated successful innovations in a telecommunication company's digital customer-support services (Sivertstøl and Fjuk 2019) and in patient-focused healthcare (Koomans and Hilders 2016) by empathizing with and understanding customers' needs. The JTBD

Table 4.1 Key elements of value of open innovation (OI)

OI elements	Examples	References
Typology of customer involvement in OI	Co-creation sessions/ideation contests/ living labs/new product co-launch	Bergvall-Kåreborn and Ståhlbröst (2009), Bilgram et al. (2011), Gatzweiler et al. (2017), Hofstetter et al. (2018), Jespersen (2010), Marcos-Cuevas et al. (2016), Martinez (2014), Nyström et al. (2014), Piller and West (2014).
OI output	New products/new services/new business models	Chesbrough (2003, 2006).
OI outcome	Effective innovation performance/ efficient innovation performance/ higher customer satisfaction/product innovativeness/financial performance improvement/risks reduction/firm competitiveness	Bae and Chang (2012), Bigliardi and Galati (2013), Chesbrough and Brunswicker (2013), Chesbrough (2011), Ebersberger et al. (2012); Lee et al. (2012), Parida et al. (2012).

concept is the result that the customer hopes to achieve in a specific context (Christensen et al. 2016a).

The most well-known example that Christensen et al. (2007) cited concerns a milkshake that renowned fast-food company McDonald's sells. The authors said that it is possible to improve existing products by understanding customers' JTBD needs, which in the case of the milkshake entails consuming the product while commuting to work. Companies can add novel ingredients or features to improve the customer experience with their products to better fulfill these products' JTBD purposes. When Christensen et al. started their research project on milkshakes, the company had already conducted market research, but saw no significant impact on revenues. The research team then started observing and interviewing customers, looking for the outcome that consumers were looking for in a specific context. They understood that most milkshakes were consumed outside fast-food restaurants, such as in cars during commutes to or from work. Thus, the desired outcome appeared clear and had little to do with the functional aspects of drinking a milkshake.

In fact, JTBD theory has much in common with outcome-driven innovation (Ulwick 2005), as customers seek solutions that yield desired outcomes (Christensen et al. 2016a). This implies that companies generally need to look for desired outcomes instead of asking for solutions (Ulwick 2002). This task is even more challenging because different JTBD typologies exist, namely, functional and emotional jobs (Bettencourt et al. 2014). The milkshake case highlights the fact that consumers have both a functional JTBD (i.e., feeling full, having something to eat) and an emotional JTBD (i.e., enjoying the commute to or from work). An additional underrated element is the context of use. Value always is related to the context of use in which a job is done (Bettencourt et al. 2014; Chandler and Vargo 2011).

In a certain context, a consumer may prefer Product A, while others may prefer Product B (Christensen et al. 2016a). This is why JTBD theory highlights consumer observation's importance in the context of use. Moreover, traditional market research has been found to be ineffective at identifying customers' evolving and hidden needs (Goffin et al. 2010). Although field observation may be costly, it offers powerful insights for innovation activities. In fact, JTBD theory effectively helps identify real competitors beyond the "usual suspects" (Christensen et al. 2016a), for example, McDonald's competes not only with other milkshake providers, but also with other companies that address the same customers' other JTBD needs, such as doughnuts, bananas, bagels, and chocolate bars (Christensen et al. 2016a).

Identifying and assessing other competing solutions is one of the most important steps in designing a new product or improving an existing one to better achieve a good fit with the market. To embrace a new product, consumers need to abandon current solutions that they use to do jobs (Christensen et al. 2016a), and companies need to identify the gains and pains that current solutions provide customers (Osterwalder et al. 2014). For example, Christensen et al. (2007) highlighted several pains from current alternatives, such as bagel dryness, doughnuts that leave hands dirty while driving, and bananas too fast to eat to effectively engage commuters during their long, boring drives to or from work.

On the other hand, bananas offer the gain of boosting health; therefore, in an attempt to provide consumers with healthier products, fast-food companies (McDonald's in this particular case) could improve their milkshakes by adding healthier ingredients or commercializing a product with less sugar. Other examples in the food industry highlight how JTBD theory is effective at explaining which products and services to create to meet customers' needs (Christensen et al. 2016a). This was the case for a rural food pantry that improves dietetic services by understanding customers' JTBD (Vaterlaus et al. 2018). Getting the job done more effectively for the consumer also may allow companies to charge more, as in the case of Whole Foods' organic food products (Ulwick and Hamilton 2016).

4.3.3 Evident and Hidden Value Co-Creation Among Vulnerable Populations

Vulnerable populations can help in the co-creation of value, as they can be utilized during the collaboration phase of the design-thinking process to foster and enhance healthy, sustainable, and pleasurable eating behaviors. Including vulnerable consumers' voices during the development process is a new concept, even if it is growing in importance within food science and technology. Different researchers in the past 20 years have pointed out the importance of a food-development process in which consumers express their opinions and test new concepts or ideas at an early stage (Grunert 1997; Grunert et al. 1997; Moskowitz 1985; Steenkamp and Van Trijp 1996), but vulnerable populations and their well-being rarely have been included in the co-creation of new foods and food experiences. Vulnerable consumers can bring important value elements into the design and innovation process and need to be considered in developing more sustainable and healthier food choices and experiences.

For instance, extant research has emphasized immigrants' precious role in value co-creation, in which they have helped companies come up with innovative products and new recipes when certain ingredients were either too expensive or not available at local markets (Peñaloza and Gilly 1999). When referring to disadvantaged people, Hilary et al. (2017) emphasized how value co-creation in agricultural value chains positively can impact smallholder farmers financially in Uganda. Other experiences from Italy and Switzerland also show how vulnerable consumers can benefit from value co-creation in the food sector. Restaurants such as Bigatt or Rob da Matt (where the food experience is co-created with economically or mentally disadvantaged people) demonstrate how vulnerable consumers can help deliver pleasurable and healthy food experiences to consumers while simultaneously preserving their dignity and well-being.

Therefore, vulnerable consumers can add value in the innovation and design-thinking process. In particular, we provide further details in the following sections

on how two specific groups of vulnerable consumers, that is, children and bottom-of-the-pyramid consumers, can help companies create and deliver pleasurable and healthy food experiences through evident and hidden co-creation.

4.4 Co-Creation with Children

Children are viewed as a vulnerable population due to their lack of ability to understand things and the fact that they live under adults' authority (Vohora 2018). However, children often are involved in innovation due to their ability to think more creatively than adults. For instance, Steen et al. (2011) conducted a co-design workshop case for a large telecommunication services provider in which the company asked children aged 7–10 years old to generate concepts for new services, and the company's R&D department considered their ideas as input for further development.

Moreover, children have been involved as co-creators even for solutions to their own needs. Concretely, Piller et al. (2011) reported on the case of LEGO Factory, a toolkit that allows the user (i.e., the child) to co-design with LEGO blocks in an open innovation setting. With this toolkit, children can create LEGO models that they like, which then will be produced and delivered to the market. Also, the food sector has started to involve kids in the value co-creation process and for design-thinking purposes.

For instance, Danone engaged its consumers in developing its popular Fruchtzwerge ("Fruit Dwarves"), a German yogurt for kids (Roth 2011), and Clemson University in South Carolina developed the "Cooking With a Chef" program, aimed at motivating parents to cook healthy meals for their children (Condrasky et al. 2006). The program taught parents and caregivers how to promote healthy eating behaviors, namely, basic nutrition, food selection, menu planning, time-saving tips in the kitchen, and food preparation skills.

The "Cooking With a Chef" program offered the enhanced skills needed for sustainable, healthful menu changes at home, especially during a time when family meals have undergone major changes (due to, e.g., increased time pressures and maternal employment; Escobar 1999), impacting the quality of children's diets.

From a JTBD perspective, the interaction between food and children increasingly is challenging. Jansen et al. (2010) underscored how obesity rates among children have been rising, threatening their health. This has elicited the need to discourage unhealthy eating styles and increase consumption of fruit and vegetables. Jansen et al. (2010) illustrated how presenting fruit and vegetables in a visually attractive way to 4–7-year-old children is correlated positively with healthy food consumption. These findings highlight the emotional aspect of the job that children want to get done while eating. Another example of JTBD in the food industry entails Bolthouse Farms, which marketed baby carrots (vegetables) like junk food, a practice that might be useful in promoting healthy eating habits (McGray 2011).

4.4.1 Bolthouse Farms: Carrots as the New Junk Food

Bolthouse Farms, founded 1915 in Grant, Michigan, with headquarters in Bakersfield, California, is a vertically integrated farm company that specializes in refrigerated beverages, producing and distributing fruit and vegetable juices, pea protein milk, bottled coffee beverages, salad dressing, and packaged carrots.

In September 2010, a group of nearly 50 carrot producers led by Bolthouse Farms (calling itself "A Bunch of Carrot Farmers") launched a new marketing initiative with the aim of promoting baby-cut carrots as an alternative to junk food for children. They hired an ad agency in an attempt to change kids' food choices. The agency first examined moms unpacking their groceries for their kids. Second, they studied where kids looked for snacks when they got home from school. They observed that kids rarely went to the refrigerator, instead preferring the cupboards or the pantry. However, even if the kids headed to the refrigerator, full-size carrots always were stored in the vegetable drawer. Therefore, they began comparing baby carrots to junk food, as both possess similar characteristics, that is, they are neon orange, crunchy, and kind of addictive. With the help of carrot growers, including carrot behemoth Bolthouse Farms, the company launched the campaign, creating individual snack packs of carrots that resembled bags of potato chips or other salty snacks, made of opaque and crinkly plastic; decorated with bold, junk-food-style graphics; and sold in vending machines (McGray 2011).

As of September 2016, the company started packaging baby-cut carrots with cartoon mascots and various flavors under the name Kids Veggie Snackers, which included Carrot Meets Ranch (ranch dressing spices with a cowboy carrot mascot) and Carrot Meets Chili Lime (hot spices and cartoon carrot characters in a romantic pairing) (Bolthouse Farms' official website: www.bolthouse.com, 2020).

4.5 Co-Creation with Bottom-of-the-Pyramid (BOP) Consumers

Bottom-of-the-pyramid (BOP), or *base-of-the-pyramid*, is a term that refers to the poorest two-thirds of the economic human pyramid, a group comprising more than 4 billion people living in poverty. More broadly speaking, BOP refers to a market-based model of economic development that wants, on one hand, to alleviate widespread poverty, while simultaneously providing growth and profits for multinational corporations (MNCs) on the other (Prahalad 2012).

Firms in different industries increasingly have adopted this concept (including the food industry), with an emphasis on alleviating global poverty, a top priority under the United Nations Millennium Development Goals. Prahalad (2004) stressed that to seize opportunities in the bottom-of-the-pyramid (BOP) market, companies should engage in an innovation ecosystem created by firms, governments, NGOs, and above all, the poor.

Therefore, BOP represents an opportunity for companies and their growth. In fact, 4 billion poor people around the world represent a vibrant consumer market, in which the poor themselves can be helpful in value co-creation by ideating innovative and affordable products, unlocking such difficult-to-access markets' economic potential.

Previous literature has investigated the link between BOP and value co-creation. Nahi (2016) stressed that extensive and profound value co-creation at the BOP is important, as it involves interaction that enables the poor to be part of a mutual learning and knowledge exchange with firms, in which the created ecosystem can produce entirely new business models characterized by both economic and social impacts.

In addition, Bharti et al. (2014) determined the key drivers of customer participation in open innovation in the context of BOP consumers. Among the different elements, these vulnerable consumers mainly engage with firms when they feel a strong relationship with the solution, when the intensity of the need is high, when empathy and trust are established, and when training opportunities exist.

Referring to hidden value co-creation, Pervez et al. (2013) conducted case studies on social entrepreneurship at the BOP. The scholars concluded that firms need to collaborate actively and immerse themselves into the community to achieve a co-development of solutions that produce mutual benefits. Thorough observation of local communities is important, as BOP customers have different JTBD compared with developed countries' consumers (Bharti et al. 2013), and most companies still have scant knowledge about the lives of the extremely poor (Ansari et al. 2012). This means that companies must become immersed in the lives of the poor to understand their needs, preferences, desired outcomes, and attitudes deeply. Only by doing this can BOP markets become a source of radical innovation (Prahalad 2012).

For instance, Dey et al. (2016) reported a case concerning the successful introduction of mobile phones in rural Bangladesh after careful observation of how farmers used the product. Thus, observation and engagement are fundamental features of value co-creation at the BOP. Another recent example of open innovation and JTBD in the food industry can be found in the No Food Waste program in India, entailing hidden and evident value co-creation, in which an Indian startup achieved the goal of serving the poor, solving the problem of food waste, and trying to reduce hunger.

4.5.1 No Food Waste: Getting Rid of the Hunger Issue

"No Food Waste is a mission to end food waste and hunger to make the 'World Hunger Free'" (No Food Waste's official website: www.nofoodwaste.in, 2020).

No Food Waste (NFW) is an Indian youth- and technology-driven surplus food recovery network created by Padmanaban Gopalan and his friends Dinesh Manickam and Sudhakar Mohan to tackle the hunger problem. The principal idea is to collect food from places that might have it in excess – such as weddings, institutions, and

homes – then repackage and distribute it to people in need. On average, 600 plates of food were being provided daily, as reported in 2017. The movement started in the Coimbatore district and has expanded to other districts in Tamil Nadu, Andhra Pradesh, and Telangana. Both hidden and evident co-creations characterize this entrepreneurial project. The owner said that the idea came to him while leaving a wedding reception where excess, unconsumed food was wasted. Outside, a poor old lady asked him for alms to buy some food. In that moment, he understood that both final users and food providers had a job to do – one strongly linked with a social goal to fight hunger. Moreover, thanks to direct experiences and feedback collected by volunteers who pick up and deliver food to needy people, No Food Waste continuously is developing innovative solutions to meet consumers and users' needs more effectively. For instance, they developed both a hotline and an app so that anyone who has excess food can log in and send a message to volunteers within the organization who then collect the food from different locations. Once the staff/volunteers reach pickup points, food quality is checked, and the food is distributed to the needy wherever they are located (identified through crowdsourcing data).

No Food Waste has received various awards over the past few years, including the International Visionary Award 2015, and was recognized by *The Guardian* newspaper as one of the top 10 mobile applications fighting against food waste worldwide.

4.6 Discussion and Contributions to Theory and the Food Industry

One of the most important aspects at the core of design thinking is collaboration. As Olsen (2015) suggested, the design-thinking approach's ultimate goal always has been collaboration, viewed as an attempt to expand the innovation ecosystem and search for new opportunities for value co-creation. Design thinking aims to guarantee a more participatory and collaborative approach to new product and service creation and development, implying a close collaboration between companies and consumers. Also, in the food industry, several authors emphasized how a new system based on collaboration, openness, and participation among several players continually should be a pursued ideal (e.g., Saguy 2011). Involving consumers is crucial within food science, as consumers can suggest, test, and express their opinions (e.g., Grunert 1997; Grunert et al. 1997; Steenkamp and Van Trijp 1996). This can be extremely important for companies' performance, as well as for the consumers served.

Similarly, trying to promote and enhance healthy eating behaviors, as well as encourage healthier food decision-making today, requires significant consumer involvement in value co-creation, with particular attention paid to vulnerable segments. As this chapter demonstrates, consumers need to be utilized in value co-creation to foster and enhance healthy eating behaviors and pleasurable and sustainable food experiences and well-being (e.g., Addis and Holbrook 2019; Batat 2019; Batat et al. 2017, 2019; Mendini et al. 2019).

By distinguishing between evident and hidden value co-creation, this chapter contributes to food-design thinking (Zampollo and Peacock 2016), food experience, and experiential marketing (Batat 2019), as well as alternative food consumptions (Batat et al. 2017). Moreover, it underlines how companies can create more value within the food service industry and inform thought processes and procedures used to create new, nutritious, desirable, and affordable foods, especially with the help of vulnerable consumers.

As outlined by this research, extant studies on food-design thinking, alternative food consumption, and their establishment have focused extensively on mainstream consumers and their behavior in the marketplace. Our research, with its many different examples, highlights the importance of viewing low literacy, bottom-of-the-pyramid, low-socioeconomic status consumers as key collaborators in establishing healthy and sustainable food-consumption patterns. For example, sustainability reached through a plant-based diet (i.e., veganism) can be achieved only if accessibility and desirability among vulnerable consumers is addressed.

This chapter aimed to show readers the importance of co-creating value in the healthy food sector together with those who are incapable of protecting their own interests, such as children and BOP consumers. As previously noted, companies can search for vulnerable consumers for value co-creation in two ways. First, they can try to capture customers' behaviors, needs, expectations, and preferences to develop new solutions via direct observation through understanding JTBD (*hidden value co-creation*). Second, we can use classical value co-creation and open innovation, which focus on companies seeking outside help directly from vulnerable consumers (*evident co-creation*).

Much more needs to be done in this field, but this chapter is among the first to highlight a collaboration between vulnerable consumers and companies to create food, consumer, and societal well-being. A collaborative approach in value co-creation can provide important insights to understand and address a wide range of transformative consumer research issues comprising relationships to food, well-being, and the design of future healthy eating experiences. In conclusion, developing cost-effective and impactful food-education programs and food innovation that actually can be implemented and utilized among vulnerable consumers should be of crucial importance and one of the primary goals for many companies worldwide.

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Chapter 5
How Will Empathetic Design Thinking Influence Food Experience Innovation? A Practitioner Perspective on Food Well-Being

Mike Atassi

What we, as design thinkers, have, is this creative confidence that, when given a difficult problem, we have a methodology that enables us to come up with a solution that nobody has before. – David M Kelley, Stanford University

5.1 Introduction

Enhancing the relationship between consumers and food products has been the subject of many innovations. Most of the advancements and innovations came from the supply side as multinational food producers continuously developed and optimized their processes across the supply chain for producing food products and services that ultimately delivered higher returns for their investors and shareholders. For the food consumer, modern innovations have successfully delivered abundance, reasonable prices, and immediate satisfaction in a fast-moving pace of life that is focused on speed and convenience. This perpetual "production-to-consumption" framework required innovations at the speed of consumption resulting in an industry with a high volume of low-nutrient food products.

In charting the path forward for shared producer and consumer value, we can begin by rethinking the producer-consumer relationship by adopting the elements of design thinking – specifically empathy – in delivering innovation across the value chain of producers and consumers. This chapter argues that food innovations that deliver an increase in food quality do not harm the producers' economic bottom line. Instead, expanding the shared value across the producer–consumer supply

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chain presents an excellent opportunity for a win-win proposition – an expanded market, higher returns, and a healthier population that provides a more extended period of human purchasing power.

5.2 Rethinking the Food Value Chain

For the food producer, the demand for meeting food needs, creating jobs, and increasing shareholder values were objectives that were traditionally met through a narrow focus, driven mainly by quarterly results and appealing products but without much thinking about consumer's long-term health benefits. This narrow focus resulted in missing the broader prospect of creating shared value by balancing the long-term well-being of the consumer against the producer's objectives.

For example, the fast-food industry generates a global revenue of over $570 billion annually (see Fast Food Industry Analysis 2020 – Cost & Trends 2018). In the United States, over 200,000 fast-food restaurants are serving 50 million Americans every day in an industry that employs over four million people and grows at a rate of over 2.5% annually. From 2008 to 2018, the industry's revenues increased by $90 billion, with McDonald's contributing the most to the industry's overall revenues (Revenue of the quick service restaurant (QSR) industry in the United States from 2002 to 2019 n.d.). The main appeal of the fast-food industry, contributing to its continued growth, is based on three simple factors: consumer experience, consistency, and price. By using extensive data analytics, market research, supply chain optimization, low prices, and process automation, the fast-food industry succeeded in generating good returns for its shareholders while relying on a consumer that wanted immediate satisfaction and a predictable experience. However, the prevalence of convenient, fast, and readily available food products has historically undermined consumers' overall food well-being. Today's fast-food industry is partially blamed for the rise of obesity and cardiovascular diseases. For example, according to the National League of Cities in the United States (Health and Wellness n.d.), it is estimated that the annual health-care costs of obesity-related illnesses are a staggering $190.2 billion or nearly 21% of annual medical spending in the United States. Childhood obesity alone is responsible for $14 billion in direct medical costs.

According to a study published in PLOS Medicine (Thiago Veiga Jardim 2019), unhealthy diets account for almost 20% of US health-care costs with diet-related conditions such as heart disease, stroke, and diabetes. Researchers reported that the annual economic burden of health-care costs from cardiometabolic diseases is about $300 per person or $50 billion nationally. One of the main dietary factors contributing to these costs is related to the high consumption of processed meats – typically served in fast-food establishments or conveniently packaged and sold at food markets. How can the industry meet its consumer demands for speed and convenience while providing returns to its shareholders and ensuring the long term health of its consumers? The answer is in a concept called shared value that delivers innovations at scale to the producers and the consumers.

5.3 Shared Value across the Food Supply Chain

The concept of shared value (Kramer 2011) is defined as the "policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social condition in the communities in which it operates." In short, "shared value creation focuses on identifying and expanding the connections between societal and economic progress." Shared value, therefore, is the connection between a producer's market success and healthier consumers. By using the concept of shared value – linking food producers and consumers in a value creation chain – we can continue influencing the creation of products that are focused on achieving economic value to the producers as well as healthy diets for the consumers. The concept of value creation is not a zero-sum value – providing healthy food products does not reduce the revenue of the producers. Instead, this value creation approach seeks to expand the economic benefits across the producer–consumer continuum. This concept is not about benevolence to the consumer or good corporate citizenship as it is the creation of another channel to increase the overall economic value for the producers while benefiting the consumers.

While market competition and financial pressures are constant factors in producer's decision-making, enabling shared value must begin with looking at innovative ways to produce and deliver new, healthier products. Because a healthier consumer is undoubtedly a better source of revenue over an extended period of time, this insight should play a transformative role by shifting producer's focus from delivering different varities of the same product to delivering products that sustain the overall health of their consumers. As producers are always looking for new channels of increased revenues and expanding markets for their products, this approach to shared value can undoubtedly play a significant factor in accelerating this transformation. Transformative thinking must begin by shifting the focus from delivering new products that encourage consumers to get more and buy more of the same or similar product. This thinking is driven mainly by market competition and financial pressures from shareholders and investors. However, producers are always looking for new channels of increased revenues and expanding markets for their products. Moreover, a healthy consumer is demonstrably a better source of revenue over a more extended period. Shared value creation can undoubtedly play a significant factor in this transformation.

Several drivers from the supply (producer) and demand (consumer) sides can be viewed as catalysts for food innovations. Myriam Sidibe (2020) argued that producers of various brands "can and must play a critical role in tackling global health issues, from violence to infectious disease to poor fitness and diet." Producers can repurpose the same market strategies that allowed them to increase their profits to affect positive changes in consumer's health. Sidibe cites the example of Knorr, a $3 billion brand owned by Unilever. Recognizing that iron-deficiency anemia is a severe health problem in many developing countries, Knorr reformulated their flagship bouillon cubes to included iron-fortified ingredients. A controlled study following a media campaign of cooking family meals with leafy greens and Knorr's

iron-fortified bouillon cubes showed the immediate benefit of the campaign when comparing two towns – one was exposed to the messaging and the other was not. Knorr's long-term benefits were clear: an established market presence and a brand synonymous with family bonding and healthy living. Aligning the challenge of expanding the shared value while focusing on a healthy consumer is a shift that is happening, but it is one that is still in its infancy.

Meanwhile, consumer behaviors are changing from the demand side. A recent article in Forbes magazine (Olayanju 2019) lists "transparency" as the most significant trend driving change in the food and beverage industry today. Food consumers are demanding to know and understand what ingredients are going into their products and what role these ingredients play in their overall health and well-being. Moreover, consumers are becoming more aware of and more inclined to read the ingredient list of any packaged food product as a matter of regular practice before making buying decisions.

One example of such a product that meets the transparency demand is a product called RXBAR. RXBAR's innovation is related to a simple message: a concise ingredient list that consumers know and which they can relate to and even pronounce. One flavor of RXBAR has the following listed on its package in bold and visible print: three egg whites, six almonds, four cashews, two dates, and no B.S. The RXBAR product, started in a suburban basement around 2013, was sold to Kellogg Co. for $600 million four years after it started. How did such a short list of ingredients receive wide consumer adoption? Using Design thinking and empathy toward consumers when designing the product were undoubtedly some of the factors that contributed to the product success.

5.4 Empathy in Design Thinking

Empathy is defined by Wided Batat (2019) as the "ability to take the perspective of others, to understand their reasoning and their emotional state." Design thinking methodology allows us to qualitatively study empathy when taking a human-centered approach to designing products and services. Gasparini (Gasparini, Researchgate.net, 2015) further defines empathy in two main dimensions. The first as an emotional empathy, being an instinctive, affective, shared and mirrored experience. This is when the designer of a product feels what the consumer experiences in using that product. The other dimension of empathy is cognitive, where one understands how others may experience the product from their point of view. Thinking about a consumer's experience with a product puts the designer in an empathetic and visceral mode to collect and understand the consumer's thoughts and feelings, and therefore, ultimately design an end-product that caters to consumer's needs. What makes an empathetic feeling complicated is that feelings (and thoughts) are intangible effects that cannot be quantified in precise measurement tools by the designer.

In the example of the RXBAR, the product designer can measure the caloric content of a single bar, but it will be hard to quantify the consumer's feeling of "this is good for me." Building shared values between food producers and consumers can be achieved at the speed of empathy adoption. By building a culture of empathy with consumers, food producers can embrace a design-centric approach that puts empathy at the center of innovations. Design thinkers use the "walk-in-their-shoes" approach to sense the tangible and intangible feelings of the consumers and predict what will make them have a successful experience. Those conclusions are tremendously hard to express in quantitative language. Instead, organizations that employ design thinking use emotional language (words that concern desires, aspirations, engagement, and experience) to describe products and users. Design thinkers discuss the emotional reverberation of a value proposition as much as they discuss utility and product requirements.

Additionally, Batat (2019) identified two approaches that can be applied to define the elements of empathy: an empathy map (business-based framework) and McLaren's empathy model (research-based applied to business). We can repurpose these two approaches for designing innovative food products.

5.5 The Empathy Map

An empathy map is a collaborative tool developed by David Gray in 1993, the founder of XPLANE, a global consulting agency that provides businesses with a human-centered design toolkit. This map can be tailored and used to answer the following questions to inform the design of new innovative products:

- What would the consumer be thinking, and how would they be feeling?
- What are their doubts and ambitions of better health?
- What might it be possible for their networks, family, and friends to say while consuming our new product?
- What would the customer catch or perceive in these situations?
- What would customers see while consuming our product in their setting?
- What might the consumer be doing while consuming our product?
- How would their behavior be modified in both public and private spheres?
- What are the aspects of the consumer's discomfort facts or worries when consuming our product?
- What improvements might the customer experience need while consuming our product/service?

5.6 McLaren's Empathy Model

This model, developed by Karla McLaren (n.d.), introduces six critical aspects of the empathy model that will help designers build a repository of empathy elements to guide their development. These aspects include emotion contagion, empathetic accuracy, emotion regulation, emotion regulation, concern for others, and perspective engagement.

Building upon the empathy map and McLaren's model, designers can transition their design from a commodity food product (e.g., a candy bar) to a "this is good for me" brand by answering the following questions (see Table 5.1).

5.7 Innovation in Food Experience Through Empathy

Delivering innovation through the empathy element of design thinking methodology requires providing a superior experience to the end-consumer – an experience that is profoundly better than the current one. Improving the current experience and value of food products is achievable through increasing nutritional value and moving the shared value need from satisfaction to societal well-being. For the producer, those innovations must generate incremental economic returns and expanded market share. Further, innovations must also gain full acceptance by the population to achieve a critical mass of benefit and allow for continuous improvements and innovations.

Using Gasparini's (2015) approach to linking empathy to food innovations, we can address three distinct factors to achieve the desired outcome of sustainable, healthy, and innovative food products: human, business, and industrial factors.

The human usability factor considers an entire consumer journey with the innovative food product considering the price, convenience, taste, and wholesomeness. Business factors consider how the potential human design factors relate to the development and marketing of food products from a business viability perspective. Furthermore, industrial factors consider the ingredient supply chain and

Table 5.1 Questions for the empathetic designers

Empathy elements	Food designer questions
Emotion contagion	Does consuming the product provide that special feeling?
Empathetic accuracy	Am I accurately gauging and measuring the consumer's feelings and satisfaction?
Emotion regulation	Can I work with different emotions as leverage rather than suppressing them (as most do)?
Perspective-taking	Can I imagine (rather than feel) the emotions of the consumer?
Concern for others	Does the well-being of consumers matter to you?
Perspective engagement	Building on the previous five aspects of empathy, do I have a holistic view of my consumer's wants and needs?

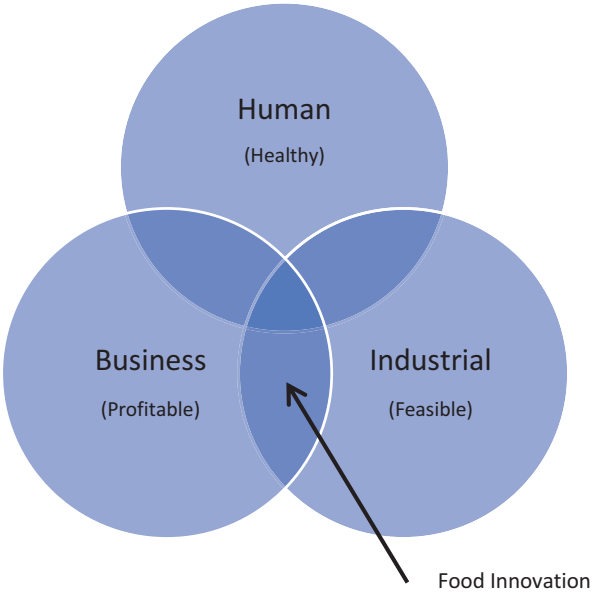

Fig. 5.1 Food innovation in design thinking. (Adapted from Gasparini 2015)

go-to-market feasibility. As depicted in Fig. 5.1, innovations happen at the intersection of the human, business, and industrial factors.

Superior food experience resulting from empathetic design-thinking innovation can be the direct result of following the nonlinear nature of the stages of design thinking. Being empathetic to the food consumer involves two distinct yet interrelated aspects of introducing innovations in food: internal and external empathy. Internal empathy is the experience of feeling the exact emotions of the consumer by the designer. It is expressive of the real consumers' feelings – for example, happy, pleased, entertained, and healthy. On the other hand, external empathy is an analytical expression of perceived feelings based on behavioral science, human psychology, and the human-centered design body of knowledge. It is a simulated model of the consumer feelings following an interaction with the innovative food product. Many disruptive innovations today employed external empathy to derive products that we have dearly adopted and use every day.

Empathy, both internal and external, can be employed to achieve balanced yet innovative food products. The former being a lagging indicator (did we achieve adoption through happiness and a positive experience?), whereas the latter measures the overall goodness, wholesomeness, and benefits of the food innovation on population health and well-being. We can identify gaps in the current food experience by using the empathy approach to understand the food consumer's needs better and drive innovations to meet those needs to deliver value across the entire lifecycle.

In the "what," "how," and "why" approach to problem solving, Simon Sinek (2009) explains that the consumer's needs and requirements fall in the "what"

category. Therefore, designers must first understand the current state before innovating solutions. We know that today, a large body of knowledge is pointing to the positive effect of a healthy diet on human quality of life and longevity. Using this insight, we can then design a plan that allows us to use design thinking tools to innovate through the lens of the consumer to achieve the desired state at an acceptable cost/beneft level.

For example, if a food consumer experience shows low satisfaction with the wait time at restaurants, a traditional corrective action dictates a process that shortens the wait time. However, this corrective action might undermine the overall food quality. An immersive experience by the innovator might very well highlight the need to change the consumer's expectations: "allow us the time to give you a meal for a healthier you," or "meals that take longer to prepare are good for you," for example.

Once we have generated enough insights from empathy studies, we can then use ideation sessions to generate innovate ideas. Ideation sessions take inputs from the empathy and need processes to generate ideas for the food products-. During the ideation sessions, it is essential to generate as many ideas as possible without being bounded by any constraints (e.g., "this is a costly idea," or "where is this ingredient to be sourced from?"). In some instances, new ideas might evolve independently and without alignment to any earlier processes. This highlights the iterative and circular nature of design thinking – new ideas are then used as input for the other processes.

Once the designers complete the compilation and vetting of new and innovative ideas, a prioritized list of the ideas becomes the input source of generating prototypes of these ideas. Teo (n.d.) argues that designers should consider a speedy finish of the prototype with lower costs and less emphasis on complete functionality. While the goal of the prototype is to gauge the consumer's involvement, interactions, and satisfaction with the prototype, the prototype also delivers a sense of early achievement and facilitates "hands-on" early testing by the designer and end-consumers to validate the feasibility of innovative ideas.

5.8 What are the Main Implications?

Today's enterprises are undertaking different corporate social responsibility (CSR) initiatives across the world – providing cleaner and more efficient energy, reducing pollution, protecting the environment, and improving public health, among many other similar initiatives. As discussed earlier in this chapter, by seizing the opportunities created by this shared value approach, we can find this shared value at the intersection of public health, market opportunities, and corporate mission. Food producers can turn the creativity of design thinkers and their empathetic approach to healthier products into real market opportunities.

Food products – reimagined. Creating new shared values across the supply and demand continuum of food products require innovations in design thinking and a reconstruction of the value from the bottom upward. Whereas the focus of food

producers in the past has been on meeting the basic needs of the consumers (suppressing hunger) at a profitable threshold, we are witnessing a transition from providing for that basic need to higher levels of meeting the demands through healthier products designed and produced by the concepts of design thinking and precisely the element of empathy. However, in food innovations, it is critically important to understand and apply the learnings from empathetic design thinking transition the empathy in design thinking from an excellent "user experience" to an excellent "user health and well-being" experience. Consider, for example, the two different designs of the famous Heinz ketchup bottle. One design (Bottle 1) is the iconic glass bottle that is immediately recognized across the globe. The other design (Bottle 2) is an upside-down plastic squeezable bottle.

Both bottles provide the same ketchup product through a consistent, recognizable, and well-designed label and visual appeal. Nevertheless, for the Bottle 2, the designers created a superior user experience by introducing a squeezable plastic bottle and making the ketchup readily available by inverting the bottle upside down. This innovation of design was so successful evidenced by a quick look at the supermarket shelves and observing the prevalence of the plastic bottles versus the original glass ones in food service establishments. However, the focus on the consumer's experience did not stop with the rethinking of the product's packaging and usability. Many producers have also reconceived their products to become healthier ones.

Using the same example of Heinz ketchup, today we see ketchup products with "no sugar added," "low sodium," and "organic ingredients" all packaged within the same inverted plastic bottle that delivers excellent consumer experience. Undeniably, consumer awareness of their well-being is on the rise, but much work remains on the producers' side. In exploring and identifying shared values, we see design thinking as a critical factor in moving from "making products that people love" into "making good products that people love."

5.9 Summary

One of the essential attributes of design thinking is the empathy attribute. Food producers can align their production and economic interests with the well-being of their consumers through a comprehensive understanding of empathy and its qualitative parameters. This chapter proposes that designing producing healthy food products through empathetic thinking does not have a cost to the producer or a higher price to the consumer. Instead, a shared value market development can be of great benefit to the producers and consumers alike.

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Part II
Implementation of Design Thinking for Food Experience Innovation and Well-Being

Chapter 6
Psychological Mechanisms Underlying Design Thinking's Impact on Gustatory Perception: Implications for Food Experiences and Well-Being

Matt Johnson, Rob Barlow, and Prince Ghuman

6.1 Introduction

Design thinking is a methodology for creative problem-solving. The most famous model was created by designers working in the heart of Silicon Valley, who went on to find the famous design firm IDEO as well as the "Hasso Plattner Institute of Design" or "d.school" at Stanford University. Practitioners describe it in terms of both a mindset and a process. As a mindset, it is *human-centered*, meaning its primary focus is on serving human needs and desires through deep and direct empathetic engagement with end-users. It is *solution-focused*, meaning it encourages a rapid pursuit of creative solutions through a process of ideation and rapid prototyping, and is fundamentally oriented around the aim of *unlockingcreative potential*. As a practical process, it is broken into five "modes" or "mindfulnesses" – empathize, define, ideate, prototype, and test – that participants may assume along the path of product or service development (Plattner 2018). While the "modes" are presented as a linear progression, the process itself is inherently iterative, meaning that practitioners may jump from one to another and cycle through them as necessary to generate a result.

Design thinking has a rich connection to the culinary world. A 2007 survey of Michelin-star chefs found that, despite a lack of formal training or exposure to its principles, their approaches to culinary innovation involved design thinking (Ottenbacher and Harrington 2007). With time, the deliberate application of design thinking principles in the culinary world has continued to gain traction. Initially concentrated in Europe, the approach has since taken hold around the globe, where it is applied narrowly, to the creative process of developing new dishes, as well as to the broader dining experience (Kudrowitz et al. 2014; Mitchell et al. 2013; Stierand

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et al. 2009; Zampollo and Peacock 2016). More generally, it has also been championed as an efficient model by which to understand and meet the needs of customers in the food industry (Olsen 2015).

Though the application of design principles in the food industry has not received as much fanfare as it has in other domains, it has proven to be an effective tool for culinary innovation. Beyond what has been reported about its role in spurring creativity among chefs and restaurant managers, the approach may also affect the actual gustatory experience of the dishes themselves. In this chapter, we aim to address this lacuna and explore the possibility that design thinking approaches directly alter the subjective tastes of the foods they inspire. In doing so, our goals are three-fold: (1) to provide a mechanistic account by which design thinking approach may impact dining and gustation, (2) to describe why the philosophy of design thinking is uniquely positioned as a tool to drive this influence, and (3) to consider the implications of these transformative framing effects for the way we experience healthy eating and for our broader "food well-being."

6.2 Gustatory Perception and Mental Models

Gustatory perception is not a straightforward transmission from the tongue. Even for the same individual, completely different *perceptions* can emerge despite identical *sensory* stimulation. In addition, a wide array of extra-sensory variables can systematically warp the subjective perception of the same food. For example, organic packaging labels bias how you taste food, regardless of what is actually inside the package (Wan-chen et al. 2013). People find turkey tastes better if it is packaged with a national brand logo vs. the same piece of meat in a generic package (Makens 1964). Coffee tastes better when you drink it from a fancy cup as opposed to a styrofoam one (Bertini et al. 2009; Carvalho and Spence 2018).

Effects like these are not exclusive to adults. In Robinson et al. (2007), researchers presented 7-year-old children with identical sets of carrots. One group was told they came from the grocery store, while the other was told they came from McDonald's. The McDonald's group reported that the carrots tasted much better and expressed a significantly stronger desire to eat them again. The effect emerged despite the fact that the actual carrots consumed were identical to one another and had never appeared on a McDonald's menu.

Evidence like this suggests that gustatory experience is highly impressionable. One compelling way to understand this impressionability is with reference to the concept of mental modeling. This is the observation that humans are not primarily sensory creatures – our brains do not experience reality directly. Instead, they construct an internal model, a representation of our experiences. Many variables impact how these models are constructed.

Of course, the signal coming from the tongue in response to the food itself is one of them. However, this signal does not faithfully translate to the ultimate perceptual experience. Rather, the same food or drink can taste different depending on a wide

array of factors, beliefs, and manipulations. Each of these provides a unique contribution to a mental model. Each time you take a bite of food, you are not experiencing the food per se, but the brain's approximation for what the experience of eating that food should be like. This is understood to be the operating mechanism for all perceptual experience. However, it is especially true for gustation, which provides a relatively weak signal compared to other senses. Vision, by contrast, provides a strong, powerful signal, and therefore the mental model for visual perception is much less influenced by these other, extra-sensory factors.

Given this discrepancy, research has uncovered the profound impact that vision can have on gustatory perception (Jansson-Boyd and Kobescak 2020; Okajima et al. 2013). One of the best examples of this effect comes from a study by Morrot et al. (2001) at the University of Bordeaux, which implies that the gullibility of gustatory perception is present at the highest levels of culinary expertise. As part of the study, the research team provided sommeliers with two different glasses of wine, one red and one white, and had them review each. Unbeknownst to the sommeliers, the "red" wine was the exact same wine as the white, dyed with tasteless red food coloring.

The results were telling. Not only were the wines perceived as tasting completely different, but the "red" wine was described as if it had red ingredients. Tasters of the white wine described it with flavors like "honey" and "citrus," while the red wine was described as tasting like "raspberry" and "mahogany." It's worth underscoring that identical wines reached the Sommelier's tongues. More recently, studies using virtual and augmented reality have replicated the results of the red dye wine test (Nishizawa et al. 2016). Virtual vision appears to impact our taste as real vision does.

It has also been proposed that highly context-specific seasonal drinks may also benefit from a similar type of extra-sensory influence (Ghuman and Johnson 2019). In America and elsewhere, the cultural phenomenon of the Pumpkin Spice Latte may benefit from the fact that it is exclusively consumed during the fall season, a time of year that carries with it a specific "mood." This heavy association may deeply impact the actual taste of the drink itself. Over the course of years, with enough repetition, our brains connect the two to such a degree that we effectively drink the abstract, emotional feeling of the Fall season.

Overall, both the behavioral and scientific evidence suggests that there is a massive gap between the objective sensation of the substance hitting our tongue and what we ultimately experience. This gap is humbling evidence of human fallibility: consumers do not, and perhaps *cannot*, experience food as it actually is. In culinary design, however, this gap represents something else altogether: a creative opportunity.

This gap in perception represents a key opportunity for culinary practitioners to take control of mental modeling, and to architect the gustatory experiences of their diners. In approaching this opportunity, there are many specific levers at the practitioner's disposal – adjustments to the music in the restaurant, menu design, and visual arrangements of dishes can all affect the taste perceptions of diners. Above and beyond these specific variables, however, a more general approach informed by the principles of design thinking holds potential to have significant impact.

6.3 Empathy, Design Thinking, and Gustatory Models

This gap in our gustatory perception, and the mental modeling process that supplements it, is especially noteworthy when considered in tandem with design thinking. We have shown that our other senses influence the mental model framing our experience of taste: for example, a louder "crunch" leads us to perceive a tastier potato chip (Zampini and Spence 2004). We have also described research showing that taste can be significantly altered by shifts in our beliefs about the characteristics of a product (e.g., we prefer wine we're told is expensive; Goldstein et al. 2008) or brand (e.g., cola tastes better to us when we're told it is Coke; Woolfolk et al. 1983). But other, more subtle psychological factors can also influence our gustatory models, including deep-seated beliefs about the inspiration, origin, and intention behind the dish.

Beliefs about the perceived intentions behind the food we are served can heavily influence these gustatory models. A range of empirical findings confirm that our beliefs about the thought processes behind other people's actions inform how we perceive them. Factoring intent into a judgment is a common, automatic heuristic (Sunstein 2005). Controlling for the act as well as the overall consequences, adults typically judge the same harmful behavior to be more morally wrong and more deserving of punishment when committed intentionally rather than accidentally (Cushman 2008). Children as young as six consider intentions in their judgments and believe that premeditated acts should be assigned greater punishments (Berndt and Berndt 1975). Non-human primates behave similarly and have been noted to seek punishment for fellow chimps who demonstrate bad intentions (Jensen et al. 2007). This deep moral intuition is reflected in the justice system, where the intention is the difference between manslaughter and murder, the latter carrying much more severe punishment.

Humans typically experience a similarly close link between intentionality and enjoyment, meaning the intention behind an act can also have a *favorable* impact on our mental models. When it comes to food, our beliefs about the intentions behind its preparation can come from many places. For example, compelling stories about the origins of a dish, cuisine, or restaurant can have a dramatic impact on the mental models that shape our experience. When these stories inform the perceived intentionality behind a dish's creation, they can infuse our mental models with extra-sensory depth. Consider the case of CatchOn, a culinary firm that compared the reactions of diners to a pair of identical dishes accompanied by different origin stories (reported in Dwyer 2015). In one condition, the dish was described simply, in terms of a concrete list of ingredients. In the other, the dish was introduced by describing the inspiration behind it: a treasured memory from the chef's childhood. Despite eating identical meals, the group that received the story prior to the dish reported a much more enjoyable overall eating experience.

In this discussion, it's worth considering the degree to which such beliefs impact the diner's experience of taste itself. It is tempting to think that the impact of these extra-sensory variables on the mental model is just that: extra. We just tell ourselves

that coffee tastes better in a fancy cup, or that turkey tastes better when it comes from a reliable brand. We assume that these effects are somehow secondary, and not part of the core experience itself. In order to best understand the true impact of belief and how this can be implemented, we must understand just how central this influence is.

6.4 Gustatory Models and the Placebo Effect

The idea that these belief-based, extra-sensory effects are somehow secondary is not an unreasonable position to take. However, recent evidence suggests that this interpretation is ultimately incorrect. These observations come from neuroimaging studies which allow researchers to eavesdrop on the brain's activity as a gustatory experience is taking place. For example, Plassmann et al. (2008) used functional MRI (fMRI) machines to observe subjects' pleasure centers as they drank wine. They examined a region deep inside their brains called the nucleus accumbens, which is heavily associated with the psychological experience of pleasure, as they tasted two glasses of wine. Prior to entering the scanner, one group was told the wine was expensive, and the other was told it was cheap. The research team found significantly more nucleus accumbens activity among participants who were told they were drinking a glass of expensive wine.

The neurological impact of belief also drives the results behind one of the most iconic food and beverage marketing campaigns: The Pepsi Challenge. At the time of the initial trials, most people surveyed reported preferring Coke and believing that Coke tasted better than Pepsi. But controlled studies found that in reality, this preference was driven by the brand label. In double-blind taste tests, the majority of people actually preferred Pepsi. However, when brand labels were showing, the effect reversed. The mere belief that one was drinking Coke had a significant impact on the gustatory experience – in this case, making Coke taste better (Woolfolk et al. 1983). And indeed, fMRI research has provided a similar story about how foundational this effect is: The mere belief that one is drinking Coke continues to drive enjoyment, even when the consumer is not actually drinking Coke. In fact, in such circumstances, researchers witness brain activity identical to what we'd expect if the person was drinking a genuine Coke (McClure et al. 2004).

Effects like these seem to work on the same principle as the placebo effect: If the person taking it *believes* it's medicine, a sugar pill labeled as medicine will often work just as well as the medicine itself. And similar to the brain-based investigations described above, recent investigations have found that the placebo effect is actually much more foundational to our experiences than previously thought. Far from being a secondary, add-on effect, placebo-based influence *is* the influence itself. The evidence for this comes from fMRI investigations which have discovered a consistent pattern of brain activation in placebo responders that suggests the effects of a placebo are just as real as that of any biological agent (Wager and Atlas 2015; Tétreault et al. 2016).

Beliefs – whether about medical efficacy or about gustation – inform our mental model of what we experience, right down to our brains' biological reactions to stimuli. Taken in tandem, these results strongly suggest that belief serves as a foundational building block of gustatory mental models. In other words, it means that mental models are not an addition to an experience, but the experience itself. Having one's meal prepared by a Michelin-starred restaurant will almost certainly produce an incredible gustatory experience. But this research suggests that much of this impact may lie in the *belief* about who has made the meal and how it was made, above and beyond the meal itself. Whether real or imagined, the diner's beliefs about the origins of the meal, the process through which it was created, and the motivation that inspired it have a profound impact.

How can these ideas be applied? It's worth reiterating here that design thinking is not merely a philosophy and an orientation. Insights are not derived from a text or from simple observation, but by interaction. In order to understand how psychological effects can be brought out in a real-world context, we must dive deeper into the *practice* of design thinking.

6.5 Psychological Impact of Design Thinking in Practice

Today, design thinking workshops are conducted in creative settings all around the world. In the most common model, these workshops involve guiding participants along the design thinking process to create something as simple and mundane as a game or a wallet for a partner. The two-hour process begins with a sequence of empathetic interviews in which participants do their best to acquire a deeper emotional understanding of their partner's needs and wants. These are then provisionally defined and serve as the springboard for the creative process. The next step is to ideate "solutions" and elicit further feedback, after which participants choose one "solution" and construct a prototype out of common craft supplies. The presentation of these prototypes to a partner can often lead to a powerful emotional response, and it is not uncommon to find one or both partners shedding tears in the moment. While the artifact itself may sometimes hold deep significance for its intended user, it is impossible to separate out its meaning from the personal connection established through the process and the sense of care and attention it represents. The object has meaning, not only because it reflects something deeply personal about who its intended user is but also because it was produced by someone else who was motivated to understand them and took the time and care to do so.

Obviously, the design process is not always so intimate and direct. However, a similar psychological effect is present in more conventional kinds of design thinkinginnovations. One famous example involves a "design challenge" put to the revolutionary design firm IDEO by ABC's news broadcast Nightline. In 1999, the producers of Nightline challenged IDEO to redesign the shopping cart, giving them just 5 days to accomplish the task (ABC Nightline 2009). During that five-day period, designers engaged everyday shoppers, professional shoppers, store

employees, and managers to develop a revolutionary new design. Rather than a large deep basket to hold everything, the new carts looked more like a pair of stacked frames that could hold up to five baskets, allowing shoppers to better organize their goods, stow their carts, and take along individual baskets when congestion restricted movement. They redesigned the wheels so that they were all capable of 90-degree turns in either direction to aid in lateral movement and a tighter turning radius. They lowered its center of gravity and shortened the cart to prevent tipping. They built hooks into the "arms" of the frame so that shoppers could hang their bags from them on the way to the car. The end result was a more convenient, flexible, and safer product. All of the innovations were the result of direct consultation with actual everyday users, and many of these innovations have found their way into modern cart design. Now consider the human reaction to these changes: it would be impossible to separate out the user's appreciation for the product's features from their appreciation for what it reveals about how their needs were taken into account in the process of its design. The appreciation of the thing includes both.

This enhancement of perceived value is as relevant in the world of fine dining as it is on the floors of the supermarket. Consider the approach adopted by Farran Adria, one of the world's most famous chefs, whose work is generally credited with spurring the modernist approach to culinary design (Myhrvold et al. 2011, p. 35). Adria is famous for the fantastical "deconstructed" creations prepared and served at elBulli, his restaurant in the town of Roses, located two hours north of Barcelona. Like the designers at IDEO, his "technoemotional" approach is self-consciously user-focused, but on a specific kind of user, who is not only enchanted by the novel and unique (if sometimes challenging) flavors and textures of the food, but by the tangible and direct engagement with their own preconceptions (Myhrvold et al. 2011). At the core of his culinary philosophy is a belief that dining is a dialogue between the chef and the diner, which he exploits through the creative application of science to his food creations.

Before its closure in 2011, diners at elBulli could expect to experience familiar flavors in extraordinary new forms, presented in dishware specifically tailored to the experience. Two of Adria's more famous creations include "spherified olives" and the "deconstructed Spanish omelette."

The former involved adapting an industrial food technique called "spherification" to create a perfect sphere that bursts with olive flavor when pierced. The latter is considered by some to be among the most revolutionary dishes in history (Rector 2015). The "omelette" was served in a sherry glass with potato foam, onion puree, and egg-white sabayon topped with deep-fried potato crumbs and left diners mystified as they experienced the flavors and concept of an omelette in an entirely new way, that was simultaneously familiar, yet completely foreign in its form. For Adria, the point of his restaurant goes well beyond sustenance: "What's radical about us," he argues, "rests not on what we serve, but on how and where. In the West, where the problem of hunger has been solved, where obesity is now the issue, the trend has to be more and more about the pleasure of eating, the fun, rather than seeing it as simply a way of satisfying our appetites. At elBulli we try and take this idea to the nth degree" (The Guardian 2011). Though Adria and others like him do not speak

the language of design thinking, he was singled out for praise by designers in 2006, when he won the prestigious "Lucky Strike" designer award given by the Raymond Loewy Foundation to honor designers in recognition of their lifetime achievements.

For established culinary temples like elBulli, belief-based impact is part and parcel of the experience. They carry a forceful brand which precedes them. When you sit down, you know you're in good hands and that incredible thought, preparation, skill, and empathy has taken place. However, design thinking can also be implemented in lesser known establishments without a reputation engraved into the mental model of the consumer. Consider SRO (Standing Room Only), a cocktail bar in San Francisco's SOMA district. Here, there is no set menu; instead, patrons co-create their drinks with the bartender. Upon entering, the customer is asked to provide input in the form of a personal story, favorite song, current mood, or any combination of the above. The bartender takes this personal input and through their own interpretation, creates a custom drink. The drink is highly personal, highly unique, and may never be made again (Urban Daddy 2014). By making the co-creative process transparent and inviting the consumer into it, mixologists at SRO take great pains to establish the powerful and transformative belief that the drink they're sipping was constructed with consideration of their own ideas, preferences, and personality.

One might still object that this approach cannot translate to the everyday – that it is because these chefs and mixologists are serving people who are seeking out food or drink adventure that they experience such an attachment to the end result. To be sure, this food and drink is often not for everyone, relying on techniques and flavor profiles that sometimes may not appeal to the average consumer. During a recent two-month residency in Tokyo, ChefRene Redzepi (head chef of the world-famous Noma restaurant in Copenhagen) famously served diners a creative twist on a traditional dish of Botan Ebi (shrimp sushi) as an opening course. The dish featured a fresh jumbo shrimp, so recently killed that it was still twitching, served with a dozen tiny black ants "for seasoning." The ants, dubbed "flavors of the Nagano forest," were foraged from the woods and released natural reserves of formic acid when eaten, mimicking the sourness of citrus (Swinnerton 2015). In a later course, diners were served a pancake made from moldy barley "created in the style of the Japanese mold *koji*" which is used in the fermentation of soy sauce, miso, and the production of sake (Martin 2019).

These offerings do sometimes involve extreme ingredients and presentation that may push less adventurous diners beyond their limits. However, the true test of such modernist cuisine is not in its technical mastery or extremity of presentation alone, but in how it challenges the consumer's preconceptions and engages people's emotions. At its best, it is a creative exercise in empathetic understanding, in which the chef engages the diner's connection with food and tradition, provoking reaction and forcing them to reassess their assumptions. The food itself elicits appreciation, but so too does the way it reflects knowledge of the diner herself. But the pursuit of such knowledge need not be confined to the *avant-garde* – the same connection may be achieved without recourse to the likes of liquid nitrogen and flavored foams, through the application of design principles to the dining experience.

We detect this connection in more mundane kinds of circumstances every day. Consider the difference between sitting down to eat a baked good from the local corner bakery as opposed to doing the same at a national chain like Panera Bread or Pret a Manger? There is a very real possibility that the baked goods served up at either place are of comparable quality. However, the experience of eating at either one will be quite different. Every Panera Bread looks the same, the employees, while friendly and polite, are not the creators of what you will eat, and you could receive the same food at any of the over 1400 franchises located around the United States. This knowledge will frame one's experience. The diner may enjoy the baked good, but, other things being equal, there is reason to believe that she will tend to enjoy it more if it is accompanied by the personal connection that comes with purchasing it from the corner bakery, where she will more readily perceive it as having been made "for her."

This insight is increasingly being utilized in the restaurant industry, where some corporate restauranteurs are going to great lengths to camouflage the ownership connections among different locations. For example, the "Joseph Richards Group" is a hospitality company in Western Canada led by Andre "Joseph" Bourque and Ryan "Richard" Moreno. The two have rapidly built a solid portfolio of 25 restaurant offerings in the region over the past decade alone by self-consciously avoiding establishing a recognizable brand that would tie the restaurants together in the minds of consumers.

While competitors in the region like the "Earl's," "Milestones," and "Cactus Club" chains offer similarly stylish cuisine and dining experiences at a similar price point, their locations share identical menus and rely on a traditional branding strategy premised on standardizing the dining experience across locations in order to establish a clear brand identity. By contrast, the Joseph Richards grouprestaurants have built each of their locations with the aim of evoking a sense of locality and personalization. Each location has a different name and has been designed with its own "personality," thus hiding the corporate ties that bind them together. This, no doubt, affects the mental framing of guests at their establishments in much the same way as in the case discussed earlier: when diners visit one of their establishments, they are experiencing something that feels unique, local, and tailored to them. Perhaps unsurprisingly, the ownership group describes their approach in a language reminiscent of the design thinking approach, where the unifying theme is a drive to "constantly [fine-tune their] concepts according to the needs of [their] guests" (Joseph Richards Group 2020).

6.6 The Food Experience and "Food Well-Being"

The value of these framing effects potentially extends beyond the commercial sphere, to our broader social approach to healthy-eating and "food well-being." Food well-being involves developing "a positive psychological, physical, emotional, and social relationship with food at both the individual and societal levels"

(Block et al. 2011, p.5; Bublitz et al. 2013). In light of the food challenges we face in modern society, including rising rates of obesity and eating disorders, there have been increasingly urgent calls for a radical transformation of the paradigmatic ways in which we understand food. Advocates propose that these challenges can be overcome by promoting "a more positive, holistic understanding of the role of food in a person's well-being" (Block et al. 2011, p.5). Specifically, they argue that we should abandon the approach currently driving research and recommendations for fighting obesity that emphasize fat, calories, and body mass index. As Batat et al. (2019) note, this approach poses healthy eating as involving a sacrifice of pleasure for the sake of long-term health, where "Consumers are encouraged by food researchers, nutritionists, and the media to exercise restraint; they are to resist the siren call of tempting foods by averting attention away from bodily states (e.g., hunger, arousal, salivation) and sensory information, in order to focus on health-related goals" (Batat et al. 2019, p.392; Yang et al. 2012). Moreover, they point out that this messaging has had a concrete psychological effect: researchers have found that framing food as healthy currently leads consumers to judge it as less palatable and enjoyable, transforming food pleasure into something that is typified as "fleeting and rebellious" (Batat et al. 2019, p.392; Liem et al. 2012; Raghunathan et al. 2006).

Instead, authors in the food well-being movement propose an alternative view that characterizes food pleasure as a "positive pathway to well-being" by placing emphasis on developing a "cultivated approach to food pleasure." They suggest reorienting our attention toward the "experiential pleasure of food" by promoting the savoring of food practices and events "in order to promote enduring health and well-being" (Batat et al. 2019, p.392). One way this might be achieved is by thinking of the dining experience as not just a way of satisfying bodily demands, but as a relational exercise. Our experience of food is highly malleable and susceptible to the sense of personal connection that arises when food experiences are self-consciously designed by creators for specific consumers. For those who are used to popping a frozen dinner into the microwave, or who may think of dining as primarily an exercise in "getting calories into the body," experiencing food in this more personal, relational way holds the potential to revolutionize the meaning they take away from the dining experience itself, and potentially transform their relationship to food.

When we adopt a user-focused approach to the design of our food experiences, it can impact our sense of taste through framing effects that are as likely to occur when others design food for us as it is when we design food for ourselves. Design thinking is a targeted way to generate these effects. The preference for pâté over dogfood does not come down to ingredients or taste since humans can hardly tell them apart (Bohannon et al. 2009). Instead, it is the product of *beliefs* about what one is eating, and not the ingredients themselves – beliefs which can be shaped by our approach to food creation.

The potential impact of using a design thinking approach to sculpt the gustatory experience can be broken down across different domains of extra-sensory influence. Overall, there are at least three different levers of influence accessible via such an approach:

- *Representation:* The most general way in which the meal is framed in the mind of the consumer. What do they think of the meal as a whole, and its ingredients?
- *Origin Story:* The "why" behind the meal. What does the consumer understand to be the origin story of the meal? What was its inspiration? Cultural, personal, or otherwise?
- *Personalization:* The degree to which the meal considered the tastes, preferences, and well-being of the specific consumer. To what extent does the meal reflect personalization and/or co-creation, and to what extent is this reflected in the consumer's understanding?

How might such a framework come together in order to rise to a real-world food well-being challenge? The challenge and opportunity of insect-based foods may provide the perfect testing ground. In recent years, insect-based meals have come forward as a nutritious, sustainable, and relatively inexpensive food option. Research, however, has found that western-based consumers are apprehensive about their consumption (Mancini et al. 2019), despite finding the taste itself comparable to vegetable-based products (Schouteten et al. 2016). This tension might be resolved by taking a design thinking approach to food creation whereby the consumer's beliefs about the meal can be deeply influenced by the attention paid to their needs in developing the meal itself.

Representation Here, relatively simple reframing could yield massive consequences. Rory Sutherland, Vice Chairman of Ogilvy group points out how effective this semantic strategy can be for fish (Sutherland 2019). For example, people are far more likely to enjoy eating Chilean Sea Bass than Patagonian Toothfish, despite being the exact same products. Similar results were found for the once-titled "Goosefish." When its name (and nothing else) was changed to Monkfish, demand increased significantly. One could imagine a similar framing effect for insects. Instead of insects, we might refer to them as "Field Protein," a description that emphasizes their most beneficial ingredient, and portrays a conceptual similarity to mainstream protein sources (e.g., "Whey Protein," Soy Protein). Time will tell which specific frame may be most effective for insects, but recent examples like Chilean Sea bass suggest that framing can play a significant role.

Origin Viewed within the context of a cultural origin, the same food can be perceived very differently. In traditional Mexican culinary culture for example, insects are commonly integrated into various meals. One of the most popular is "chapulines," grasshoppers which are toasted with savory spices, and then consumed as a crunchy snack. By introducing chapulines through their cultural origin, the food has been well received by non-Mexican cultures who are otherwise uneasy about the concept of eating grasshoppers in general. Chapulines have been integrated into many high-end, non-Mexican restaurants such as The Black Ant in New York City. Using similar framing, The Seattle Mariners American Major League Baseball team were even able to introduce chapulines onto their stadium menus as an upscale sports snack (Vinh 2017).

Personalization Design thinking practitioners will evoke a sense of personalization among consumers as a natural part of the process. By consulting diners directly, food experiences are constructed based on findings derived from their empathetic engagement with them and their concerns. These experiences may be tailored to the diner via a range of means, including the ways that food is prepared and served and the design of the dining venue itself. When it comes to engaging new "insect diners," for example, one important mechanism through which this might be achieved is by making certain that the flavoring and serving style of insect plates are familiar to the diner, and that the experience has been designed to make the transition easy. Simply acknowledging some of the Western taboos around eating insects and offering familiar dishes with an "insect-twist" will go some ways toward comforting these fears and evoking the sense that the experience has been designed with their best interests in mind. Involving consumers in the choice of protein, perhaps even with initial "taste testing" may have a similar effect, by not only giving them an opportunity to tailor the dish to their tastes, but by evoking a sense of ownership over the dish.

6.7 The Practice of Design

We can appeal to and cultivate beliefs on these dimensions by adopting a design thinking approach to the creation of food experiences. Let us continue to use the integration of insects within the western diet as an example.

The first "mode" or mindfulness of design thinking is empathy. We must get to know our subject and learn about who they are, not just as diners, but as beings who are situated within a social and cultural context. Learning this information will help us to better understand the terms under which they will be receptive to the introduction of insects to their diet.

For example, we might gain valuable insight into how practical representation and origin stories may influence their psychological response to food by asking: What is the cultural frame through which they view food? Which kinds of food traditions are familiar, and which are foreign? How, if at all, have they typically gone about introducing new kinds of food into their lives? What kinds of practical resemblances and symbolic references might appeal to their intuition? Are there foods they currently eat that bear practical resemblances to, or share characteristics with, certain ways in which insects may be consumed? For example, can crispy grasshoppers replace a staple food within their diet without significant disruption? And where do diners want their food to come from? For example, are there opportunities to leverage the environmental sustainability or relatively humane features of raising and harvesting insects for food within their mental framing of the dish?

The role of empathetic questioning in cultivating personalization goes beyond even these features. We might push further, to ask about their specific food needs given their lifestyle. What is their daily schedule? What are their specific food needs? How might insects be used to fulfill them? What, if anything, about eating

insects does not appeal to them? And, given their existing tastes and habits, what broader nutritional role could insects play within their "food journey?"

Using this information to inform our decisions, the next step is to integrate these findings into a focused needs statement that will serve as a platform for developing healthy food solutions. For an individual who is afraid of insects, the following may be appropriate: "*x* needs a way to consume insect protein that does not trigger her fear of insects." A needs statement for an adventurous diner who seeks new and exciting culinary experiences will be very different. For example, "*y* needs to be challenged by the flavors and presentation of her food" or "*y* needs her food experience to support a good story" may be appropriate. Whatever needs statement is eventually decided upon, it should not be treated as *the* definitive statement of their needs: it may turn out to be a "sacrificial concept," something that serves the purpose of driving work to promote further understanding, but that is not part of the final result.

The next step is to ideate, brainstorming solutions to this needs statement, ideally with others. In developing a set of possible ideas, participants should strive to reach a specific goal. There is a profound difference between saying "come up with as many ideas as you can" and "come up with twenty ideas." Adopting the latter approach and setting an aspirational goal will force members of the group to push beyond their intuitive limits to come up with truly different kinds of solutions that may not have occurred to them without the pressure of a specific goal. While these ideas may seem silly, crazy, or impractical to some, they may resonate with others who view problems in slightly different ways or who have knowledge that allows them to see how such ideas may be actioned. In this way, the cognitive diversity of the group may be leveraged to generate results that exceed what could be produced by each member of the group working alone (Hong and Page 2001; Page 2008).

Once we have settled on a potential solution, the next step is to prototype and test it. Rather than trying to develop the perfect version of our ideas, it is crucial to allow people to experience the innovation firsthand at an early stage, to construct "scrappy" prototypes of the idea, and allow users to interact with them. Designers can use these interactions as a means of generating more information about user needs and preferences and to understand how their beliefs (in this case about what counts as "proper food") are shaping their food experience. It is important not only to engage the user in the discussion but also to observe their reactions to prototypes. How do they react to the food? What are their facial expressions and bodily movements upon receiving it? What do their initial interactions with the food look like – how do they try to "use" it? It is crucial at this phase to remember that constructing a prototype and recording reaction to it is not to justify one's choices and decisions to the user, but about gaining a better understanding of her needs. It provides the designer information that will facilitate the production of a better final product that not only directly serves the consumer's needs but also will leverage their existing structures of belief to promote a successful integration of insects-as-food into their lives.

As we have seen, taking these steps will not only help designers to develop food solutions that their audiences will appreciate, but ones that influence the beliefs of their audiences in constructive ways. These can impact their most fundamental

responses to an unfamiliar and previously unappealing type of food. Along the way, designers can access new, healthy, and sustainable food experiences that will not only serve the user in the short-term but also help to broaden food horizons to additional experiences.

The design process should be thought of exactly that – a process. It is not something that is ever "completed." Instead, it can best be viewed as a mindset, an attitude toward the user, their needs, and the means of their fulfillment. This general orientation paves the way for the designer to constantly learn from their observations and experiences and to fine-tune their concepts.

6.8 Conclusion

Currently, application of design thinking principles to the food industry focuses primarily on understanding the consumer in order to provide them with an experience that they will enjoy. The exercise is ultimately about *transforming businesses* in order to satisfy the consumer. However, applying the design thinking framework to the production of dishes and food experiences also involves transforming dining into a self-consciously relational experience, in which the diner's raw perception of the food itself interacts with an awareness that the experience has been designed for them, with their needs and desires as a fundamental focus. It *transforms the consumer* by altering the mental model by which they experience their food. Conceptualizing the gustatory experience through the lens of mental modeling reveals new dimensions of the culinary creation process. By empowering chefs with greater insight into the neuroscience of how such models are sculpted and influenced (e.g., beliefs, storytelling, and empathy), we can provide a unique toolset from which these practitioners can draw.

Overall, it's our hope that the perspective discussed here can empower a bright future for design thinking approaches within the food industry. We hope to inspire chefs and food designers to create cuisine that better reflects the needs and desires of the diner, transforming the way they understand their relationship to food and thereby triggering new and powerful forms of emotional response.

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Chapter 7
How Food Experience through Ambiance and Food Design Can Promote the Well-Being of Consumers

Francine E. Petersen and Cara de Boer

7.1 Introduction

What consumers choose to eat every day can impact their well-being in different ways. It can affect their health, and it can affect their happiness. Consuming healthier foods has the potential to increase the well-being of consumers in the long term. Many consumers, however, believe that better health and food enjoyment are in conflict with one another. As a result, to increase their momentary happiness, these consumers tend to forego healthier foods and favor more indulgent ones. This chapter offers a food experience design framework that enables practitioners to create food experiences that will help consumers to make healthier choices that also make them happier.

Promoting tasty food lies at the heart of food marketing. Restaurants, food grocers, and other marketers are not interested in promoting "unhealthy" food per se; they are interested in promoting "tasty" food that people will enjoy. Why would this goal be different for those selling healthy food? It should not be different. However, this is not intuitive or obvious because most consumers believe healthier foods are less tasty and less enjoyable than unhealthy foods (Raghunathan et al. 2006). As a result, consumers are less likely to choose healthier food options, especially if they have an "enjoyment" goal in mind. We propose that one way to help consumers overcome this implicit association is by providing them with better food experiences. We integrate scientific knowledge on consumers' responses to food experiences from diverse theoretical perspectives, with the goal of identifying food experiences that should help to not only motivate consumers to eat more healthily but also enjoy their healthy choices more.

Helping consumers to be happier as a result of making healthy food choices is probably a sustainable long-term strategy from a consumer welfare and business

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perspective. Some of the research we review suggests ways to motivate consumers to make healthier choices, without explicitly taking emotions into account. In contrast, we join a more recent group of researchers who have put forth a more positive perspective on the pleasure of healthy eating (Batat et al. 2019; Block et al. 2011; Cornil and Chandon 2016a, 2016b; Rozin 2005). Eating healthy for pleasure can help consumers change their attitudes (e.g., overcome negative associations with healthy food) and form new habits (e.g., eat more healthy food on a regular basis; Turnwald and Crum 2019).

Our focus on the pleasure of healthy eating also serves as an input for food design thinking. *Food design thinking* is the process by which food designers transform knowledge and ideas from food science, food psychology, and food culture into creative food solutions (Zampollo and Peacock 2016). Food design thinking is a consumer-centered approach whereby food products are developed and created to fit an existing need among consumers (Brown 2008; Olsen 2015). We focus specifically on which ambient and food design features can promote healthy eating, pleasure, and the well-being of consumers. This framework can fuel the research and practice of food design thinking.

The results of such research benefit not only consumers themselves but also offer institutions (e.g., firms, governments) strategies to develop contexts that can potentially increase the well-being of consumers. Firms that invest in making their customers happy enjoy a number of positive outcomes, ranging from greater customer satisfaction to increased profits (Schmitt and Van Zutphen 2012). Governments and other public-oriented institutions (e.g., schools and universities) can also apply this knowledge. In the context of food in particular, restaurants, grocers, and other food sellers can improve the experience of consumers and increase their well-being.

7.1.1 Food Experience Design: Ambiance and Food Design

We will focus on two dimensions of food experience: ambiance design and food design. **Ambiance design** includes aspects of atmospherics, the food choice context, and the environment. Examples include the lighting in a restaurant, the way a buffet is organized, and so forth. **Food design** includes aspects such as the aesthetics, presentation, variety, and complexity of the food offered. In other words, food design refers to specific alterations in the food itself, such as its texture, the way it looks, its variety, and so forth. As such, we focus on experiential features available when consumers make decisions that stimulate their five senses but are not necessarily cognitively taxing. For example, we do not include research on cognitive information (e.g., the availability of nutrition information, labels, etc.) because of its less experiential (more cognitive) nature.

7.1.2 *Consumer Well-being: Healthier Choices and Happiness*

We define consumer well-being as both (a) the quality of consumers' choices for them and/or society; and (b) consumers' emotional responses to an experience. As a result, we divide consumer well-being into two facets: healthier choices and consumer happiness. **Healthier choices** refer to consumers deciding to eat more nutritious foods (e.g., choosing vegetables over white bread) and lower calorie foods (e.g., choosing foods with less sugar or less fat). **Consumer happiness** encompasses the positive emotional reactions consumers might experience when they consume healthy foods. The reactions include a range of emotions, such as pleasure, enjoyment, anticipated pleasure, and other positive responses.

The food experience design framework presented in this chapter includes variables we believe apply to healthy eating for theoretical reasons—for example, the research included at least one relatively healthy item, or there are theoretical or practical reasons (practical evidence) to believe a variable applies to healthy eating.

7.2 Effects of Food Experience Design on Healthy Choices

Consumers' eating choices are much more situationally driven than you might imagine. These situations often lead people to make unhealthy eating choices. The prevalence of fast-food chains such as McDonald's and Dunkin' Donuts, the availability of unhealthy snacks and sweets, and the rise of online ordering services such as Uber Eats, have been blamed for the rise of obesity (Berridge et al. 2010). To address the problem of unhealthy eating, the research has mostly focused on reducing the attractiveness of unhealthy foods by making small changes in the environment (Broers et al. 2017).

In contrast, we focus on strategies to steer consumers toward making healthy choices. How can the food experience—its ambiance and food design—make healthy food more attractive? The success of the grocer Whole Foods, where carefully selected organic produce is shown within an aesthetically pleasing environment, is perhaps practical evidence that food experience design can lead to healthy eating. But what designs work best in different situations?

7.2.1 *Ambiance Design*

The colors in a restaurant, the way healthy and unhealthy food are positioned, and the style of music played are part of the eating experience. Ambient factors engage the five senses and can, together or independently, change the atmosphere of an eating environment (Hansen et al. 2005). Decisions on ambiance in an eating environment are probably most often linked to marketers trying to enhance the experience

of consumers. For instance, a marketer might suggest playing soothing jazz music to give an eating environment "class". Similarly, putting contemporary art on a restaurant's walls can create a "hip and trendy" dining experience. An interesting side effect of these nonfood-related changes in the ambient design is that they probably also affect the food and beverage choices of consumers.

One interesting way to use ambiance design to stimulate healthy choices is through nudging. The Nobel-prize winning concept of nudging, introduced by Thaler and Sunstein (2008) in their book *Nudge*, has gained an impressive amount of attention, both in the media and in research. Nudging refers to making small changes in the environment, which are also referred to as changes in *choice architecture*. These changes gently guide consumers toward a certain action. For example, presenting a fruit salad at eye level and cakes and pies above eye level on a buffet should increase the likelihood of consumers choosing the fruit salad. This is a simple change in the environment, or choice architecture, that can lead consumers to make healthier food choices. Over the years, a variety of nudges have been developed. A recent meta-analysis suggests that nudges are an effective way to steer consumers toward better eating choices (Cadario and Chandon 2020). For the purpose of this chapter, we will focus on those nudges that have been linked to healthy eating, namely salience enhancements, convenience enhancements, sensory cues, and plate changes (Cadario and Chandon 2020).

Salience enhancements are forms of nudging that make a healthy option more visible to consumers (Cadario and Chandon 2020; Kroese et al. 2016). This can be done by decreasing the physical distance between a consumer and a healthy food and increasing the physical distance between a consumer and an unhealthy food. Changing the location of healthy and unhealthy foods in this way enhances the visibility, or salience, of the healthy options and increases the likelihood that consumers will choose them. For example, putting healthier options like apples, baby carrots, and smoothies closer to a store's cash register can increase their consumption. In contrast, unhealthy options like potato chips, candy bars, and soft drinks can be placed further from the cash register (Kroese et al. 2016). Similarly, in grocery stores, placing the whole-wheat pasta at eye level and the regular pasta below eye level will nudge consumers toward choosing the whole-wheat pasta.

Nudging through convenience enhancements can be done by simplifying the process of choosing the healthy product (e.g., Cadario and Chandon 2020; Romero and Biswas 2016; Conklin et al. 2004). This can be done by matching consumers expectation of where the healthy food should be with its actual location. In one experiment, participants consumed more of a healthy juice when it was placed to the left of an unhealthy juice; however, the consumption of the unhealthy juice was the same regardless of whether it was placed to the left or right of the healthy juice (Romero and Biswas 2016). Similarly, putting a salad on the left-hand side of a piece of bread may be an effective way to increase the consumption of salad.

Increasing healthy choices through sensory cues can be achieved by emphasizing the attractiveness of a healthy option (Cadario and Chandon 2020). For example, referring to a salad as "tasty," "delicious," or "amazing" or putting healthy food in attractive containers can capture the attention of consumers and encourage them to

make healthy choices. A study that took place in five university cafeterias in the United States revealed that describing vegetables with experience-focused labels increased diners' vegetable selections by 29% relative to health-focused labels (Turnwald and Crum 2019). For example, the researchers found the diners ate more vegetables when the vegetables were described with exciting words, such as "sizzling," and "inspired," and indulgent words, such as "caramelized" and "creamy." The same was true for traditional words, such as "old-fashioned," and "homestyle," as well as location-based words, such as "Thai" or "Provence." In another study conducted at a large university cafeteria, vegetables were described in taste-focused ways such as "twisted garlic-ginger butternut squash wedges" or "rich buttery roasted sweet corn." Vegetables with such descriptions were chosen more often than those described in more basic terms ("butternut squash; corn"), in healthy terms ("with no added sugar; reduced-sodium corn") or even in positive healthy terms ("antioxidant-rich; vitamin-rich") (Turnwald et al. 2017).

How well consumers react to sensory cues may also depend on their hunger cues (Cornil et al. 2014). For example, when shown vivid pictures of food, hungry consumers seem to choose smaller portions, whereas nonhungry consumers actually choose bigger portions. This suggests that cafeterias, where consumers primarily go to eat lunch and alleviate their hunger, may benefit by displaying vivid pictures of healthy foods. In contrast, grocery stores, where consumers are not (necessarily) hungry or less hungry, may benefit less by displaying vivid pictures of healthy foods. Using larger bowls for side dishes such as vegetables, fruit, and soup is another way to gently guide consumers toward healthier options (Cadario and Chandon 2020; Rolls et al. 2010). Similarly, research suggests that providing bigger, lower-energy dense salads to consumers as a first course can reduce their meal energy intake by 12% (Rolls et al. 2004).

In terms of the specific design of an eating environment, open kitchens lead consumers to infer that the food is prepared more carefully (Alonso & O'Neill 2010). Specific colors can also promote healthy choices. Research suggests that although consumers strongly prefer harmonized colors and softer colors in à la carte restaurants, salad bars with fresh versus soft colors might be beneficial because fresh food is associated with fresh colors (Hansen et al. 2005). Music, too, can promote healthy food choices. Music played at a low volume in a café has been found to increase the sales of healthy foods by making consumers feel more relaxed (Biswas et al. 2019). In the same vein, playing high-pitched music makes diners engage in "good behaviors," such as choosing healthier options and ordering lower-calorie foods (Dong et al. 2019).

7.2.2 Food Design

Healthy food, perhaps even more than unhealthy food, may benefit particularly from food aesthetics. Traditionally, unhealthy food, such as chocolate cake, is considered and referred to as a temptation in the self-control literature (e.g., Trope and

Fishbach 2000). The immediate (and anticipated) pleasure derived from eating a tempting but unhealthy food makes consumers disregard their long-term health concerns, such as managing their weight, for example (e.g., Baumeister 2002). Diners assume that the immediate pleasure of consuming a healthy option, let us say an apple, is unable to match the immediate pleasure of a tempting food, such as chocolate cake.

One way to boost the immediate appeal of healthy foods is to focus on food aesthetics. Offering delicious-looking healthy foods and artfully cut vegetables and fruits may be a way to promote their immediate appeal. Improving the aesthetics of healthy food and how it is arranged on a plate can also be a good way to improve the taste perception of healthy food. Why? Because research suggests consumers pay attention to aesthetics (Hansen et al. 2005). Consumers who tend to engage with the multisensory, aesthetic, and symbolic aspects of food choose and eat smaller portions of indulgent, unhealthy items, such as chocolate cake (Cornil and Chandon 2016b). This is true for both adults and children. That is, when consumers engage with the aesthetics of the food they are eating, they tend to eat less of unhealthy foods.

In addition to a food's aesthetics, its texture can affect healthy eating behaviors. For example, research suggests that eating smooth versus rough-textured chocolate makes consumers overestimate the number of calories they are eating (Biswas et al. 2014). However, this only happens in the absence of attribution, or when consumers pay no particular attention to how the chocolate feels in their mouths. In the presence of attribution, or when consumers believe their thoughts related to the sensory experience of eating chocolate can affect their consumption experience, smoothness did not lead to a distorted calorie estimation. Of particular interest is that in the absence of attribution, and after sampling smooth versus rough-textured chocolate, participants preferred a healthy option in a subsequent consumption setting (Biswas et al. 2014). This suggests that designing sweets to be small and smooth can increase healthy consumption. Another systematic review suggests that consuming solid foods or semi-solid foods increases a person's feeling of satiety relative to consuming liquid foods (Almiron-Roig et al. 2013).

Variety is yet another way in which food design can positively affect people's eating behaviors. For instance, in one study, researchers gave participants a banana to eat in the morning. In the afternoon, participants could choose either jellybeans or a piece of fruit to eat. The participants in one group (the low-variety group) were offered the same type of fruit in the afternoon as they had been offered in the morning: a banana. Participants in the other group (the high-variety group) were offered a different kind of fruit in the afternoon: an apple. When a different type of fruit was offered in the afternoon, participants were more likely to choose it rather than jelly beans. This suggests that food marketers may want to increase the variety of healthy foods they offer or change their menus periodically. For instance, a restaurant might offer different types of fruit salads each week or use a suggestion board to rotate in healthy dishes on a weekly basis (Burns and Rothman 2015). Other research suggests that filling a plate with a variety of vegetables, instead of one vegetable, increases the vegetable intake of consumers (Meengs et al. 2012). Finally, research also suggests that placing a healthy bar (an apple cereal bar) between two unhealthy

bars (chocolate cereal bars) increases the chances people will choose the healthy bar (Keller et al. 2015).

7.3 Effects of Food Experience Design on Consumer Happiness

It is clear that consumers do not eat solely for nutritional purposes. Emotional eating, for example, is common. It is thought to be generated as a result of a consumer's habit of using food to regulate his or her emotions (Kemp et al. 2013). Put plainly, eating is a source of happiness. We eat because doing so is pleasurable. However, in line with consumers' intuition that healthy foods are less tasty, the research on food consumption also assumes that pleasure must be sacrificed for the sake of healthy eating (Cornil and Chandon 2016b). On top of this negative association, most research on food consumption takes a somewhat negative view of pleasure, defining it as "the satisfaction of visceral impulses triggered by the environment or by negative emotions" (Cornil and Chandon 2016a). In contrast, we join a more recent group of researchers who have put forth a more positive perspective on the pleasure of eating (Batat et al. 2019; Block et al. 2011; Cornil and Chandon 2016a, 2016b; Rozin 2005).

We believe that eating healthy foods can and should be pleasurable, and that consumers can eat a healthy meal and enjoy it. We believe that the joint effect of consumers' preferences for healthier foods while also pursuing eating pleasure is what leads to sustainable, long-term consumer well-being. This view is consistent with an "eudaimonic well-being" perspective, where well-being is more complex than only the hedonic experience of positive emotions. Eudaimonic well-being encompasses meaning and self-realization, and focuses on living one's life in a full and deeply satisfying way (Deci and Ryan 2008).

In the previous section, we presented a few ways in which food experiences can lead to healthier choices. In this section, we explore the role positive emotions linked to food experiences play in terms of helping people to make those choices. We also explore the downstream enjoyment consumers experience when they eat healthier foods because they anticipate the pleasure of doing so. Our review shows that the emotions that emerge as a consequence of the food experience can help consumers with their choices and lead them to enjoy healthy choices more.

7.3.1 Ambiance Design

The atmospheres of stores, restaurants, and other environments have been shown to elicit positive emotions (Spence et al., 2014). These emotions create value for customers and allow the establishments to create relationships with their customers

(Babin and Attaway 2000). The establishments that elicit positive emotions are those that are more enjoyable to visit (as opposed to those we must visit to obtain specific products) and involve dimensions such as optimal design (e.g., lighting, décor, organization, and colors) and ambient factors (e.g., music and scents) often associated with more prestigious atmospheres (Baker et al. 1994).

The relationship between positive moods and healthier food choices is complex. Mood consistency theory predicts that a positive mood may enhance a person's consumption of healthier foods via positive inferences about the environment. However, mood regulation theory predicts that the resulting choices depend on the extent to which the consumer perceives the consumption to help the person achieve his or her mood management goal (Andrade 2005). Indulgent foods (those that are typically more pleasurable, fun, or affect-laden) are often used as a mood regulation tool. However, if people believe their moods will not change as a result of what they eat, they don't need to indulge in unhealthy foods to manage their moods and will eat more nutritious foods as a result (Labroo and Mukhopadhyay 2009). In our review, we identified a few instances in which positive moods can help consumers enjoy healthy food more.

A consistent mechanism through which a positive mood motivates healthier choices involves having a future-orientation. Positive mood is a cue to make people focus on the future. Positive mood encourages a more long-term perspective by signaling that the present is benign (Labroo and Mukhopadhyay 2009). By broadening our perspective (Fredrickson 2001), a positive mood helps people to see the big picture (Labroo and Patrick 2009). People in a positive mood tend to regulate their behaviors to attain future well-being (Aspinwall 1998), and, consistent with these views, research shows that when positive moods are associated with future-orientation, people tend to consume in a healthier fashion (Labroo and Mukhopadhyay 2009; Labroo and Patrick 2009).

Consumers in a good mood tend to prefer healthy foods over indulgent foods because they tend to focus more on long-term, future-oriented goals such as health (Gardner et al. 2014). Thus, successful food experiences should be designed with this phenomenon in mind: motivating future-thinking, as consumers will tend to choose healthier options when they are focusing in the future (Laran 2010). Toward this goal, not all positive emotions would create this effect. For example, gratitude, a positive emotion that emerges due to something good that has initiated in the past, may increase a consumer's consumption of sweets (Schlosser 2015). But hope, a future-oriented emotion, helps consumers to eat more healthily (Winterich and Haws 2011).

Another important aspect is pleasure anticipation. The anticipation of pleasure stimulates one's appetite and encourages consumers to seek out specific stimuli. Food is a powerful motivator of sensory pleasure (Shiv and Fedorikhin 2002). People who tend to experience the emotional world vividly and deeply (consumers with high affect intensity; Bagozzi and Moore 2011) anticipate more pleasure from eating, experience more cravings, and report enhanced eating intentions when exposed to food advertising (Moore and Konrath 2015). Much research has been done with regard to the anticipated pleasure of eating indulgent foods (e.g.,

cinnamon rolls, pizza, and cookies). However, anticipated pleasure has been shown to play an important role in terms of the enjoyment of healthy foods as well (Turnwald and Crum 2019).

Enjoying the multisensory, aesthetic, and symbolic aspect of food has been coined as "epicurean eating pleasure" (Cornil and Chandon 2016a). Research shows that epicurean eating tendencies are positively correlated with people eating smaller portions of more indulgent, unhealthy foods, such as chocolate cake (Cornil and Chandon 2016b). That is, when people focus on enjoying the food they are eating, they tend to eat less of unhealthy foods. For some consumers, this may be an individual tendency. However, it is also possible for food marketers to motivate consumers to involve their senses so as to eat smaller portions of indulgent foods.

Although motivating consumers to engage their senses can be a good way to increase their pleasure (Cornil and Chandon 2016a; Krishna 2012), this strategy alone may not be sufficient to increase the consumption of healthy foods. In the context of healthy foods, we believe that it is important to clearly point out that the taste of the healthy food in question is pleasant. For example, taste-focused ways to describe vegetables (e.g., "balsamic-glazed") have been shown to not only motivate consumers to eat more vegetables but also to anticipate and experience a positive taste experience and eventually change their attitudes about the taste of healthy food (Turnwald et al. 2017; Turnwald and Crum 2019). These strategies are in line with a more holistic approach to the food experience that puts savoring and pleasure at the heart of eating (Batat et al. 2019).

Motivating consumers to savor the multisensory, communal, and cultural meanings of food experiences can also increase a consumer's overall well-being. To achieve this, consumers would move from taking a local perspective on eating (i.e., focusing on the food itself) to taking a more global perspective that encompasses the contemplation of the food experience (through one's senses), socially connecting during the process, and creating meaning associated with food experiences (Batat et al. 2019).

In addition to these, other strategies to engage the senses can be employed. For example, food advertisements that encompass multiple senses can result in greater enjoyment of eating compared to advertisements that focus on taste alone (Elder and Krishna 2010). Providing information that activates imagery (e.g., about the preparation of the food) or emotional connections (e.g., the food's place of origin) can increase the pleasure of consumers as well (Hoegg and Alba 2007; Lee et al. 2006). Cornil and Chandon (2016b) suggest that sensory imagery (imagining vividly the taste, aroma, and texture-related sensations of a food before eating it) can make consumers happier with smaller portions of hedonic food. In the end, consumers were also happier with what they ate. This occurs because the experience highlights the pleasure dimension instead of any potential health costs associated with eating the indulgent food (Belei et al. 2012). If consumers had focused on their health (e.g., by the influence of health appeals such as reading warnings and nutritional information), they could have perhaps been served smaller portions, but they would not have enjoyed them as much.

Interestingly, healthy food labels overwhelmingly emphasize health attributes (e.g., low fat and low sugar) rather than how tasty the foods are (Turnwald and Crum 2019). This is intuitive considering the attitudes consumers have about healthy food and their motivations to choose them. However, a series of recent studies suggest that emphasizing the taste and satisfaction of healthy foods rather than their nutritional properties is a successful strategy that increases the odds that consumers will choose healthy foods and make healthy choices over a long period of time. The strategy can also enhance people's post-consumption ratings with regard to the deliciousness of vegetables and eventually improve people's mindsets about the deliciousness of healthy foods (Turnwald and Crum 2019).

Another way to increase the enjoyment of healthy foods via ambient design may be by introducing rituals. Vohs et al. (2013) manipulated the enactment of rituals prior to the consumption of three carrots. Participants in the ritual condition were instructed to use an identical set of gestures, such as using their knuckles to rap on the desk, taking deep breaths, and closing their eyes for a moment, every time they tried a carrot. Participants in the non-ritual condition performed equally elaborative, but non-identical gestures before tasting each carrot. Doing these rituals increased the anticipated enjoyment of eating the carrot and the enjoyment while eating the carrot relative to those who had not performed a series of rituals. This was especially the case when the consumption of the carrot was delayed. Given that rituals are an important part of consumer experiences (Rook 1985), different ritual practices can be incorporated into food experience to eventually stimulate a greater enjoyment of healthy choices. For example, think of the ritual of dining out at a restaurant and how the sequences of happenings repeat themselves with each visit.

7.3.2 Food Design

The popular notion of "eating with one's eyes" is pervasive. The combined flavors, colors, smells, and textures of food are a central part of the food experience. Aesthetics and design can make products more pleasurable and improve people's lives by persuading them to make better decisions for themselves and society (Patrick 2016). On the one hand, one might wonder if design and aesthetics are a good match for healthy foods, given previous research results and consumers' intuition about healthy and less-tasty foods. On the other hand, there are clearly aspects of food design that should be taken into consideration when it comes to healthy foods. This is especially true when you consider how consumers perceive "bad" food designs. For example, one study found that consuming unattractive produce negatively affected how consumers view themselves (Grewal et al. 2019). The question then becomes: What food designs make healthy eating more pleasurable?

The sensory properties of the food have been found to be the main source of emotions in the food experience, where satisfaction, enjoyment, and desire were experienced most often (Desmet and Schifferstein 2008). The conditions that elicit these emotions include statements that refer directly to sensory properties and

experienced consequences, and statements that refer to more indirect conditions, such as expectations and associations (Desmet and Schifferstein 2008). In line with the previous section, sensory attributes and anticipated and experienced emotions are the main sources of emotions that increase people's enjoyment of food.

Research shows that the color and presentation of foods can enhance the enjoyment of eating by increasing the aesthetic value of the food (Hoyer and Stokburger-Sauer 2012; Zellner et al. 2014). Humanizing old and imperfect produce—for example, presenting an aging cucumber as a smiling face—can enhance consumers' evaluations of the product by generating feelings of compassion and warmth toward the aging process (Koo et al. 2019). Similarly, presenting images of cooked food or the food itself can increase both people's taste expectations and liking of the food (Hurling and Shepherd 2003). Think of a dessert trolley or the "food models" shown in many restaurants (replicas of dishes to show consumers what the dish looks like). This can be helpful when the raw food tends to generate a low expectation of liking or does not help consumers to envision the finished product.

Increasing the complexity of the food can generate the intriguing possibility that consumers will enjoy it more, and not less, with each bite. This is called "hedonic escalation." It is more likely to happen if a person expects a new flavor with each additional bite (Crolic and Janiszewski 2016). This raises the possibility of managing the surprise around a food (Turnwald and Crum 2019). The complexity, and the surprise that comes with each bite, can be highlighted to create an experience around the consumption of that food. This can create "sensitization" that prolongs the hedonic escalation (increased enjoyment) and retards hedonic adaptation (decreased enjoyment). For example, if consumers are tasting a wine, the fact that each sip can be surprisingly different from the previous can be highlighted to lead to greater enjoyment.

7.4 Implications and Contributions to Food Design Thinking

The goal of this chapter was to illustrate the positive effects food experiences have on people's healthy choices and happiness. We distinguish two types of food experiences: ambiance and food design. We first reviewed the effect food experiences have on healthy consumer behaviors. We illustrated several ways in which ambience and food design encourage healthy behaviors. Then, we reviewed the interplay between food experiences, healthy behaviors, and consumer happiness. We contend that positive emotions can contribute to healthy choices and increase people's enjoyment of healthy foods. We critically analyze the literature and integrate the results which we believe would apply to healthy foods, from theoretical or practical perspectives. Based on this, we pointed out the measures that can be taken to help increase the extent to which consumers enjoy healthy meals. The food experience design framework presented here can guide practitioners as to how to best design food experiences that lead consumers to make healthy choices and increase their happiness.

Traditionally, food design thinking focuses on incorporating a consumer's present and future needs into R&D and the innovation process of the food value chain (Olsen 2015). The goal is to promote innovative food solutions that fit consumers' needs (Brown 2008). Our focus on food experience suggests that food design thinking can occur across the entire food value chain and should not necessarily be limited to the conceptual stage of food innovation. Instead, innovative solutions aimed at promoting healthy eating patterns along with the well-being of consumers can occur on the level of food design as well as ambient design.

Moreover, food design thinking needs to be further incorporated in the domain of healthy eating and well-being (Batat et al. 2019). This chapter addresses how ambient design and food design can be included in a holistic food design process to promote health, positive emotions, and people's well-being. As such, the chapter can help researchers and other interested parties prioritizing certain food design choices or research directions. The focus on both pleasure and healthy eating further suggests that several, perhaps even conflicting, needs of consumers should be considered when developing innovative food solutions.

Future researchers may want to further explore how food design thinking can harmonize a variety of conflicting needs consumers have so as to promote pleasant and healthy food choices. Incorporating food design thinking in health-focused research and interventions can be a strong tool used to promote healthy consumption without prohibiting unhealthy food choices. Reducing the consumption of unhealthy foods inevitably leads to a restrictive mindset, whereby the foods become "forbidden" or "bad." These restrictive measures are likely to cause dissatisfaction among consumers and may make it difficult for them to stick to healthy lifestyles in the long term. Block et al. (2011) call upon a paradigm shift in the way researchers and practitioners think about health. Instead of viewing food as merely a way for people to get the nutrients they need, Block and colleagues propose a "food-as-well-being" approach. Food well-being entails a "positive psychological, physical, emotional, and social relationship with food at the individual and societal level" (Block et al. 2011).

We build further on this paradigm and propose that the positive aspects of food experiences can lead to greater health and happiness. Typically, the choice of unhealthy foods has been viewed as an impulsive choice, mainly driven by hedonic, emotionally driven, short-term motives. The choice of healthy foods, in contrast, is conceptualized as a cognitively driven choice that benefits the long-term goals of consumers (e.g., Metcalfe and Mischel 1999; Baumeister and Vohs 2003). In this framework, healthy eating depends on how successful your cognitive processes are at "controlling" your affective responses. Instead, we propose that choosing healthy foods can also be driven by emotional processes. Positive feelings or emotions, such as anticipated pleasure or hope, can promote healthy eating without a person necessarily needing to engage in a high level of self-control. Further research could explore which other future-oriented emotions can help people make healthy food choices.

We also challenge society's dichotomous way of thinking: for example, tasty versus healthy, work versus fun, and punishment versus reward. When we have one

of these, we cannot have the other. We tend to think that enjoyment, comfort, and luxury do not come easily. Instead, we need to work hard to "earn the right to indulge" (Kivetz and Simonson 2002). This mentality can be counterproductive. For example, being overly restrictive with one's diet during the week can result in a person's binge eating during the weekend. Most of us pursue different goals simultaneously, such as the goals of leading both healthier and happier lives (Pocheptsova et al. 2015). We, therefore, believe that a pleasant-focused approach to food can help consumers achieve their goals and sustain healthy lifestyles in the long term.

Finally, we provide institutions and food-industry managers with information they can use to design food experiences that can potentially increase the well-being of consumers by helping them consume and enjoy healthier foods. Our focus on food experience highlights that merely making healthy food available is insufficient. For example, in the 1990s, McDonald's launched the McLean, a low-fat burger. In a blind test, consumers preferred the McLean to the fast-food chain's high-fat burgers. Nonetheless, the McLean was a market failure. To be sure, putting healthy foods on menus and shelves is a great first step. However, institutions and firms can promote healthy eating in a more active way: By associating healthy food with an experiential aspect to help consumers overcome their perceptions that the food is less tasty or less enjoyable. The advantage of focusing on the food experience as a basis to promote healthy choices is that it is a less restrictive way to promote healthy behaviors (see the previous discussion and Block et al. 2011).

Takinowa, a Swiss restaurant chain, may be an example of a restaurant implementing many of the principles of enjoying healthy foods. Their slogan is "food for joy," and their mission is to "make food a pillar of our health and well-being." Nonetheless, their claims (descriptions of the food they offer) are essentially health-focused or functional ("wholegrain, seasonal, good cooking methods," etc.) and not experience-focused (e.g., taste or enjoyment-focused). This offers the chain an opportunity to focus even more on the food experience. Implementing such a strategy does not require changing the assortment of the food. Merely changing the description of the food shown around the environment, for example, can be a way of promoting healthy eating behaviors and greater well-being.

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Chapter 8
The Role of Emotions in Designing Innovative Food Experiences for Consumer Well-Being: Contributions to Design Thinking

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1 Introduction

A great designer is able to understand and satisfy both our material and emotional needs. "Abundance has satisfied, and even over-satisfied, the material needs of millions—boosting the significance of beauty and emotion" (Pink 2006). As our fundamental needs are met, we are increasingly looking for emotionally satisfying experiences (Brown 2008). In order to fulfill consumer needs and produce innovative food experiences that enhance consumers' well-being, designers should bear in mind that consumers are not only cognitive but also emotional beings and food is an extremely emotion-laden experience due to its symbolic nature.

Food is charged with primal meanings and first impressions of life. Food experiences go beyond nutrition and simply alleviating hunger; they encompass and nourish not only the physical body but also the mind and soul. As such, they affect and are affected by both physiological and emotional states. Therefore, innovative designs that aim to enhance consumer well-being must adopt a holistic perspective and take into account the affective dimension of the food experience.

Design thinking is a discipline inspired by designers' sensibility when it comes to matching people's needs with what technology can allow them to do (Brown 2008). This sensibility is particular to the designer (in opposition to the consultant) and is the ability to empathize with clients and users, and see and feel the world as they see and feel it (Nussbaum 2005), a capacity that should also guide the design of innovative food experiences. Due to their affective nature—consumers' needs are sometimes not explicit, but latent instead (Brown 2008). Hence, designers' job is

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even harder within the context of food experiences, which tend to be emotion-laden and symbolic in nature.

This chapter focuses on the role of emotions in designing food experiences and explains (1) why design thinking needs to include emotions, (2) how food experiences impact emotions, (3) how emotions affect food experiences, (4) the role of emotions in various stages of design thinking and in designing holistic food experiences, and finally (5) some of the difficulties that researchers and designers may face while integrating emotions into food experience designs. In order to tackle these issues, we first review the role of emotions in shaping consumers' experiences, then discuss their role specifically in food experiences, and finally reflect on the implications of our findings for food experiencedesign thinking.

2 Does Design Thinking Need Emotions?

Emotions are central to the design thinking process. Affect inspires and pervades the life of designers. The memory of emotional experiences is one of the most important sources of the creativity that characterizes the initial steps of the design thinking process (Solovyova 2003). Moreover, this is itself often accompanied by positive emotions: it involves human-centered, playful, and collaborative methods and tools that naturally foster positive emotions and well-being in the members of a design team (Kröper et al. 2011; Liedtka 2018).

Furthermore, design thinking outputs aim to elicit positive emotions in users, defining for each new service a unique affective proposition (Venkatesh et al. 2012). The members of the design team become managers or architects of feelings (Venkatesh et al. 2012): they design product/service attributes that are no longer simply characteristics of the offer, but emotional entities instead (Venkatesh et al. 2012). Because the ultimate success of companies that take advantage of design thinking practices is to "capture customers' hearts" (Venkatesh et al. 2012), it is imperative to understand in depth what consumption emotions are and how to elicit them.

3 Emotions and Their Role in Consumers' Experiences, Satisfaction, and Well-Being

Emotion is "a mental state of readiness that arises from cognitive appraisals, has a phenomenological tone, is accompanied by physiological processes, and may result in specific actions" (Bagozzi et al. 2002, p.37). It is a concept included under the umbrella term "affect," which also includes other emotive variables such as mood (characterized by a longer duration than emotions) and feeling (directed toward a specific object in a relatively stable way) (see Ben-Ze'ev 2000 for a review).

This definition of emotion arises from the cognitive theory of emotions (Lazarus 1991). According to this theory, emotions have a *cognitive origin*. In other words, they derive from an appraisal of present, past, or, in the case of anticipated emotions, future events. Cognitive psychology points to the fact that every emotion originates not from the event per se, but from the individual's evaluation of that event. A cook, for example, is proud not only of the cake itself but also of the reflections s/he makes about his/her skills in creating it. Moreover, in line with cognitive theory, emotions motivate actions. For instance, guilt can promote pro-environmental behavior (Bedford et al. 2011) and prevent food waste.

In terms of the elicitation of emotions, cognitive theory is currently the dominant paradigm. Other psychological theories (e.g., behavioral theory) maintain that the conscious or unconscious analysis of a stimulus is not a necessary condition for an emotion to arise (Zajonc 1980). According to this view, emotions can also be elicited by neural processes (Izard 1993) such as hormone production. Nevertheless, "especially in connection with consumption emotions, it is also true that emotions are rarely arbitrary reactions disconnected from reasoning on events concerning our existence. For this reason, appraisals are considered an important element of consumer behavior analysis even though they are not a necessary condition for emotions" (Soscia 2013, p.13).

Emotions often appear in clusters and not one at a time (Ben-Ze'ev 2000). As discussed in an earlier example, the cook may be satisfied of the cake and proud of his/her skills. Making a clear distinction between the two affective states is not always easy. This is why in consumer behavior we often study *clusters* of emotions. Clusters are often formed according to the valence of emotions (positive versus negative; e.g., Meiselman 2015), although other approaches have been offered in the literature (see Soscia 2013 for a review). Another widely adopted approach (Mehrabian and Russell 1974) offers three dimensions to classify emotions: Pleasure, Arousal, and Dominance (PAD). Pleasure is the degree to which one feels happy versus sad and includes states such as joyful, happy, and satisfied. Arousal is the degree to which one feels excited or apathetic and includes the states of surprise, stimulated, alert, or active, as well as boredom. Dominance is the degree to which one feels in control or free to act in a given situation. It includes emotive states such as fear and worry. For example, a supermarket may be designed to stimulate these three classes of emotions in consumers: a creatively designed shop window can stimulate pleasure, promotional activities (e.g., food tasting) may increase arousal, and well-designed category management may help customers identify the food items on their shopping lists and stimulate their feeling of dominance.

3.1 Personal and Contextual Factors that Impact Emotions

Emotions are complex because they are extremely specific to personal and contextual factors (Ben-Ze'ev 2000). Individuals differ in terms of *temperament* (behavioral tendencies shaped by biological factors that relate to the manifestation of

emotiveness) and *emotive traits* (personal predisposition toward feeling a specific emotion) (Soscia 2013) or the intensity of positive and negative emotions felt (Jaeger and Hedderley 2013). Furthermore, context affects emotions too. For instance, an emotion might be felt in a specific circumstance but not in another identical one since, after the first time, the situation has become "familiar." For example, a consumer may be happy reading a tempting restaurant menu, but bored the second time she finds the same food options.

Besides individual and contextual differences, another important factor that shapes consumers' emotions is culture. Culture has a strong bearing on affective diversity and expressivity in consumers. For instance, in Chinese cultures, pride is inhibited from a very early age and this impacts consumers' responses to promotional stimuli (advertising) that evoke this unfamiliar emotion (Aaker and Lee 2001). Shame also plays a strong role in regulating behavior, as suggested by the linguistic diversity in Chinese for the word *shame* (Li et al. 2004). The correlation between the level of individualism and emotional expressivity (Matsumoto et al. 2008) further indicates that culture has extensive influence on the emergence and expression of emotions. Experiencedesigners targeting global markets should not neglect how emotions may differ from one culture to another, as culturally congruent emotions may denote higher satisfaction.

3.2 Emotions Shape Consumption Experiences

The literature on consumption emotions (Bagozzi et al. 2003; Bagozzi et al. 2016) reveals that emotions impact experiences at all four stages (pre-consumption, core-consumption, purchasing, remembered experiences; Arnould et al. 2002) of consumption through their role in motivation, decision-making, engagement, memory, and information recall. The pre-consumption experience stage includes searching, planning, and imagining the experience. This is an emotionally charged stage since individuals frequently anticipate the pleasure an experience will create (Hirschman and Holbrook 1982; O'Shaughnessy and O'Shaughnessy 2002; Phillips and Baumgartner 2002).

This is especially the case in experiential contexts (Pearce 2009). During the pre-consumption experience phase, both anticipated and anticipatory emotions have a substantial impact on consumers' experiences. Anticipated emotions are affective reactions that one may envision experiencing in the future if an event or outcome were to happen (e.g., pride if one imagines cooking a big Thanksgiving dinner). Anticipated emotions are based on pre-factual thinking about imagined events. They are affective forecasts. Anticipatory emotions (e.g., fear, worry, and hope) are experienced in the present, real affective responses to probable future events (e.g., hope that one will be able to cook a big Thanksgiving dinner) (Baumgartner et al. 2008). People can experience both anticipated and anticipatory emotions in a particular consumption situation (Baumgartner et al. 2008). Anticipated and anticipatory emotions may motivate or inhibit the next stages of consumption behavior

(purchase and consumption). In fact, in many situations, emotions are a far more powerful motivator than logic or goals.

For instance, inviting one's family for a Christmas dinner may elicit a sense of anticipated joy, happiness associated with the idea of sharing food during a family reunion. At the same time, the planning for the dinner can be a source of anxiety: the host is prepared to commit considerable financial resources in buying and preparing food with an uncertain result. The mixed feelings in the experience include both anticipated (joy) and anticipatory (anxiety) emotions. Emotions can act as barriers to action and shape consumers' decisions. Recognition and management of anticipated emotions is a critical point in designing innovative experiences for consumer well-being. For instance, to decrease the anticipated sense of guilt of a consumer who wishes to treat herself to a dessert, low-fat nutrition labels could be useful (Wansink and Chandon 2006).

In the pre-consumption phase, emotions may also affect encoding and retrieval of information (Isen et al. 1978) regarding the alternatives available. For example, positive emotional states may enhance access to positive information in memory. Moreover, people in a good mood recall more positive and less negative information about a product than those in a bad mood (Isen et al. 1978).

The purchasing experience includes choice, payment, packaging, as well as the interaction with the service provider. The buying (and consumption) moments represent opportunities for experiencing emotions (Hirschman and Holbrook 1982). It is an especially emotionally charged experience in high-involvement situations as consumers face important consequences for their decisions. For example, the emotion of shame is effective in inhibiting harmful behaviors such as alcohol abuse (Agrawal and Duhachek 2010) and in strengthening self-control (Chun et al. 2007), making a consumer's food experience healthier.

Various elements of the experience may elicit emotions and determine the overall value of the experience as well as the specific action tendencies. For instance, a pleasant experience with a service provider can promote joy and satisfaction whereas an unpleasant interaction is likely to result in frustration or disappointment. Specific emotions are likely to result in varying action tendencies among consumers. For example, Bonifield and Cole (2007) examined the emotional reactions of consumers to negative restaurantexperiences. The two distinct possible discrete emotions elicited by poor service—anger and regret—were found to impact differently on conciliatory and retaliatory behaviors.

The core consumption experience itself may be a source of emotion as various aspects of it can elicit emotions (e.g., physical sensations, satiety, and servicescape). Emotions within this experience may determine the level of consumer engagement, and are central to consumers' satisfaction and post-consumption behavior. Furthermore, emotions during the core consumption experience itself are likely to affect the level of recall. The level of emotional intensity (high level of emotive involvement) during the stimulus encoding affects recall (Isen et al. 1978). Brands that have a more dominant affective component are likely to be remembered more easily than brands with a less dominant affective component (see Erevelles 1998 for a review of the role of emotions in recall). Furthermore, the valence of emotions

stimulated through the experience has a direct impact on the overall well-being of consumers. Schwarz and Clore (1983) demonstrate that people take advantage of their momentary affective states to evaluate how happy and satisfied they are with their existence in general, meaning that a pleasant and romantic dinner, for example, may contribute to overall pleasure in one's life.

The role of emotions in the experience does not simply end with consumption; emotions affect the experience in the post-consumption phase too. Emotions may arise after the experience of consumption through imagination (Hirschman and Holbrook 1982). The phenomenon of nostalgia has been widely studied within the context of food. Proust's madeleine is probably the best-known example, and even those unfamiliar with the text may have heard about the narrator's nostalgic journey of memory when he tastes a madeleine dipped in his tea. This example shows how emotions associated with the experience of consuming food products can extend this experience for a far longer time, even for a lifetime.

4 Emotions and Food Experiences

The studies that have looked into emotions within the context of food experiences can be classified in two main groups: those that focus on the effects of food experiences on emotions and those that focus on the effects of pre-existing emotional states on food experiences. In this section, we review the findings from each of these groups of studies. The first subsection below, "Effects of Food Experiences on Emotions," highlights the broad range of emotions that are provoked through food experiences and the factors that shape emotions within such experiences. The following subsection, "Effects of Pre-Existing Emotional States on Food Experiences," reviews the impact of emotion dimensions (valence, arousal, and intensity) on food experiences, individual difference variables, and their impact on food experiences, and finally the two processes (emotion congruency and emotion regulation) that may explain the impact of emotions on food experiences.

4.1 Effects of Food Experiences on Emotions

Food experiences affect the way we feel, and elicit both positive and negative emotions. Food consumption typically reduces arousal and irritability, and increases calmness and positive affect (Gibson 2006). It lessens feelings of helplessness, depression, loss of control, and distress (Markus et al. 1998) and stress (Oliver et al. 2000). Food experiences frequently give us a sense of comfort and reward. They elicit delight and pleasure (Batat 2019; Batat et al. 2019; Cornil and Chandon 2016). For instance, having dinner at a high-end restaurant, opening a bottle of champagne, or preparing a nice dinner is often synonymous with pampering oneself and having

fun. In fact, a good meal is considered as one of the main sources of pleasure in life (Westenhoefer and Pudel 1993).

Food experiences may also result in negative emotions depending on the consumer's expectations, needs, meal size, and whether the meal composition closely matches with her habits (Gibson 2006). Feelings of disgust (Rozin et al. 1984), guilt (Graham-Rowe et al. 2014), and self-loathing (Lerner 2004) are not uncommon. In short, a wide range of emotions—both positive and negative—are observed in food experiences. A survey study by Desmet and Schifferstein (2008) reveals that 22 emotions, including the 19 basic emotions listed in the typologies of Ekman (1972), Lazarus (1991), and Ortony et al. (1988) can all be experienced in response to food. A survey of emotions that were elicited after tasting or reading about food names (Cardello et al. 2012) suggests at least six groups of emotions in relation to food experiences: happy (e.g., glad, pleased, and joyful); calm and peaceful (e.g., polite, secure, and tame); energetic (e.g., active, adventurous, wild, and daring); loving and affectionate; disgusted and guilty; and bored.

Although food experiences encompass the full range of emotions, some emotions seem to be mentioned more often within the context of food experiences. For instance, in Desmet and Schifferstein's 2008 study, positive emotions (satisfaction, enjoyment, desire, amusement, love, stimulation, pleasant surprise, relief, admiration, hope, and pride) were reported to be experienced more often than negative emotions (boredom, disappointment, dissatisfaction, disgust, unpleasant surprise, shame, contempt, fear, sadness, anger, and jealousy). Satisfaction, enjoyment, and desire were experienced most often, and sadness, anger, and jealousy least often. From an early age, food is associated with nourishment, warmth, comfort, and social interaction (Smith et al. 1990; Moens et al. 2007; Stifter et al. 2011). Hence, it is not surprising to find hedonic asymmetry in response to food experiences. Positive emotions elicited through food consumption can in fact be a way to promote greater consumer well-being. Focusing on pleasurable bodily states during food experiences enhances the experiential pleasure of food and can be a positive pathway to well-being (Batat et al. 2019).

4.1.1 Factors that Shape the Food-Elicited Emotions

Affective reactions to food experiences can be understood as responses to a combination of at least three main factors: (1) sensory and nutritional properties of the food in the experience, (2) the environment of the food experience (e.g., ambiance and social context), and (3) the physical, psychological, as well as social consumer characteristics (e.g., physical state, individual traits, past experiences, and sociocultural background) (Table 8.1).

Table 8.1 Factors that shape food-elicited emotions

Food-related factors	Nutritional properties of food	E.g., macronutrient or micronutrient content
	Sensory properties of food	I.e., visual, olfactory, auditory, gustatory, and tactile qualities of food
Environment	Servicescape/physical environment	E.g., ambient conditions, physical space
	Social environment	I.e. any interaction between and among consumers and employees
Consumer-related factors	Physical state of the individual	E.g., hunger, thirst, fatigue, and age
	Past experiences	
	Sociocultural background	E.g., religion, income, and region
	Individual traits	E.g., food neophobia and variety-seeking

Nutritional and Sensory Properties of Food

A food experience, especially consumption of food, has a direct impact on one's body. The functional or nutritional aspects of food (e.g., macronutrient and micronutrient content) activate physiological changes in the body. For instance, carbohydrate-rich meals may improve mood (Benton and Donohoe 1999; Christensen 1993, 1997; Gibson and Green 2002). The effect is explained by the serotonin increase in the brain (Wurtman 1982). Another physiological mechanism is hinted at by an animal study revealing that fat and carbohydrate in foods moderate activity of the hypothalamic–pituitary–adrenal axis and dampen stress responses (Dallman et al. 2003). Energy-dense foods (e.g., sugar and fat) induce a positive affect and result in cravings, whereas bitter or unknown foods result in a negative affect such as disgust (Macht 2008).

The sensory characteristics of food also have a substantial impact on emotions (Thomson et al. 2010). Sensory attributes are made up of the visual, olfactory, auditory, gustatory, and tactile qualities of food. One may be excited or surprised by the texture, color, or smell of food. Humans also respond to odors emotionally (Chrea et al. 2009; Porcherot et al. 2010). Taste (e.g., salty, sour, and bitter) is important from the beginning of one's life. Even among newborns, sweet tastes result in a positive affect whereas bitter tastes result in a negative affect (Rosenstein and Oster 1988). In a study by Robin et al. (2000), sweet taste prompted the lowest automatic nervous system (ANS) response and was associated with happiness and surprise; bitter taste induced the strongest response and was associated with anger and disgust; sour and salty tastes produced moderate responses and were associated with all emotions, reflecting more variable taste associations.

A study by Thomson et al. (2010) reveals that the sensory attributes of dark chocolate are linked to emotional profiles. For instance, dry and bitter were associated with aggressive, energetic, and masculine emotions while sweet, creamy, and smooth were associated with pleasantness-related emotions (e.g., interested, happy, and loving). In another study, bitterness elicited feelings of moral disgust (Eskine

et al. 2011), whereas sweetness enhanced agreeableness and pro-social behavior (Meier et al. 2012).

The Environment

The environment of food experiences, composed of the servicescape (Bitner 1992) and social environment, affects the elicited emotions. Servicescape is the manmade, physical surroundings and includes ambient conditions (e.g., temperature, air quality, noise, music, and odor), physical space (e.g., layout, equipment, and furnishings), as well as signs, symbols, and artifacts (e.g., signage, personal artifacts, and style of décor). Social environment encompasses both the employees and other consumers or individuals involved in the food experience. Both the physical environment (servicescape) and social environment of food experiences contribute to the formation of emotional responses.

Servicescape shapes consumption experiences (see Wansink and Chandon 2014 for a review) and contributes to the materialization of emotions within an experience. For example, imagine that a customer enters a grocery store and is confused because s/he cannot find signage that directs him/her to the food items s/he is looking for, and is emotionally distressed because of the crowd, temperature, and noise. The customer is not able to shop for groceries, at least not very easily and in a pleasing environment. Here, the environment limits the success or efficiency of the customer's behavior and results in negative emotions. Research (Bitner 1992; Nasar 1989) suggests that at least two environmental dimensions may predict liking of a particular environment: complexity (visual richness, ornamentation, and information rate) intensifies emotional arousal whereas coherence (order, clarity, unity) and compatibility (e.g., how well a place blends in with its surroundings) enhance positive evaluation.

Servicescape also influences the nature (e.g., duration of interaction) and quality of customer–employee interactions too (Bitner 1992; Holahan 1982). "All social interaction is affected by the physical container in which it occurs" (Bennett and Bennett 1970). For instance, factors such as seating arrangements, the size of the space, and physical proximity of others shape social interactions, and therefore the emotions elicited, within food experiences. Therefore, the impact of servicescape on emotions may be also through social interactions.

As well as the physical environment, social environment—the interactions between and among consumers and employees—also has a substantial role in the emotions elicited within food experiences. Decades of research has shown that social context affects food-related behaviors (e.g., food choice and amount consumed). Groups may provide the social norms for consumption behavior and conforming to a group norm may be a positive emotional experience (Higgs and Thomas 2016). Furthermore, eating with someone may amplify the hedonic qualities of the food experience (Boothby et al. 2014); both pleasant and unpleasant experiences may be stronger when shared. The presence of others may even affect the desire to eat. For instance, Barthomeuf et al. (2009) reveal that emotions expressed on other

people's faces may impact the desire to eat. Moreover, sharing of food resources and experiences increases interpersonal closeness and affection (Hamburg et al. 2014). Meals eaten in a group setting also create a sense of belonging (Ogden 2011). Not only other consumers but also employees impact the emotions elicited within food experiences. For instance, a study on upscale restaurants (Ryu and Jang 2007) reveals that employees have a significant effect not only on pleasure but also on the level of arousal.

Research indicates that one's emotional response to the environment may be transferred to people or objects in the environment. In other words, even if the emotions elicited within the experience are not related to the focal product (food), the unrelated emotions may still affect evaluation of that product. The affect-as-information literature (Pham 1998; Schwarz and Clore 1983) indicates that environmental or extraneous stimuli can affect subsequent evaluations since people frequently misattribute their reactions to the extraneous stimulus as reactions to the focal product or experience.

When consumers experience a product or service, they often consider their feelings in that very moment. The momentary feelings could originate from irrelevant sources. However, consumers still use those feelings as informative for their evaluations of the product or experience (Pham 1998). For instance, ambient scents can elicit emotional responses that can impact product evaluations (Bosmans 2006). The environmental factors do not necessarily need to be part of the designed experience. Any type of environmental factor during the experience may affect the emotions and, consequently, the evaluation of the focal experience or product.

Consumer Characteristics

Besides the food and environment, the physical state of the individual (e.g., hunger, thirst, fatigue, and age), past experiences, sociocultural background (e.g., religion, income, and region), and individual traits (e.g., food neophobia and variety-seeking) impact the emotions within food experiences. One's age (Den Uijl et al. 2016) and physical state shape overall food experiences. For instance, a hungry or a well-rested person is likely to feel more enjoyment and satisfaction from a good meal than does a full or tired person.

Personal meanings that originate from one's past experiences also affect the emotions induced through food experiences. For instance, food names elicit emotions as they evoke memories of an emotional experience with the food (Thomson et al. 2010). The emotional response to food names versus tasted foods may be different. In fact, the emotion associated with food names may be even stronger than the tasting of the food itself (Cardello et al. 2012). A specific preparation may not evoke the idealized experience. The idealized experience may be loaded with associations that originate from remembered or imagined events.

Sociocultural factors are also very important in how one interprets the food experience and, therefore, how one feels during or after the experience. Ethnicity, history, religion, and social status have shaped food choices and consumption experiences throughout history. Shopping for, preparation, and consumption of food are embedded in sociocultural context (Mennell et al. 1992; Murcott 1995; Delormier et al. 2009). Hence, it is not surprising that one's sociocultural background has a substantial impact on food emotions. For instance, insects and other invertebrates are consumed in Asia, Australia, and Central and South America (MacEvilly 2000). However, the same experience is likely to conjure feelings of disgust among Western consumers. Similarly, food experiences involving pork are likely to conjure strong negative emotions among some religious groups (e.g., Muslim and Jewish).

Personality traits, especially food-related ones, may also affect emotions elicited by food. For instance, food neophobia (reluctance to ingest novel foods; Pliner and Hobden 1992) affects taste expectations. Conversely, food neophiliacs and variety-seekers (Kahn 1995) tend to lean toward new food experiences (Mak et al. 2012). Emotions experienced during exposure to or consumption of novel versus familiar foods may differ among consumers who have these food-related personality traits. Food neophobic individuals may feel disgust and repulsion whereas variety seekers may feel excitement when they are exposed to novel foods.

Although not a personality trait, another individual difference variable that can impact the emotional experience is how mindful one is during a food experience. Mindful eating is defined as "a nonjudgmental awareness of physical and emotional sensations associated with eating" (Framson et al. 2009, p. 1439) during consumption. Within the domain of food consumption, mindfulness studies investigate how much attention or awareness is given to sensory aspects of food (Tuorila et al. 1994; Mustonen and Tuorila 2010; Shiv and Nowlis 2004). Research points out that mindfulness promotes psychological well-being (Brown and Ryan 2003), and mindful eating enhances food satisfaction (Bays 2009; Engstrom 2007).

All these aspects of a food experience shape not only experienced but also anticipated consequences for consumers. Anticipated consequences have a substantial impact on current experiences due to anticipatory emotions. For instance, one may experience fear of becoming fat or unhealthy by consuming unhealthy foods or feel hope of living a healthy life by consuming fruit and vegetables.

Anticipated consequences may emerge from personal or cultural meanings and associations attached to food experiences. For example, Macht and Dettmer (2006) asked women to rate the extent to which they felt anger, fear, guilt, sadness, joy, boredom, and loneliness after eating a chocolate bar. Significant effects were found only for joy and guilt. Joy was elicited by the sensory pleasure of eating chocolate, and guilt was induced by negative thoughts associated with eating chocolate (e.g., its unwanted impact on body weight). Anticipated consequences resulted in feelings of guilt that were experienced in the present moment.

4.2 *Effects of Pre-Existing Emotional States on Food Experiences*

Pre-existing emotional states have a substantial impact on food experiences. Emotions affect motivation to eat (Arnow et al. 1995; Macht and Simons 2000), food waste behavior (Graham-Rowe et al. 2014), affective responses to foods (Ferber and Cabanac 1987; Willner and Healy 1994), food choice (Gibson 2006; Oliver and Wardle 1999), chewing (Macht 1998), eating speed (Krebs et al. 1996), amount ingested (Greeno and Wing 1994), as well as metabolism and digestion (Blair et al. 1991; Wing et al. 1990). Research indicates that dimensions used to categorize emotions—valence, arousal (Greenwald et al. 1989; Russell and Feldman Barrett 1999), and intensity (Frijda et al. 1992)—result in changes in eating (Macht 2008). Emotions impair cognitive eating controls.

For instance, Patel and Schlundt (2001) found that meals eaten in positive or negative moods were larger than meals eaten in a neutral mood. Comparing positive to negative emotions, Lyman (1982) found that participants had a greater tendency to consume healthy (vs. junk) foods while experiencing positive (vs. negative) emotions. Negative emotions (e.g., anger, fear, sadness, and stress) seem to decrease food pleasantness but increase impulsive eating (Macht 2008). By contrast, positive emotions (e.g., joy) increase food pleasantness and consumption of healthy food (Lyman 1982; Macht 1999; Macht et al. 2002).

Besides valence, arousal, and intensity also impact food experiences. High arousal (e.g., fear and tension) or intense emotions, compared to low arousal (e.g., boredom and depression) or low- to moderate-intensity emotions, suppress food intake (Mehrabian 1980; Robbins and Fray 1980). For example, Mehrabian (1980) found that during periods of boredom, depression, and fatigue, higher food consumption was reported. However, lower food intake was reported in the case of fear, tension, and pain. Animal studies suggest a similar relationship between intensity and food intake. For instance, rats reduce food intake in response to intense noise (Alario et al. 1987; Pare´ 1964) and electric shock (Strongman 1965; Weiss 1968), but enhance their intake and eating speed in response to low to moderate noise and electric shock (Krebs et al. 1996; Strongman et al. 1970).

4.2.1 High Variability Across Individuals

Although the effects of pre-existing emotions on eating have been studied extensively, it remains challenging to foresee how an emotion affects eating for a given group of people (Macht 2008). The specific effects of individual emotions on consumers are highly variable. The same emotions can enhance food intake in one group but reduce it in another. Individual difference variables (e.g., emotional or restrained eaters, and trait anxiety) may help us understand how pre-existing emotional states impact food experiences.

For instance, in response to fear and negative mood states, restrained eaters (Stunkard and Messick 1985) tend to eat more than nonrestrained eaters (Greeno

and Wing 1994; Rotenberg and Flood 1999). Furthermore, emotional eaters (van Strien et al. 1986) are more susceptible to overeating in response to negative emotions (Slochower 1983) such as stress than nonemotional eaters (Oliver et al. 2000). Additionally, trait anxiety is correlated with susceptibility to emotional eating, especially among obese people (Schneider et al. 2010).

4.2.2 Emotion and Food Regulation: Emotion Congruency vs. Emotion Regulation

The impact of emotions on food experiences may be explained by two different dynamics (Desmet and Schifferstein 2008): emotion-congruent versus emotion-regulating consumption (Christensen 1993; Macht 1999; Macht et al. 2002; Macht and Simons 2000). Emotion-congruent consumption implies that positive emotions enhance both consumption and pleasure from food experience whereas negative emotions diminish them. In line with this, for example, sadness has been found to reduce (and joy to increase) enjoyment from food and motivation to eat (Macht et al. 2002; Willner and Healy 1994).

The second dynamic, emotion-regulating consumption, implies that consumers use food to overcome negative emotions. In other words, unlike emotion-congruent consumption, negative emotions increase consumption. This strategy is prevalent among healthy, normal weight (Macht 1999; Macht et al. 2005; Macht and Simons 2000), as well as obese (Agras and Telch 1998; Gluck et al. 2004) people. Food is used to reduce arousal (Cantor 1981), to improve negative mood (Booth 1994; Thayer 2001), to escape from unwanted self-awareness (Heatherton and Baumeister 1991), or to reduce stress (Polivy and Herman 1999). For instance, a diet rich in carbohydrates and low in protein may raise the serotonin level and, accordingly, decrease feelings of helplessness, depression, loss of control, and distress (Markus et al. 1998).

Eating appears to have an affect-reducing effect, especially for anxiety (Kaplan and Kaplan 1957), anger, loneliness, boredom, and depression (Ganley 1989). Besides food consumption, ethical consumption (e.g., veganism), minimizing or preventing food waste, food offering, and sharing of food may all serve as emotion regulation strategies. The desire to avoid experiencing negative emotions (e.g., guilt, frustration, annoyance, embarrassment, and regret) motivates consumers to engage in ethical consumption (Malone 2012) as well as minimize food waste (Graham-Rowe et al. 2014). Hamburg et al. (2014) propose that food offering may increase positive affect for both the provider and the recipient. By offering food, the provider not only aims to mitigate the recipient's negative affect but also her own.

Social aspects are an important part of the emotion-regulating power of food experiences (Troisi and Gabriel 2011). Having your needs met as an infant (e.g., feeling satiated and warm) is associated with the presence of others (e.g., mother). For instance, in rats, the mother's nursing is an important factor in the development of the pups' stress response system (Meaney and Szyf 2005). Similarly, in humans, food experiences may be associated with comfort and a social connection that results in emotional power. For instance, specific foods (e.g., comfort foods) tend to

offer psychological comfort (Wansink and Sangerman 2000). Intriguingly, not only consuming but also even thinking about these foods has emotional consequences. For example, the effect of a belongingness threat on loneliness is attenuated when individuals write about the experience of eating a comfort food (Troisi and Gabriel 2011). Not surprisingly, the effect does not seem to materialize for individuals with an insecure attachment style (i.e., weak caretaker–child interaction).

Nevertheless, the relationship between negative emotions and food is not as straightforward as implied by initial studies. Different negative emotions may have different effects on consumers' food experiences. For instance, boredom may be associated with an increase in appetite, but sadness with a decrease (Macht 2008). Some clinical studies suggest anger to be the main cause of binge eating (Arnow et al. 1992) or impulsive eating (Macht 1999). Even the same negative emotion may increase consumption in some situations and decrease it in others.

For instance, one of the most prominent inducers of emotional eating is stress. An overview of studies by Macht (2008) indicates that on average 30% of individuals show an increase whereas 48% show a decrease of appetite or intake in response to stress. In short, it is still hard to predict under which conditions emotion congruency versus emotion regulation strategies may shape the impact of pre-existing emotions on food experiences.

5 Implications for Design Thinking and Food Well-Being

Box 8.1. Marketing the Food Imperfection: The Tesco Case
In Europe, millions of tons of fruit and vegetables are not commodified since they do not meet the aesthetic standards required by the market. This situation provokes a feeling of disgust and negative surprise among some consumers (Barone et al., 2019). In order to contain food waste and reduce the monetary losses for farmers, Tesco—a British multinational groceries retailer—signed an agreement with a Spanish fruit supplier to produce juice from fruit that may be considered ugly by consumers and would be otherwise wasted or used to feed animals (Smithers 2018). The retailer's intuition aligns with the design thinking definition of customer value that is created "by appealing to aesthetic preferences and catering to emotional experience" (Venkatesh et al. 2012, p. 304). This intuition is supported by experimental studies performed by Barone et al. (2019) that show how imperfect products that have been physically processed do not elicit the negative emotions that they provoke in their original state: a clever and simple design intervention that makes consumers more willing to accept imperfection and, consequently, reduce food waste.

Human beings need both their functional and emotional needs to be met through food experiences. Hence, in all stages of food design thinking, the role of emotions should be identified and taken into account. During the initial stage of design

thinking, design thinkers make significant efforts to understand consumers and their food experiences. A thorough understanding of consumers requires consideration of both the functional and emotional dimensions of what is a very emotion-laden experience: food consumption.

For instance, a team that aims to minimize food waste at a school cafeteria may realize that the issue has emotional (e.g., fear of gaining weight) rather than cognitive (e.g., lack of knowledge) or functional origins. Another example is the consumption of edible insects. Many Western consumers find it hard to eat insects even though it might reduce their environmental footprint. New solutions that focus on this issue's functional dimensions may fail to address the underlying need. A feeling of safety may need to be at the core of the solution, and while designing the experience, designers should perhaps make consumers feel comfortable and safe.

A human-centered approach is fundamental to design thinking, and so designers need to explore how emotions shape all stages of the consumption experience. Unfortunately, a standard experience survey rarely includes emotions experienced during the various consumption stages. Surveys and even interviews focus mostly on the functional properties of the experience, and emotions within the experience often go unnoticed and unaddressed. Identification of emotions may require qualitative methods (e.g., in-depth interviews, focus groups, as well as projective techniques such as metaphors, storytelling, or word associations). With regard to metaphors, the Zaltman Metaphor Elicitation Technique (ZMET; Zaltman and Coulter 1995) is an effective qualitative tool able to reveal consumption emotions through the complementary use of qualitative techniques and an in-depth interview.

This technique has been successfully used in the food industry to map the emotions related to food safety (Lagerkvist, Okello and Karanja 2015). Besides qualitative methods, face-reading technologies are an effective neuro method that is able to test emotional reactions to a food experience. For instance, Danner et al. (2014) tested emotional reactions to orange juice prototypes and were able to distinguish between seven facial expressions linked to six emotions (angry, happy, disgusted, sad, scared, and surprised). A discovery process that attends to users' emotions is likely to minimize the risk of innovation failure (Liedtka 2013).

Under the empathy and problem definition stages, it is also crucial to realize that designers and researchers are also human beings and have emotions. These emotions may interact with those of the consumers and employees (or respondents). For instance, researchers may exhibit distaste when trying to understand consumers' behaviors or emotions. The emotions of researchers or designers, as well as their level of emotional empathy, may impact their efforts to develop a thorough understanding of consumers' emotions.

The idea generation stage should include the emotions that will be induced during the consumption stages. Each stage or part of the experience that is newly developed is likely to induce certain emotions among consumers, and the designers should be aware of this and consciously manage and integrate the emotions into the new design.

A prototype (e.g., physical mock-up and flowchart) is often used to test new products or services. Imagery plays a crucial role in the use of these prototypes. Cognition may not capture the whole experience and emotional responses are

required to capture accurate feedback about imagined experiences (Kavanagh et al. 2005). Hence, paying attention to emotions is likely to produce more accurate feedback in testing by making imagined experiences more vivid (Liedtka 2013).

Prototypes should integrate and be tested for emotion-inducing aspects of the experience for both the consumers and the providers of the experience. Emotions arise from the interaction between consumers, service providers, and environment. Hence, the emotions displayed by service providers are likely to shape those of the consumers. Prototyping and testing without taking this into consideration may therefore limit the reliability of the results. The prototype should be tested by ALL relevant stakeholders (e.g., consumers and employees) and include the specific emotions that were induced as well as sources of the emotions (why and how the emotions were induced in all stages of the experience).

Furthermore, integrating emotions into the new design is likely to facilitate the production of a more fulfilling experience. If emotions motivate and engage consumers within the experience, and therefore create additional value, then emotion-laden experiences are likely to enhance customer commitment and loyalty. Previous research has pointed to the connection between eliciting an emotional connection during an experience and greater consumer loyalty or advocacy (Pine and Gilmore 1999; Schmitt 1999; Davenport and Beck 2001; Gobe and Zyman 2001; Pullman and Gross 2003; Zaltman 2003). Hence, not only satisfaction from the experience but also commitment and long-term loyalty should be measured when testing emotion-laden experiences.

6 Conclusion

This chapter has presented an overview of the role and importance of emotions in designing food experiences. We would like to emphasize some of the issues and challenges that designers may face while integrating emotions into the design thinking process. First of all, measuring emotions is difficult for several reasons (see Ben-Ze'ev 2000). Emotions are often unconscious or hard for respondents to identify. What is measured is the interpretation of the emotion rather than the actual emotion. Cognitive biases associated with the interpretation of emotions as well as scale issues make the task even more complex. In any case, self-reporting is usually the simplest assessment method; however, it should be completed with non-self-reporting measures (e.g., neuro-marketing techniques such as magnetic resonance imaging) to obtain a better understanding of the emotional experience.

Emotions are subjective and emerge from the interaction among several variables as outlined in this chapter. They are subject to each individual's appraisal of his/her situation in that moment. For instance, even if designers elicit the emotion during the first experience, the second experience will not be the same for the individual. Repetition changes the emotional experience. Emotion is not only specific to each individual but also depends on previous experiences as well as situation and environment. Therefore, it is challenging to elicit specific emotions in a standard

manner. Designers need to consider the volatile nature of emotions and how to address this issue in their designs.

Designers and researchers need to understand various types of empathy (Davis 1983; Thornton and Thornton 1995) and develop excellent emotional empathy skills (i.e., to feel what other people experience) to be able to understand and integrate emotions into the food experience design. Luckily, empathy is not simply innate but can be learned and cultivated through training. Emotional empathy training should be part of designers' training.

Any design process that involves emotions is unlikely to be an easy one. However, no food experience can be complete without emotions. Consumers are emotional beings and need both their physical body and emotions to be nourished in order to feel whole and well. Emotions are an integral component of any food experience and, therefore, need to be integral to the design thinking process that creates innovative food experiences for consumer well-being.

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Chapter 9
Design Thinking for Food Well-Being: An Adolescent Language Perspective

Giulia Miniero, Marta Pizzetti, Angelo Baccelloni, and Francesco Ricotta

9.1 Introduction

Adolescence is a transitional phase that spans from childhood to adulthood, during which physical and psychological mutations transform the individual. In this life stage, young consumers become more independent and start to take the first autonomous consumption decisions as a way of escaping from parental control. As a result, parents lose their primary influence on adolescents, who devote their attention to peers. Friends, then, become a source of inspiration in the consumption process, especially for those products that are publicly consumed or characterized by a strong symbolic meaning, including food (Story et al. 2002; Stanford University 2020). For these reasons, adolescence is an interesting context in which to explore how individuals build their future relationships with goods, services, and brands.

Food, from a marketing perspective, plays a relevant role in an individual's life, and the exploration of individuals' relationship with it has played a central role in many streams of research. Recently, such a relationship has been explored under the lens of food well-being, defined as a positive psychological, physical, emotional, and social relationship with food at both the individual and societal levels. Previous research on food well-being has primarily addressed adult consumers (e.g., Mugel et al. 2019) or children (e.g., Hémar-Nicolas and Ezan 2019).

Conversely, less is known about teenagers, despite the great influence adolescence has on the relationship with food in adulthood. What are the sources of influence for adolescents? How do they describe well-being related to food? What

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is the role of school in influencing their food consumption choices? What is the role of the family? How do adolescents interact with their peers when making food-related decisions?

These are the primary questions that drive this chapter. The present work aims to shed light on the questions above by employing a language analysis. By exploring the language teenagers employ to express their ideas about food well-being, this research seeks to understand how adolescents choose words and concepts to express their ideas about food well-being. Indeed, studying the language is fundamental in order to understand how people reflect on concepts and form their own opinions. Tausczik and Pennebaker's (2010) research suggests that by studying the words people use, it is possible to infer the characteristics of these people and the type of social relationships in which they are engaged.

Moreover, studying language relevant to adolescents and their behavior is of great interest: as Eckert (2003) confirmed, language plays a central role in shaping social interactions in groups. If, as Pennebaker et al. (2003) suggest, the words people use are diagnostic of their mental, social, and physical state, studying how adolescents use words and how they associate them to one another is insightful and may well reveal their thoughts and opinions regarding the concept of food well-being.

This chapter therefore employs a quantitative content analysis to explore the concepts and words adolescents use to express their opinions about food well-being, with the aim of identifying the primary sources of influence for adolescents related to the concept food well-being. The chapter is structured as follows. First, we review the main research contributions to design thinking and food well-being. We then illustrate the latter in the context of adolescent consumption, explaining how an analysis of language may be insightful to our understanding of what adolescents think and perceive about food well-being. Following this, in the methodology section we illustrate the sample and the research protocol adopted. The findings section outlines the most relevant associations of concepts revealed by adolescents. Then the conclusions of the study are presented.

9.2 Design Thinking in Food Well-Being

The term design thinking, first mentioned by Buchanan (1992), commonly refers to a user-centric discipline that relies on the designer's sensibility and methods to match people's needs (Brown 2008). Kelley & Kelley (2013, p.24) defined design thinking as a method to "find human needs and creating new solutions using the tools and mindsets of design practitioners." Thomas Edison, in creating the electric light bulb, adopted the logic underlying design thinking to solve a problem widespread among people. In contrast, several authors trace the foundation of this approach to MIT Professor John Arnold, who strove to create inventions aimed at solving real problems of potential users.

Google queries for the term "design thinking" reveal about a billion and a half search results, exemplifying the increasing relevance of the process today. In

particular, various efforts have been made to study applications among business organizations in order to create: a) a human-centered product development process, and b) an expectation of rapid experimentation and prototyping. These efforts also strive to expand the innovation ecosystem by looking for opportunities to co-create with customers and consumers (Brown 2008; Olsen 2015).

Building on the notion that design thinking seeks to enhance the user-centered perspective, Stanford University (2016) identified five phases to summarize these basic steps of the process: (a) defining the problem, (b) finding needs and synthesis, (c) ideation; (d) prototyping, and (e) testing. The "defining the problem" phase aims at enucleating the issue that should be solved. The second phase, distinguishing between obvious and hidden needs, seeks to reveal end customers' needs. In the "ideation" phase, participants are encouraged to create new solutions by brainstorming. Relevant ideas are tested on consumers throughout the prototyping phase. In the last step of this circular process, prototypes are tested with consumers who are allowed to learn the dystonic elements of the developmental process (Brenner et al. 2016) (Fig. 9.1).

According to Olsen (2015), although prior research has primarily examined a plethora of distinctive design thinking applications that can drive either positive or negative business outcomes, little is known about design thinking and food well-being relationships. Block et al. (2011) defined food well-being as a positive psychological, physical, emotional, and social relationship with food at both the individual and societal levels. Food well-being is necessarily influenced by the cultural, environmental, and legal factors that govern people's attitudes and behaviors toward food.

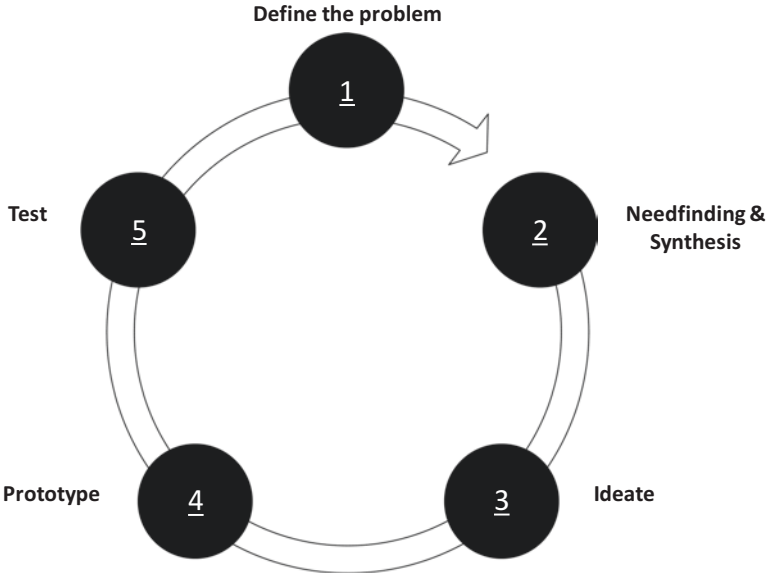

Fig. 9.1 Design thinking adapted from Stanford University (2016)

Adopting the author's perspective, the prevailing paradigm of food consumption was primarily associated with: (a) the functional nature of the food, (b) restraints and restrictions, (c) attention to body mass index, and (d) a set of paternalistic and normative aspects (Block et al. 2011). Today, a relevant new paradigm is assumed, generated by the modification of consumption and composed by (a) a more holistic and integrative role of food in our lives, (b) a consumer-oriented approach, and (c) a new set of attitudinal and behavioral responses related to food (Block et al. 2011).

In further detail, the findings suggested by the author are easily relatable to design thinking processes for two reasons: they represent a user-centric approach and strive to comprise the latent component of demand. More recently, Zampollo and Peacock (2016) conceptualized food design thinking as the process by which food designers transform knowledge and ideas derived from food science, food psychology, and food culture into creative solutions. Using design thinking to enhance food-related well-being means adapting methodologies and tools to facilitate reflections on the eating experience (Zampollo and Peacock 2016).

Prior research has suggested that practitioners, as star chefs, often juxtapose their experience with a playful approach to draw novel food that is both exciting and familiar enough to be palatable (Hekkert et al. 2003; Zampollo and Peacock 2016). Tracing the roots of design thinking, John Dewey (1934), in "Art as Experience," stated that a continuum exists between the refined experience of works of art and everyday activities and events (Zampollo and Peacock 2016). Quoting Beckman and Barry (2007), the aforementioned approach has laid the foundation for the "second generation" of design theories and methods, focusing on design as a social process.

From a problem-solving process to a problem-formulating process in which arriving at a collectively acceptable starting point is the core of the effort (Beckman and Barry 2007). This is in contrast to previous works that provide a potential explanation as to why practitioners seem to be more inclined to generate new ideas using their experience. In this research, we advance current knowledge by investigating the process systematized by Stanford University (2016). Using an adolescent-centric approach, we work on the first two phases of the design thinking process, namely, the definition of the problem and the identification of needs, exploring the language adolescents use in describing the concepts of food well-being. This is done with the aim of identifying drivers (e.g., problem statements; Luchs et al. 2015) that facilitate the learning process surrounding consumption patterns and relevant agents in the food socialization process for adolescents.

9.3 Food Consumption in Adolescence

Adolescence is a formative period of life in which young consumers begin to be more autonomous and responsible about consumption choices, including food. Pursuing a balanced diet and creating a positive relationship with food is paramount

in achieving food well-being in adulthood, but the increased independence typical of adolescence can jeopardize such a process.

A number of studies suggest that health is not a primary concern for adolescents (Neumark-Sztainer et al. 1999; Veeck et al. 2014), even though they are knowledgeable about the importance of a healthy and varied diet for their development (McKeown and Nelson 2018). As a consequence, teenagers do not eat enough vegetables, fruits, and dairy products (Neumark-Sztainer et al. 1999), preferring, to mention a few, snacks, confectionary, carbonated drinks, and fast food (Marshall 2018; Walsh and Nelson 2010). Parents have a primary role in guiding teens toward healthy consumption. The more parents are informed about health, the more adolescents eat healthy items instead of fast food products (Moore 2018). This tendency is fostered by communal meals with parents, which facilitate a healthy relationship with food (Hammons and Fiese 2011; Veeck et al. 2014; Walsh and Nelson 2010).

However, adolescents often escape parental control because of changes in their lifestyle that allow them to eat away from home more often (Stanford University 2020), or because of their desire for privacy, which leads them to eat in self-isolation. When adolescents are not under the supervision of parents, they may adopt unhealthy consumption behaviors, including skipping meals (Neumark-Sztainer et al. 1999) or overeating unhealthy food items (Chan et al. 2009). Moreover, in such instances, sensory cues, convenience, and social pressure exert a strong influence over teenagers' food choices.

Taste, appearance, color, and smell are primary drivers in influencing adolescents' preferences and food consumption choices. Specifically, taste appears to be the most important influence over food choice, both in Western (Neumark-Sztainer et al. 1999) and Eastern cultures (Veeck et al. 2014). Adolescents refuse to eat food they do not perceive to be tasty, because they tend to prioritize pleasure and immediate gratification derived from tasty food (Veeck et al. 2014). They believe that what is healthy is not tasty and prefer high-fat and high-sugar items to satisfy their increased hunger (Stanford University 2020; Kinard and Webster 2012). The desire for immediate pleasure leads adolescents to select food venues based on convenience, which means based on the proximity to their school or home (Marshall 2018) and the average price of food items (Marshall 2018).

Eating with peers is another contextual factor that influences teenagers' food choices. With peers, indeed, hazardous consumption behaviors are more likely, including alcohol (Cocker et al. 2018) and unhealthy food consumption (Chan et al. 2009). Social pressure and social acceptance are particularly relevant during this life stage: adolescents conform to their peers to avoid ostracization and derision (Wooten 2006). Such a desire to be accepted and avoid social exclusion influences eating: for example, young consumers may refuse to bring healthy food to school in favor of "junk food" (Kelly et al. 2006).

In other cases, the influence of body image can generate maladaptive practices related to food intake, such as the use of laxatives or vomiting to bring about weight control (McGinnis et al. 2006), overly restrictive diets, or binge-eating episodes (Stanford University 2020).

9.4 Food and the Perception of Food Well-Being: The Language of Italian Adolescents

Following the design thinking process, we employed an adolescent-centric approach to explore adolescents' perceptions of food well-being. Placing adolescents at the center of the research process is paramount for engaging them and developing successful intervention programs for this segment of consumers (Elliott 2018). The extant literature suggests that the failure of some intervention programs targeting adolescents is caused by the adult-centric perspective that is employed, against which adolescents may develop a rebellious attitude, or perceive the program as paternalistic (Batat et al. 2019; Mason et al. 2013). Indeed, nutrition-based information and food restrictions have been demonstrated to have a limited effect on food well-being in adolescence (Mason et al. 2013).

With the aim of defining the issue of food well-being for adolescents, an exploration of the language adolescents employs in describing their thoughts and opinions on food well-being is carried out. Indeed, studying the language is fundamental in order to understand how people reflect on concepts and form their own opinions. As Tausczik & Pennebaker (2010:25) argue:

> The words we use in daily life reflect who we are and the social relationships we are in. This is neither a new nor surprising insight. Language is the most common and reliable way for people to translate their internal thoughts and emotions into a form that others can understand. Words and language, then, are the very stuff of psychology and communication. They are the medium by which cognitive, personality, clinical and social psychologists attempt to understand human beings.

In this domain, language is useful in unveiling the concepts and processes adolescents use to experience the notion of food well-being. In addition, specifically to the specific group of consumers chose, language plays a fundamental role in the creation and maintenance of social groups, and hence of adolescent peer groups (Eckert 2003). If, as Pennebaker et al. (2003) suggest, the words people use are diagnostic of their mental, social, and physical state, studying how adolescents use words and how they associate them to one another is insightful and may well reveal their thoughts and opinions regarding the concept of food well-being. Moreover, language – like other types of behavior – conveys meaning and influences attitudes (Sela et al. 2012).

More specifically, the function and emotion words used by people provide important psychological cues to their thought processes, emotional states, intentions, and motivations (Tausczik and Pennebaker 2010). In addition, how people express themselves by choosing to use specific words is reliable across time and situations. Choosing certain articles or including other emotional words in the usage of verbal tense tends to remain stable across individuals (Pennebaker and King 1999). Therefore, language becomes very useful in understanding how adolescents frame their views on the concept of food well-being, and how this concept is grounded in their daily routines. Thus, we employed a qualitative method (i.e.,

semi-structured interviews) to collect and explore the language adolescents use to describe their perception of food well-being.

We recruited a purposive sample of 14 Italian teenagers (ages 14–18 – see Table 9.1). We believed that an investigation of the Italian context was interesting because: (a) Italian food (derived from the Mediterranean diet) is considered nutritious and healthy (Vermeulen et al. 2016); (b) Italy has a strong food identity (De Rosis et al. 2019); (c) several national programs have been developed to facilitate a positive relationship with food among Italian adolescents (De Rosis et al. 2019), and (d) Italy has lower levels of disease related to food compared to other European countries and has the lowest percentage (10.5%) of obese individuals among all of the European countries (Eurostat 2020).

Existing research on Italian teenagers has investigated the role of socialization agents (i.e., media, institutions, family, and peers) in forming eating behaviors and has emphasized the complexity of the process with regard to food well-being (De Rosis et al. 2019). Moreover, Lazzeri et al. (2013) tested the effectiveness of an intervention program in promoting fruit consumption among teens, demonstrating the positive effect it has on behavioral change. Such studies employed a quantitative approach to investigate and test relationships among adolescents' behavioral patterns related to food instead of exploring adolescent minds by analyzing their words and language choices.

In the current study, we conducted semi-structured interviews, because this method enables the researcher to gather participants' perspectives and facilitates free expression among the respondents (Spiggle 1994). The interviews took place in

Table 9.1 Profile of the respondents

Age	Number of respondents	Gender	Region	Year of high school (average)
13	1	Male: 0	Southern Italy: 1	1
		Female: 1	Central Italy: 0	
			Northern Italy: 0	
14	3	Male: 3	Southern Italy: 0	1,5
		Female: 0	Central Italy: 3	
			Northern Italy: 0	
15	6	Male: 2	Southern Italy: 0	2
		Female: 4	Central Italy: 6	
			Northern Italy: 0	
16	0	Male: 0	Southern Italy: 0	0
		Female: 0	Central Italy: 0	
			Northern Italy: 0	
17	5	Male: 3	Southern Italy: 4	4
		Female: 2	Central Italy	
			Northern Italy: 1	
18	2	Male: 0	Southern Italy: 1	4,5
		Female: 2	Central Italy: 0	
			Northern Italy: 1	

a calm environment and lasted about 30 minutes each. Two of the authors of this study conducted the interviews, which were audio-recorded and in turn transcribed. The interview protocol began with ice-breaking questions (i.e., self-presentation and questions about the family) to facilitate the discussion that followed. After a "grand tour" question about what they believe food well-being means (Ruth et al. 1999), the interview progressed by asking respondents to indicate foods, situations, and experiences they connect to the notion of food well-being. The interview protocol was designed to cover the main aspects of food well-being and also to leave room to extend the discussion. Following the qualitative approach, the protocol was adapted to facilitate dialogue with the adolescents (e.g., question wording and new questions).

The transcription of the interview generated 65 pages of text. An automated text analysis was performed on the interviews. Text analysis was deemed suitable because it allows for the analysis of text in a systematic and replicable way and helps to find overlooked correlations and relationships among constructs. We employed the linguistic inquiry and word processing software (LIWC) (Berry et al. 1997) to process the text. LIWC helps in extracting, uncovering, and counting known entities and constructs (Humphreys and Wang 2019). This includes a standardized dictionary that allows for the measurement of sentiments, cognitive and social processes, psychological states, and traits (Berger et al. 2020; Humphreys and Wang 2019). Such a dictionary has been developed based on psychometrically tested scales (Humphreys and Wang 2019).

9.5 Findings

In order to answer to the research question, which is focused on gaining a better understanding of the language adolescents use to describe their idea of food well-being, we employed a quantitative content analysis methodology. The 14 interviews were automatically coded using the LIWC software (Pennebaker et al. 2007) and its internal dictionary in Italian.

As Berry et al. (1997) explain, the program analyzes written samples on a word-by-word basis. Each word is then compared against a file of words that is divided into different dictionary scales. The latter tap into five general text dimensions: positive emotions, negative emotions, cognitive mechanisms, content domains, and language composition. LIWC assumes that the percentage of words used within a given category reflects a speaker's general psychological state. For example, when an individual uses negative emotional words in a speech sample, it is presumed to reflect his or her feelings of higher degrees of negative emotion (Pennebaker and Francis 1996).

In short, the LIWC program provides a simple, efficient, and valid approach to language analysis (Berry et al. 1997). Additionally, the linguistic scales developed for LIWC have been successfully used in several studies to predict multiple outcome variables, from deception in verbal communications (Berry et al. 1997), to

personality (Berry et al. 1997), to psychological adjustment to health (Pennebaker and Francis 1996).

Data exploration revealed that the language used by adolescents in describing their thoughts regarding food well-being is multifaceted. Indeed, participants expressed their opinions using, on average, 1825 words per each interview, and there was no significant difference in terms of gender. The most recurrent single word employed was "well-being" (328 mentions), followed by "friends" (280 mentions), and then "eating" (272 mentions). With the goal of better understanding the types of words employed by our participants in their discourse related to food well-being, we first identified the most recurrent categories of words.

Figure 9.2 shows that in describing their relationship with food well-being, participants heavily employ words that refer to the categories of cognitive processes ($Cog\_proc_{ave} = 5.72$) and social processes ($Social_{ave} = 4.29$). This result is interesting because, as Tausczik and Pennebaker (2010) explain, using several words in discourse that refer to the cognitive process reveals a complex thinking style, which is reflected in a deep understanding of the environment.

At the same time, adolescents also describe their ideas of food well-being using references to those actions that seem to give them pleasure, as well as positive emotions such as talking, communicating, and spending time with friends (e.g., social). The third most recurrent dimension is the "I" category ($I_{ave} = 3.31$). This reveals how the participants' locus of attention is still focused on themselves (Sela et al. 2012). Following this pronoun, the three most commonly used words were "eating," "leisure," and "home" ($eating_{ave} = 2.23$; $leisure_{ave} = 1.65$; $home_{ave} = 1.35$).

This might support the idea that when thinking of food well-being, adolescents refer to the concrete and practical action of eating and tasting food, but also associate this activity to a pleasurable moment in which they can escape from their daily duties (e.g., leisure), with the majority of this activity taking place at home.

This first glance into the language of adolescents and food unveiled several interesting facts about the data, which were subsequently analyzed further, zooming in on the specific relationship between concepts and words. By relying on a correlation

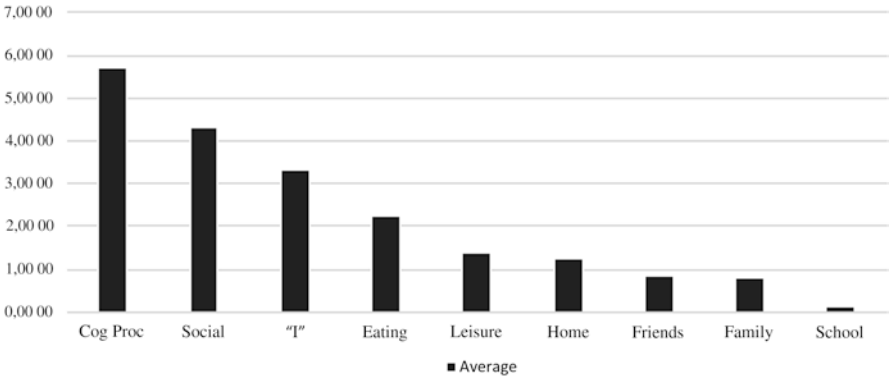

Fig. 9.2 Most relevant categories

analysis, the discourse interpreted showed that adolescents do not appear to have a positive attitude toward school. Despite their age and their lifestyle, which causes them to spend a large percentage of their time at school (Eckert 2003), it appears that school is not very central to adolescents' lives. In addition, according to the language associated with it, school has a significant and negative correlation with the words "friends" (r = −.562*[1]) and "social processes" (r = −.537*) in general. Apparently, school is not the place where social interactions and social exchanges take place, but is, rather, considered detrimental to their interactions and appears not to even be a place in which it is possible to establish friendly relationships.

The fact that both correlations are relatively high and negative leads to the notion that the role adolescents assign to school is marginal in their lives, despite spending an important chunk of their day at school. This also reflects on the overall role school plays for adolescents and its centrality in their lives. From tracking their language, it is possible to infer that school as an institution is not a locus of attention. This therefore suggests important implications for policy makers when addressing food and nutritional issues: school does not appear to be the right vehicle for such communication because of adolescents' negative perceptions about it.

Surprisingly, the place where adolescents feel most comfortable, which receives continuous attention in their language, is "home." When speaking about their homes, adolescents strongly and positively associate it with the ideas of "Eating" (r = .674**) and "Leisure" (r = .990**). This reveals the solid bond most adolescents have with their childhood and their food socialization processes. When thinking of their own food well-being, adolescents return to where everything started: their homes, with their families.

Looking at the adolescent discourse on the topic in its entirety and placing it solidly in their perspective, it is very interesting to understand the role that "home" has in their lives compared to the role of "friends." Indeed, the correlation between the act of consuming food (e.g., "eating") and the word "friends" is not as high as the correlation between "home" and "eating" (r = .648*, r = .674**, respectively). The language analysis suggests in this case that when thinking of eating and their well-being, adolescents demonstrate a positive anchor with the routines and traditions learned in their homes, where the food socialization process started and developed over time. However, contrary to expectations, traditions and routines are apparently not correlated with the idea of family: the correlation is not significant (r = .105).

This evidence may be key in revealing the true role of home and friends for adolescents: it seems that home represents for them a place of shelter, their safe place for relaxing, escaping, and being on their own. Home is not directly connected with spending time with family, as this is not the idea of eating, but it is the place where they feel safe and protected. Indeed, this is also revealed by the high and very positive correlation between the concepts of "home" and "leisure." This may reinforce the idea that for adolescents, home is the place to go when they need to take time for

[1] *The correlation is significant at .05 (2 tales); ** the correlation is significant at .01 (2 tales).

themselves, to reflect, to think, and to relax. This perspective regarding leisure, which is not intended in this context to mean having fun but is employed in a more introspective way, is confirmed by the fact that this concept is not significantly correlated with "friends" (r = .180). Apparently, this might make no sense: it is surprising, though, that when adolescents consider their leisure time, they do not associate it with their peers. This might be explained by the conception that when talking about their food well-being, adolescents experience leisure as a time for themselves in which they want to relax and escape from their daily lives.

Overall, it seems very important to acknowledge that for adolescents, the idea of "home" is still very important and very present in their language: it represents the core of their food well-being, since they clearly associate the idea of shelter and protection they receive at home with the idea of eating and taking time for themselves. Such a result might suggest that adolescents associate their home with the idea of their childhood: home is where they received their mother's care and where they feel protected and they are free to be whomever they want to be.

In terms of managerial implications, this idea is very interesting: home is still central to their adolescent lives, and it is still the place in which the first ideas about nutrition and well-being were learned and assimilated by them. At the same time, the language analysis disclosed that it is important not to immediately associate the idea of home with the idea of family, from which adolescents seek to be detached.

The third relevant concept in the analysis of adolescent language is "friends." Not surprisingly, teenagers consider their peers very important, and being part of a group during the teen years is a fundamental aspect of their lives. Focusing on the data, the exploration revealed that there are two distinct domains of concepts associated with "friends." The first is cognitive processes. Indeed, friends are positively and significantly correlated with all of the words that represent the idea of thinking, forming opinions, introspection, and the development of attitudes (rcog_proc = 756**; rintrospection = .678**; rcertainty = .603*). Friends are therefore partners in the establishment of a collective view on the world in general, and it seems that adolescents rely on friends to see life through their eyes.

The strong correlation to cognitive processes, which did not emerge, for example, with concepts such as family or school, demonstrates how friends are important in driving a collective way of thinking among adolescents. This means that the place where adolescents learn and form an opinion is not within their family or at school, but, rather, with their friends. This idea has tremendous implications in terms of policy: in order to be heard by adolescents, it is fundamental to use their peers as a vehicle. The second domain of concepts associated with friends is "social process." The data analysis revealed that friends have a positive and significant correlation with all of the dimensions of social processes, including social interactions, hearing, and communication (rsoc_proc = 765**, rhearing = .695**, rcommunication = .821**). This highlights the importance adolescents assign to spending time with their peers and the activities they enjoy: listening to music, talking and exchanging opinions, and engaging in interactions.

It is also very interesting to find that social processes in general have a significant and negative correlation with family (r = −.567*). Once again, the language

analysis outlines the importance of friends not only in driving the cognitive process and their view toward life but also in shaping their social interactions and exchanges with peers. Family appears to be very marginal to adolescents' world, despite the figurative and metaphorical importance that "home" still has in their lives.

9.6 Contributions

This research is grounded on the first phase of the design thinking process, which is very critical since it is the step by which the problem is assessed and defined (Luchs et al. 2015). The methodology employed here contributes to the first phase of the design thinking process by outlining, using quantitative content analysis of the language employed by adolescents, the primary sources of influence over teenagers related to food well-being.

The language analysis allowed us to determine that adolescents rely on three different sources of information when making decisions related to food well-being: school, friends, and family. Moreover, the analysis also helped to clarify the nature and the valence of each source of influence for adolescents. More specifically, thanks to the design thinking research protocol, the role of school as a source of influence over adolescents emerged as negative. Surprisingly, school does not appear to be a consideration for teenagers: its influence is negative, and it is perceived as a force that undermines the overall quality of the relationship adolescents have with food and food well-being. In addition, the problem definition phase of the design thinking methodology enabled us to further specify the role of family among teenagers.

Adolescents appear to be reluctant to rely on their families in making food consumption decisions, preferring instead to concentrate on their peers. At the same time, they still consider the role of their homes as central to their food consumption experience. These findings also prove insightful in terms of managerial implications. Until now, schools have always been considered by policy makers as an influential source of information for food-related campaigns (e.g., De Rosis et al. 2019; Mason et al. 2013).

This research begins to challenge this assumption, especially among adolescents. This might be true because of their age, which makes them reluctant toward school and more prone to be influenced by their peers. In addition, the second-most widely recognized source of influence over food-related decisions was considered to be family (e.g., Veeck et al. 2014). Again, this research presents evidence that contradicts this idea.

For marketers, these findings may suggest that adolescents are eager to begin to show their independence and autonomy. Toward this end, when addressing adolescents with campaigns or products promoting food well-being, marketers may want to emphasize the "do it yourself" aspect of food preparation. In this way, marketers could leverage adolescents' apparent desire to be independent. This may be particularly effective, since adolescents still rely on their homes as an important location

for consuming food. Therefore, suggesting easy and fun ways to prepare meals that tap into adolescents' food well-being might prove to be a well-received form of communication. Home is perceived as a pleasure generator and a powerful driver of food well-being. Such a result has many implications for the segmentation strategy.

Using adolescents as a primary target, the above-mentioned evidence suggests that focusing on new products and services which could be consumed at home by adolescents, driven primarily by the motivation of self-enhancement, may prove beneficial. Moreover, our findings suggest a possible method of adapting product offerings to better match adolescents' tastes and expectations. This can be described as a form of experience bundling composed by logistics services – such as food delivery firms – with the content aimed at generating food meanings and integration into adolescent rituals.

Moreover, given the overall importance of friends and peers among adolescents, marketers can suggest ways to experiencefood well-being in the company of peers by highlighting food items and their preparation, which adolescents can then consume with their friends, either at home or elsewhere. Toward this end, social media might be very relevant in spreading such information: adolescents rely heavily on these channels to send and receive communication, and they are very prone to adopt behaviors that become mainstream on social media platforms (van Dam and van Reijmersdal 2019). The role of influencers becomes relevant in ensuring that messages are well received (van Dam and van Reijmersdal 2019).

With regard to this final point, our research also provides input regarding the tone of voice that should be employed when communicating with adolescents: messages that rely on moral appeal might not be persuasive, since they create a distance and a barrier between the sender and the receiver (Albers-Miller and Stafford 1999). This is the same barrier that adolescents create between themselves and the school environment. On the other hand, messages crafted with emotional appeal might be more interesting for adolescents, since they tap into their desire for shared experiences with their friends. Our findings also suggest implications for the role of school, which is perceived by adolescents as working space. According to Kahneman et al. (2004), individuals tend to be less happy after spending time on work activities versus fun activities. As a result, if a potential enjoyable activity is framed as work or is delivered through a medium or in a setting that is similar to work, its ability to generate enjoyment, feelings of happiness, and fun decreases. For these reasons, school is not the right place for adolescents to learn, expand their knowledge, and form an opinion regarding food well-being.

9.7 Conclusion

In conclusion, this analysis revealed that adolescents have three important concepts in mind when thinking about and defining their own sense of food well-being: school, home, and friends. These may also represent the three developmental trajectories of their lives. Indeed, the perceptions associated with school are negative.

Despite the fact that adolescents spend a considerable amount of time at school, this does not appear to result in corresponding credibility, and adolescents consider themselves very distant from the institution. School does not seem to be the right media to convey messages and ideas related to adolescents' food well-being. Because it is perceived as the locus of formal and codified learning and knowledge, school seems to have a detrimental effect on the socialization process and the development of social relationships among adolescents. Our data analysis suggests that if school is where adolescents attain formal knowledge, it does not contribute to increased awareness of food well-being.

At the same time, it appears that adolescents believe they are ready to leave their families. In other words, family and parents are not very influential sources of information for adolescents. The family does not appear to be central to their lives or shape their way of thinking. On the contrary, the idea of having a hideaway, a nest to have some time on their own and relax, is very central. Home plays precisely this role: a safe place to hide and spend some quality time, through which the idea of food well-being is clearly routed.

Toward this end, given the strong connection between home and eating, it might be inferred that the food well-being concept is associated with the idea of finding a more private and intimate way of consuming food and nurturing adolescent souls. When dealing with their attitude formation and their interactions with peers, friends are adolescents' locus and their focus of attention. This might suggest that adolescents are in the process of creating distance between and detaching from their families and are instead devoting themselves to the establishment of their own identity. In order to do so, adolescents rely on their peers as a mirror for their behaviors and their cognitive processes. Therefore, adolescents' friends emerge as the new media in which to find and generate perspectives related to food well-being. Friendship, in this realm, represents a key dimension of food well-being, since it fosters positive and pleasurable social interaction and experiences. As such, friendship can be considered the best channel to exploit in order to increase the learning process of adolescents regarding food well-being. Therefore, to increase awareness of food well-being, it is necessary to talk to the flock rather than a single adolescent.

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Chapter 10
Luxury Foodservices: The Design Thinking Approach and Contributions to Food Well-Being

Nabanita Talukdar

10.1 Introduction

The concept of luxury has witnessed a significant change in the recent times. Luxury has become more about experiences and less about materialism. Consumers are buying fewer products and spending more on experiences such as food, wine, hotels, and travel (Harriet 2018). According to a study on luxury goods' worldwide market. Bain and Company (2018) published by Bain and Company (2018), luxury experiences continue to remain attractive among consumers. In comparison to 2017, luxury hospitality witnessed a sales growth of 5%, and gourmet food and fine dining witnessed a sales growth of 6%. Big luxury companies are utilizing the growing trend of "experiential luxury."

Luxury brands are, in particular, venturing into gastronomic experiences. The global market size of luxury foodservices was valued at 300 million USD in 2019 (Euromonitor 2019). Gucci opened a fine dining restaurant Gucci Osteria in Florence. The restaurant is located next to Florence's Palazzo Vecchio, which includes a Gucci store. The interior of the restaurant makes explicit reference to Gucci's cultural heritage and aesthetics (Street 2018). Gucci Osteria Florence has a capacity of fifty seats, and the high-end dishes, such as the Emilia burger, or tortellini in Parmesan sauce, are served by Three-Michelin-star chef Massimo Bottura.

Collaborating with the same chef, the Italian fashion house opened another Gucci Osteria in the USA. This restaurant is located on the top floor of Gucci building in Beverly Hills, Los Angeles. It is on a terrace overlooking Rodeo Drive and reflects the essence of Gucci boutiques by having walls decorated with Gucci-patterned wallpaper (Sheppard 2020). Luxury jeweler Tiffany has opened the restaurant The Blue Box Café at its flagship store on Fifth Avenue in New York. The cafe's interior features Tiffany's signature eggshell blue, and the breakfast menu

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includes food options such as smoked salmon and bagel (Bronner 2017). Ralph Lauren opened Ralph's Coffee & Bar in a corner of its flagship store on Regent Street in London and offers food with names such as "Ralph's brownie" (Harper 2019).

In sum, luxury brands are venturing into recognizable and luxurious gastronomic experiences primarily for marketing purposes. Food experiences are helping luxury brands to offer innovative brand experiences, to appeal to millennials, and to increase foot traffic to their stores.

Previous research (Kiatkawsin and Han 2019) found that consumers patronize luxury restaurants as a way of representing success, and that this results in strong interpersonal influence. However, luxury restaurant patrons are looking beyond taste and toward immersion in a complete dining experience (Yang and Mattila 2016). Maybe such consumers attach a symbolic value to their luxury consumption and share Instagram posts of the "haute cuisine" (i.e., premium or high-quality food) to signal status. Or, maybe they want to enjoy the blended experience of "haute couture" and "haute cuisine": the combination of the environment and the delivery of services.

In either case, to better appeal to these consumers, luxury players can incorporate the design thinking approach. Using this approach, luxury players can generate the right marketing communications to promote their gastronomic services at their cafes and restaurants. Furthermore, through foodservices, there exists an opportunity for luxury marketers to contribute to food well-being.

10.2 Food Marketing as a Dimension of Food Well-Being (FWB)

Food plays an important role in individuals' lives: it provides nourishment but also carries cultural and symbolic meanings. Due to the holistic role played by food in individuals' lives, food-related decision-making is now examined through the experiential approach of *food as well-being* and not through the functional approach of *food as health*. The notion of "food well-being" (FWB) encompasses a positive emotional, physical, psychological, and social relationship with food at individual and societal levels (Block et al. 2011).

One of the domains central to the FWB framework is food marketing, and it is a key factor affecting an individual's relationship with food. Food marketing can play a major role in preserving and promoting an individual's well-being. Food marketing comprises a range of societal factors (e.g., marketing mix, segmentation, targeting, and positioning) and individual factors (e.g., consumption, cognition, and emotions). Marketers use the traditional "4 Ps" of marketing (product, price, promotion, and place) in order to influence consumer attitudes and behavior toward food. Previous studies have shown that marketing cues can influence consumption

at the individual level and that many of these consumption decisions are made with minimal cognitive effort or awareness.

Marketing impacts not just the amount of food consumers purchase but also their cognitions and emotions associated with food. For example, consumers perceive healthy food as pricier than unhealthy food (Haws et al. 2016). Additionally, the pleasure involved in eating is a motivation of some importance for consumers. In the context of food marketing, it has been suggested (Block et al. 2011) that one of the future research questions on FWB should be "what marketing communications and other tactics mean with regard to the food pleasure dimension of FWB." It has also been pointed out (Scott and Vallen 2019) that future research should study how firms' marketing efforts can promote FWB, and the downstream consequences of such efforts on behalf of consumer well-being.

10.3 The Design Thinking Approach

Design thinking is defined as "a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid prototyping, and concurrent business analysis" (Lockwood 2010). Design thinking applies human-centric design principles to the whole range of innovation activities. "It is a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity" (Brown 2008, p.86).

Being customer-centric is the central tenant of design thinking. Design thinkers put the consumer at the core of the thinking process, making the process collaborative and allowing it to integrate different viewpoints. Design thinking emphasizes the future instead of how things currently work. While design thinking involves five stages, the two most important stages are to "empathize" and "define" (Hasso Plattner Institute 2009).

These two process steps focus on understanding customer needs (Brown 2008). This kind of customer-centric thinking process assures that team members will find ideas that are relevant and value-adding for the customers (Brown 2009). In the academic literature, design thinking is synonymous with increasing innovativeness (Liedtka 2014). Liedtka (2014) provided examples of ten different organizations where design thinking has had a strong impact on practice.

Organizations such as IBM and 3 M are utilizing design thinking to engage customers more completely. For example, IBM used insights generated from real customers to test their new models while making the process a collaborative experience. Innovation can be increased by design thinking when it acts as a problem-solving process as well. This type of problem-solving can help an organization become more successful at innovation by helping managers visualize possibilities they hadn't imagined before. Design tools like conducting ethnographic interviews or customer journey mapping contribute to solving a problem and finding new opportunity. The nonprofit organization The Good Kitchen started with a design thinking

approach planning initially only to update their menu but ended up making transformational changes to every part of their meal delivery service (Liedtka 2014). Prototyping can lead to interactions with real customers, and this is a superior source of information for organizations compared to running web-based surveys with no human interaction.

Design thinking can produce innovation in the food industry and increase well-being by focusing on three main strategies that address the essence of this new food approach: empathy for the consumer, visualization along with rapid prototyping, and collaboration. The goal of this chapter is to discuss how luxury marketers can adopt design thinking to create healthy, pleasurable, and innovative food experiences in their restaurants, cafes, etc., through delivery, meals, space, and services. Specifically, this chapter will outline how luxury brands' taking a design thinking approach can contribute to FWB in the context of food marketing.

In what follows, first I discuss the current state of knowledge regarding how luxury brands are utilizing experiential marketing to create innovative food experiences that are pleasurable. I also discuss how the restaurants, cafes, etc., of luxury brands can incorporate design thinking in their food experiences and thereby contribute more to food well-being.

10.4 Luxury Food Experience and Experiential Marketing

Holbrook and Hirschman (1982) argued that consumption experience is a phenomenon oriented toward the pursuit of fantasy, feeling, and fun. These researchers called it the "experiential view." In contrast to the traditional view, experiential marketing views consumers as emotional rather than rational beings, concerned with achieving pleasurable experiences. Marketers can create five different types of experiences, which are distinguished as "sensory experiences (SENSE); affective experiences (FEEL); creative cognitive experiences (THINK); physical experiences, behaviors and lifestyle (ACT); and social-identity experiences that relate to a reference group or culture (RELATE)" (Schmitt 1999, p.53). "Experiential marketing is thus about taking the essence of a product and amplifying it into a set of tangibles, physical and interactive experiences" (Atwal and Williams 2009, p.341).

Two primary features of experiential marketing are consumer experience, and the focus of consumption as a holistic experience. Consumer experience results from living through things which provide values (sensory, emotional, cognitive, behavioral, and relational). Consumption experience is no longer an experience of consuming an isolated product, but a holistic experience (Schmitt 1999). Luxury marketers face a challenge in applying the principles of experiential marketing to their activities because luxury goods are almost always experiential. Luxury brand products are purchased for their aspirational qualities.

Consumer response to luxury brands is rooted in impulse, emotions, and extravagance (Lavidge and Steiner 1961). Hagtvedt and Patrick (2009) contrast luxury and non-luxury (value) brands explicitly. While the purchase of value brands is

associated with functional and utilitarian benefits, the purchase of luxury brands correlates with emotional and hedonic satisfaction (Hagtvedt and Patrick 2009). The motivations driving prestige-seeking behavior are multiple, but sociability and self-expression are primary among them. Users hope to communicate their distinctive lifestyles by consuming luxury brands.

The main qualities of luxury products, as described by Jackson (2004), are "exclusivity, premium prices, image and status, which combine to make them more desirable for reasons other than function" (p.158). Therefore, maintaining the attributes of a luxury brand is fundamental to its success. Fionda and Moore (2009) have identified nine principal dimensions of luxury brands—"brand identity, marketing communications, product integrity, brand signature, premium price, exclusivity, heritage, luxury environment, experience and culture." Among these brand dimensions, luxury brand experience is critical for brand success. Luxury brand experience is summarized as a combination of "sensations, feelings, cognitions, and behavioral responses evoked by brand-related stimuli that are part of brand's design and identity, packaging, communications and environments" (Brakus et al. 2009, p.52).

Delivering superior consumer experience is an expectation in luxury, since luxury consumption is not only about the pursuit of materialism but also about indulgence, pleasure, and enriching experience (Chandon et al. 2016). Based on consumer involvement and intensity, Atwal and Williams 2009 described a framework for luxury marketers to use in strategically delivering their experiential offers. The framework consists of four experiential zones, two of which are entertainment and aesthetic. Luxury marketers such as Gucci have added restaurants with Michelin-star chefs for the entertainment experience. Such restaurants boast of elegant and spectacular interiors for the aesthetic experience. The key to successful experiential marketing for luxury marketers is to offer a holistic experience. In order to generate a holistic and unique experience, the experiential marketing activities from luxury marketers should form a multisensory experience through brand management strategy (Lindstorm 2005). Multisensory marketing is "marketing that engages consumers' senses and affects their perception, judgment, and behavior" (Krishna 2012, p.33).

In the restaurants and cafes launched by luxury players, there are multiple chances to implement multisensory marketing and thus to establish a positive experience for consumers (Lindstorm 2005). The luxury marketers have set a range of stimuli in order to appeal to all five senses. In terms of the visual cue, the high-end decorations create optical sensations. To establish the taste experience, high-end cuisines are offered. In the realm of luxury brands, multisensory appeals can play decisive roles in consumer value perceptions (Kapferer and Bastein 2012). For example, in regard to food marketing, when luxury players share visuals of the high-end cuisines (e.g., exquisite cuisines) and imagery of the eating spaces (e.g., elegant interiors and panoramic views) as marketing communication, the sensory component can stimulate excitement and pleasure (Aaker 1997). Additionally, the experiences available in luxury restaurants and cafes are thought to be stored in consumers' long-lasting memory, affecting their subjective and internal responses, which are

eventually reflected in attitudinal and behavioral outcomes (e.g., Brakus et al. 2009; Holbrook 1999).

For social value (prestige orientation and status), such luxury brand experiences can also result in social approval, for example, when consumers share about their experiences (e.g., post pictures of food on Instagram) (Holbrook 2006). For individual value, representing personal alignment with a luxury restaurant or cafe is strongly related to a customer's self-identity and their hedonic motives. Such brand experiences may lead to pleasure, and emotions or moods such as happiness and amusement (e.g., Holbrook 2006). Luxury marketers can create emotional and engaging connections with their consumers through the service and food offerings in their restaurants and cafes. Food consumption offers important opportunities to create memorable, innovative experiences. Food has high symbolic value and can be conspicuously consumed (e.g., food served as high-end cuisines created by signature chefs).

The environment (i.e., atmospherics) in which food consumption occurs also plays a pivotal role. Atmospherics is the intentional control and structuring of environmental cues (Kotler 1973). The physical environment has a direct effect on consumer attitudes and behavior (Reimer and Kuehn 2005). In environmental psychology, Mehrabian and Russell (1974) developed the framework of servicescape by linking the broad category of stimulus-organism-response (SOR) models to the pleasure-arousal-dominance (PAD) paradigm. Since SOR and PAD have strong connections to the specific elements of the environment, they can affect consumers' attitudes and behavior. "Environmental stimuli define the retail atmosphere and thereby shape consumer's emotional and behavioral reactions" (Addis and Holbrook 2019, p. 1).

Turley and Milliman (2000) provide a comprehensive overview of atmospheric variables using a systematic literature review. The atmospheric variables are comprised of the following: external variables (e.g., exteriors of building, architectural grandeur, size of the building); general interior variables (e.g., flooring, color schemes, lighting, wall composition, paint and wall paper); layout and design variables (e.g., space design and allocation, furniture, waiting areas, location); point-of-purchase and decoration vehicles (e.g., artwork, pictures, point-of purchase displays); and human variables (e.g., staff characteristics, consumer characteristic, privacy, crowding).

These specific elements have tremendous potential to act as drivers of successful food consumptionexperiences in the restaurants and cafes of luxury marketers. Good food is not the only appeal for the patrons of such restaurants. These consumers want to immerse themselves in a holistic experience (Fleming et al. 2007). Through the art works on display, and spectacular and elegant interiors, consumers derive pleasure and a way to escape from the monotony of their mundane lives. Therefore, the environmental atmosphere of luxury restaurants plays a key role in shaping a memorable food experience. A successful food experience is not about excellence in one isolated area, but across numerous criteria (Addis and Holbrook 2019).

10.5 Luxury Foodservice and the Design Thinking Approach

Luxury foodservice includes chained cafes/bars and full-service restaurants owned by international luxury and fashion houses (Euromonitor 2019). Luxury foodservice is associated with offering a food experience that is unique, of superior quality, novel, and extraordinary (e.g., Henderson 2017; Lane 2010). The basic requirements for luxury foodservice are supreme artisanal ingredients sourced with utmost care and attention to origin, and their impeccable preparation. Consumers are provided with a complete sensorial experience in the delivery of luxury foodservice. The two primary reasons for using luxury foodservice are to increase brand awareness and to attract consumers to stores. In the present times, consumers primarily discover brands using Instagram and other social media platforms. Furthermore, since consumers are keen to share branded food on social media platforms foodservice is a powerful marketing tool for luxury brands. Taking advantage of this opportunity, many luxury brands have started offering Instagram friendly food items such as coffee, and popsicles in stores and through pop-up marketing activities. For example, Fendi operated a pop-up cafe in Milan serving Double-F-branded popsicles all throughout 2019. Celine served classic French butter biscuits in 2019. Saint Laurent opened a coffee serving cafe in its Rive Droit store in Paris just before Paris Fashion week. Giorgio Armani's New York flagship store, the Armani Ristorante Fifth Avenue, offers great views of Fifth Avenue and Central Park in the background.

In the present times, consumers are adopting healthier lifestyles and are conscious about wellness. They want to mitigate the negative environmental and social impact of their consumption habits. In the foodservice space, this is evidenced through increasing demand for sustainable food options, including organically grown and locally sourced ingredients, as well as vegetarian and vegan options. With luxury consumer foodservice serving as a powerful marketing tool for luxury brands, offering environmentally and socially sustainable food options could help to elevate a brand's overall social image in the minds of consumers. The stores of luxury marketers continue to face growing competition from ecommerce.

Luxury marketers are therefore adding foodservice option not simply to attract consumers to their stores but also to keep consumers inside the stores for longer duration. The brand extension of foodservice has risk associated with it. Such an extension can only work if it serves to reflect the brand identity and complement the product offering and store experience. It is imperative that a luxury brand's foodservice extension should have luxuriously designed, aesthetically pleasing surroundings and an exceptional standard of food and drink. Communication of the brand narrative and its DNA through the foodservice outlet are essentials in creating an immersive customer experience.

Luxury marketers are converging their restaurants or cafes with their retail spaces, locating the restaurants or cafes close to or within the retail spaces. Since the two industries (food and retailing) satisfy different customer needs (eating and shopping), the question that arises is whether luxury marketers can offer unique and holistic experiences based on food. I argue that luxury marketers should adopt the

design thinking approach in order to create innovative and holistic food experiences. It is important for luxury marketers to understand the needs and desires of the consumers who visit their restaurants or cafes.

Despite the convergence of retailing and restaurant, the consumer profile of those visiting the restaurants exclusively or visiting both the restaurants and retail may have a completely different set of desires in comparison to those who are exclusively visiting the retail. In the design thinking approach, luxury marketers can start with *empathy*, which is to establish a deep understanding of the consumers for whom they are creating the holistic foodservice. Luxury marketers should put themselves in the consumer's shoes, which means understanding them as real people with real needs. It involves developing an understanding of their emotional and rational needs and wants. Luxury marketers can capture consumer needs and wants through design tools such as in-depth ethnographic interviews. With a focus on creating holistic food experiences, luxury marketers can talk with their consumers, and, based on consumer insights generated out of these real consumer interactions, luxury marketers can come up with initial concepts. Such concepts can then be prototyped with the aim of soliciting feedback.

Luxury marketers can follow the four stages of the design process by asking its four basic questions. "*What is, What if, What wows and What works*?" The "What is" stage is an exploration of current reality. "What if" imagines a new future. "What wows" makes some choices about what has value. And "What works" takes us into the marketplace (Liedtka and Ogilvie 2011, p.21). In the process of designing holistic food experiences, luxury marketers can incorporate the following design thinking tools to address the four questions:

- Visualization: Luxury marketers can use imagery to predict possibilities and produce them.
- Journey mapping: Luxury marketers can assess the experiences in the current form through their customers' eyes.
- Mind mapping: Through the exploration activities such as consumer interviews, luxury marketers can generate insights. Such insights can be utilized to create the designs.
- Rapid prototyping: Luxury marketers can prototype designs and test them with real customers, which is a better source of information than web-based survey which has no real human interaction.
- Customer co-creation: Luxury marketers can enroll customers as participants in the creation of designs that best meet their needs.

With the design thinking approach, luxury marketers can create innovative foodservices which can be a source of substantial competitive advantage. During the process of understanding their customers through the design thinking approach, luxury marketers can come up with new possibilities as well. A company's success in marketing food-related experiences depends largely on the competence of the company to deal with the challenge of designing an integrated holistic experience rather than focusing on a single driver experience. I believe that the design thinking approach will help luxury marketers create holistic food experiences for consumers,

which will lead to success in marketing food-related services (i.e., food marketing). I further believe that food marketing from luxury marketers can have a significant impact on FWB.

10.6 Luxury Foodservice and Food Well-Being (FWB)

Food marketing is the use of practices such as pricing, promotion, product design, elements, and distribution strategies that can influence a consumer's food choices (Dority et al. 2010). There is extensive research on the effects of food marketing on consumer relationships with food. In the context of product design, for example, designing the food product or the utensil used to serve food as "cute" increases indulgent consumption (Nenkov and Scott 2014). The name used on a food product (i.e., product design) can also influence consumption.

For example, when a pasta salad dish is described only as "pasta," dieters perceive the dish as unhealthy and as less tasty compared to non-dieters (Irmak et al. 2011). Proximity to fresh and healthy food (i.e., distribution strategies) can influence consumer well-being (Grier and Davis 2013). Showing overweight models in advertising can have negative consequence on food consumption and consumer well-being (Lin and McFerran 2016). The use of licensed characters (e.g., Leonard et al. 2019) and anthropomorphism (assigning human characteristics to nonhuman objects) (e.g., Cooremans and Geuens 2019) can influence consumers' food choices in favor of healthy or unhealthy options.

Collectively, due to the mixed results obtained from previous research, using any of the marketing tactics from food marketing to promote FWB is a major challenge. The design thinking approach is a potential game changer that luxury marketers can use to their advantage. Putting the customer at the center will enable the luxury marketers to gain a deeper understanding of consumer needs. Luxury marketers can use this knowledge to design marketing-based interventions, which can then improve consumer food choices in the direction of individual and societal well-being. Luxury marketers can also gain insights about marketing-based interventions, which might not lead to the hoped-for consequences.

Food well-being is a complex construct, which combines the relationship between food and well-being at both individual and collective levels (Block et al. 2011). It addresses emotional, psychological, physical, and social well-being. Adoption of a general perspective on food as a provider of well-being is a departure from viewing its role through the narrower perspective of simply providing energy. This is a broader perspective that associates food with pleasurable activities. Individual, subjective well-being refers to individual evaluations of a plethora of objects related to their lives such as events, identities, contexts, and so on (Diener 1984). The perception of quality of life by individuals (Keyes et al. 2002) is comprised of three main aspects: (1) the individual evaluation of the general life or part of it; (2) the individual's affect; and (3) eudaimonia, which is a sense of purpose in life (Diener et al. 2006). Marketing and consumer research are trying to better

understand the contributions of consumption activities to well-being and happiness (Mogilner et al. 2011).

Previous research (Van Boven and Gilovich 2003) found that positive experiences drive happiness more than rewarding purchases of material objects. Addis and Holbrook (2019) explained that holistic foodservices can lead to positive food experiences which can contribute to all dimensions of well-being.

> First, having a pleasurable food experience drives a better evaluation of that event-eating in an individual's life. Second food-related pleasure makes individuals feel better, with a stronger and wider range of positive emotional reactions. Third, it also encourages healthier psychological functioning. (Addis et al. 2019, p.30)

These authors show that proper marketing strategies are required to create memorable food experiences, which can increase food well-being at both individual and aggregate levels. The creation of memorable foodservice is possible only through proper design and implementation of gastronomic experience. Such a design is crucial for success in the food-service industry. The designed foodservices should be a holistic experience consisting of a bundle of elements and services, which display a high level of synergy. Design of a holistic foodservice can contribute to superior food experiences. Moreover, the design can help in creating authentic food experiences for consumers. Through successful food experiences, food marketers can build long-term relationships with customers. Consumer engagement and implementation of customer relationship management (CRM) is the key to sustaining a highly valued food experience over time.

For foodservice providers, it is important to rise to the challenge of developing a deeper understanding of food-related consumption experience. With the incorporation of a design thinking approach, luxury marketers will have an edge in providing superior holistic food experience in their restaurants and cafes. The superior holistic food experience will contribute to food well-being at individual and community levels.

In this chapter, I made an attempt to explain the implementation of design thinking for foodservice innovation and a well-being outcome by focusing on the whole food experience. The most important aspect of a luxury food experience is not what people eat, but why and how people eat. Therefore, in luxury foodservice, the experiential aspects related to food such as hedonism, symbolism, and aestheticism are essential for a pleasurable experience with food (Batat et al. 2017). As discussed in the prior section, by putting consumers first, using food design thinking can provide luxury marketers with important insights for improving the holistic food experience.

For example, luxury marketers can provide high-end culinary experiences by hosting different chefs and offering healthy, pleasurable, sustainable food options. At the same time, luxury marketers can contribute to food well-being, because consumers experience pleasure through their holistic luxury foodservice at the individual level. And the sustainable food options, which have minimal impact on the environment, can increase consumer well-being at the societal level. Luxury marketers can apply food design thinking by including the voice of the consumer in the

creation of a restaurant with the right kind of atmospherics such as elegant space and exquisite interiors.

Creating the right kind of atmosphere in the restaurants is critical for luxury marketers since consuming food is an experiential purchase, which has higher intangibles than purchasing material luxury goods in store or online. It is harder to assess the experience objectively since consumers have more involvement and several attributes may factor into influence the overall evaluation of the luxury foodservice (Gilovich and Gallo 2020).

Food design thinking incorporates the importance of consumer empathy. Hence, consumers are more likely to use narrative processing associated with emotions or mental imagery while deciding which luxury foodservice to buy (Gilovich and Gallo 2020). By putting consumers first, luxury marketers can know their customers better and can offer substantive innovations such as designing a menu with healthy and gourmet choices. Through rapid prototyping, luxury marketers can discover their mistakes quickly and garner useful feedback for further developing their ideas.

Dining out in luxury restaurants is usually done with other people; therefore, such an experience can nurture social connections and contribute to consumer well-being. There is a close connection between the experiential purchase of consuming food in a luxury restaurant and a consumer's identity (Gilovich and Gallo 2020). Therefore, luxury marketers can collaborate with their consumers to further innovate their foodservices such as food delivery, food choices, and restaurant atmospherics. Furthermore, food design thinking can contribute to the restaurant industry in the following ways: it can increase foodservice options, use advanced technology for payment and loyalty programs, focus on appealing to millennials and Generation Z, and it can reduce food waste.

10.7 Conclusion

Food pleasures derived through the consumption of holistic food experiences at the restaurants and cafes of luxury brands positively affects well-being (Batat et al. 2019). During such food experiences, individuals can achieve greater self-awareness of pleasurable sensory and bodily states (Petit et al. 2016). Additionally, food pleasure encourages smaller portion sizes and a greater deal of enjoyment, thereby improving consumer health (Cornil and Chandon 2016a, 2016b). Accordingly, food pleasure serves as a tool to support healthy eating, reduce food waste, and promote greater consumer well-being.

Batat et al. (2019) defined "experiential pleasure of food (EPF) as the enduring cognitive (satisfaction) and emotional (i.e., delight) value consumers gain from savoring the multisensory, communal, and cultural meanings in food experiences [in order to promote enduring health and well-being]" (p.393). The experiential pleasures of food also have major policy implications. Training programs in taste education can be developed by policy makers, and such programs can focus on celebrating food throughout its entire journey right from food's production to its

disposal. Luxury marketers creating holistic food experiences based on the design thinking approach for their restaurants and cafes have tremendous potential to contribute immensely to FWB. However, more research is needed.

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Chapter 11
Food Well-Being in the Higher Education Sector: How to Leverage Design Thinking to Create Healthy and Pleasurable Food Experiences Among College Students

Jane Machin and Brooke Love

11.1 Introduction

Higher education is an important and unique sector to examine food well-being, defined as an integrative understanding of the psychological, physical, emotional, and social relationships individuals have with food (Block et al. 2011; Scott & Vallen 2019). Transitioning into adulthood and living away from home for the first time, students demonstrate inadequate food literacy (Abraham et al. 2018; Kang et al. 2014; Malan et al. 2020; Tam et al. 2017; Wilson et al. 2017). Food availability is often limited to on-campus institutional dining services, fast-food restaurants, and vending machines, with little access to grocery stores (Caruso et al. 2014; Dhillon et al. 2019; Horacek et al. 2013; Lugosi 2019). Promotions for junk food and beverages, such as pizza, burgers, and sugar-sweetened sodas, dominate marketing efforts aimed at this demographic (Bragg et al. 2018; Buchanan et al. 2018; Jayanetti et al. 2018), though calorie concerns, especially among female students, guide many food decisions, often at the expense of pleasurable and social food experiences (Rozin et al. 2003; So et al. 2012; Zein et al. 2016). Meanwhile, university food policies, such as mandatory meal plans, can be costly, confusing, and wasteful (Ellison et al. 2019; Laterman 2019; Pappano 2016). As a microcosm of universal food experiences, student food well-being experiences can inform innovation in all food sectors.

Food research in higher education can also help improve the well-being of the food insecure, a large, but inadequately understood, population (Bublitz et al. 2019; Lugosi 2019). Food insecurity is defined as the "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (Anderson 1990, p. 1560). Students are more likely to experience hunger than US households on average (Cady 2014; Laterman 2019; van Woerden et al. 2019; Watson et al. 2017). Estimates of college

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food insecurity range from 20% to 60%, depending on campus location (Cady 2014; Maroto et al. 2015; Martinez et al. 2018). Poor nutrition and food insecurity directly threatens physical and mental health (El Ansari et al. 2014; Holder 2019; Kang et al. 2014), which diminishes academic performance and likelihood of degree completion (Cady 2014; Maroto et al. 2015; Martinez et al. 2018; Meza et al. 2019).

For university administrators, dining facilities represent an important element of their strategic plans (Mathewson 2017). Auxiliary services such as dining can help differentiate universities in an increasingly competitive marketplace (Ng 2005; Reynolds 2007; Vagh & Coca 2020; White et al. 2017; Wooten et al. 2018). The fact that college review websites now rank campus food experiences speaks to the importance of innovative food design in university choice. And at a time when higher education institutions are reluctant to raise tuition rates, and face cuts from state budgets, dining services offer a valuable source of revenue (Snyder et al. 2019). Annual reports show the top three global commercial food companies, Sodexo, Aramark, and Compass Group, which serve hospitals, industry, and jails, as well as education, reported revenues over $68 billion in 2019.

Improving campus food experiences is an inherently "wicked" problem, a socially complex, highly ambiguous issue that has no clear solution (Churchman 1967; Rittel & Webber 1973). The qualitative research methods embedded in design thinking are best suited to tackle wicked problems (Buchanan 1992; von Thienen et al. 2014). Design thinking applies nonlinear, human-centered practices that focus first on understanding problems from multiple perspectives, then ideating, prototyping, and testing solutions (Brown 2008; Tschimmel 2012).

Design thinking can be conceptualized in two primary phases: understanding problems, then identifying solutions (see Fig. 11.1). The first stage is to develop an *empathic* understanding of stakeholders' lived experiences, findings from which are synthesized to better *define* the issue (Brown 2008; Luma Institute 2012). Guided by the problem statements generated in this stage, an iterative process of *ideation*, *prototyping*, and *testing* begins to identify innovative products, services, and experiences. Although the model suggests a linear relationship between these stages, design thinking is, in practice, more flexible and recursive (Brown 2008; Luma Institute 2012).

From corporate food giants such as Mars Wrigley (Berry 2019) and PepsiCo (Ignatius 2015) to the uniformed services of the United States (Adams 2016), organizations are rapidly adopting design thinking practices to create novel solutions to unique food challenges. To date, however, research applying design thinking to improve the food experiences of university students is limited. Most research in this area comprises quantitative surveys examining either student satisfaction with food services or the nutritional quality of campus food (see Lugosi 2019, for review). These studies remain firmly rooted in the paternalistic and functional view of food as health (Block et al. 2011).

In this chapter, we first report on the implementation of the design thinking process to generate a more holistic and integrative understanding of how students use food to build community and derive pleasure. In the second section, we present the

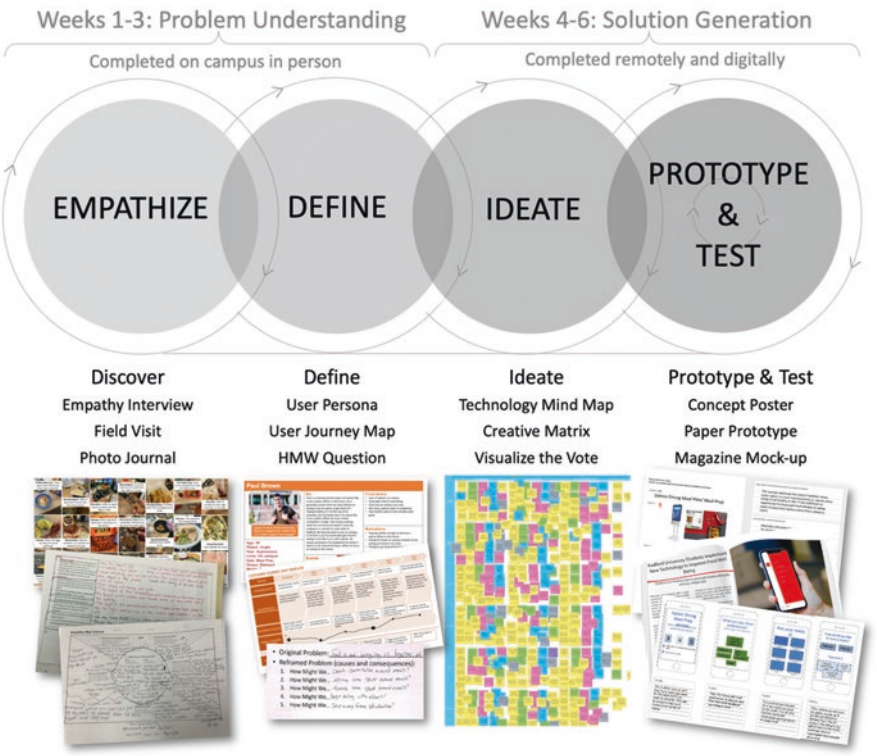


Fig. 11.1 Design thinking process to improve food well-being

key factors found to influence campus food experiences and highlight digital solutions designed to improve student food well-being.

11.2 Context: The University Food Environment

The research reported in this chapter was conducted at a university located in a small rural city in America, with approximately 8000 undergraduate students in total. Figure 11.2 illustrates the food resources available in the area. On the university campus, there are three dining facilities: two are "all you can eat" dining halls, while the third houses several retail restaurants, including Au Bon Pain, Chick-Fil-A, Papa Johns, and Wendy's. There is also a Starbucks coffee shop and a small convenience store.

All these locations are staffed and managed on behalf of the university by the institutional foodservice provider Chartwells, part of the global Compass Group (see Fig. 11.3). Just off-campus are four additional convenience stores and several casual dining restaurants serving mainly pizza, burgers, and sandwiches. There is a

Fig. 11.2 Local food resource environment

small farmer's market that is only open on Saturday mornings in the summer when most students have already left campus. The nearest grocery store is located approximately one mile uphill from the center of campus and is served by one bus route on an hourly schedule. Further afield, requiring a car to access, are two larger grocery stores and more fast-food restaurants.

As with many American universities, first- and second-year students are required to live in residential housing and purchase the associated meal plan. Meal plans are also available to students living off-campus. The three-meal-a-day dining contract costs between $10 and $17 per day, depending on which dining hall evening meals are consumed. These costs represent up to 70% saving on the cash door rate for each meal and are lower than the national average of $19 per day (Mathewson 2017).

Students pay the full cost of the meal plan at the beginning of the semester and then "purchase" meals by swiping[1] their student identity card at the register. The appropriate dollar amount is deducted from their balance. Positive meal plan balances remaining at the end of the semester do not transfer to subsequent semesters. Students can also use their meal plan to purchase food from the on-campus retail restaurants, with an exchange rate of $8.37 per card swipe. If a retail purchase costs less than $8.37 (e.g., the student uses it to buy a coffee for $3), the remaining money is forfeited, or, in student slang, "burned." If a retail purchase costs more than $8.37, the equivalent of two meals will be deducted from the meal plan balance, even if the

[1] For this reason, students commonly call the incremental deductions from their meal plan, "swipes."

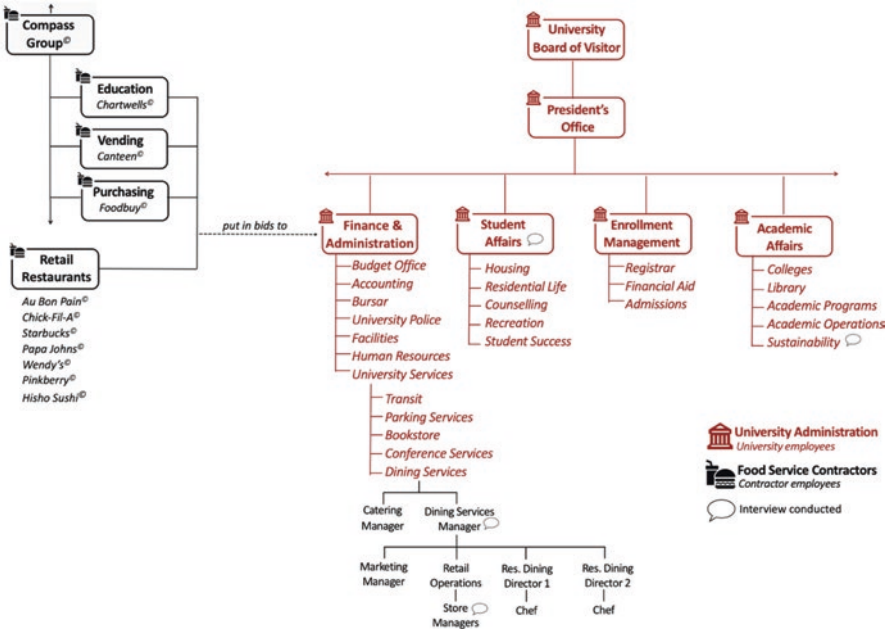


Fig. 11.3 Simplified campus foodservice key stakeholder map

Fig. 11.4 Demographics of student design thinking researchers

extra cost is only one cent. Money on a meal plan cannot be used in off-campus restaurants, grocery, or convenience stores.

11.3 Process: Implementing Design Thinking

The design thinking process (see Fig. 11.1) was implemented by 50 students in a creativity class over six weeks. Figure 11.4 provides summary demographics of the student researchers. They comprised a relatively even balance of gender and academic class, with a higher percentage of minority students than the national average. A majority received federal financial aid, data that are consistent with the overall student population of this university.

11.3.1 Weeks 1–3: Problem Understanding

Tasked initially with the broad challenge of improving food well-being on campus, students spent the first 3 weeks applying design thinking methods to reframe the problem into more precisely defined and addressable problem statements (Brown 2008; Luma Institute 2012). We began with a collective brainstorming session to identify how the five sections of the food well-being model – food availability, food literacy, food marketing, food socialization, and food policy – manifested on our campus. Students used this information to conduct unstructured empathy interviews with both mainstream and extreme campus food consumers. Researching extreme users is a useful technique to capture multiple user perspectives (Ideo.org, n.d.). Examples of extreme users in this context included students with food allergies or dietary restrictions, students who worked in campus food services, students who commuted, students with children, and students from different countries. Mainstream users constituted students who used some variant of the campus meal plan. Students recorded key insights on empathy maps, designed to capture what participants say, hear, see, do, feel, and think (Ideo.org, n.d.).

Students next conducted individual field visits, recording observations of behavior at multiple food locations throughout the day using handwritten notes and photographs. Field visits provide an unbiased, first-hand perspective of the problem, often challenging preconceptions and revealing surprising insights about unmet needs (Kumar 2013). Students were also encouraged to keep a visual food journal for one week, photographing their daily food experiences and using hashtags to caption each moment. Approximately 400 unique photographs were generated through these two exercises. Photography is a proven research technique that helps participants recall mundane information and share ideas with others (Hergenrather et al. 2009). In addition to their individual research, key administrative stakeholders answered student questions about university food services. These included the Vice President for Student Affairs, who oversees student housing and residential life, the Dining Services Manager, responsible for all campus food operations, the Marketing Manager, in charge of dining-related communications, and the Sustainability Manager, who promotes sustainable practices, including food, on-campus (see Fig. 11.3).

To maximize group learning from all this research, individual student data were shared with the entire class at multiple stages in the research process through group discussion. For example, in one exercise, students shared their interview findings with a partner and recorded key insights on post-it notes that were placed on posters around the room for all students to read. In another exercise, students used the *SHOWED* method (Cooper & Cooper 2014; Hirunyawipada & Paswan 2013; Scopelliti et al. 2014) to answer five sequential questions about the food photographs they had taken: "What do you See here? What is really Happening here? How does this relate to Our lives? Why does this situation, concern, or strength Exist? and What can we Do about it?" (Wang et al. 2000). Research findings were also shared online for students to access at any point during the semester.

The empathize stage of design thinking requires divergent thinking, in that it is about gathering as much information as possible (Ideo.org, n.d.). Convergent thinking, however, is required in the define phase to concentrate that knowledge into specific, actionable problem statements. Students first synthesized insights from the research to create Personas, or summary profiles representing different populations concerned with unique aspects of the overall food well-being problem (Ideo.org, n.d.). Approximately 20 unique Personas were generated, including a student living off-campus frustrated with his poor cooking skills; a Freshman worried about gaining weight; a restaurant worker who felt inadequately trained, a student with food allergies dissatisfied with campus compliance with food contamination procedures, and an eco-warrior upset at the lack of recycling and food waste. Each student then created a customer journey map, identifying pain points in their Persona's food experience. The Persona profiles and customer journey maps were then used to brainstorm specific, actionable problem statements. Using the popular "How Might We…?" question format to encourage inclusive, solution-focused ideation (Ideo.org, n.d.), students were encouraged to reframe the same problem in multiple ways since the way a question is asked influences the solutions that emerge.

11.3.2 Weeks 4–6: Solution Generation

Having chosen a specific problem statement to focus on for the remaining project, students next engaged in a series of ideation exercises to generate solutions. An important constraint was placed on their brainstorming at this stage: their ideas had to use digital technology. This constraint was introduced for several reasons. First, research suggests that constraints can improve both the quality and quantity of solutions generated (Cooper & Cooper 2014; Hirunyawipada & Paswan 2013; Scopelliti et al. 2014). Second, we wanted to avoid frequently suggested, but uninspiring and unrealistic, non-digital solutions such as lower prices or new restaurants. Finally, we wanted to acknowledge the central role technology plays in the current and future generations of students. Born in the era of mobile technology, social media, and high-speed internet, this population belongs to the generational cohort labeled Gen Z (Dimock 2019). They are more digitally active than any previous generation (Brown 2018). Almost all own both a smartphone and laptop (Boucher 2018) and use these devices to multitask, seamlessly integrating their online and offline experiences (Francis & Hoefel 2018).

Students first spent a week learning about six upcoming areas of digital technology to broaden and deepen their understanding of the range of possibilities in the constraint: artificial intelligence, immersive experiences, apps, smart spaces, mobile tech, and blockchain. Students then completed a collaborative brainstorming session using the online whiteboard platform Stormboard (www.stormboard.com) to share knowledge about existing applications in each area. Examples included virtual assistants, biometrics, robotics, the Internet of Things, drones, 3D printers,

autonomous cars, fitness trackers, smartwatches, smartphones, QR codes, virtual and augmented reality, and mobile applications.

Students then completed a Creative Matrix, a popular design thinking tool to spark new ideas at the intersection of discrete categories. The columns comprised three of the most common Persona profiles (students living on-campus, students living off-campus, and students working for dining services) while the rows represented each of the six areas of digital technology. Working again on Stormboard, students posted digital "sticky notes" outlining solutions to their problem statement at each intersection. Over 500 ideas were generated in total, representing 300 unique ideas after omitting duplicate ideas. Students voted on their favorite ideas in each intersection to identify popular solutions. They also provided structured feedback on their favorite ideas using the Rose, Thorn, Bud design thinking technique (Luma Institute 2012). Roses represent aspects of the idea that are particularly appreciated. Thorns are concerns, while Buds describe possible extensions of the idea. The technique encourages specific, constructive criticism, rather than vague expressions of likes and dislikes.

The next stage of the design thinking process is the development and testing of prototypes. Students used feedback from the Creative Matrix to choose an idea to develop further. They first produced a concept poster and paper prototype of their idea to test with friends (Luma Institute 2012). Feedback from this research was implemented into a final design solution, presented in the format of a magazine article reporting on the successful launch of the idea. The magazine article had to describe persuasively how the proposed innovation would improve the food experience of the intended target audience.

11.4 Results: Insights Leading to Innovative Digital Food Experiences

Results are organized by each of the five domains of the food well-being model: food availability, food literacy, food marketing, food socialization, and food policy. Within each section, we first discuss insights uncovered by students during their empathy interviews, field visits, and photo journals and present representative photos and hashtags produced during this research. Three themes emerged in each food well-being area, summarized in Table 11.1. Students used these insights to reframe the broad challenge of improving student food well-being into specific problem statements that were used to stimulate idea generation. Corresponding examples of problem statements for each theme are presented in Table 11.1. Short descriptions of the most popular solutions are then presented. Please note that students were asked to consider the *desirability* of the solution above *feasibility or viability*. The goal was to generate truly novel ideas, disregarding temporarily financial and technological constraints, in the belief that it is easier to tame wild ideas than inspire boring ideas. While the ideas have been organized according to the primary food

Table 11.1 Emergent research insights and problem statements

	Emergent themes *Key insights that consistently emerged in student interviews, observations, and food journals*	Example problem statements *How Might We (HMW) questions focusing on each emergent theme*
Food availability	**Choice**: Perceived variety and quality of food	*HMW improve access to fresh foods?* *HMW increase food variety?* *HMW improve weekend food access?*
	Convenience: Perceived ease of access to food	*HMW make dining on the go healthier?* *HMW reduce waiting times for food?* *HMW encourage use of public transportation?*
	Disposal: Food waste and recycling	*HMW make recycling easier?* *HMW innovate waste disposal?* *HMW share leftover food?*
Food literacy	**Declarative knowledge**: Understanding nutrition information	*HMW prevent the freshman 15?* *HMW encourage holistic food well-being?* *HMW increase access to nutrition information?*
	Procedural knowledge: Applying nutrition information	*HMW make calorie counting easier on campus?* *HMW make cooking less intimidating?* *HMW better manage our food budgets?*
	Motivation: Inclination to use nutrition information	*HMW encourage grocery shopping?* *HMW help student with time management?* *HMW increase cooking opportunities?*
Food marketing	**Awareness abyss**: Inadequate promotion efforts	*HMW prioritize messaging around food well-being?* *HMW use social media to improve food well-being?* *HMW better promote healthyfood choices?*
	Perception dissonance: Reality refutes beliefs	*HMW increase perceived choice?* *HMW make students happier with food experiences?* *HMW increase positive word of mouth sharing?*
	Reward me: Motivating positive food experiences	*HMW compensate students for eating healthily?* *HMW penalize unhealthy eating behaviors?* *HMW reward students for recycling?*

(continued)

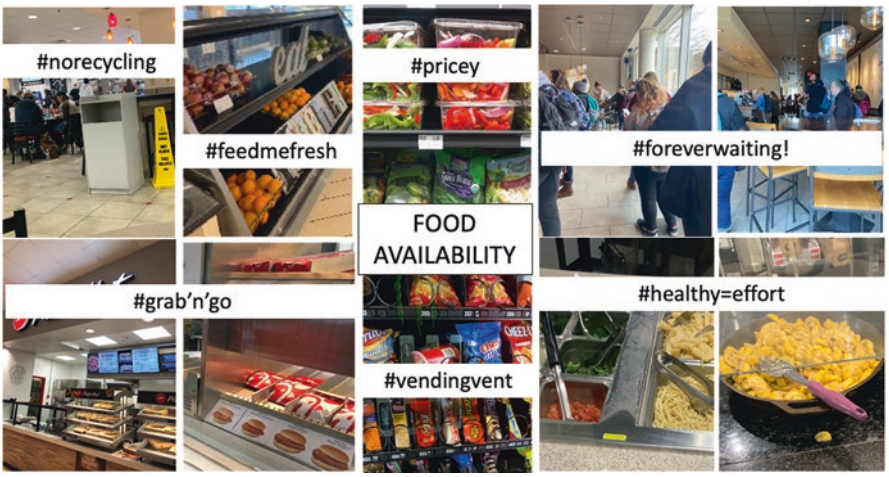
Table 11.1 (continued)

Food socialization	**Peer pressure**: Managing food-related discord	*HMW remove fear of missing out (FOMO)?* *HMW distribute food preparation/ disposal duties?* *HMW share meal swipes?*
	Eating solo: Seats but no tables	*HMW get people to sit together at a table?* *HMW remove the stigma of eating alone?* *HMW better arrange seating in dining halls?*
	Food Celebration: Connecting socially through food	*HMW encourage group eating?* *HMW design more food celebrations?* *HMW develop a more social food culture every day?*
Food policy	**Swipe me**: Meal plan decisions	*HMW personalize meal plans?* *HMW avoid wasting swipes at semester end?* *HMW avoid "burning" swipes?*
	Hear my voice: Providing feedback to administrators	*HMW choose vendors that reflect students' desires?* *HMW inform administrators about food issues?* *HMW facilitate student-dining services collaboration?*
	Serve safe: Sanitary food handling	*HMW better train new foodservice employees?* *HMW help protect those with food allergies?* *HMW ensure sanitary food experiences?*

well-being theme, innovations frequently solve problems in two or more domains, consistent with the integrated nature of the model.

11.4.1 Food Availability

In a university setting, food availability depends on campus dining policies. Freshmen and sophomores at this university are required to purchase a meal plan, largely limiting dining to on-campus options. Consistent with prior research (e.g., Dhillon et al. 2019), students relying on meal plans complained about the limited variety of dining options and poor food quality, especially on weekends and evenings.



Photograph 11.1 Photos and hashtags representing student perceptions about food availability

Our research suggests that institutional dining hours are based on traditional breakfast, lunch, and dinner times, which were incompatible with students' preferred eating habits. Short of spending additional money to consume food off-campus, students felt compelled to either eat at times when they were not hungry or to eat unhealthily because the fast-food restaurants kept the longest hours. Access to fresh fruit and vegetables was particularly limited due to inconvenient opening hours of campus facilities and limited transportation options to go to off-campus grocery stores.

Irrespective of meal plan status, all students expressed frustration with long wait times at campus dining facilities. This is not simply because Gen Z expects immediate gratification. Students had busy daily schedules and felt powerless to not only reach campus food destinations, but order and consume their food, in the 15-minute time period between classes. Quick access to healthy food options felt especially onerous, since they were not easily portable and usually required utensils to consume. For this reason, many students felt compelled to purchase nutrient-poor vending machine snacks or easily accessible "grab'n'go" fast-food options.

In the food well-being model, food availability also includes recovery and recycling, which emerged as another important theme in our research. Not only did students find it difficult to locate recycling receptacles in the dining locations, they had trouble keeping up with local recycling procedures. For example, Starbucks recently changed their coffee cup material, making it incompatible with the university recycling policies. Moreover, most students were unaware that discarding a container with any liquid contaminates the contents of the entire trashcan, making it unsuitable for recycling. Those interested in sustainability issues were also dismayed to observe the quantity of food wasted in the all-you-can-eat dining halls.

Examples of innovative digital solutions to food availability (abbreviated descriptions)
• Virtual assistant that lets customers notify service workers when self-serve food items go out of stock.
• Smart fridge magnet that scans groceries, tracks consumption, creates automatic shopping lists and sends alerts about expiring food.
• Robots and drones that can pick up and deliver off-campus take-out or grocery orders.
• Block-chain technology to track individual food waste data to promote more sustainable behaviors.
• 3D-printed protein snacks that can be ordered via an app in class and picked up en route to the next class.
• Smart kiosks where you can digitally order your food instead of standing in line.
• QR code on to-go meals to facilitate quick self-service check-out.
• Smart trashcan that sorts waste based on package QR codes indicating recycling compatibility.
• App that estimates current wait times at all dining locations, helping you decide where & when to go.
• Digital lockers that preserve pre-ordered food from dining halls until a convenient pick-up time.
• App that identifies in real-time the closest campus dining locations with fresh fruit availability.
• Tray-return carousels that automatically photograph each person and their discarded food and upload images of excess waste to social media for friends to shame them.
• iWatch notifications when dining halls reduce price of expiring stock.
• Digitally managed, self-watering hydroponic salad growing systems.
• Robo-chef in each residential building that chops, mixes, cooks, and serves personal meals.
• App that notifies students of unused restaurant ingredients to prevent waste.

Photograph 11.2 Photos and hashtags representing student perceptions about food literacy

11.4.2 Food Literacy

Our research suggests students have relatively high levels of declarative knowledge about food nutrition. They understood, for example, that a healthy diet is high in fruit, vegetables, and whole grains and low in sugar and fat. They were frequently frustrated, however, with the difficulty of accessing such information. The salad bar in one of the dining halls, for example, provided calorie information for each item to three decimal points, in obscure serving sizes, deterring calculation of any useful data.

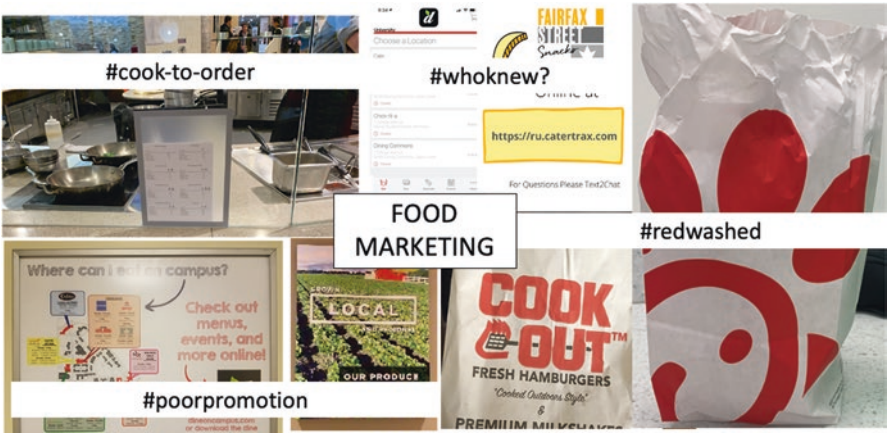
To be food literate, however, requires more than just facts, and students often lacked the ability, motivation, or opportunity to apply their knowledge. Even when nutrition information was clearly disclosed, for example, food choices often remained unhealthy, with convenience and taste prevailing over nutritional value. This was especially true for those relying on campus meal plans. Students living in non-university apartments often had access to special cooking equipment such as slow cookers and air fryers, which facilitated healthy meal preparation. Limited kitchen counter space in residential housing, however, combined with small shared freezers and poor-quality equipment demotivated fresh food preparation and cooking. One hack students identified to eat healthily with minimal effort was to prepare the same nutritious meals every day. Due to the unique nature of campus dining plans, financial ability also influenced student food literacy. Students on meal plans found it difficult to budget their swipes evenly over the course of the semester, ending the semester either hungry or with unused dining dollars.

Examples of innovative digital solutions to food literacy (abbreviated descriptions)
• QR codes on to-go meals that automatically add nutrition information into a calorie tracking app.
• Smart fridge locks that only open at pre-specified times to prevent impulsive snacking behaviors.
• Augmented reality cooking software that guides users through recipes in their own kitchens.
• Meal plan tracking app that prevents overspending in the early part of the semester and uses machine learning to predict weekly future balances based on current behavior.
• Smart plates that calculate nutrition information by food weight, density, and color.
• Genetically based personalized nutrition plans.
• Smartwatch that reads body functions such as sweat and heart rate to alert user to low nutrient levels.
• Oven-connected baking pans that turn off oven when food is ready.
• Virtual assistant that provides recipes based on local food availability.
• Smart utensils that send signals encouraging users to eat more slowly.
• Biometrics to personalize food experiences based on emotional as well as nutritional needs.
• A vibrating shirt that reminds students who skip meals to eat.
• Mouth sensor that measures sugar, carb, alcohol intake and warns user when over preset limits.
• Smart mirrors in dining halls to encourage healthy eating and discourage food waste.
• Handheld grocery scanners that record price and nutrition facts and recommend recipes.

11.4.3 Food Marketing

A considerable discrepancy exists between the *actual* food options available, and student *awareness* and *perceptions* about those options. In reality, hot menus rotate daily, each including at least three vegetable dishes. There are stations featuring short-order cooks who make hot dishes, such as omelets and fajitas, to order. A lengthy salad bar includes a wide variety of fresh fruits, vegetables, dairy, fish, and deli meats. There is a section dedicated to gluten-free options, as well as a smoothie bar, a pasta bar, and a sushi station, all of which can be purchased with the campus meal plan.

The institutional foodservice vendor Chartwells sources food locally when possible, and their Balance U program serves nutrient-dense, portion-controlled options in each meal period. Another Chartwell's campaign, Fuel for Life on Campus (FYUL), distinguishes functional foods with special labeling in each dining station, and students with allergies are encouraged to "don't be shy, self-identify" when placing meal orders. As noted earlier, however, students firmly believed campus dining to lack variety and be unhealthy.



Photograph 11.3 Photos and hashtags representing student perceptions about food marketing

Inadequate marketing efforts are primarily to blame for this discrepancy. While nutrition data, opening hours, and menus are updated daily on the university's website, finding the information on mobile devices was clunky and time-consuming. As a solution, many students designed apps that made accessing such information more manageable, oblivious to the fact that such an app already exists. The Chartwells' *Dine on Campus* app is freely available in all app stores and features additional functionality such as a quick feedback form and special event notifications.

Poor promotion and confusion over the relationship between Chartwells and the university contributed to the lack of awareness and use of the app. Communications

on Twitter, Facebook, and Instagram throughout the semester also failed to have an impact. The dedicated university-dining social media accounts have very few followers, and posts are rarely liked or shared. In contrast, the fast-food restaurants on-campus bombarded students with marketing messages. Multi-million-dollar national advertising campaigns, combined with local promotions and the omnipresent red packaging of most burger joints, easily deceived students into believing unhealthy food was more prevalent on-campus than healthy food.

Examples of innovative digital solutions to food marketing (abbreviated descriptions)
• Proximity beacons that alert students to nearby healthy food options or offers.
• An app that allows users to scan their meal and provide immediate feedback to the food service provider.
• Smart water bottle that rewards students with meal plan swipes every ten times it is filled.
• Integrate Chartwells *Dine on Campus* app within the university's existing app architecture.
• Augmented reality game (like Pokémon go) where players earn points for eating healthy food.
• Social media competition to earn meal plan swipes in return for sharing food promotions and events.
• App that integrates to-go ordering from campus food locations with pedestrian delivery service.
• Room sensors that detect energy levels to determine optimal locations and times for pop-up kiosks.
• Use digital information screens to promote healthy options available at campus dining locations.
• Live cooking events featuring campus chefs that stream on gen Z social media sites such as Instagram, Twitter, YouTube, and Snapchat.
• Food hack streaming videos using foods available at campus locations.

11.4.4 Food Socialization

Food consumption on campus has a significant social component. From baking a special birthday cake for a friend turning 21 to purchasing Starbucks for their resident assistant, food was used to celebrate and reward both big and small occasions. Formal gatherings, club meetings, sporting events, and impromptu hangouts all used food to encourage participation and increase well-being and satisfaction (Mendini et al. 2019). International food tasting events were used to promote diversity and inclusion. Students enjoyed sharing food experiences on social media through "food porn" photography (Koh 2017) and participated in #vibechecks, where food images were used to express current emotional states.

Not all social experiences around food were pleasurable, however. International students and those from more cosmopolitan cities were particularly vocal about the lack of meal diversity. On the other hand, attempts by dining services to introduce food items novel to this largely provincial population met with resistance. Such

Photograph 11.4 Photos and hashtags representing student perceptions about food socialization

food neophobia is associated with poorer dietary behaviors overall (Capiola & Raudenbush 2011; Olabi et al. 2009).

Food was frequently a source of discord, both inside and outside the home. Piles of dirty dishes in the sink and other kitchen misuse left roommates angry and disillusioned. Students felt pressure to eat out with their friends, even though they had little money, and shame when asking to "borrow a swipe," so they could stay with a group eating on-campus. Oftentimes, academic schedules did not line up, leaving students to eat alone. Rather than face the difficulty of finding a free table, and the embarrassment of sitting friendless, students would resort to purchasing less healthy, but more accessible, fast-food meals.

Examples of innovative digital solutions to food socialization (abbreviated descriptions)
• Option to "check-in" on *Dine on Campus* app so friends can find where you are eating.
• App to share recipes and compare and contrast eating habits with other students on and off campus.
• Interactive napkin dispenser that signals you would welcome others joining your table.
• Smart (nonalcoholic) cocktail maker that prompts mixing, mingling, and conversation.
• Sharing platform (like Airbnb) that matches available dining spaces with those needing a seat.
• App that allocates and tracks household jobs equitably between roommates.
• Smart tableware that uses biometrics to identify which roommate used it and when.
• Interactive digital jukebox app that allows students to choose the music playing in dining locations.
• Parking like app that identifies open seating in different restaurants before you arrive.
• Smartphone notifications that tell you when a table is free in the restaurant of your choice.
• Tinder-style app that matches diners sitting alone with partners based on food preferences.

11.4.5 Food Policy

Photograph 11.5 Photos and hashtags representing student perceptions about food policy

State and federal regulations govern many food production, safety, nutrition, and labeling policies, leaving little freedom for university autonomy. That said, most student frustrations in this area concerned meal plan contracts, which are firmly within the university's control. For students with dining plans, each time their identification card is swiped at an on-campus food vendor, money is deducted from their balance.

The actual dollar amount charged varies by the meal type (e.g., breakfast costs $2.18) and the dining location (e.g., dinner costs between $4.28 and $10.72 depending on dining hall). When used in one of the retail restaurants that franchise space on campus, such as Au Bon Pain and Wendy's, a card swipe deducts a standard $8.37. If the item purchased costs less than this amount, the remainder is forfeited. Students found it difficult to track their meal plan balances, and very few managed to spend their plan evenly over the course of the semester. Students who ran out of swipes before the semester was over faced food insecurity, often going days without eating enough healthy food to sustain an active, healthy life. On the other hand, students with positive balances engaged in crazy stockpiling, such as purchasing multiple cases of soft drinks from the back of a Coke truck. Under current university policies, students cannot share swipes unless they are both physically present at the restaurant.

There is nothing to prevent the university from facilitating an easier exchange of student swipes. They have, in fact, piloted a program where students can donate up to two swipes each semester to a communal pot, available for students facing food insecurity to use. Most students were unaware of the program, and their enthusiasm

upon learning about it was tempered by the cumbersome process involved in donating their swipes. Potential recipients of the donated swipes, on the other hand, expressed reluctance to use the system for fear of being stigmatized. To solve these issues, several students designed innovative digital exchanges where swipes could be traded anonymously.

Technically, such exchanges are relatively easy to execute. The difficulty comes in persuading senior university administration. As with all large bureaucracies, change requires the agreement of many stakeholders, often with competing interests (see Fig. 11.3). For this reason, students also desired a better communication mechanism to provide student feedback to key administrators. It can be difficult for one student voice to be heard, but an app that allowed ideas to be shared and "upvoted" could potentially carry a lot more influence.

The last concern students had in this area was with regard to sanitary food handling. Even though federal state and local regulations are supposed to ensure the safe handling of food, students with allergies felt particularly upset at unsafe behaviors they had observed, such as a worker using the same (gloved) hand to pick up cheese, meats, and vegetables when assembling a sub sandwich. High student employee turnover rates and a perceived lack of training reduced trust in the safety of the food preparation.

Examples of innovative digital solutions to food policy (abbreviated descriptions)

- An augmented reality headset that provides new employees with constant reminders and feedback.
- Smart disposable gloves that change color when exposed to pathogens, contaminants, or unsanitary surfaces.
- Auction style app that lets students put up for bid excess swipes. Students in need can bid on these swipes up to the maximum retail value.
- Digital swipe library that allows students with excess swipes to easily donate and students in need to anonymously "borrow" donated swipes.
- Swipe-exchange app that works like Venmo, but allows you to share swipes easily with friends.
- App that translates the cost of retail food prices into the equivalent number of swipes and identifies items to purchase to use the full swipe value and avoid "burning" a swipe.
- Block-chain technology to track and monitor food source and safe preparation.
- Portable Bluetooth device that digitally analyzes meal ingredients to warn about potential allergens.
- Smart barcodes that change color at check-out if the food is out of date or has potential allergens.
- Mobile feedback tool that is embedded in university app to open conversations with administrators.
- Digital petitioning platform to share ideas for change with social networks and build support.

11.5 Implications for Higher Education, Food Industry, and Design Thinkers

This chapter extends our understanding of food well-being to include the experiences of undergraduate students in North America. Exemplifying Gen Z, the youngest and most ethnically diverse generation in American history (Brown 2018; Dimock 2019), the 20 million students attending college represent 40% of all 18- to 24-year-olds (Snyder et al. 2019). Rising competition among higher education institutions to attract and retain these students has increased the importance of auxiliary services such as dining to better differentiate themselves in the marketplace (Reynolds 2007). Our findings can help college administrators, and their global foodservice partners such as Sodexo, Aramark, and Compass Group, design healthy and pleasurable food experiences that best meet the desires of this tech-savvy generation.

At the simplest level, our results revealed a strong desire for a smartphone app, integrated within existing university software, that allows students to check opening hours, browse menus, and order and purchase food online. This app would ideally be linked to their dining plan, providing real-time feedback on their purchases and meal balance. With advancements in big data modeling, it would not be difficult to add predictive functionality to the app, helping students plan their spending more evenly over the semester.

The app could also notify students of seating available at each restaurant location and allow students to "check-in" so their friends can find them when their own classes finish. Embedding nutrition information into the purchasing system would also allow students to quickly and easily track food intake and could even help identify healthier choices, potential allergens, or hacks to combine food items in novel ways, increasing perceived variety. Adding a campus delivery function, in which prepared food could be walked or biked to the customer location, would not only solve one of the biggest frustrations' students expressed (too little time to reach restaurants between classes) but also generate income opportunities.

Other innovations might be less technically feasible or economically viable but offer enormous potential for competitive advantage if implemented. Colleges should consider improving residential cooking facilities to include, for example, smart slow cookers that help students combine raw ingredients from the dining halls into delicious, novel meals, or smart fridges that track food consumption and notify students when they are running low on ingredients, or when foods are about to expire. This values-driven generational cohort identifies strongly with social issues and would likely prioritize college campuses that promote innovative food sustainability initiatives. Placing smart mirrors around dining halls, or selfie cameras at tray return carousels, for example, could discourage food waste much like the mirrors and cameras at self-service check-out registers inspire honest behavior.

Daily decisions regarding what, where, when, and how much to eat dominate students' time and energy, and, in this respect, they are analogous to most food consumers. Insights gained from understanding how to improve *student* food well-being, then, can inform innovation in *all* food sectors. Food is not merely a means to survive, but a deeply social and emotional experience. The use of food in our data to connect, reward, and celebrate confirms food pleasure is central, not contrary, to healthy eating and well-being (Batat et al. 2019).

When planning new dining concepts, foodservice providers need to consider the broader social context, not just individual customer tastes. These will differ depending on the type of institution. Our students expressed a desire for interactive tools that let newcomers know you are welcome to join an existing group. In elementary schools, where food items are traded between children, designing menus and digital tools that facilitate such behavior could stimulate new social interactions. In a hospital, on the other hand, food experiences that consider the patient, volunteer, and visitor needs jointly might improve visiting hours and patient satisfaction (Hartwell et al. 2016; Ottrey et al. 2018).

While at first glance, some aspects of the student dining experience may seem unique to the higher education sector, other industries can still learn from our research. Prepaid meal plans, for example, are increasingly popular in the hospitality industry with international brands such as Disney, Busch Gardens, and Royal Caribbean offering prepaid dining options within their vacation packages. The healthcare sector is also experimenting with this method of food provision. Insurance company Humana, for example, offers the *Well Dine* program, which delivers up to 60 meals in any plan year for patients recently discharged from the hospital (Humana Well Dine 2020). The gift card market also shares characteristics with prepaid meal plans. Every year $4 billion is spent on restaurant gift cards, balances on which are not transferable, and often expire before they are used, forfeiting millions of dollars of unredeemed assets (Packaged Facts 2018). Our research suggests that facilitating the exchange of meal or dollar balances would greatly improve customer satisfaction.

Our findings can also guide policy to improve the food well-being of those who experience hunger, a large and inadequately understood population (Bublitz et al. 2019; Lugosi 2019). Food insecurity remains a persistent public health issue in the United States, affecting more than one in five households with children (Gundersen & Ziliak 2018). Our students expressed a strong desire for digital exchanges that allow meal plan swipes to be donated to those facing hunger. Similar flexibility might improve the federal Supplemental Nutrition Assistance Program (SNAP), whose recipients receive monthly benefits on a plastic electronic benefits transfer (EBT) card (Gregory & Smith 2019). Tech-facilitated tools that increase awareness of, and access to, delicious and nutritious food can also help improve food security for this population.

Our research also demonstrates the value of design thinking to improve food well-being. Prior studies examining student food services seek a quantitative estimation of dining satisfaction and nutrition intake (Lugosi 2019). Such surveys miss

key elements of the design thinking practice, including empathy, visualization, and collaboration, which are critical to fully understanding food needs. Solutions emerging from these normative methods are often limited to simple product ideas, missing opportunities to develop healthy and pleasurable experiences that also include innovations in the space, delivery, and payment of the meal. In the current research, food products represented only a tiny fraction of the solutions generated to improve food well-being. Instead, students designed innovative experiences for all stages of the food journey, from awareness through consumption to disposal.

We strongly recommend foodservice providers apply design thinking to their own innovation processes. While companies such as Compass Group already host employee competitions to crowdsource new concepts, our research suggests inviting the target audience to co-design services would deliver more desired solutions. We also believe there is enormous potential to build a Food Well-Being Network (FWBN). Inspired by the Food Recovery Network (www.foodrecoverynetwork.org), a national nonprofit, started at the University of Maryland, that unites students fighting food waste and hunger, and the British Design Council (www.designcouncil.org.uk), the goal of the FWBN would be to help college chapters around the world use design thinking to innovate healthy and enjoyable food experiences that improve the well-being of all.

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Part III
Design Thinking for Innovative Food Experiences and Well-Being: What's Next?

Chapter 12
Integrating Consumer Food Experience with Health and Sustainability Outcomes: The Critical Role of Design Imperatives

Sara Beckman, Anne Fletcher, and Ricardo San Martin

12.1 Introduction

Decades of research have shown the positive benefits of consuming plant-based foods such as fruits and vegetables, nuts, and whole grains for preventing cardiovascular disease (e.g., Hu 2003), treating diabetes (e.g., McMacken & Shah 2017), creating anti-inflammatory effects (e.g., Watzl 2008), and much more. The focus on plant-based foods has increased in recent years as the food industry has engaged in creating new products from plant-based ingredients that mimic many of the physicochemical and sensory attributes traditionally associated with animal-derived foods, including milk, eggs, and meat (McClements 2020). The market for plant-based foods – used from here forward in this chapter to refer solely to those developed as substitutes for animal-based foods – grew 11.4% to $5B in 2019, outpacing the overall food market which only grew 2.2% that year ("Retail Sales Data," 2020).

Plant-based foods are on the rise at a time when the food industry is placing increasing strain on the environment, causing global health problems (Poore & Nemecek 2018; Springmann et al. 2018). With growing wealth, consumers seek more Western-style diets that often contain higher levels of fat, salt, and sugar. These diets have resulted in a rise in such chronic diseases as diabetes and obesity (Willett et al. 2019). As people add more animal-based products such as meat, fish, eggs, and milk to their diets, pollution, land utilization, water consumption, and greenhouse gas emissions are increasing along with associated health challenges. Thus, the 2030 Agenda for Sustainable Development of the United Nations' Food

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and Agriculture Organization recommends significantly reducing consumption of animal-based products (Transforming our world: the 2030 Agenda for Sustainable Development, n.d.).

Plant-based meats aim to support this agenda. But their development is creating fundamental questions about how "meat" should be defined. Conventional meats, cultured meats, and plant-based meats collectively create "ontological ambiguity" around the classification of meats and associated products (Jönsson, Linné, & McCrow-Young 2019), which in turn generates misunderstanding in the marketplace as to the true health and sustainability benefits associated with plant-based meats.

Mimicking meat-like products with plant components requires highly refined plant fractions that can only be obtained through intensive processing. Paradoxically, the industry narrative portrays these compounds as naturally derived from plants with, for example, photos on their websites and product packaging of fresh soybeans or potatoes to represent the highly processed protein isolates used in their production. But no plant naturally produces protein isolates. Worse, the production process to obtain refined plant fractions often removes beneficial compounds such as vitamins, minerals, and fibers.

Today, the nutritional content of plant-based meats is like that of their animal-based counterparts, high in unsaturated fats (coconut) and even higher in sodium levels. The only clear benefit is the absence of cholesterol. Recent studies by Harvard Medical School (Hu, Otis, & McCarthy 2019) and advice by Kaiser Permanente doctors ("Hype vs. fact: The reality behind 2019s most popular nutrition trends," 2019) warn the population of the health implications of these products.

Furthermore, very few independent studies rigorously quantify the environmental impact of these products. In fact, the studies used to construct the industry narrative have been sponsored by the plant-based food industry or performed by groups with a clear interest on this space (e.g., Plant Based Food Association, Good Food Institute). For example, Beyond Burger bases its narrative on a white paper about the sustainability of its products, not one published by a scientific journal with an editorial committee, and therefore, its assertions have not been subjected to scientific scrutiny (Heller & Keoleian 2018). In a paper published by Impossible Foods on the sustainability of its products, two of the four co-authors are employees of Impossible Foods (Goldstein, Moses, Sammons, & Birkved 2017). Clearly, more independent studies are urgently needed to validate (or invalidate) industry claims.

Consumers, thus, make choices to consume plant-based meats largely based on the representation of their advantages by the industry itself integrated with their experience of choosing, preparing, and consuming these products. The tension between the industry narrative and the real benefits of this first generation of plant-based meats derives from the design imperatives used to manufacture these products. The founders of these companies invariably indicate that their mission is to remove animals from the food supply chain. Human nutrition or reduction of food-related diseases, such as childhood obesity or diabetes, is not part of this mission.

Clearly, if more stringent design imperatives were chosen, for example, avoiding the use of purified protein fractions or extrusion, the complexity of the challenge

increases significantly requiring a thorough understanding of more fundamental scientific principles such as food microstructure, emulsions, rheology, colloidal systems, texture, flavor chemistry, and protein chemistry. Learning these principles is not easy, as all these disciplines are complex and require years of practice to master. Furthermore, there is tremendous potential to tap into technologies not extensively explored in the Western world, such as fermentation or the use of fermentation-derived products. Transformation of plant texture, flavor, and preservation properties though the use of microorganisms to produce specific compounds (e.g., gelatin and casein) will definitively help in creating a novel generation of healthier and more sustainable plant-based foods.

At some level, the design opportunity seems clear. Studies show that plant- and cell-based meat alternatives can provide considerable environmental and nutritional savings compared to animal-based meats (Heller & Keoleian 2018; Hoek et al. 2011; Ritchie, Reay, & Higgins 2018; Tuomisto & Teixeira de Mattor 2011). It is less clear, however, whether consumers are willing to adopt plant-based food alternatives, and their willingness to do so will determine the effectiveness of both government policies and business strategies aimed at diverting attention from animal-based products (Arora 2019). Meanwhile, consumers remain overwhelmed and utterly confused by a bewildering array of messages and labeling that appear on the foods (and other products) they buy (Moon, Costello, & Koo 2017).

Into this murkiness step the food designers who must make choices around the design of food products, their production technologies, and the consumer experiences associated with them, which often entail conflicting desired outcomes. This chapter focuses on the process of framing and reframing the plant-based food design challenge and the use of design imperatives to clarify the objectives of any given design effort. It leverages learnings from work at the Alt.Meat Lab at UC Berkeley.

12.2 Alt.Meat Lab

The Alt.Meat Lab is housed in the Sutardja Center for Entrepreneurship and Technology in the College of Engineering at UC Berkeley. Its mission is to help entrepreneurs and researchers develop the next generation of foods such as plant-based meats, dairy substitutes, and alternative sources of fat and protein. The Alt.Meat Lab offers courses, conducts research, and collaborates with entrepreneurs, companies, and investors to support building start-ups in this space.

Its headline course is a two-semester sequence offered to graduate and undergraduate students. Both semesters are part of the Challenge Lab series in the Sutardja Center where student teams develop business concepts to pitch at the end of each semester. The winners from each class then compete in the prestigious Collider Cup for a chance to win seed funding from the investors in the audience.

Part 1 of the sequence is *Alt Meat: Product Design and Customer Needfinding* for students from diverse disciplines seeking to understand why people choose alternatives to meat and how to build business concepts based on what they learn.

Student teams spend the semester learning methodologies of ethnographic design research and applying them to specific topics that could help people eat less meat. Though plant-based meat analogs are certainly one option, in this first semester course, students broadly explore the entire terrain of meat-free ways to obtain enough protein. The goal of the course is not necessarily to promote meat analogs, but to understand the behavioral factors that lead to less meat consumption and to design business concepts that could successfully replace meat in the marketplace.

In part 2 of the course, *Product Design of Plant-Based Foods*, teams design an original plant-based food, based on a thorough understanding of the scientific and technological foundations needed for its production: food microstructure-macrostructure relationships, texture and flavor chemistry, manufacturing processes (scaling-up), quality assurance, regulatory issues, etc. The semester-long project involves product design (iterative prototyping), production process design including inputs (raw materials, utilities, etc.) and outputs of the process (unwanted by-products, secondary products, effluents, etc.), sizing of equipment, estimating production costs and income, and identifying distribution and marketing issues and potential partners, among others. Throughout this chapter, we draw from the work students have done in this class with specific focus on how they undertake the job of framing the design imperatives for their food design projects.

12.3 The Role of Framing in Design

Of the four basic capabilities associated with design (Beckman & Barry 2007) – observe/notice, frame/reframe, imagine/design, and make/experiment – arguably the most important is frame/reframe (Beckman & Barry 2015; Bessant, Öberg, & Trifilova 2014; Dorst 2011).

> "Framing" is a term commonly used within design literature…for the creation of a (novel) standpoint from which a problematic situation can be tackled. Although frames are often paraphrased by a simple metaphor, they are in fact very complex sets of statements that include the specific perception of a problem situation, the (implicit) adoption of certain concepts to describe the situation, a "working principle" that underpins a solution and the key thesis: IF we look at the problem situation from this viewpoint and adopt the working principle associated with that position, THEN we will create the value we are striving for. (Dorst 2011, p. 525)

Framing and reframing engage design teams in a process of sensemaking (Klein & Moon 2006) during which they strive to get at the essence of a problem, often by searching for a "central paradox" and then examining the context that surrounds that paradox (Dorst 2011). It is by deeply understanding such paradoxes and the system dynamics that surround them that designers find new and interesting approaches to seeing and solving problems.

The design of plant-based foods must appreciate the immense complexity of the food production process and its environmental and health effects as well as the convoluted process of human choice-making around food consumption (Batat et al.

2019). This challenge begs for the use of both ethnographic research (Weiss 1994) and systems thinking (Meadows 2008) in the development of design imperatives to communicate a shared frame to the development team.

12.4 Design Imperatives to Communicate Frames

The result of a framing and reframing, or sensemaking, process is often a set of selected design principles that will direct option generation and design choices. Design principles are general strategies for solving a design problem, while design imperatives are the selected design principles and unique requirements that emerge from research to be applied to a specific design challenge (Fletcher, Barry, & Gonzales Dharap 2014).

Design imperatives comprise the list of requirements a design must satisfy to be considered successful. Collectively, the design imperatives for a given project form the design brief. The design imperatives for a novel office chair, for example, might include: must hold the weight of a 100–300 pound human comfortably for 14 hours per day without any damage to the chair's structure; must fit the client's "sleek and minimal" look; and must be manufactured in the United States with a cost-of-goods of $45 or less. With these parameters, a chair designer has a clear idea of where to start.

All design works with a structure of imperatives, whether explicitly or implicitly stated. While we explicitly stated some of the design imperatives for our chair, we left implicit such imperatives as the chair must have four legs, a seat, and a back and, as an office chair, it will be used to sit at a desk rather than for relaxing in front of the TV. Because these implicit imperatives are commonly shared among most office chair users and designers, their omission from the explicit list is unlikely to cause problems. The bigger challenge for designers is in the use of terms like "comfortable," which may be interpreted quite differently from user to user and from designer to designer.

Some implicit design principles have been passed down for years by architects, engineers, and designers (Lidwell, Holden, & Butler 2010; Quinan & Alexander 1981). They serve as heuristics or rules of thumb that capture learning over time about what seems to work well. Designers, for example, have long leveraged the Golden Ratio in which the ratio of a short segment to a long segment is equal to the ratio of the long segment to the sum of the two segment lengths. The Golden Ratio shows up in nature (e.g., nautilus shells), architecture (e.g., the Parthenon, Stonehenge), and art (e.g., Leonardo da Vinci's Mona Lisa), even as the circumstances of its use are unclear (Markowsky 1992). The Golden Ratio continues to appear in everyday products today, such as the iPhone's proportions and the 2.125″ by 3.375″ size of credit cards. It is just one of hundreds of general design principles used by designers on products today. Generic design principles provide a basic understanding of how to design a wide variety of things.

For design communication to proceed smoothly, it is important not only to clarify explicitly stated design imperatives but to identify and articulate implicit imperatives as well. In the example of chair comfort, this is fairly easily done with a testing protocol that lays out how many people of what weights and body types must test the chairs and what comfort rating they must give for the chair design to be deemed "comfortable." As problems become more complex, however, we need more explicit and specific guidelines that are tailored to the context. We need systems of design principles that work together in a coherent way to reflect both an understanding of what the major needs of the system are and the most effective ways to meet those needs.

12.5 Creating Design Imperatives for Food Design

One of the principal challenges of food design is implied and often conflicting imperatives. Consider the design imperative that food be "healthy." Likely included in design briefs for many food design projects, it requires further unpacking to identify the many underlying implied assumptions about what "healthy" means that could significantly change the outcome of the project. Take yogurt as an example. The question of whether yogurt qualifies as "healthy" generated a spirited discussion among students in the Fall 2019 *Alt.Meat Product Design and Customer Needfinding* class.

Yogurt is one of the most popular fermented dairy products worldwide, accepted by consumers due to perceived health benefits that go beyond basic nutrition (Weerathilake, Rasika, Ruwanmali, & Munasinghe 2014). Yogurt carries an aura of health that goes back to at least the 1970s when hippies and "back-to-the-landers" made their own yogurt and served it with their homemade granola as the pinnacle of virtuous eating, a form of sociocultural appreciation (Batat et al. 2019). That healthy halo continues today despite clear evidence to the contrary for many yogurt formulations. A recent study by design firm Quotient Design Research, for example, found that parents identified Go-Gurt as a healthy form of yogurt to feed their kids despite its very high sugar content (about 2 teaspoons per 50-calorie serving) and extra flavors and preservatives.

In their in-class debate, the Alt.Meat students unanimously agreed that Go-Gurt and other highly processed, sweetened versions of yogurt are not healthy. But they disagreed vociferously about plain, unsweetened yogurt made from organic milk. Dairy eaters in the class argued that yogurt is a good source of low-fat protein with probiotics that are good for gut health. The vegans, on the other hand, argued that cow's milk is fundamentally unhealthy, citing research about cardiovascular health and dairy products. One particularly passionate student stood and shouted across the room "I wouldn't eat yogurt even if you paid me a million dollars!"

If yogurt's healthy bona fides (Weerathilake et al. 2014) are suspect and subject to this level of emotional debate, pinning down what food designers mean, in general, when they specify "healthy" as an imperative is exceptionally challenging. Nutritional research changes frequently as do people's beliefs, and they do not necessarily change in the same direction. An examination of the evolution of food design imperatives related to "health" and novel foods over the past few decades is illustrative.

In the 1980s, we learned that fat, and especially animal fat, was bad. (Nutrition experts also recommended eating less added sugars at the same time, but that advice did not capture the popular imagination in the same way.) Suddenly, everyone drank nonfat milk, used margarine instead of butter, and ate fat-free cookies. Eating Snackwells' fat-free cookies in the early 1990s felt virtuous, as if one were eating "free" calories (Jacobson 2015). Clearly, the design imperative within food companies was *must not have fat (or if it does, use plant-based trans-fat).*

In the early 2000s, the Atkins diet exploded onto the scene. People seeking to lose weight were convinced that bacon cheeseburgers for breakfast would work. And so, the carb-free diet was born. Suddenly, we had another category of food to avoid. With both fat and carbs now deemed "unhealthy" (by public opinion, not necessarily science-based), what was left? Protein. Protein shakes, protein bars, protein powders all proliferated under the design imperative *must be high in protein.*

We have been in the protein boom since the early 2000s, but the cracks are beginning to show, both in public opinion about health (maybe those ideas about less saturated animal fat from the 1980s were not so off-base after all), and in our dawning awareness of the impact of animal agriculture on climate change. Now that we have vilified animal protein on top of fat and carbs, it is no wonder "plant-based" is booming. It is the only food left! Impossible Foods and Beyond Meat represent two of the more popular brands associated with the new design imperative *must be plant-based*.

As this short history shows, health fads and food research are only loosely related. Humans have myriad struggles with food choices and consumption. They are uncertain about what to prepare for meals, distracted, inefficient and inexperienced at preparing food, and lack nutritional knowledge (Grimes & Harper 2008). In the case of plant-based replacements for what have historically been animal-based products, established understandings of what food is are being destabilized and new ontologies for referring to and understanding food are being created (Jönsson et al. 2019). As a food designer, how does one reconcile conflicting, deeply held, and often incorrect beliefs about health with people's individual tastes, habits, ethnic traditions, budgets, and cooking abilities? Our best solutions to date are in-home ethnographic research where we see how people within a culture adapt social norms to fit their personal situations and systems mapping to appreciate the complex interactions associated with food design.

12.6 Ethnographic Research to Understand how Consumers Experience Food

Gaining empathy for end users is considered a central task in design, distinguishing the field of design from that of the sciences (Heylighen & Dong 2019). While the sciences focus on objectivity, rationality, neutrality, and a concern for "truth," designers engage more practicality, ingenuity, empathy, and concern for "appropriateness" (Cross 1982). Food design must reconcile the cultural norms of the sciences and those of design to integrate scientific research and development of food with the values, preferences, and thought processes of the humans who experience that food.

The observe and notice work of designers emphasizes spending time with customers and users, observing and conducting interviews with them to explore their physical and social interactions, cognitive processing, culture experiences and norms, and emotions (Kumar 2013). Qualitative research, in general, as defined by the fields of ethnography and anthropology, employs methods such as narrative research, phenomenology, grounded theory, ethnography, and case studies (Creswell 2013). Tools used include conversation analysis and micro analysis of interactions, enhanced by designers through capturing everyday human behaviors in video (Wasson 2000).

Such qualitative research, when done properly, aims to understand cultural behaviors such as rituals, roles, and performances, meanings including symbols, beliefs, and values, as well as tools including physical spaces, technologies, and techniques used by humans (Mariampolski 2001). This research is done with small numbers of respondents in specific subcultural groups who feel needs more deeply to help designers see emerging needs before they become common in the general population (Baldwin & Von Hippel 2011; Weiss 1994).

Because the entire experience of food, from anticipation and preparation through to completion and remembrance, is embedded in culture and identity (Mintz 1996), food design is particularly well-suited to ethnographic research. Specifically, if food designers want to encourage healthy eating (which is often associated with notions of deprivation) (Liem, Toraman Aydin, & Zandstra 2012; Raghunathan, Naylor, & Hoyer 2006), a deep ethnographic exploration of food culture in the target group can uncover meanings attached to healthy eating *and* pleasure, for example, the careful "education of the taste" in some countries (Reverdy, Chesnel, Schlich, Köster, & Lange 2008). Food design and culture are inseparable, so food designers can incorporate food meaning, experience, and pleasure as a tool to help people eat more healthfully (Batat 2019; Batat et al. 2019). Ethnographic research is a means of deeply understanding all elements of the food experience, including functional, social, and emotional aspects of that experience.

Food research often begins with a goal: A snack food company wants to product a new energy bar, a sports food company wants to make anything *but* a new bar, and a class of UC Berkeley students wants to help people eat less meat. That goal establishes a starting frame for the project and guides the structure of the initial research.

That snack food company, for example, might ask "how far can we creatively extend bars?" which would lead it to explore people who live "bar lifestyles" and whose demanding everyday needs push them beyond what current bars offer, for example, iron man triathletes with full time jobs and families. Upon identifying those "bar lifestyle" people and arranging to spend time with them, the data collection begins.

Along with typical ethnographic research questions, the Quotient Design Research team doing the snack food company study used some clever techniques to more deeply understand the role of bars in their interviewees' lives. In one case, they brought to the interviews a collection of different bars and other foods and asked the interviewees to sort them and then explain the piles. Interviewees consistently described categories such as energy bars, snacks, real food, and performance food. When multiple respondents converge on a shared mental model of these food categories, without prompting by the researchers, we can be fairly certain that this is a common way of mentally organizing food (Weller 2007).

A map such as this, in turn, helps food companies redefine their categories, or fit new products into existing categories. In a subsequent study, interviewees were offered a 1-year supply of one food product and one beverage of their choice. The "forced choice" technique encourages respondents to go beyond "right" answers that they suspect will please the researchers and choose what they actually would use. These types of exercises gave the interviewers the chance to dig deeply into the thought processes that underlay these respondents' food choices and the "contemplation, connection, and creation" (Batat et al. 2019) that make up their experience of the food.

Based on the analysis of language used in in-depth interviews with 17 respondents across three geographical regions, the team formulated a nascent set of design imperatives for bar design. Those design imperatives had to appreciate what triggered people to consume bars (i.e., what type of energy needs – e.g., brain charge, deep charge – they aimed to fill at the time), what caused them to trust bars (e.g., few simple ingredients, fresh taste), and what motivated them to engage with bars (e.g., help me connect, invest in myself). Note the recognition across these findings that consumers seek to fulfill not only functional needs but social and emotional needs as well. Their experience of bars was not just about the product itself, but also about the role that the product played in their lives.

This depth of research, represented here in a very surface level summary of the types of design imperatives unearthed, gave the snack food company a deep representation of its customers and how they thought about bar consumption to take into the food design process. Married with the scientific understanding of bar design, the company successfully reinvigorated what had been seen as a slowing market for bars. They integrated deep understanding of the customer experience associated with bars with their scientific knowledge to reposition their products in the customers' lives.

When the UC Berkeley students set out to find ways to help people eat less meat, they did so on teams, each of which chose one of the four different prompts: Redefine "center of the plate" as something other than meat; "sexy beans" to elevate the humble bean as a minimally processed alternative to meat; explore who might

eat lab-grown meat and why; and low-cost plant proteins to expand access beyond affluent Westerners. Students relied primarily on ethnographic interviews and displacement exercises where they asked their respondents to try new foods and/or cut out others as a way of gauging the difference between stated opinion that often anticipates a culturally correct, pleasing answer ("I would totally eat beans") and reality ("Well, I didn't quite get around to cooking the beans you gave me").

Surprisingly, given the diversity of prompts and user groups studied, many common needs emerged from the research. In each presentation throughout the semester, teams looked at one another with astonishment as one after another came to similar conclusions. A few of the common findings were as follows:

1. People tend to give up meat all at once, based on a transformative experience, film, or conversation, and then struggle to find alternatives causing them to "fall off the wagon" and get back on again.
2. Meat continues to be extremely tempting (particularly the smell) to those who have given it up, especially to new vegetarians, and especially in its unhealthiest, easiest-to-get forms when one is feeling weak: Late night fried popcorn chicken came up several times. Even the vegan who would not eat yogurt for a million dollars admits to salivating when she passes the Brazilian BBQ restaurant.
3. Health information was passed along person-to-person in a chain of trust, and not in a top-down official format. Often, the health advice from two trusted sources is in conflict, leaving people confused and uneasy.
4. There is a deep distrust for all forms of processed foods. A critical difference between vegans and the rest of the people studied is that many also consider animal products to be highly processed because of the factory farming system.
5. Day-to-day at-home cooking relies heavily on a rotation of familiar basics (though these basics differ among people), and adopting new recipes and cooking routines is not easy.

Notice that these findings speak to the overall experience people have with food, not just with the products themselves. They speak to their experiences of choosing, preparing, and consuming foods and how these fit into the broader social and cultural environments in which they live.

Most plant-based meats focus primarily on the second finding that meat continues to be extremely tempting, even to those who have given it up. They aim to provide sufficiently similar taste and texture experiences to entice people to consume them. Given the overall findings, however, it is clear that to help people avoid meat long term, the other four findings also must be addressed, or at least not violated.

Though meat analogs do a decent-to-good (depending on the brand) job of replacing the taste and texture of specific types of lower value meat (ground beef and chicken strips are the most common), it does not easily produce the mouthwatering smells that people truly miss. With the notable exception of the newer ground beef analogs, using plant-based meats as a substitute in traditional recipes requires skill and creativity on the part of the cook, going against principle number 5. Finally, and perhaps most importantly, meat analogs are in direct conflict with the desire to eat less processed food, only adding to the confusion we see in finding 3.

Design imperatives are at their best when they frame problems as sets of interrelated needs that must all be solved at once. Currently, the alternative meat space is narrowly focused on one design imperative: *Create a plant-based food that mimics meat as closely as possible.* While this narrow focus has led to great strides, its limitations are becoming more apparent. It ignores other, equally strong, behaviors and beliefs associated with the overall experience of consuming plant-based foods. And the processing inherent in satisfying that narrow imperative may create problems of its own.

The most successful student projects in Part 1 of the Alt.Meat sequence in Fall 2019 aimed to reconcile seemingly contradictory needs with multifaceted imperatives: *Design minimally processed, high protein, plant-based foods that fit easily into already established shopping and cooking patterns.* Essentially, they aimed to satisfy all the needs *except* mimicking meat.

The team that won last year's class prize developed a pasta sauce based on high-protein legumes, vegetables, and spices whose protein content is higher than that of a typical meat sauce. It would sit alongside other ready-made pasta sauces in the grocery store, requiring no behavior change for those already buying sauce. And because it is essentially a curry cleverly made to taste good with pasta, whole legumes and vegetables are used with minimal processing.

Design imperatives can capture the complexity and contradictions within food design and help us create new foods that satisfy several needs at once. While these solutions are often technological, it is important to keep our perspective open to elegant low-tech ideas. Integrating all of the findings from ethnographic research with, for example, sustainability design imperatives requires integration into a systems view of the design challenge.

12.7 Systems Mapping to Understand Dynamics of Choices

"In simplest terms, systems thinking is a way of seeing and talking about reality that helps us better understand and work with systems to influence the quality of our lives. In this sense, systems thinking can be seen as a perspective. It also involves a unique vocabulary for describing systemic behavior, and so can be thought of as a language as well. And, because it offers a range of techniques and devices for visually capturing and communication about systems, it is a set of tools" (Kim 1999, p. 2). Through visualization of a messy system, patterns of behavior are determined and leverage points for creating changes in the system are identified. Systems thinking leverages learning about human behavior, such as that from ethnographic interviews, placing it in context to understand system dynamics and the enablers and inhibitors of change in a system (Kim 1999; Meadows 2008). How the system is perceived can vary according to how a given stakeholder is engaged in the system. Thus, systems thinking requires understanding all the stakeholders involved, mapping the system dynamics from each of their perspectives, and then examining the

patterns of interactions to determine in what ways the behavior of the system might be improved (Sterman 2000).

Figure 12.1 shows a systems model for understanding how to improve healthy food access in a low-income urban environment. Constructed as a community activity involving various stakeholders, it provided insight into key levers for increasing healthy food consumption, such as reducing neighborhood crime (Mui et al. 2019). In this systems map, a "+" represents a same relationship, meaning that the two linked elements move either up or down together.

For example, as the "availability of unhealthy food" goes up, "purchasing of unhealthy food" goes up, and similarly, as "availability" goes down, "purchasing" goes down. A "-" on a connector indicates elements that have a reverse relationship. For example, as "marketing and advertising for healthy food" goes up, "perceived value of unhealthy food over healthy food" goes down, and vice versa. The map captures the important interactions among subsystems of health motivation, food business development, economic opportunity in the community, and social support systems.

Imagine a similar map that captures dynamics we have raised around plant-based meat development. There might be subsystems around each of the findings from the Alt.Meat class: a reduced meat consumption cycle; a meat attractiveness cycle; a learning about healthy choices cycle; a processed food consumption cycle; and a cooking meals cycle. There also might be cycles to represent selection, preparation,

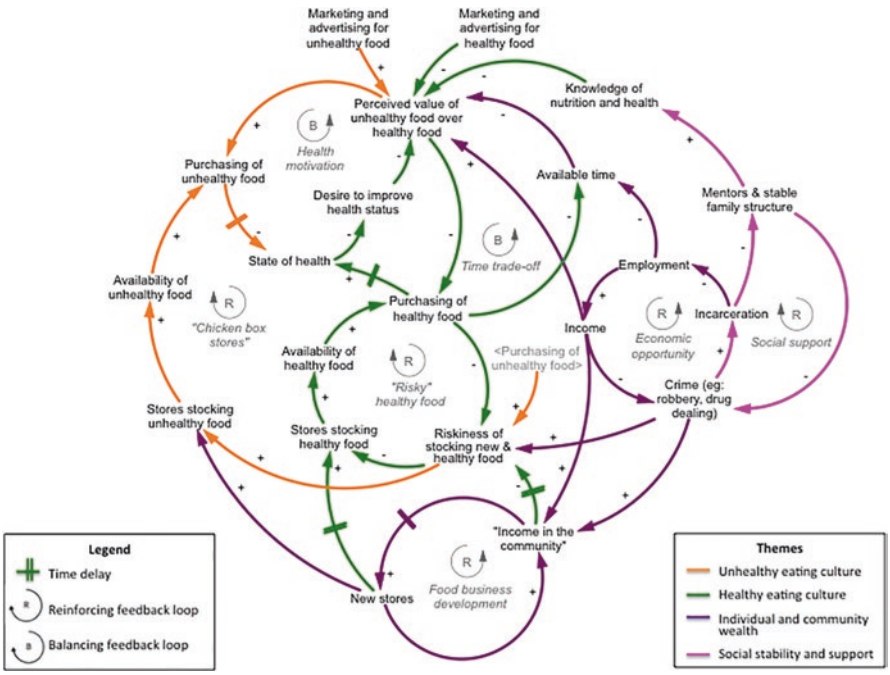

Fig. 12.1 Health food consumption systems diagram. (Mui et al. 2019)

and consumption of foods, and another that brings alive the social and cultural dynamics associated with consumption of food. All these subsystems represent information collected through ethnographic interviews.

There would also be subsystems representing the environmental and social effects of designing, producing, and distributing food. It is the intersections among these subsystems that will be of greatest interest and can determine how design imperatives might be constructed for future food design efforts to optimize the whole rather than individual elements of the system.

12.8 Implications

We have illustrated the importance of choosing design imperatives to frame the problem to be solved in a food design effort and the results of those choices in underserving consumers. We have highlighted ethnographic research and systems modeling as means of surfacing and selecting design imperatives.

To support meaningful development of design imperatives, design thinking scholars must more deeply understand "designerly thinking" (Cross 2006; Johansson-Sköldberg, Woodilla, & Çetinkaya 2013) and the downsides of "quick and dirty" ethnography (Hughes, King, Rodden, & Andersen 1994; Jordan & Lambert 2010; Wasson 2000). Deep understanding of consumers requires going beyond surface level questions and simple framing tools to get to meaningful understanding of customer experiences such as those derived by Quotient Design Research in the "snack bar company" example. Design thinking scholars must also contemplate integration of design thinking constructs with systems thinking (Dzombak & Beckman 2019) to appreciate not only human experiences but also the social and environmental impacts associated with those experiences.

Integration of a systems perspective will allow for policy makers to understand the impacts their choices might make, a possibility illustrated by a rich literature on the policy implications of plant-based meats (Jönsson et al. 2019). The creation of the systems map around healthy food access led to having a shared language across stakeholders, new understanding of the elements affecting healthy food access, and the possibility of simulating the healthy food access system to identify leverage points for creating change in the neighborhood food system (Mui et al. 2019).

The food industry will benefit from greater shared understanding across consumers, policymakers, and the industry itself of the larger dynamics of the food system. This will facilitate development of more inclusive design imperatives – beyond *create plant-based foods that mimic meat* – resulting in development of improved consumer experiences and health outcomes as well as products that have lower impact on the environment. Using systems mapping to create shared language between food industry participants and policy makers will facilitate execution of the new design imperatives.

12.9 Conclusion

The narrative chosen by industry to position plant-based foods can mislead consumers into believing that these foods are healthier and more sustainable than animal-based foods. This is because transforming plants into meaty products requires intensive processing and removes some of the benefits of eating unprocessed plants. If more stringent design imperatives are used to create novel plant-based foods, the complexity of the challenge increases and deep technological expertise is needed.

Tapping into Eastern traditions around plant-based foods, such as fermentation, has an immense potential to create better plant-based foods. Engaging in ethnographic research to unearth deeper understanding of how consumers experience food will allow for more informed choice of design imperatives. Creating systems maps will allow design teams to appreciate the leverage points for making positive change on multiple fronts through their design decisions. Taken collectively, it is possible to imagine reducing the environmental footprint of the food industry overall while at the same time creating healthier and happier consumers.

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Chapter 13
An Experiential View of Food Design Thinking: Expanding Consumer Centricity for Food Well-Being

Lia Zarantonello and Bernd Schmitt

13.1 Introduction

Food design thinking—the application of design thinking in the food industry—has attracted increased attention in the last few years. The approach has been described as "the *best* way to be creative and innovate" because of its focus on consumers in different phases of new product development and innovation processes (Johansson-Sköldberg et al. 2013, p.121). Marketing practitioners and consultancy agencies alike work in this field. To illustrate, IDEO, one of the leading design thinking agencies, has used its design thinking methods to help companies in North America to design and launch new food brands and has developed brand extensions in the food category (https://www.ideo.com). Other firms provide support to food businesses by designing new dishes, food products, food events, food services, food systems, and "anything in between" (http://fooddesignthinking.org). There is also increased interest among scholars, although the number of academic contributions is still small (Olsen 2015).

Although food design thinking has the merit of putting the consumer at the center of innovation processes, it also presents some drawbacks that need consideration. Having originated in a practitioner environment, food design thinking has the benefit of being an actionable and pragmatic process, but, at the same time, it may focus on the most evident aspects of consumer–product interactions that rarely offer a competitive advantage. We believe that food design thinking currently lacks a solid framework to interpret consumers' experiences with products and narrowly focuses on solving consumers' problems at the point of purchase or, rather, usage.

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The question is, therefore, how can companies achieve a better understanding of consumers and plan for experiences that make them feel happier?

The objective of this chapter is to evolve the concept of consumer centricity in food design thinking by providing a well-established theoretical background rooted in consumer experience and happiness studies. We argue that food design thinking needs to adopt an "experiential view" for consumer centricity. Such a view, in marketing and consumer research, has focused on understanding in depth how consumers relate to products, services, and brands through their experiences (Schmitt 2010). The experiential view has also shown how experiences can contribute to consumer happiness (Schmitt et al. 2015). Applying the experiential view to design thinking can help companies to design articulated, prolonged consumer experiences that improve consumers' life, rather than merely focusing on product interactions that satisfy a need.

To that end, we first review design thinking and food design thinking, then move on to the experiential view of consumers and food well-being, following which an experiential model of consumer centricity in food is presented. This chapter concludes with a discussion of the implications of the extended concept of consumer centricity for theory and practice.

13.2 Food Design Thinking

Design thinking was originally developed within the field of design studies (Buchanan 1992), but it has since evolved beyond a general form of "engineering" thinking when designing technical products as part of innovation. It has been described as a human-centered innovation process that emphasizes observation, collaboration, fast learning, the visualization of ideas, rapid prototyping, and concurrent business analysis (Lockwood 2010). Although practitioners have been using it for a long time, it is only recently that scholars have started theorizing it by clarifying, for example, how it differs from what are perceived as the best food innovation practices (Olsen 2015).

Food design thinking is a "process by which food designers transform knowledge and ideas derived from food science, food psychology and food culture into creative solutions" (Zampollo & Peacock 2016, p.203). Food design thinking results from the application of a design thinking mindset and corresponding methods to the food context. The core idea of food design thinking is to put consumers at the center of product development and innovation processes. This means that companies should involve consumers to identify problems and co-develop with them solutions for those problems (Seidel & Fixson 2013).

Practically, consumer centricity is achieved in design thinking by applying a series of methods that can be grouped in three categories (Brown 2009; Hargadon & Sutton 1997; Shane & Ulrich 2004). The first category, need-finding, is aimed at identifying the needs of consumers through a series of techniques, such as ethnography, that allow innovation teams to become "emphatic" with consumers and better

understand what they think and how they feel in relation to a problem. The second, brainstorming, intends to generate, together with consumers, ideas for product concepts as possible solutions to this problem. The third is prototyping, which involves consumer participation in co-developing and testing the product concepts derived from the previous phase.

Consumer centricity contrasts with the dominant way of thinking about food science and technology (for a review, see Busse & Siebert 2018). Traditionally, food companies have favored experts over consumers in the food development process, based on the belief that experts possess superior abilities to sensorially judge food products; they have involved consumers mostly at the end of these processes to assess the acceptance of new products resulting from the experts' analysis and evaluations (Olsen 2015). The techniques employed at this end stage include focus groups, conjoint analysis, and product-driven tests (Van Kleef et al. 2005).

13.3 The Experiential View of Consumers

13.3.1 Definition of Consumer Experience

The notion that consumers are not only rational decision makers but are also attracted by the experiential aspects of consumption—the "3Fs" (fantasies, feelings, and fun)—has been advanced by Holbrook and Hirschman (1982). Their experiential view of consumer behavior emphasizes the importance of nonutilitarian aspects of consumption, such as symbolic, hedonic, and aesthetic, that consumers pursue when they relate to different consumption objects such as products, services, and brands. The view was presented as an alternative to the mainstream information-processing view of consumer behavior, and is seen in the literature as a fundamental and complementary approach to better understand consumer behavior. The concept of experience has been at the center of this view and has been described as holistic, cumulative, subjective, and personal, an "assemblage" of different dimensions and "contrasting," because of the simultaneous presence of opposite elements, attitudes, and behaviors (Batat 2019). Over the years, it has been examined in relation to its process, dimensionality, and occurrence (Schmitt & Zarantonello 2013).

Consumer experiences can be described as complex processes occurring over extended periods of time. According to Arnould et al. (2002), experiences related to consumer behavior can be classified into four groups: (1) anticipated consumption, which includes searching, planning for future purchases, daydreaming, budgeting, and fantasizing; (2) purchase experience, which refers to choice, payment, bundling product, service encounter, and atmospherics; (3) consumption experiences, which relates to sensory experiences, satiation, satisfaction/dissatisfaction, arousal/flow, and transformation; and (4) remembered consumption, which is related to reliving past experiences, often in nostalgic ways by telling stories, comparing old and new times, talking with friends of days gone by, playing "what if," daydreaming, and

sorting through memorabilia and other mementos. All these phases of consumer experience are important from an experiential view, although marketing scholars have traditionally focused on first two phases, that is, anticipated consumption and purchase experience (Arnould et al. 2002).

Consumer experiences have also been described as a multidimensional construct. Scholars have examined the multidimensionality of the experience concept in relation to different consumption objects (e.g., products, services, and brands). In managerial writings, Pine and Gilmore (1999) identified four "realms" of experience—education, entertainment, escapism, and aesthetics—whereas Schmitt (1999) provided a classification of five types of experience—"sense," "feel," "think," "act," and "relate"—based on past work in philosophy (Dewey 1925) and cognitive science (Pinker 1997). Similarly, Dubé, and LeBel (2003) distinguished the four "pleasure dimensions"—emotional, intellectual, physical, and social pleasures—while Gentile et al. (2007) distinguished six experiential components: sensorial; emotional; cognitive; pragmatic; lifestyle; and relational. Brakus et al. (2009) identified four experience dimensions, labeled as sensory, affective, intellectual, and behavioral. This latter classification of experiences in a consumer context has become one of the most prominent in the academic literature and has been expanded upon in subsequent contributions.

Schmitt et al. (2015) identified a "relational" dimension of brand experience and Nysveen et al. (2013) demonstrated the relevance of the relational dimension of brand experience for service brands. Andreini et al. (2018) developed an advanced model where brand experience is articulated on three levels corresponding to the level of embeddedness of subjective experience in wider social contexts: microlevel, which takes into account dyadic interactions and encounters; mesolevel, based on structured patterns of action and interaction in collectives such as communities, social groups, subcultural or countercultural aggregates, and firms; and macrolevel, which considers broader social categories such as institutions, class systems, society, and intersocietal systems.

Consumer experiences can also vary based on the frequency of their occurrence and degree of novelty. Extraordinary experiences differ from ordinary experiences based on their lower frequency of occurrence, although they have greater memory impact (Abrahams 1986). Extraordinary experiences are intense, stylized, and can transform an individual who live through them. Examples from the literature include experiences of river rafters (Arnould & Price 1993) and skydivers (Loeffler 2004). In contrast, ordinary experiences are routine and are part of everyday life. Examples of ordinary experiences include walking and having time alone (Carú & Cova 2003).

To empirically investigate consumer experiences, researchers have applied a variety of methods from positivistic to interpretive epistemologies (Addis 2005), which scholars have often referred to as "experiential methods" because of their ability to deeply investigate consumers and their sensations, emotions, thoughts, and behaviors (Batat 2019). Methods based on positivistic epistemology include consumers' physiological response on central or peripheral levels (e.g., response latency techniques and neuroimaging techniques) as well as surveys and experiments using experience-related measurement scales such as the those for visual

product aesthetics (Bloch et al. 2003) and emotional attachment (Thomson et al. 2005) (see Zarantonello & Pauwels-Delassus 2015). Methods based on interpretive epistemology, in contrast, comprise role-taking, case study, participant observation, ethnographic, and netnographic approaches (including netnography mobile self-ethnography), as well as projective techniques, interactive and subjective personal introspection, phenomenological interview, photo elicitation, qualitative diary research, the Zaltman metaphor-elicitation technique, and multisensory sculpting (Addis 2005; Batat 2019; von Wallpach & Kreuzer 2013).

13.3.2 Consumer Experience and Happiness

The idea that consumer experiences are positively related to happiness is well established in the consumer research and psychology literature. Happiness can be described as "the degree to which a person judges the overall quality of this life-as-a-whole favorably" (Veenhoven 1984, p.22) and is closely related to concepts of life satisfaction or subjective well-being (Deci & Ryan 2008).

Some scholars have contrasted experiences, or experiential purchases, with material possessions or material purchases. Material purchases have been defined as "those made with the primary intention of acquiring a material good: a tangible object that is kept in one's possession," whereas experiential purchases are "those made with the primary intention of acquiring a life experience; an event or series of events that one lives through" (Van Boven & Gilovich 2003, p.1194). There is evidence that experiences make people happier than material possessions for several reasons: (1) experiences are more open to positive reinterpretations, are a more meaningful part of one's identity, and contribute more to successful social relationships (Van Boven & Gilovich 2003); (2) people talk more about their experiences than their possessions and derive more value from doing so (Kumar & Gilovich 2015); and (3) experiential purchases, such as travel and meals out, inspire more gratitude than material purchases, like clothing and jewelry, and lead to more altruistic behavior (Walker et al. 2016).

Research on materialism has found similar effects. Within consumer research, there are two major ways of measuring materialism and its effect on happiness: materialism conceptualized as a value (Richins & Dawson 1992) and materialism perceived as a personal trait (Belk 1985). Belk (1985) found negative correlations between materialism and happiness and between materialism and life satisfaction. Similarly, Richins & Dawson (1992) correlated materialism with various aspects of life satisfaction and concluded that those with high scorers for materialism were less satisfied with their lives.

Some scholars have emphasized the importance of certain conditions under which these findings may change. For example, Nicolao et al. (2009) found that the valence of the outcome of the purchase moderates differences in respondents' retrospective happiness with experiential purchases, leading to both greater happiness and greater unhappiness. Caprariello and Reis (2013) argued that although acquiring

experiences provides more happiness than material possessions, this effect depends on whether they can be shared with others versus consumed alone; spending money for social purposes—whether experientially or materially—was more important for consumer happiness than buying experiences or possessions per se.

Research also focused on the importance of broadening the concepts of consumer experience and happiness in order to better understand how they relate to one another. Focusing on extraordinary versus ordinary experiences, Bhattacharjee and Mogilner (2014) showed that age moderates the type of happiness consumers look for: younger people gain more happiness from extraordinary experiences, whereas ordinary experiences become increasingly associated with happiness as people get older, such that they produce as much happiness as extraordinary experiences when individuals have limited time remaining. Similarly, Schmitt et al. (2015) proposed evaluating the effects of experiential and material purchases, viewed as two separate dimensions instead of endpoints of the same continuum, on happiness both in the form of pleasure and meaning—the two key dimensions of happiness based on psychological studies, namely, hedonic and eudaimonic approaches (Kahneman et al. 1999; Waterman 1993). They also emphasized the importance of considering the type of experience that is evoked by experiential versus materialistic purchases, as it may moderate the relationship with happiness.

13.4 Food Well-being

The relationship between food and well-being has been emphasized in an influential paper by Block et al. (2011), in which they proposed shifting from the traditional view of "food as health," focused on nutrition and dietary imperatives, to a new view of food as "well-being," which provides evidence for the positive and holistic contributions that food can make to consumer well-being. They thus promoted a shift from a functional, authoritarian perspective adopted in food decision-making studies toward an integrative, positive perspective that recognizes the holistic role that food can play in consumers' lives.

They also identified five aspects that influence how consumers relate to food: social factors; economic issues; food literacy; emotional knowledge; and physical and psychological traits. Bublitz et al. (2013) further developed this perspective by identifying three types of goals for food well-being: functional; hedonic; and symbolic. Functional goals are about achieving health objectives. Hedonic goals refer to the gustatory pleasure and perception of well-being inherent in the experience of consuming food. Symbolic goals are associated with the creation of social links resulting from, for example, sharing meals with others, adopting a particular diet to adhere to, or remaining within a social norm.

Subsequent research on food well-being has further developed the notion of food contributing to consumers' well-being. Recently, Batat et al. (2019) expanded the notion of pleasure as a result of food consumption. Building on the concept of "epicurean eating pleasure" (Cornil & Chandon 2016), they developed the concept of

"experiential pleasure of food" as a "the enduring cognitive (satisfaction) and emotional (i.e., delight) value consumers gain from savoring the multisensory, communal, and cultural meaning in food experiences" (p.393) aimed at promoting enduring health and well-being. Similarly, Mugel et al. (2019) found support for the idea that food is not only associated with pleasure but also with enjoyment, where "pleasure is the good feeling that comes from satisfying homeostatic needs such as hunger ... Enjoyment, on the other hand, refers to the good feelings people experience when they break through the limits of homeostasis, when they do something that stretches them beyond what they were ... Enjoyment, rather than pleasure, is what leads to personal growth and long-term happiness" (p.282).

In summary, food well-being research has emphasized the complex role of food in consumers' lives and how it contributes to their well-being beyond functional and hedonic goals.

13.5 An Experiential Model of Consumer Centricity in Food

By bringing together the perspectives on consumer experience, happiness, and food well-being, we propose an extended, experiential model of consumer centricity, a concept which lies at the core of food design thinking. Based on the experiential view of consumers, we propose embracing a deeper and broader concept of consumer experience by focusing on several key aspects such as its duration, dimensionality, relationship with people's happiness, frequency of occurrence, and the nature of the context where they occur. Specifically, this relates to the following:

1. The *evolution of experiences over time*, beyond the point of purchase and usage, so as to consider the entire consumer experience, including what happens before consumption (i.e., anticipated consumption), the purchase and consumption experiences, and what happens after (i.e., remembered consumption and nostalgia) (Arnould et al. 2002). This means taking into account, for example, daydreaming and planning activities related to the consumption of a food product; the purchase of the food product and the environment in which this takes place; the actual consumption of the food product and consumers' sensations and feelings during that moment; and consumers' reflections and feelings after the actual consumption has finished. In the case of a wine product, for instance, this would mean considering not only when the wine is bought or drunk, but also when consumers start daydreaming about consuming wine on a specific occasion (alone, with a partner, or with friends) or planning the purchase and consumption, as well as when, after drinking it, consumers may live the wine consumption experience again sometime in the future, by thinking back to what happened or telling others about it.
2. The *different dimensions of consumer experiences*, that is, sensorial, affective, intellectual, and behavioral experiences (Brakus et al. 2009). This multidimensionality nature of experiences emphasizes the importance, in the food context,

of considering aspects not only related to the sensorial and gustatory stimulation, but others such as the emotions that food products trigger (e.g., nostalgia, gratitude, and satisfaction), the ability of food products to stimulate consumers' thinking (e.g., ideas for a new recipe or reflections about different cultures certain dishes come from), and certain behaviors or bodily aspects (e.g., healthy eating, or eating certain food to feel powerful and energized). It has been shown, for example, that wine consumption is not only associated with sensorial pleasure but also with emotional and cognitive responses (Charters & Pettigrew 2005), that French *haute cuisine* has moved from a supremacy of the gustative dimension to an overall stimulation of the five senses as well as intellectual and conceptual aspects (Hetzel 2004), and that chocolate consumption is connoted by affective and intellectual aspects such as recalling memories from one's past and feelings of nostalgia (Zarantonello & Luomala 2011).

3. The *positive relationship between consumer experiences and happiness*, which implies adopting a long-term perspective that takes into account pleasure and meaning happiness and goes beyond the merely momentary satisfaction derived from consuming a given food product at a specific point in time. Therefore, it is not only about feeling happy because of a pleasant and aesthetically gratifying dish, but also about feeling happy because of the meanings that food consumption gives to you (e.g., as a demonstration of love, affection, or care from a partner, or as a means to achieving a better, healthier lifestyle, or as expressing values about how food should be sourced and distributed within society). In the context of Valentine's Day, Close and Zinkhan (2006) identified "preparing & consuming food/drink" as one of the main categories of behaviors and rituals associated with this day and its celebration. They showed that consumers engaged in activities such as preparing romantic food (e.g., heart-shaped sandwiches and aphrodisiac dishes), having candle-lit dinners, cooking at home instead of going out (thus avoiding overcrowded restaurants), drinking expensive wine or champagne, and eating chocolate and desserts, all of which are associated with meanings of love, affection, and intimacy toward the other person involved in these activities.
4. The *frequency and the degree of novelty of consumer experiences*, based on which there can be ordinary versus extraordinary experiences. In the context of tourist food experiences, Quan and Wang (2004) showed that food consumption in tourism can be an extension of the daily, ordinary dining experience as well as part of the peak experience in tourism and in contrast to the daily experience. In non-tourist settings, consumers may access food-related extraordinary experiences such as going to a Michelin-starred restaurant or buying luxury food products to enjoy at home or with friends. Because of their high frequency of occurrence and low degree of novelty, ordinary experiences related to food may not be memorable but are still significant to consumers in other ways, for example, because they indicate the love, care, and attention given by a loved one.
5. Finally, the *nature of the context* in which consumer experiences occur, based on which there can be social versus individual food experiences. Even if eaten alone, food products can stimulate social experiences. Scholars have shown that

symbolic or iconic food products such as Nutella, even though they are very cheap compared to consumer electronics or automotive products, can stimulate brand communities of consumers in a similar manner (Cova & Pace 2006). Also, food products are often photographed and shared with others on social media (Zhu et al. 2019).

Our experiential model of consumer centricity in food is depicted in Fig. 13.1.

It is not rare to see innovation teams looking at consumer needs with a problem-solving mindset, focused on identifying food-related barriers that consumers verbalize, and trying to remove them. Their aim is usually to design a food product with features that address consumers' problems and hence increase their satisfaction during consumption. To that end, the research mostly focuses on point of purchase and usage, with ethnographic techniques being used to observe and analyze behaviors while collecting explicit verbalization of dissatisfactions and desires.

In contrast, following the points above for an expanded model of consumer centricity, we propose a shift from consumer satisfaction to happiness, whereby food products are means that consumers can use to feel happier. In this perspective, innovation teams could look for competitive advantages along the entire experience (before, during, and after the food consumption) and develop value propositions based on a multidimensional view of what brings happiness beyond the industry standard of "appetite appeal." To achieve this, innovation teams should widen the toolbox of research methods to include projective and implicit techniques that focus

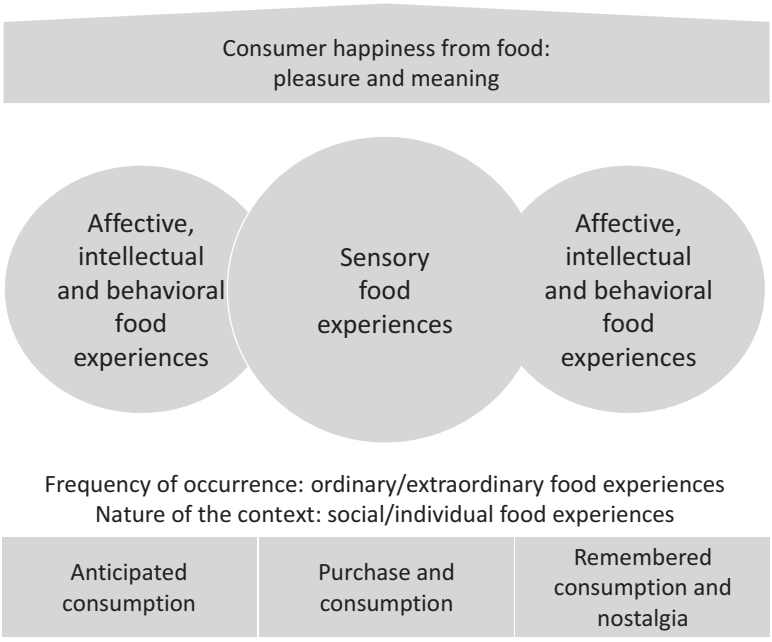

Fig. 13.1 The experiential model of consumer centricity in food

on the unconscious and nonverbal: qualitative diaries research, Zaltman metaphor-elicitation technique, interactive and subjective personal introspection (Batat 2019), and multisensory sculpting (von Wallpach & Kreuzer 2013) are all examples of this.

In Table 13.1, we summarize the key differences between the traditional view of consumer centricity in food design thinking and our experiential model of consumer centricity for food well-being.

To bring this difference to life, let us consider the example of a company that would like to innovate in the sweet-snacks sector. From a traditional perspective of food design thinking, innovation teams would probably understand what consumers want from a sweet snack and identify problems they have and possible alternatives.

For example, consumers may want energy for the rest of the day but not unhealthy ingredients. They would then identify product features that could address and solve these problems (e.g., which ingredients). Finally, they would identify competing sweet snacks that could be consumed on the same occasions and position themselves against them.

In contrast, by adopting the experiential view of consumer centricity, innovation teams would aim to design a snack that broadly makes consumers feel better but also less guilty. They would not neglect the anticipation moment in which desire builds, possibly trying to prolong it. They would also acknowledge how people tend to cope following sensorial gratification, and try to compensate the negative feelings by designing interactions with others or building additional layers of meaning.

In a nutshell, the innovation team would design a product for the entire consumer experience (before, during, and after the sweet snack consumption), expand gratification from sensorial aspects to the affective, intellectual, and behavioral aspects, and possibly identify competitive advantages by benchmarking themselves against wider competition in media and entertainment (e.g., a Facebook feed).

Table 13.1 Traditional versus experiential view of consumer centricity

	Traditional view of consumer centricity in food design thinking	Experiential view of consumer centricity for food well-being
Objective	To solve consumers' problems	To make consumers feel better
Moments	Point of purchase/usage	Entire consumer experience
Components	Fragmented view of experience	Holistic view of experience
Design focus	Design the product and its features	Design consumer experiences
Co-development	Of products/solutions	Of experiences/shared moments
Competitive set	Similar product features	Similar experiential benefits
Outcomes	Satisfaction by closing frustration gaps	Happiness by augmenting positive aspects
Research approach	Ethnographic research	Experiential research
Research focus	Observation and stated preferences	Emotions and implicit preferences

13.6 Conclusion

This chapter, based on the experiential view of consumers, contributes toward a more rigorous and theoretically grounded development of the consumer centricity concept. The literature review on food design thinking has highlighted the importance of putting consumers at the center of innovation processes in order to design products that are desirable, viable, and feasible. However, we propose that a deeper and broader understanding of consumers can be achieved by referencing to the concept of consumer experience and, in particular, by focusing on its duration, dimensionality, relationship with people's happiness, frequency of occurrence, and nature of the context in which experiences occur.

We maintain that a theoretically grounded experiential lens has the merit of evolving academic literature on consumer centricity for food design thinking beyond conversations on practical needs, product functionality, and the observation of the consumer–product interactions at the point of purchase or usage. Our model proposes extending the way consumers are considered and examined.

We advocate that food design thinking (1) shifts in focus from the point of purchase/usage to the entire consumer experience process; (2) adopts the experiential framework to build experiences with food products along affective, intellectual, and behavioral dimensions, not just sensorial ones; (3) examines the aspects of the consumer experiences that make consumers happy, that is, designing food experiences that make consumers happy, not just sensorially gratified; (4) takes into account the frequency of occurrence of food experiences and the degree of novelty; and (5) considers sharing and individual consumption. Indeed, adopting an experiential view of consumers would encourage academics to research new product design implications for moments other than purchase/usage, set consumer happiness as the ultimate goal of a well-designed product, and create richer interactions that encompass meaning as well as sensorial pleasure. We also call for further advancement and validation of the proposed framework.

From a practical point of view, this chapter aims to provide practitioners with a better-suited platform for food design thinking processes at a moment when the need for healthier and more natural products has moved from an emerging industry trend to a mainstream requirement. In fact, we maintain that this experiential view of consumer centricity in food design thinking enables practitioners to develop more credible and balanced products for well-being, where the jolt of sensorial gratification becomes a point of parity and just one of the dimensions to address when designing a consumer experience.

In this context, product features expand beyond texture, color, smell, and taste. They can now include elements that create competitive advantages in relation to anticipation and meaning by looking at new moments of interactions and experiential components (e.g., thoughts, feelings, and behaviors). Such products—explicitly addressing the demand for well-being and happiness—will be able to command a premium price.

We already see examples of such an approach in fast-moving consumer goods (FMCG) categories, such as teas, where the product is designed to deliver against people's mood rather than claiming better taste or refreshment properties.

In terms of process, our suggestion on how to frame and script the steps to develop consumption experiences for food products that sustain people's well-being comprises the following:

- Picture the person, not the consumer. Map what is a happy life for your target and how their well-being is derived from food.
- Benchmark your experiential universe, not a retailer's category. Identify competition that delivers well-being through consumption experiences. What are the points of strength? What is not (or is poorly) addressed?
- Move the dials to plan for a holistic response. What experiential components are over-represented and under-represented among competitors? Is there any mismatch in delivering well-being through balanced and healthier food products?
- Design for chains, not for hooks and triggers.
- Think about the actual purchase/consumption occasion as only one among the many moments of engagement. How do we build narrative tension? Can the moment of consumption become the climax by building an anticipation stage in which ease of access and consideration is achieved. Also, how do we establish a habit? Think of purchasing as a habit; plan it as a recurring event that can be established through careful management of the potential negatives emerging post food consumption.
- Augment value perception by designing the experience, as well as the product. Make it plural and social. Design food products that allow an experience of sharing or consuming with others. Sharing does not have to be limited to the actual moment of consumption. Also, make it personal. Infuse a sense of extraordinary even in routine habits.

We believe that a lot of work still needs to be done in designing healthier food products for well-being, paying attention to the moments when experiential components other than the sensorial engagement are dominant and not addressed. We believe it is possible to overcome the trade-off between "health" and "pleasure," and that the actions above can constitute a first step in this direction.

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Chapter 14
Precision Retailing: Building Upon Design Thinking for Societal-Scale Food Convergence Innovation and Well-Being

Laurette Dubé, Dilip Soman, and Felipe Almeida

14.1 Introduction

As a holistic framework, food well-being (FWB) is conceived as "a positive psychological, physical, emotional, and social relationship with food at both individual and societal levels" (Block et al. 2011, p.5). It traces ways forward for research and action for individuals and society through five domains: food socialization, literacy, marketing, availability, and policy. The decade that followed since the introduction of the concept has seen significant theoretical development bearing on the experiential quality of eating and its dynamics (Batat et al. 2019), as well as on the five primary domains (Bublitz et al. 2019; Scott and Vallen 2019).

Progressively, and understandably so, design thinking has taken a central stage in innovation pathways moving toward FWB (Olsen 2015). Illustrating the comprehensive approach underlying design thinking is defined in a foundational article by Tim Brown (2008, p.2) as a "discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity." By looping back and forth through the spaces of inspiration, ideation, and implementation, design thinking takes a system view of possible innovation and value creation pathways while being centered on a deep understanding of consumers' lives, both in their product-related and broader dimensions (Brown, 2009). Hence, different shades of such human-centered design approaches, very much core to FWB, have

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flourished, including lean startup (Müller and Thoring 2012) and agile innovation (Cooper and Sommer 2018).

Many chapters in this book open highly promising horizons for design thinking methods in accelerating innovations that contribute to FWB in one way or another. Innovation has been the accelerating agent of much social and economic progress since the onset of the first industrial revolution. However, it is now well known—in particular in the domains at the intersection of agriculture, food, health, and the environment—that not all of them are conducive to FWB, some being at the root of critical challenges facing the twenty-first-century society, including chronic diseases, climate change, and biodiversity loss (Dube et al. 2012). It is, therefore, useful to envision food well-being through innovations consumers need for their vitality and health; what they can and want to pay for; what the planet can offer in a sustainable way; and what actors in the agriculture and food sectors can and want to produce in a cost-effective and economically viable manner, a concept known as food convergence innovation (Dube et al. 2012, 2014, 2018).

As we enter the fourth industrial revolution that blurs the boundaries between the biological, physical, social, and digital realms (Floridi 2014), we introduce precision retailing (PR) as a solution-oriented transdisciplinary approach for a next-generation design thinking that can inform convergence innovation for societal-scale FWB. Bringing biological, behavioral, organizational, and complexity sciences together, PR borrows from precision medicine and its extension to neuroinformatics (Aronson and Rehm 2015) to trace the multi-scale mechanisms driving human behavior and uses behavioral, business and systems analytics to link these to multi-scale mechanisms of different types shaping real-world contexts.

The aim is to bridge the divides that constrain our ability to create a high level of convergence between economic, social, and commercial outcomes called for by societal-scale FWB. In this chapter, we first review the key components of the PR framework. We then delve into how current design thinking methods can be advanced to capture better the multi-modal and multi-sensory quality of food convergence innovation products and experiences. Finally, we sketch ways forward for business and other organizations as drivers of behavioral change and ecosystem transformation for lasting societal-scale impact.

14.2 Precision Retailing

Precision retailing (PR) takes an enriched view of "retail" as the gateway between individual decision-making (be it as consumer, producer, parent, patient, or citizen) and the professions, organizations, institutions, systems, and policies that impact adaptive or less adaptive real-world behavior in diverse and ever-changing modern contexts. Traditional linear linkages along these multi-scale pathways have been severed for long, and forces of change are many: technological, demographic, economic, a shift in values. Change in many everyday human behaviors and respon-

sible action on the personal and professional sides of life are pressing prerequisites to FWB at scale (Block et al. 2011).

Challenges arise in lasting behavioral change at scale in both personal and professional domains with the full diversities, complexities, interdependencies, and dynamic processes at play for the human brain guiding decisions in real-time and in real-world contexts, also characterized by unprecedented speed and connectivity. Moreover, a person is often facing conflict more than convergence among his/her roles as a consumer, producer, patient, and citizen (Dube et al. 2012, 2014). PR combines recent scientific advances in the understanding of the neurobiological and psychological basis of real-world human behavior, with the knowledge we have on intersectoral and multi-scale pathways creating real-world contexts. These provide insights for first moving toward better convergence for individual him/herself, in both mind and deeds. They also inform better convergence between economic, social, and environmental outcomes as a target for a product, experience, and systems created by all organizational and institutional actors involved in shaping real-world contexts.

Figure 14.1 assembles the different brain process components operating at any given point in time underlying real-world decisions. Decision-making under risk and uncertainty, anchored into the pioneering work by Herbert Simon since the 1950s on bounded rationality (Simon 1959, 1979), and later work on behavioral economics by Kahneman (2003), Thaler (2016), and Shiller (2017), reflect a rich portfolio of biases, heuristics, and other shortcut strategies that first accounted for every day deviation from normative rationality. For instance, prospect theory (Kahneman and Tversky 1979) refers to the perfectly rational homo economicus that has come to drive modern economy and society, to motivate a boundedly ratio-

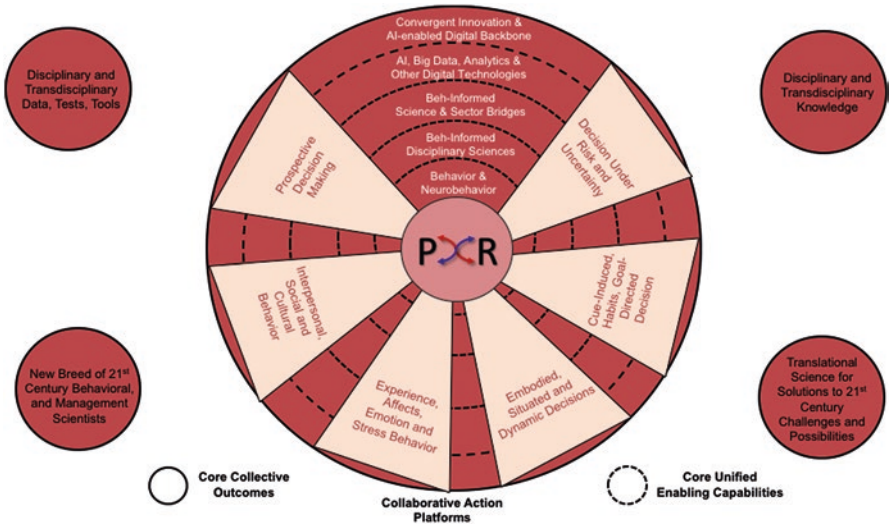

Fig. 14.1 The precision retailing framework

nal view of human decision-making, with the different value given to equivalent choice options as a function of their framing as gains or losses or their temporal or spatial granularity.

Advances in the same line of research now offer a general model of value-based decision-making supported by prefrontal cortex regions (Rangel et al. 2008), potentially informing nudge and other behavioral strategies in an adaptive/normative direction (Guthrie et al. 2015; Schonberg et al. 2014).

The second type of decision process consists of goal-directed, cue-induced decision-making (Decker et al. 2016). These are viewed as the outcome of a delicate balance between, on the one hand, impulses triggered by wired-in or learned internal or environmental signals of potential rewards and, on the other hand, one's ability to yield or exercise control as a function of whether such impulses are adaptive or maladaptive in achieving goals.

Particularly in domains such as food, challenges arise as immediate environmentally triggered goals often time conflict with more adaptive long-term goals of health and wellness, making lasting self-control challenging (Inzlicht et al. 2014). In turn, the embodied decision-making component accounts for the full array of multi-sensory, accelerating agent, and other biological processes activated by not only choice options but also by the whole situated context and states in which these are experienced (Clark 2013; Pezzulo et al. 2013).

Spread broadly across brain systems with the first engagement of frontoparietal regions and distinct contribution of temporoparietal junction (Arzy et al. 2006), embodiment and its situated interplay with cognition have thus far received little consideration in the decision-making literature (Cisek and Kalaska 2001). Nevertheless, they may be the most critical component when it comes to complex and dynamic "real world" behaviors in "real-time," whether decisions are made in a physical or digital context (Clark 2013; Gonzalez et al. 2017). Recent research provides mounting evidence on how vision, touch, taste, and other senses are not only singly and jointly processing objective external features, but also how they can assess and learn risk and rewards at the episode level and over time, leading, when appropriate, to habit formation and change (Lepora and Pezzulo 2015; Nagengast and Wolpert 2011).

PR further gives significant space in accounting for real-world behavior to immediate and chronic stress, affect, and emotion. These are vital evolutionary components of human experience with the amygdala as the central support, but they are core processes that drive short- and long-term decision-making and behavior (Blascovich 2014; Reeck et al. 2016). Consider emotions such as anxiety, hope, gratitude, regret, and trust (e.g., Dimoka 2010), all these emotions intrinsically bear an intertemporal linkage between the present state and behavior at both immediate and distant point in time (be it future or past). The nature of this link differs importantly from the immediate-transaction-only and future-to-present-temporal-discounting that are at play in earlier episode-level value-based and goal-directed decision-making components.

Another behavior component that goes beyond the episode-level decision-making dynamics underlies prospective judgments (Szpunar et al. 2014). These processes are being internally generated and supported by what is known at the "default network," brain systems they are typically disactivated in attention-demanding talk executive-control task (Adnan et al. 2019). Key among the prospective decision-making processes are the perception of others (theory of mind), empathy, and moral judgments (Laurita et al. 2017; Singer and Lamm 2009); one's self-perception and regulation over one's life course (Hershfield 2019); as well as mind wandering, mindfulness, and creativity (Stillman et al. 2017). Prospective judgments further enable the construal and bringing together of appropriate knowledge, reasoning, or mind wandering to support creativity, simulation, and projection (Baird et al. 2012; Beaty et al. 2018). For instance, neuroscience research has shown that increasing the salience of the future self-activates the default network brain area and dampens episode-level maladaptive present-focus intertemporal choice (Ersner-Hershfield et al. 2008). Relatedly, organizational behavior research showed that farmers and managers were more likely to engage in sustainability practices if these were associated with a sense of the extended present, instead of immediate action for a future outcome (Kim et al. 2019).

Last but not least, social components, in all their shades and across the lifespan, are integral component processes of real-world decision-making and behavior (Cacioppo et al. 2018). They are also supported by the default network connected throughout the brain (Bzdok and Ionnidis 2019). Starting with a parent-child attachment that contributes to a lifetime encoding of sensory, emotional, and cognitive tendencies, other social processes, namely, interpersonal, group, network, and cultural processes, not only impact the intrinsic valuation of choice option but also set parameters and norms for decision-making. Culture, for instance, gets embraced, even though it consists of historically transmitted patterns of meanings and symbols, explicit and implicit, while the behavior is acquired and transmitted by symbols (Mu et al. 2015). Subjective elements of culture include values, beliefs, attitudes, norms, roles, affects, cognitions, meanings, and mental processes, and are therefore likely to have pervasive influences per se and in interaction with other component processes (Geertz 1973).

PR acknowledges that all behavior components (triangles in Fig. 14.1 reviewed above) are potentially at play simultaneously as the brain makes decisions in real-world contexts. Bridging science, model, and data on these components provides a strong foundation for the scientific study of rational and less-rational motives and processes impacting human choice and behavior at the individual and aggregate level, in real time and in the real world. A few integrative "brain-to-society" models tracing some of these multi-scale processes have been offered, examining lifestyle choices (Dube et al. 2008; Neseliler et al. 2019), as well as subjective well-being (McAdams and Pals 2006; Sheldon et al. 2011), and self-generated cognitions (Fox et al. 2016). These models are also in line with the concept of consilience, defined as unity in human brain functions expected to reflect the unity of disciplinary science studying these (Wilson 1998). Figure 14.2 illustrates how these multiple components operating on multiple scales may come together in an updated version of

the brain-to-society (BtS) model of eating as a motivated choice, which places real-world human behavior at the intersection of neurobehavioral and societal pathways (Dube et al. 2008).

According to multi-scale models such as the BtS model of real-world behavior, human beings contain and are contained within a multi-level hierarchy of processes occurring at different scales and levels of analysis (Sheldon et al. 2011). In such complex and dynamic adaptive systems (Duggirala et al. 2017; Hammond and Dube 2012), each type of process operates at its own level, while influencing, or being influenced by, processes at other levels of the hierarchy. This is well illustrated in the following well-being context example provided by Sheldon et al. (2011, p.10): "… an anxiety researcher might want to know about the biological dysregulation that accompanies panic attacks, the cognitive processes involved in the construal of situations, the personality processes (traits, temperament) that influence the response to such construals, the interpersonal processes by which anxious personalities interact with others, and the cultural-level processes by which anxiety is evoked and channeled. This implies a five-level model for data collection: multiple biological processes accompanying multiple cognitions each nested inside of multiple types of personalities nested inside of multiple types of interaction patterns nested inside of multiple types of cultures."

Empirically examining such multi-scale dynamics is a daunting task. However, embracing some of these complexities, while accumulating evidence may be the only route to a truly comprehensive understanding of both real-world human behavior and real-world contexts. Dube and colleagues (Vainik et al. 2013; Silveira et al. 2016, 2018) have started exploring empirically such web of causal events within the FWB domain, establishing linkages between individual differences in dopaminergic gene systems translating into difference not only in corresponding neurobehavioral processes but also in the impact of social contexts on adaptive real-world

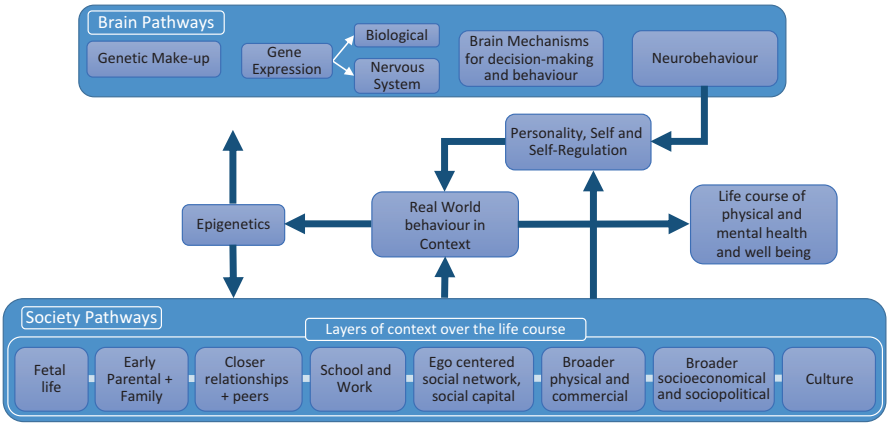

Fig. 14.2 The brain-to-society model of real-world human behavior in contexts. (Adapted from Dube et al. 2008)

eating behavior, including socioeconomic status and obesogenic quality of the food environment.

For instance, low socioeconomic children with dopaminergic gene expression, making them more responsive to environments, were found to eat more fat than those without this genetic variant. On the other hand, the opposite effect was observed for the same genetic variant in children with high socioeconomic status, that is, they were eating less fat than their corresponding control group (Silveira et al. 2016). The ambitious empirical and computational exploration of this complex, multi-scale, and dynamic interplay lies at the core of PR. This is becoming possible for a large part because of the digital revolution, now powered by a unique combination of big data and artificial intelligence (AI) that has transformed all of science and society to open new frontiers.

Combining omics with other aspects of the digital revolution in bio-medical domains (Aronson and Rehm 2015), neuroinformatics has started to bring together insights from neuroeconomics and other disciplines from the full neuroscience portfolio, which in combination with behavioral economics enable real-time assessment of neurobehavioral and psychological processes in diverse and changing contexts. At the same time, AI, big data, analytics, and other digital technologies have become ubiquitous on the social side of the BtS model, providing convergence insight and analytics on innovation, strategy, process, or practice deployed at professional, organizational, institutional, system, and policy level throughout all social and economic sectors of society (what has been called industrial revolution 4.0). By bringing together biological, behavioral, organizational, and complexity sciences, PR enables more precisely targeted, better differentiated, and more impactful solutions than the prior standard practice in supporting normative and adaptive real-world behavior in as real time as possible.

In sum, the twin overarching goals of PR are to embed the knowledge, data, and models of both real-world behaviors and contexts to enrich the disciplinary and sectoral science, innovation, process, and practice at professional, organizational, institutional, or system levels in all domains that contribute to individual and collective health, wealth, and well-being. AI can be used to identify the key behavioral and neuroscience constructs impacting human decisions at the individual level; understand how these conflict or converge in real time and in the long term in supporting real-world adaptive behavior at the individual level; and explore how AI and big data can help provide convergence insights on what can be adaptive human and machine decision-making and behavior guiding business and well-being (the How).

PR also uses a portfolio of characterization tools and integrative statistical and computational models to sketch a convergence analytic framework linking specific mechanisms of decision-making and behavior to multi-scale and multi-sector practice, strategy, system, and policy that altogether shape the diverse and dynamic conditions observed in experimental and naturalistic real-world physical and virtual contexts (the Why). Finally, PR uses the most recent design, delivery, and monitoring methods for convergence research and innovation in complex and dynamic contexts, building cooperative mindsets and lifelong learning for adaptive personal, professional, and organizational behavior (the What).

14.3 PR Insights into Design Thinking

How can PR inform a next-generation design thinking to enable societal-scale FWB, with current practice possessing already many needed building blocks? Indeed, design thinking and other human or user-centered designs already root innovation into getting close to users and observing their activities to unravel known and lesser-known needs and trends.

Searching for technologies or methods that can better satisfy them is currently done through rapid prototyping and testing, with each cycle developing a more refined, complete prototype. In basic terms, foundational/exploratory research is initially performed to understand the overall landscape of the problem and what should be designed. One of the most famous outputs in this first stage is the creation of personas, a document that provides an overall understanding of consumers or users, segmenting profiles in line with who will buy or use the product. As illustrated in Fig. 14.3, personas go beyond the traditional demographic segmentation to include emotional and contextual aspects of the user. Methods used to gather these data are primarily surveys (for demographics) and interviews with ethnographic methods (to understand needs, context, and behavior). Occasionally, psychometric and biometric data collection is added to better infer about overall personality traits and biological activation in response to stimuli or contexts.

Empathy letters are created to provide guidelines for exploring pain, gains, and routine activities that the researcher should focus on during the interviews or ethnographic research. In a later stage, confirmatory research is done to build, test, and iterate the design that was initially selected. Here, consumer or experience journeys, typically collected through observation and supported by methods such as neurophysiological data collection, can also be populated with results from user testing to precisely inform not just what are the critical moments of the experience for the user but also how critical they are. Understanding consumers and users is critical to optimize food innovation and experience along the whole journey, including pre- and post-use and consumption.

We propose that design thinking can be brought to another level by PR, combines the power of advanced analytics and AI with the richness of data on both the real-world behaviors and real-world contexts produced in real time with the ever-increasing and ever-faster digitization of everyday life, economy, and society.

The unprecedented innovation power, speed, and connectivity AI and other digital technology and computational methods accelerate our ability to capture the diverse, complex, and dynamic nature of consumer motives, values, and aspirations in a compliant manner to inform a sophisticated human-centered approach to the design of food product and experience that better captures their multi-modality and multi-sensorial nature. For instance, Bayesian networks (Marcot and Penman 2019) combine AI and statistics in models that graphically and probabilistically represent relationships among variables. Such modeling is useful for data mining and could be enriched by material from basic design thinking methods for determining and explicitly displaying the relationship among variables, representing expert knowl-

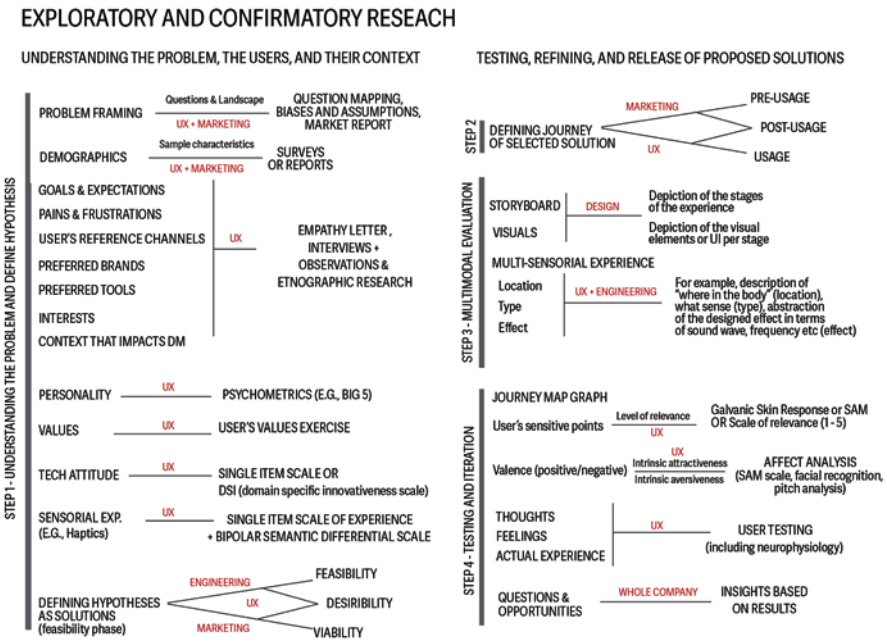

Fig. 14.3 Basie design thinking method

edge and combining expert knowledge and empirical data, and identifying key uncertainties.

In turn, deep learning models can compute complex and hierarchical representations of the date that can trace emotional and embodied processes surrounding value creation for consumer experience at the convergence sweet spot in either physical and digital contexts (Clerico et al. 2016). We elaborate further in both the contexts of convergence food innovation products and consumer experience.

14.3.1 Insights into Convergence Food Product Design and Delivery

Figure 14.4 illustrates the target convergence sweet spot described earlier for attributes of food products to be part of a diet portfolio supporting FWB. Where does the appropriate balance between sensory, nutrition, price, and the many other qualities expected at the convergence sweet spot that creates value in meat, dairy, or beverage product innovation?

A design thinking method suggested by Dorst (2011) defines the viewpoint from which the value to be created can be perceived (i.e., frame) so that the designer can apply a specific working principle associated with the viewpoint (i.e., "how") to then create the desired perception of value and underlying objective feature. To cre-

ate a frame, however, is essential to understand the landscape of the problem and critically think about it, questioning the diverse aspects that involve the user, the context, and even the problem definition itself.

Within the design thinking process, point-of-view (POV) is an exercise that uses a storytelling approach to create empathy about the user problem within its context. By creating a POV before exploring potential solutions, a team can describe the relationship between a fictitious consumer, how they perceive a specific product or specific product categories, their individual needs, desires, societal pressure, and also how they are influenced by other aspects of the industry and related industries (if necessary).

The POV should highlight the specific contexts that include the obstacles (pains) and the users' goals (needs). One way to elicit the representation in consumer minds in a holistic manner is by describing it as an open question focused on the problem, leading to multiple solutions. Questions such as "What is the food at the convergence sweet spot?" is a good example of a trigger (i.e., a motive that incites the start of a design problem) because it exposes two broad concepts (i.e., food and convergence) that can be defined by the team as they want (i.e., "what is the food?" and "what convergence are we talking about") but it should not be considered a general problem statement because it does not directly explore the needs or pain points in it. Questions such as "Why convergence in food products?" are better examples since this type of question is an attempt to critically think and expose the real problem and needs behind the problem. Here, designers can use tools such as the "5 whys" in an attempt to get to the core problem that should be addressed (e.g., building food that reduces the anxiety and costs of poor) and even the inferences made about the context (e.g., a future in which overpopulation and climate change consequences force people to still live in areas where water levels have risen above ground level).

By the end of the exploratory phase, and with the general problem described and the POV created to induce empathy, the team can start their informed search for hypotheses as a solution to the problem. How-might-we (HMW) sessions are well known between designers; herein, they are only a creative tool to reach to a large number of diversified hypotheses. Some guidelines to create interesting HMW questions are as follows: Amp up the good: questions in which a particular positive

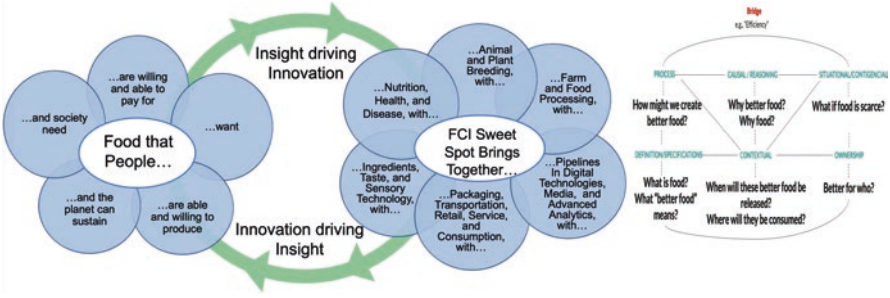

Fig. 14.4 Design thinking for convergence food product innovation

aspect is detached from fears and leads only to a positive outcome (e.g., "How might we use sustainable ingredients already used in the place to create food that is not so different to the community?"). Explore the opposite: questions in which fear or negative emotions might actually lead to positive outcomes (e.g., "How might we use fear of scarcity as fuel to explore sustainable alternatives?"). Question the assumption: questions that attempt to provide another perspective of the cause of the problem (e.g., "How might we enhance FWB without convergence?"). Create an analogy from pain/need or context: here, the question addresses the problem by transforming the need or context into an analogy that can induce empathy into designers and unlock new creative solutions (e.g., "How might we create convergence in food like a new language?"). Challenge the context: these questions are aimed at twisting the context to find new frames in which solutions might be perceived as valuable (e.g., "How might we create novel foods that make the current options look boring, unwholesome, and expensive?").

Typically, this creative design thinking process is complemented by (a) facts and empirical data: information from market research, competitive analysis, benchmark analysis, and others collected via secondary or even primary research (e.g., context inquiry or pilot studies) that can better inform you about the trigger; (b) biases and assumptions: a self-awareness type of work in which the team tries to list all their personal beliefs and assumptions that might consciously and unconsciously affect the search for innovative frames and solutions. Listing the biases does not fully stop their influence over one's decisions and creative solutions, but it can help. The team can and should also help by pointing out to these biases when the questions, gaps, and solutions are being proposed; (c) gaps: after this initial exploration is done, a first understanding of the general problem may surge by identifying possible gaps in the existing data. POVs should be written after facts, biases, and gaps are listed since a good POV should take into consideration these three factors.

POVs facilitate HWM sessions, which spur the generation of solutions and product prototypes that will be developed from defined consumers/users' segments. Similar POV exercise can be done with the various disciplines and practices that are to be brought together to assess the feasibility and long-term viability of convergence food innovation product (the right part of Fig. 14.4).

How can PR be embedded in such a twin design thinking process done with both the consumer/user of convergence food innovation and with experts from the different disciplines/practices needed for its actual design and delivery? Big data and social media analytics can inform on the diverse drivers of behavior in different populations and/or in the same individual in different situations or over time (Eisenberg et al. 2019; Michie et al. 2017). These can be combined with consumer journeys mapping that typifies behavioral economics methods to acquire a 360° view of how specific foods fit within specific types of eating episodes and how these episodes accumulate into a person's diet as part of one's livelihood, lifestyle, social life, or cultural values.

Consumer insights also explore how nutrition and health are positioned with other motives such as taste, fun, convenience, price, or others. Points of value creation can be specified along with the full experience of shopping, purchasing, pre-

paring, consuming, or disposing of food products. Loyalty and relationship management programs of manufacturers and/or retailers encourage the repetition of such cycles and provide an opportunity for assessment of long-term patterns and outcomes.

The second use of big data is for predictive analytics to generate new datasets that would otherwise not exist, integrating behavioral science with machine learning in a cycle where insights drive innovation and innovation drives insights (see Fig. 14.5). Given the wealth of data from the Internet, there are new technologies to extract information from unstructured data (e.g., text, images). Research study platforms like Ethica.com now allow researchers to collect textual and visual information from experiment participants. The analysis of this new type of data is made possible with the recent advances in machine learning.

Recent consumer data science research demonstrates the use of deep learning to help categorize pictures posted on social media platforms, like Instagram (Ravì et al. 2017). As posting pictures of meals/food is becoming increasingly common, these new data can be used to assess (in great detail) the type of foods that individuals are consuming. Text is another primary source of unstructured data, and natural language processing has allowed researchers to extract essential features from these data.

For example, fitness and food trackers are essentially modernized food diaries. Consequently, the ability to process, synthesize, and categorize large bodies of text at scale means that these new technologies can be used to convert food diary information into data formats that are conducive to further analysis (i.e., what foods people eat together at the same eating episode). Since it is the same person who makes food and eating decisions as a consumer who is also over one's life course in the roles of students, workers, parents, patients, or citizens, the integration of consumer insights and behavioral economics may help design and deploy intervention targeting lifelong FWB in a manner that is also economically, culturally, environmentally sustainable.

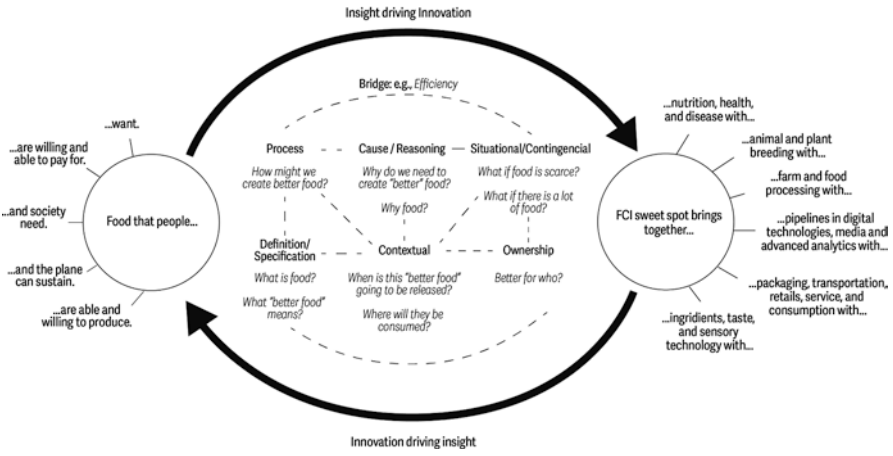

Fig. 14.5 The insight-innovation cycle

14.3.2 Insights into Multi-Sensory Consumer Experience Design

Eating is clearly a multi-sensory experience and emphasis has been placed on consideration of taste, flavor, mouthfeel, etc., and their balance with nutrition and other product features are the object of extensive exploration and optimization of product formulation. Here we take the consumer experience per se as a testbed and focus on the haptic sense to illustrate how design thinking and PR can be richly combined.

From a PR perspective (Culbertson et al. 2018), haptic experience consist of tactile behavior (expression) that is modulated by the relationship between emotional feelings (body), cognition (brain), and context (environment). The tactile behavior (e.g., light versus strong grasping) is influenced by the context of touch (e.g., neutral versus happy moment) and the duration, intensity, warmth, size of surface area, and wherein the body the touch is induced. Cognition is also responsible for creating behavioral control and prediction to infer the type of tactile behavior that is best suitable for the moment, and it does so by using previous bodily experiences and social cues (contextual information).

In human-machine interaction, it is possible that this framework can be applied with AI systems to induce more accurate haptic feedback (i.e., feedback better adaptable to the context). Context is, for example, critical in touch interactions because tactile behaviors (e.g., hug, squeeze, shaking) do not have universal interpretations. This means that the same behavior can communicate different types of emotions that can even be of different valence polarities (e.g., hate and love) (Hertenstein et al. 2009).

Hertenstein and colleagues also showed that affect discrimination via touch is influenced not only by the type of tactile behavior but also by its interaction with the duration and intensity of the stimulus. Thus, communication or expression via touch seems to be closely related to not just sensing the touch, but also to the context in which the touch is induced and to expectations (predictions) created by the brain using past bodily experiences (see Fig. 14.6).

14.4 Behavioral Change Through Organization, Institution, System, and Policy

Typically, design thinking ends by translating what is needed to deliver value along the consumer journey in an economically viable model into a business canvas. It is useful to note the difference in discourse between design and management. For design, discourse areas consist of the creation of artifacts, reflexive practice, problem-solving activity, reasoning/making sense of things, and creation of meaning (Johansson-Skoldberg et al. 2013).

Within the management literature, design thinking is based on three discourses: a way of working with design and innovation, a way to approach indeterminate

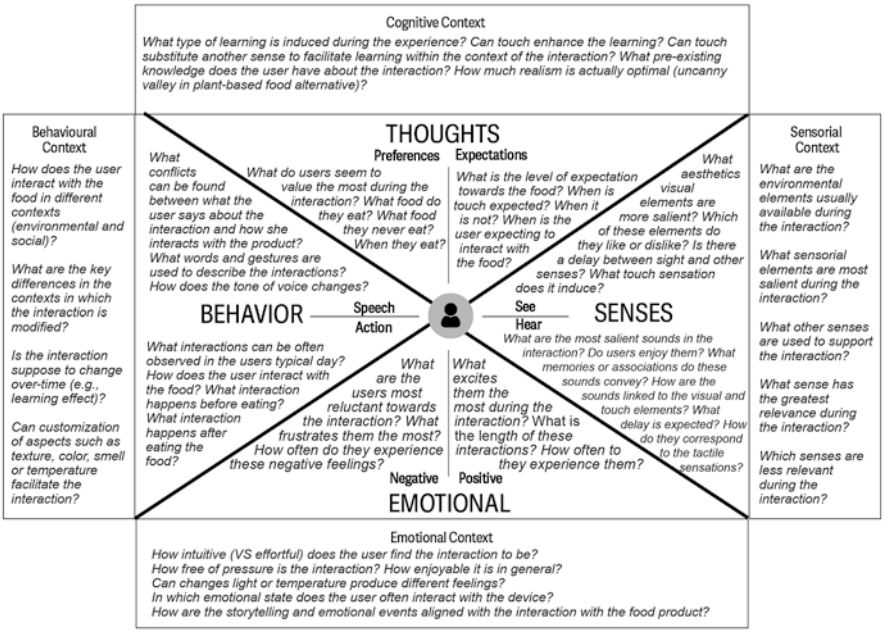

Fig. 14.6 Multi-modal and multi-sensory design thinking

organizational problems, and a set of necessary skills for practicing managers, and part of management theory. Every organization, institution, system, or policy is fundamentally in the business of behavior change. Whether it be a government trying to get business to comply with environmental regulation, a business convincing its customers to be loyal to their products, or a financial advisor encouraging a client to save for retirement, behavior change is critical to the organization's success. How can behavioral insights and PR best be embedded in organizations to achieve better outcomes, improve the efficiency of processes, and maximize stakeholder engagement? Behavior change challenges faced by organizations can be categorized into four types: compliance (i.e., convincing people to behave per prescribed standards), switching (i.e., persuading people to choose A instead of B), consumption (of information, medication), and acceleration of decisions (i.e., minimizing procrastination).

The regulatory and compliance world has used approaches that Ly and Soman (2013) refer to as restrictions. These approaches might include bans on specific behaviors, or restricted access to certain outcomes that force the individual to choose alternatives. In economics, behavior change is accomplished through both positive (carrots) and negative (sticks) incentives. Positive incentives include discounts, interest rate hikes (for savings), subsidies, and sales promotions, while negative incentives include penalties, taxes, and surcharges.

In advertising and communication, behavior change can be accomplished by providing the decision-maker with information that will allow them to make a more

prudent choice. Moreover, in the world of behavioral sciences, several psychologists (Mullainathan and Shafir 2009) have written extensively about the fact that small changes in context could trigger significant changes in choices and behaviors. This nudge/choice architecture approach to behavior change is another classic example of the use of psychology in behavior change (Tu and Soman 2014). Each of these four approaches is efficacious and has limitations when used in isolation (Soman 2015). This four-pronged approach to behavior change will be the basis of a behavior-change framework that we aim to produce (Soman 2015).

How can PR accelerate on-the-ground operation and adaptive learning for all organizations, institutions, and policy along supply chains and markets if they are to support individuals and society on their path to SWB? The current state of affairs in most research and innovation efforts does not fully account for the diversity of roles and behaviors of a person in his/her everyday life role as a consumer of private and public goods, services, and programs, as a citizen, or a producer played at community, organization, or institution level. PR can help articulate a person-centered systems approach to develop an empirical and/or computational model that links individual decision-making to the multi-scale convergence of technical, social, and institutional innovation through organizations.

Computational models can now be developed to capture some of this complexity, but they must be theoretically grounded and empirically informed. Big data and AI can be used to unravel mechanisms and establish causality when possible within individuals themselves and/or in terms of the combined contribution of the complex and dynamic web of biological, social, and system-level factors impacting a person's dietary behavior at any point in time. Such knowledge is necessary to know what works, for whom, when and in that context, and to inform the design of well-targeted nudges or any other innovation/interventions targeting improve nutrition and health. This ensures that the interventions work when they are expected to work.

Machine learning and AI have helped to improve the credibility of causal inferences. For example, an increasingly popular method for causal inference is using the random forest to obtain treatment effects that are heterogeneous across individuals. The ability to obtain heterogeneous effects will allow for better personalization of health nudges, as each individual (or population segment) will likely respond to the proposed behavioral interventions differently.

Person-centered synthetic ecosystems (SEs) can be developed as a virtual platform to make statistically representative synthetic populations and environments and to simulate the impact of different intervention prototypes over time by combining various disparate data collection efforts into a population-level, geographically explicit representation. This is obtained through the compilation and statistical extrapolation of various disparate data collections (census, cohorts, clinical studies, and diverse surveillance data) into a population-level, geographically explicit representation, to operationalize government, private, and academic research for population-level planning.

Traditionally, SEs have served as the basis for agent-based simulation in infectious disease, public health modeling, and transport modeling (Wang and Tang 2004; Monteiro et al. 2014; Bazzan et al. 2015; Yu et al. 2014). Synthetic ecosys-

tems give researchers the ability to map cohort and cross-sectional data collection efforts, environmental surveys, and geospatial information in a familiar environment to represent various indicators and population characteristics. They can be a powerful support to academic, private, and public research, action, and monitoring needed for societal-scale FWB.

14.5 Conclusion

The next-generation design thinking approach sketched here with PR integration is still in the early stages of development and deployment to help individuals, businesses, and society move toward the lasting FWB at scale. It is offered to serve as a springboard for scientists, designers, and consumers to create their breakthrough knowledge and equip them with bridging frames, mindsets, theories, and methods to understand and contribute to societal-scale behavioral change and ecosystem transformation. As human-in-the-loop cyber-physical systems (Shirner et al. 2013) are becoming core to the everyday life of individual, business, and society, this next-generation design thinking has the potential to accelerate societal-scale FWB.

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Chapter 15
Design Thinking to Engage Consumers in Achieving Zero Waste Food Experiences: The CEASE Framework

Sonia Massari, Marta Antonelli, Ludovica Principato, and Carlo Alberto Pratesi

15.1 Introduction

Every year, 1.3 billion tons of food is wasted along the food supply chain (FSC), from cultivation and production to final consumption causing significant economic, environmental, and social harm. Each year, approximately 1 trillion dollars' worth of food is wasted (FAO 2014) and the associated environmental costs, due to the use of natural resources required to produce food that is discarded or lost uneaten, amount to 700 billion dollars, with social costs amounting to approximately 900 billion dollars (FAO 2014). Food waste also poses a challenge to global food security: theoretically, if food waste were reduced by 25%, 821 million chronically undernourished individuals could be fed (FAO 2013; EIU-BCFN (2018).

Therefore, reducing the phenomenon represents a "triple win" solution: it can save money for smallholders and farmers, food producers, retailers, restaurant managers, and households, and it can alleviate world hunger (FAO 2019; Cicatiello et al. 2019). Wasting food means wasting the water, land, and energy required to produce it, while avoiding food waste would reduce food-related global per capita GHG (Greenhouse Gas emissions) along the food production–consumption chain, and consequently reduce the adverse effects of climate change (FAO 2013), which is

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why governmental institutions, companies, NGOs, scientific community, and individuals have recently shown growing interest in the food waste phenomenon (Schanes et al. 2018). According to the IPCC, the food waste-related GHG emissions account for 8–10% of the total emissions from the food system, with a climate change mitigation potential of 0.8–4.5 Gt CO2 eq per year (Mbow et al. 2019).

Food waste minimization has also been included in the 17 Sustainable Development Goals (SDGs) set by the UN as the third target of the SDG 12—Ensure sustainable consumption and production patterns—which states: "by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses" (SDG 12.3, UN 2015), and is consistent with many other SDGs, from SDG2, Zero Hunger, to SDG12, Sustainable Production and Consumption, and SDG13, Climate Action.

In developed countries, large amounts of food are wasted at the end of the food supply chain (European Commission 2010; USDA 2017), and according to the literature this is mainly driven by consumer behavior, habits, situational factors, and attitudes (Principato at al., 2020; Parfitt et al. 2010; Principato 2018). In the EU, for example, 70% of food waste occurs in the home and in the food service and retail sectors, with the production and processing sectors contributing the remaining 30% (FUSIONS 2016).

As opposed to food waste, food loss can be defined as the decrease in edible quantities of food in the early stages of the supply chain, from field to industrial processing. It is mainly due to economic and structural reasons, such as a lack, or inefficiency, of infrastructure and storage facilities. As such, it is more common in developing countries.

Food waste is a "nasty problem" that increasingly requires holistic approaches to include all actors, systems, and institutional structures involved, as well as to highlight multi-level and inter-sectoral solutions (Närvänen et al. 2020).

Food businesses are increasingly required to address the world's most pressing environmental issues. Processors, distributors, and retailers can substantially reduce their own impacts, starting from the reduction in food waste. This is also increasingly required by consumers. In 2019, when buying food, EU consumers looked for ethics and beliefs, besides cost and food safety (EC 2019a). This will require innovative approaches to the food business that, as such, can benefit from design thinking that is already helping companies and organizations to match people's needs with what is technically feasible and commercially viable (Brown 2008).

In this context, this chapter presents an analysis of the Too Good To Go app. The app is helping, encouraging, and motivating users to engage in food waste reduction, while persuading a smaller group to start taking concrete action to reduce waste. Nevertheless, to increase the impact on food waste reduction, additional action and a broader engagement on the part of businesses are strongly needed. Indeed, this chapter presents a new framework CEASE that deploys design thinking for the purpose of reducing food waste while aiming to build a community of conscious consumers that actively engage in food waste prevention actions.

15.2 Background

Design thinking can be defined as a solution-oriented and creative process based on an understanding of human values, needs, emotions, and desires (Massari 2017). According to the Hasso-Plattner Institute of Design at Stanford (2007), design thinking can be framed as a process consisting of five stages (Emphathize, Define, Ideate, Prototype, and Test). Design thinking provides a "systemic" vision, understanding the processes that are part of a system. As such, it can contribute to a paradigm shift that allows us to look at changes and change drivers from a different point of view, including the reduction in food waste. The popularity of design thinking in business research reflects the need to overcome silos and to introduce innovation for a more effective dialogue between different stakeholders, for example, in the area of corporate responsibility, which is increasingly challenged in grappling with climate change, financial crises, and market uncertainty (Bendell and Doyle 2017). Applying design thinking approaches can lead the designer to develop empathy for the people that will deploy or ultimately be impacted by the service or product (Visser et al. 2005; Young 2010). In addition, by applying design thinking methods to business processes, the creativity of the designer expands and a remarkable growth is achieved in the creativity of end users and stakeholders (Massari 2017).

Only a few studies have linked design thinking approaches and practice to individual cognition and decision-making for prompting business innovation. In recent times, there has been an increasing interest in design thinking approaches, both among scholars and practitioners (e.g., de Mozota 2010; Mutanen 2008; Perks et al. 2005; Veryzer and Mozota 2005). The concept has also been applied to sustainability (Young 2010) and the management literature (among others, Dunne and Martin 2006; Brown 2008, 2009; Martin 2011).Young (2010) identified five approaches that constitute design thinking processes: human-centered, research-based, having broader contextual view, collaborative and multi-disciplinary, using iterative delivery and prototyping. Design thinking can assist the sustainability transition of businesses, both in terms of becoming more resource efficient and in developing new business models that integrate sustainability and its core principles, through many facets, for example, eco-design, design for purpose, design for behavior and systems design, and enabling solutions (Young 2010). As an approach based on Consumer Empathy, Visualization and Rapid Prototyping, and Collaboration, it represents an effective food innovation practice (Olsen 2015).

The issue of sustainability has become more relevant recently, especially for companies, which are increasingly required to comply and align with the SDGs. Some of the key drivers of sustainable business practice include legislative pressures, brand/reputation management and risk mitigation, consumer demand, and employee satisfaction, which are among the key drivers for businesses adopting more sustainable practices (Young 2010), competitive advantage over their competitors (Ojo et al. 2015), with business model innovation being considered as one of the key tools to make strategic use of sustainability in organizations (Geissdoerfer

et al. 2016). In Europe, this process of transformation underpins the European Green Deal and the circular economy advocated by the "From Farm to Fork strategy" (EC 2019b). In this context, design thinking can be a tool for companies to innovate and achieve a sustainable business model or implement sustainable practices such as food waste reduction and redistribution by putting the end user's needs and values at the center of the analysis. Thanks to empathy and creativity, design thinking has the potential to solve complex problems such as those presented with sustainable objectives, with innovative solutions (Massari et al, 2020; Marti and Rizzo 2003; Manzini 2015; Massari 2012). Due to the role played by food in sustainable development, it is argued here that design thinking has a role to play along the entire food production chain, from the production phase to post-consumption.

15.3 Design Thinking Approach to Support Sustainable Consumer Behaviors

15.3.1 Change Mindset and Change Drivers

As shown by some authors, there are several approaches and actions to tackle food waste along the food supply chain (see Parfitt et al. 2010; Hanson and Mitchell 2017). However, no validation tools have been provided to determine whether these actions produce a long-term change of mindset, and therefore activate mechanisms through which, based on an understanding of food waste, people engage in no-waste behavior. It is argued here that, in order to achieve a real mindset change, it is necessary to reframe the issue and try to provide companies with design tools that are able to set specific steps which will really involve people in a human-centered approach to understanding waste and introducing new and more sustainable behaviors (for both end consumers and stakeholders).

In order to change the procedures and mental patterns of a community, the behavioral routines of individuals need to be broken (Verplanken 2010; Wood et al. 2002). An experiential change has to be activated to accompany and support the cognitive and cultural restructuring of a collective action. Tomasello (2005) argues that the roots of the human capacity for symbol-based culture, and the kind of psychological development that takes place within it, are based on a cluster of uniquely human cognitive capacities that emerge early in human ontogeny. These include the capacity to share attention with other people, to understand that others have intentions of their own, and to imitate not just what someone else does, but what someone else has intended to do.

We are aware that certain behaviors are not appropriate, such as reacting too hastily, smoking, or being too sedentary (Tomasello 2005). In this case, we are aware, but we do not become aware. Therefore, even though we are aware, we do not make a change. A good way to motivate the change is to make the effects of wrong behavior visible (Verplanken and Wood 2006). Many people do not wash

their hands before eating, but if a dye was used to make bacteria visible, everyone would wash their hands. But it will not be enough. Some types of behavior may be wrong, but we do not desist from them because they give us some kind of relief. The problem is that generally this relief is short term, but the negative consequences are only appreciated in the medium or long term. This chapter therefore presents an approach to promoting a long-lasting, deeply rooted, and positive behavioral change.

Reaching the SDGs and achieving resilience, that is, the ability to adapt to change, is not just a technical exercise. True transformation will happen only if social aspects remain at the forefront. In this process, food takes on a special value, representing a way to build a community, the nucleus which values and people revolve around. Social-ecological systems can combine the more technical aspects of sustainable development with its social and personal ones.

It is important to try to better understand what forces are driving behavior and begin to discuss the values which support them. If the only goal is to produce food at a low cost, the current agri-food system is fine as is. But if, for example, we want to produce healthy food which aims to achieve environmental, economic, and social sustainability, it is essential to try to get people with different points in touch with each other. The values we need to work on cannot just be "taught." Instead, they must be transmitted through food experience; we need to create empathy between humankind and the environment (Batat 2016, 2019). Sustainability and resilience are not just technical matters; they need to be approached from a social perspective as well.[1]

15.3.2 Too Good To Go: A Case Study

Too Good To Go is an application that allows consumers to connect directly with retailers to give them the opportunity to put the surplus food back into circulation at the end of the day. Retailers can sell their food surpluses through Magic Boxes that represent the strength factor of this model. The use of the app has the potential to contribute to the achievement of the SDG 12.3 target which requires a 50% reduction in food waste per capita. Although the business model of Too Good To Go requires considerable involvement on the part of the end user, it still presents an opportunity for improvement to ensure clear communication of its intent and as well as freedom of communication and creativity between end users.

Too Good To Go embraces four main values: responsible consumption, responsible use of resources, environmentally friendly, and raising awareness about food waste. Too Good To Go emphasizes the importance of four main actions: trusting, moving forward, thinking, and growing. This may be reminiscent of a Deming

[1] From an interview to Katrina Brown https://www.barillacfn.com/en/magazine/food-and-sustainability/empathy-between-man-and-environment/.

Cycle (Plan, Do, Check, Act) characterized by stronger social and environmental components.

Too Good To Go was not the first app launched to tackle food waste; many technological innovations over the past four years have tried to do the same thing but more slowly and less effectively. There are several reasons for the strong growth experienced by Too Good To Go in recent times. The most significant element is its business model. In fact, the success factor behind this application is the Magic Box, which literally paved the way for the dissemination of Too Good To Go. The Magic Box is a small bag containing a surprise selection of fresh products and meals that remain unsold at the end of the day and which cannot be put back on the market or served the next day.

This makes life easier for retailers as the only commitment they have is to collect leftover food at the end of the day and make up the Magic Box. This is fundamentally important, as making the management of food surpluses simple for retailers is a strategic lever for the successful implementation of Too Good To Go. Retailers tend to have no way and no opportunity to manage their unsold food through offers or announcements, as these are activities that require time and resources they do not have during the working day. Making up the Magic Box, on the other hand, requires no effort and is decidedly better than the alternative of randomly advertising products often considered "undersold" because of their low quality. However, one has to be careful about associating food waste with low quality. Very often unsold food is considered to be of a lower quality than the food successfully sold by the store, but it should not. The food contained in the Magic Box is of equally high quality but has not been sold due to a variety of simple reasons and circumstances: for instance, because of a particularly rainy day that caused a smaller number of people to visit the store than expected.

Another strategic lever for Too Good To Go is the simplicity of the app for consumers. Once the app is downloaded to the phone and geolocation is activated, users can view the participating stores and select a nearby retailer and purchase a Magic Box. Users get a great offer, paying just one-third of the full price and obtaining a complete meal. After having ordered the Magic Box, the order is paid through the app and is picked up in the time slot specified by the app at the store. Only then do consumers discover what is inside the box. The food-saving potential of the scheme is always emphasized to the end user.

Another factor supporting Too Good To Go is the international dimension of the project. When it was set up, the Too Good To Go model was validated in several countries through pilot projects, more specifically in Denmark and France. In these two countries, it spread widely in the main cities (in Paris, there are currently more than 2000 participating stores). Strong collaboration with the large-scale retail trade, such as Carrefour, has allowed Too Good To Go to expand very quickly. In France, there are more than a thousand Carrefour points that have joined and are contributing to a reduction in food waste, thanks to this app.

Too Good To Go is proving to be an effective means of reducing food waste, not only in terms of international distribution but above all for its win–win–win

business model. Retailers are able to dispose of surplus food while at the same time gaining several advantages: from strengthening their eco-friendly image to possibly acquiring new customers. Consumers can buy good food at a cheaper price while at the same time saving food that would have been thrown away and, from a sustainability point of view, food waste is reduced.

As a study reported (van der Haar and Zeinstra 2019), consumers have various reasons to make use of Too Good To Go and use the app in different situations. From the focus group discussions, it became clear that there are three main drivers for using/installing the app: saving money, reducing food waste, and having a surprising experience. These three drivers create a synergy that cannot be separated without devaluing the concept. When users in our survey were forced to choose their main reason for using Too Good To Go, reducing food waste was most often chosen (35%), followed by the surprise experience (26%), saving money (20%), and being part of a movement (17%). As for changes in attitude, motivation, or behavior regarding food waste as a result of using the app, only minor effects were found in this study. A few participants indicated some changes in their attitude or behavior since they started using the app because their awareness of food waste was already established prior to using the app. For them, using the Too Good To Go app reinforces this awareness and supports users in their efforts to reduce waste food.

Moreover, 22% of the respondents indicated that they started other actions to reduce food waste, such as buying fewer groceries, cooking more creatively with leftover food, freezing food or leftovers more often, buying groceries more conscientiously, cooking less food by determining amounts according to how much food is actually needed, and checking stock (e.g., in the fridge) more frequently. These reported actions have been linked to food waste behavior and food waste prevention in the literature (Van Geffen et al. 2016).

An additional aspect of Too Good To Go was the creation of a Facebook group where users started sharing their experiences, writing, and posting photos of the Magic Boxes. With pre-made apps, users are sometimes destined to experience a standard process, which removes creativity from the user experience. Too Good To Go has given free rein to the spread of these emerging groups that create a fundamental opportunity to manage the end user experience and how it is perceived.

This chapter seeks to answer one of the questions the report leaves open and which in our opinion is one of the main challenges for developing future sustainable food innovation business models, and that is the effect that will most likely be achieved when Too Good To Go is able to get consumers on board who are currently less aware and less engaged in the food waste problem and the potential solutions. In this scenario, what are the levers that must be taken into consideration to involve and change the behavior of a more general target of users, which therefore also includes those less aware and less engaged in the food waste issue? Our goal in this chapter is to present CEASE as a Design thinking framework that can guide initiatives against food waste toward more effective business models, with a longer lasting in the future.

15.3.3 New Design Thinking Framework: CEASE

The goal of this chapter is to investigate how to build innovative business models and initiatives that engage consumers who are currently less aware and less engaged in the food waste problem, in long-lasting behavior change and produce more substantial impact in the long term.

For this purpose, we analyze and validate the disciplinary approaches that most deal with food waste. We started by analyzing the five assumptions that Stickdorm et al. consider fundamental in service design (2011), which are as follows:

1. Always user-centered.
2. A co-design process: users must be involved in every design step. In order to be able to design systems and services for food waste, from the early design stages, the concrete involvement of people (both users and stakeholders) is needed through creative methodologies (approaches), toward a concrete and long-term impact.
3. Sequential, but never a linear process.
4. Evident from the outside: intangible services must be as tangible as possible, particularly through physical artifacts.
5. Based on a holistic and systemic approach: the entire surrounding environment must always be considered to reflect the complexity of the system and look for potential opportunities.

The marketing approach is somewhat complementary to that of service design as described above. In particular, it reinforces the principle that people are always at the basis of innovative services, and consequently relationships (between people and other people, or between people and objects, between people and organizations, or between different organizations). If Service Design supports the 3P-based approach which includes Participants, Processes, and Physical Evidence, on the other hand, marketing supports the 4P-based approach (Product, Price, Promotion, and Place).

At first glance, it might appear that the goals and assumptions of marketing are incompatible with the goals and assumptions of sustainability. Traditional marketing encourages growth, promotes an endless quest for satisfying needs and wants, and seems to view resources as ever abundant (Csikszentmihalyi 2000; Swim et al. 2011). In contrast, a sustainability focus suggests that utilized resources can be renewed by mimicking the circular flows of resources in nature, and it respects the fact that the capacity of both resources and the environment are limited (McDonough and Braungart 2002; Mont and Heiskanen 2015; Secondi et al. 2019). A framework called SHIFT supports the important role of marketing in encouraging sustainable consumption. It proposes that consumers are more inclined to engage in pro-environmental behavior when the message or context leverages the following psychological factors: Social influence, Habit formation, Individual self, Feelings and cognition, and Tangibility (White et al. 2019).

In recent years, social design has further contributed to providing creative solutions for the sustainable development and well-being of individuals and communi-

ties. The added value that social design has brought to other approaches has been to ensure a positive impact in social circles, therefore, to sensitize the whole of society to design and therefore also to disseminate positive practices, which can be accepted/shared by larger or smaller communities. David Kelley and Tim Brown of the Ideo Company and the D-School of Stanford University (Hasso Plattner Institute of Design at Stanford 2007) have provided in the last 20 years easily understandable tools to teach managers and CEOs to use the Design thinking approach by five phases: " Empathize -> Define -> Ideate -> Prototype -> Test."

In the Too Good To Go case study, we found all the strategic business goals underlined by marketing, service design, and social design approaches. Starting from the analysis and results of the Too good To Go case study, we identified five challenges and drivers of behavioral change that can encourage sustainable behavior and lead to more systemic businesses:

1. *Communication*: build communication channels with the communities, both through internal and external communication networks.
2. *Empowerment*: lead consumers to concrete and tangible operations and actions; help them to believe in a common vision and therefore to support their engagement and commitment to sustainable development.
3. *Awareness*: launch services that have educational objectives. The goal is to change behavior toward more sustainable and correct solutions; launch calls to action directly among consumers, to actively involve them to participate in concrete and tangible experiences.
4. *Shareability*: create pathways for users to share their experiences together both online and offline.
5. *Ecology*: take into account the diversity of targets, encourage all behaviors that positively influence into the community and have a measurable long-term local impact.

The five drivers described below can be used to capitalize on the marketing, service design, and social design approaches and deliver a new potential design thinking framework to create innovative food businesses aimed at more conscious and responsible consumers. This new design thinking framework, represented by the acronym CEASE (Communication, Empowerment, Awareness, Shareability, Ecology), has the potential to impact on both individual and collective behavior, which in turn has a positive impact on tackling food waste and has long-term consequences (Fig. 15.1).

15.4 Discussion and Conclusion

In this study, we approached the food waste issue using design thinking methods, highlighting the fact that if we want to pursue a zero waste society, we need to engage with consumers and empathize with them. To gain an empathic understanding of the problem means to find out more about the area of concern through observ-

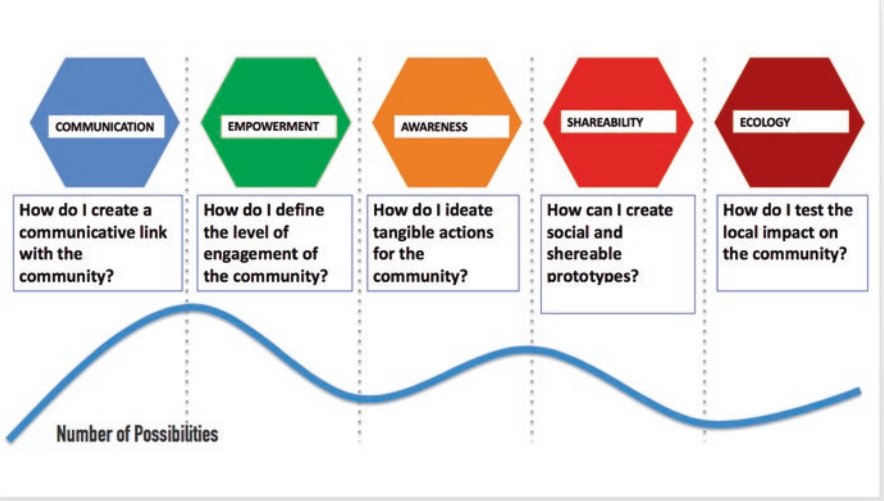

Fig. 15.1 The new CEASE design thinking framework based on Stanford's design thinking model

ing, engaging, and empathizing with people to understand their experiences and motivations, as well as immersing in the physical environment to gain a deeper personal understanding of the issues involved. A substantial amount of information is gathered at this stage to use during the next stage and to develop the best possible understanding of the users and their needs.

As highlighted in our background, a zero food waste society increases individual and collective well-being, thanks to the improvement in food availability, more informed food consumption, and a reduction in the environmental impacts related to food waste (as highlighted by Block et al. 2011).

The CEASE framework aims to help business foster consumer engagement, and ultimately promote food well-being. Understanding these five stages of CEASE will empower anyone to apply the design thinking methods in order to solve complex problems that occur around us—in our companies, in our countries, and even on the scale of our planet. This means that the new business models need a different generation process, as conventional methods do not respond sufficiently to the demands and challenges of today's society. The CEASE framework puts the final user at the center, as shown by the engagement, the call to action, and the enabling tools provided to the end user. At the same time, this framework must also satisfy a diversity criterion so that it can be used by the largest possible user base (e.g., the shareability of the experience).

Through communication, end users will naturally become increasingly aware of the theme addressed by the project and be able to make a more substantial contribution to the cause and contribute to achieve a greater local impact in both social and environmental terms, thanks to his experience as a user. The values of this framework lie in its capacity to provide end users with an experience in which everyone

feels involved and important to contribute to reducing food waste while improving the lives of individuals and the entire community. An extra value generated by this model is the sharing of a common goal between end users and the opportunity to directly share their experience with other users, generating new stories and new knowledge and consequently greater awareness among the people involved.

It is argued here that the use of design thinking in business innovation has the potential to encourage more sustainable design, but it depends on what criteria are applied to the observation of users, the choice of their needs to be explored, and the company's intention. The use of design thinking involves a shift in mindset, from considering a product simply as a physical thing to regarding it as part of a set of relationships that fulfill various purposes for different people. This is part of the experiential consumption as shown by Addis and Holbrook (2001).

Design thinking could encourage businesses to respond to the needs of consumers, rather than seeking ways of marketing existing things to them. This is closely connected to developing a functional perspective on what consumers do, and why they do it.

Taking a consumer need perspective, or "functional approach," and seeking to meet that within resource constraints, is a key sustainability policy paradigm (UNEA 2016). Design thinking can thus provide a new way of practicing a more connected and holistic way of doing business by embracing different points of view as it is about designing methodologies (Brown and Wyatt 2010).

The proposed CEASE framework is a first attempt to inform new business innovation to tackle food waste. A number of limitations and directions for future research are acknowledged, such as the need to develop key performance indicators for each of the proposed heuristics informing the CEASE framework as well as the need to test concretely in business environments. Through the implementation of the CEASE model, the end user will feel more and more responsible, not only in the consumption phase, but in the choices of the whole food supply chain. To achieve this result, big companies and especially start-ups need to focus primarily on the involvement of people in their processes.

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Chapter 16
From Food Product to Food Experience: How to Use Design Thinking to Service Vulnerable Populations and Improve Their Food Well-Being

Nina Veflen and Øydis Ueland

16.1 Introduction

Design thinking, the process of transforming deep user insight into new solutions by utilizing methods and mindsets borrowed from designers, has evolved to become one of the most rapidly spreading approaches for development globally (Pitsis et al. 2020). Today, design thinking is applied not only for product and service development but also for societal, political, and economic problems. For instance, d.school at Stanford University offers courses in designing for social systems with the aim of empowering nonprofit and philanthropic leaders and practitioners to work in more effective, human, and strategic ways (Designing for Social Systems n.d.). The world-famous design company IDEO presents examples of how design can be used to shape the world we want to see on its homepage (The future of . . . n.d.). Designing for circularity, reducing plastic, redesigning cities, and improving peoples' emotional well-being are some of the examples it mentions.

The food industry also applies design thinking. In a *Harvard Business Review* interview, CEO of PepsiCo Indra Nooyi explains how design thinking helped her to turn the company around (Ignatius 2015). Design in PepsiCo is no longer limited to choosing the packaging's color. Today, design has a voice in nearly every important choice the company makes—design thinking is driving innovation.

Although its popularity has grown, design thinking is still an infrequent approach to food development (Olsen 2015). While the design thinking approach takes consumer insight as its point of departure for development, the contemporary view within food science is to perceive the consumer's voice as a validation of the expert's voice.

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While design thinking asks for an ethnographic deep dive into consumers' life to finding needs and unsolved problems, the traditional food science view asks for consumers' product acceptance (Olsen 2015, p.183). Experts' and trained sensory panelists' product evaluations are often treated as the core, while the voice of the consumer is added later in the process to secure acceptance. Few studies have empirically investigated design thinking within a food context. One of the few is a qualitative investigation of one agricultural design project in Australia, which found that a key advantage offered by design over conventional strategy and innovation approaches is the ability and the project structure to (re)frame the perceived challenges (Peppou et al. 2017, p.13).

Another is Gonera and Pabst (2019), who identified distinct challenges and benefits of using design thinking in large food research projects. To our knowledge, no one has investigated how design thinking can contribute to healthy food consumption among vulnerable populations.

The aim of this chapter is to discuss whether design thinking can be a useful approach to promote and enhance healthy eating behavior among vulnerable populations. After presenting what we understand by food experiences and healthy eating for vulnerable groups, we discuss how three specific aspects of design thinking—empathy, visualization, and collaboration—can promote or enhance healthy food consumptionexperiences.

16.2 From Food Product to Food Experience

The food value chain is a complex matter, ranging from "the farm to the fork." Traditionally, food science has focused on the food product. The aim has often been to optimize production, to make the product safer and healthier, to extend its shelf life, to improve its sensory properties, etc. However, over the last 30 years, consumer sciences have played a more prevalent role within food science. The MAPP, a marked-oriented research center investigating consumer food experiences, was founded at Aarhus University in 1991 (see Scholderer and Brunsø 2013 for a history of MAPP). Already in 1995, Grunert published a model of how consumers mentally link their perception of food product characteristics to self-relevant consequences. This model describes how consumers' experience of food depends not only on their perception of food quality, but also on the usage situation, the shopping script, the meal preparation script, and their motivation to comply (Grunert 1995).

More recently, the discussion within food marketing has revolved around food experiences for well-being. Block et al. (2011) proposed that we restructure the food-as-a-health-paradigm away from the emphasis on restraints and restrictions and toward a more positive, holistic understanding of the role of food in our overall well-being. They argued that "no one sits down to eat a plate of nutrients" (Block et al. 2011). Rather, people are seeking physical, psychological, and emotional nourishment from food consumption. Food well-being is the experiential pleasure of food, what Batat et al. (2019, p.392) defined as "…a journey that involves the

enduring cognitive and emotional pleasure consumers gain from savoring the multisensory, communal, and cultural meanings of food experiences."

Within this stream of literature, food experiences have to do with both food practice activities and consumption—the immediate, the remembered, and the expected food pleasure are highlighted. In addition, food consumption has to do with connection to other people, food cultures, and society as a whole. The fundamental philosophy behind this approach is that greater consumer well-being can be enhanced by supporting positive associations and emotions around food activities (Batat et al. 2019).

Previous studies have found support for the view of treating a food experience as a journey. Schifferstein et al. (2013) investigated how consumers experienced a food product at different stages of product usage; they found that different sensory modality influenced consumers during their food journey. When choosing a product on a supermarket shelf, vision had the largest influence. When opening a package and cooking food, smell was most prevalent. Taste dominated the eating experience. They found that food experiences were not static but varied over time. In their review paper, Dacremont and Sester (2019) discussed how food behavior is modulated by a large variety of contextual factors related to physical, social, and temporal environments; the intrinsic properties of the food; and individual characteristics (Dacremont and Sester 2019).

Another study found that convenience food consumers faced trade-offs related to factors such as sensory perception, health, economy, managing relationships, and values related to food traditions, quality of life, and sustainability (Olsen 2012). These findings show that food experiences are holistic, influencing many aspects of life. Sharing food is a communal act that links us to other people. In daily life, we often say that "sharing is caring"—serving food is a potentially powerful way of creating a feeling of solidarity and bonding (Belk 2009).

A qualitative investigation of elderly people's food consumption reported that the low food intake by these participants appeared to be shaped by a myriad of sociocultural and health-related factors (Chatindiara et al. 2020). Some of the factors it mentioned were that they hardly felt hungry and had lost interest in eating. However, being in the company of others encouraged them to eat. They preferred foods that they had grown up with, and some needed to avoid food due to illnesses, food intolerance, or chewing difficulties. Food experiences are clearly a complex matter, a matter best approached with methodology suitable for complexity. Design thinking is one such approach. Buchanan (1992) claimed design thinking to be specifically good at handling "wicked" problems—those that are incomplete, contradictory, or with changing requirements (Buchanan 1992).

16.3 What is Healthy Eating for Vulnerable Groups?

Consumer vulnerability is a wide term encompassing vulnerability in all aspects of life, such as in economic, social, situational, personal, or health contexts (Baker et al. 2016). Although the term is easy to comprehend, its content may differ depending on who the reader is. It is therefore necessary to define precisely in which context consumer vulnerability is considered. Consumer vulnerability can be described by external factors, internal factors, or by a combination of the two. External factors are associated with, for instance, structural, economic, or societal conditions, which consumers have less control over. Internal factors are closely linked to individual characteristics, which may be tangible, or to individual states, which may be of cognitive origin (Baker et al. 2016). Baker et al. (2016) stated, "Consumer vulnerability is a condition, not a status" (Baker et al. 2016, p 137).

While considering consumer vulnerability is useful for pinpointing factors to be aware of when developing strategies for improving consumers' situation, knowledge of who is the vulnerable consumer is the logical starting point. From a health perspective, those with serious health conditions are considered to be vulnerable consumers (Kemp et al. 2015). For vulnerable groups, concrete strategies, advice, or products may improve their lives. All people must eat to survive, but for some vulnerable consumer groups, what they eat is more important than it might be for other groups. For instance, consumers with specific medical conditions, children, and older people are more dependent on the nutritional composition of their diets to uphold good health.

The World Health Organization (WHO) has published five keys to a healthy diet to provide general advice on what to be aware of on a daily basis (5 keys to a healthy diet n.d.). In addition, many countries have published their own dietary advice, including recommendations for groups with special dietary needs (Nordic Council of Ministers 2014). Consumer groups with special medical conditions such as food allergies, food-related noncommunicable diseases, or those undergoing medical treatment are usually (or to some extent) informed of dietary restrictions by their health services. Although these groups are under medical guidance, health consciousness and food intake in these groups may vary, as shown in an example of culturally different approaches to food intake following cancer treatment (Hoang et al. 2019; Zhang et al. 2015). This poses a challenge with respect to increasing compliance with dietary advice in order to limit bad consequences and improve well-being and quality of life in these groups.

Another vulnerable consumer group consists of pregnant women and small children. The basis for a healthy life is established by adequate nutrition during the early stages of life. In this phase, mothers and children are normally followed up on by health care systems—dietary advice is an important part of this contact (Nielsen et al. 2015). However, many consumers are not aware that they belong to a vulnerable group, where adhering to tailored dietary advice can provide a healthier life. This is particularly evident, as people grow older—here, changes in nutritional requirements begin in one's 50s and increase in importance with advancing age. For

some nutrients, like protein and vitamin D, requirements increase with age compared to younger age groups, whereas energy requirements decrease (Gaffney-Stomberg et al. 2009). Thus, cognitively, older adults often do not relate changes in their bodies to changes in their dietary requirements. This poses a challenge for upholding a healthy life over time.

A healthy life and being able to live at home for as long as possible are desirable for both older people and their communities. Therefore, knowledge of what affects healthy eating is important to ensure that older adults can eat healthily (Host et al. 2016). Healthy eating for older adults means a more nutrient-dense diet but without a corresponding increase in energy. Because older adults normally eat less, have reduced sensory sensitivity, and may have difficulties with chewing and swallowing, the sensory attributes of foods are particularly important (Doets and Kremer 2016).

In addition, knowledge about older adults' thinking about what healthy eating is and means to them is important. For instance, older adults differ in their following of a healthy diet based on how important they deem it to be. Some follow health advice, while others argue that they had lived so long, it does not really matter what they do (Lundkvist et al. 2010). Other drivers of healthy eating among older adults are related to social and contextual aspects (i.e., eating with family, eating with good friends, meeting and eating in cafeterias or canteens). They eat more, they think the food tastes better, and the situation is more pleasurable when they are in the company of friends or family (Bjorner et al. 2018; Vesnaver et al. 2016).

The combination of factors influencing food intake among vulnerable older adults must be addressed using new methods in order to provide solutions that work.

16.4 Empathy with Vulnerable Groups

One of the core elements of design thinking is consumer-centricity. A successful product is a product that solves a problem for the user. Therefore, understanding the user and the problem she faces is necessary in order to develop a good solution. Consumer-centricity is not sufficient to achieve this, but it is a good starting point. According to Brown (2008), for a successful product to materialize, consumer insights need to be combined with what is technically feasible and viable from a business point of view. In design thinking, the consumer insight phase is called the "empathy phase." Here, rich information about the user is collected, often by applying ethnographic methods such as participative observation studies and contextual interviews. Observing the user when using a product in a familiar situation and asking follow-up questions might generate insights that would be otherwise hard to gain. Consumers are not always aware of what they do, and asking them questions about routinized actions, often conducted without much conscience consideration, may not be the best way to reveal problems with existing products or other latent needs that the user may have.

Observing consumers in a real-life situation is a better approach to learning (Beckman and Barry 2007). To become empathic with users, we need to hear what they say and observe what they do. We know from many previous studies that what people say is not always the same as what they do. Accordingly, we must try to get under their skin to reveal both their thoughts and their feelings. We need to reveal their latent needs. To be empathetic means to put yourself into the user's situation. First, when we are able to see the product through the eyes of the user, can we spot problems and discover opportunities for improvement.

Can empathy, which has proven successful for product development (see the review by Mitcheli et al. 2019), also be useful when promoting healthy eating among vulnerable groups? We argue that it can. No food is healthy before it is eaten. Therefore, understanding why people eat or do not eat a specific food is a good starting point for promoting healthy eating. Let us take a malnourished old woman living alone as an example. To understand why she has lost weight, it can be useful to observe her in her own home when she prepares and consumes food. We may guess about many explanations for why she does not eat. Is it boring to make food and eat alone? Does she miss someone to care for who can compliment her cooking? Do prescribed medications affect her appetite? Is she no longer able to open the food package? Are the pots stored too high up on the shelves? Does she experience a reduction of sensory sensitivity? This is all guesswork. By observing and talking to her, we might get closer to an answer.

Vulnerable groups can be very heterogeneous. Individual disabilities, medical conditions, and limitations imposed by stages of human life as well as social, political, and environmental determinants can make people vulnerable. To promote healthy eating among these groups, we need to collect deep data on their concerns and perspectives. By immersing ourselves in different groups' experiences, we are less likely to look exclusively at our own experience as the source of understanding. The empathy phase helps us to recognize that these groups' preferences might differ from our own preferences (Liedtka 2015). This deep dive into the life of the user might also help us to broaden our perspective and let go of a too-narrow, too-focused perspective. Until we really understand the problem, it is hard to develop a good solution.

One of the challenges with such an ethnographic approach is the resources it demands. While a survey can be distributed to a large pool of respondents and analyzed quickly, it is time-consuming and expensive to conduct participative observation studies. Accordingly, these studies are often conducted on small sample sizes (Beckman 2020). Instead of statistical generalizability, theoretical generalizability is applied. If what is observed does not hold for a larger sample size, the conclusions are of limited use. It is therefore important to look for general patterns and to conduct other studies to verify the observations later.

16.5 Visualization of Vulnerable Groups

Another core element of design thinking is the ability to visualize ideas, often by applying tools borrowed from design, such as simple sketches, models, or prototypes. Metaphors, role-plays, and oral pitches are also used to communicate ideas. In their review of design thinking, Micheli et al. (2019) found 37 different types of design methods and tools that researchers had applied, including personas, journey maps, prototypes, sketching, and storytelling.

Visualization is both a communicative activity and a cognitive device. It is an approach to allow everybody working on a problem to see the same thing. Sensemaking follows a phase of collecting deep insight. Intense engagement with reflections around the observations are necessary to develop a deep understanding of the problem to be solved or changed (Beckman 2020). Visualization is a way of making abstract ideas so concrete that other people can understand them. With a common understanding of a problem, it is easier to orchestrate brainstorming sessions for solutions or further elaborations of the problem. The problem needs to be framed—framing and reframing is at the heart of design thinking.

Can visualization also be useful for promoting healthy eating among vulnerable groups? Again, we argue that it can. Visual tools, such as an empathy map (Empathy mapn.d.), which categorizes what people say, do, think, and feel, can be helpful for structuring observations. Thinking around such a map can help user patterns to evolve, which can be described as "personas." Personas are fictitious descriptions of users based on rich observations of real users. To make these personas more real, we provide names and pictures and describe backgrounds, skills, demographics, and other relevant characteristics. By describing such personas for different vulnerable groups, it becomes easier to imagine their situation and thereby to develop plans for promoting healthier consumption.

A sketch showing critical points in a person's food consumption journey is another visualization technique that can be useful for understanding vulnerable groups. Safeconsume, a large Horizon 2020 project aimed at reducing food-borne illnesses, developed a customer journey map that visualizes critical customer handling points for safe food handling at home: (1) planning, (2) shopping, (3) packing, (4) transporting, (5) storing, (6) hygiene (both personal and for the kitchen), (7) preparing, (8) serving, (9) eating, (10) storing, and (11) disposing of food. What type of food we buy and how we transport, store, prepare, and consume food do matter. Illustrating this complex process that is based on scientific evidence in a simple drawing makes it easier for the team working to improve food safety behavior to form a common understanding of critical consumer handling points that need to be addressed. Similar customer journey illustrations can be developed for specific vulnerable groups, helping to communicate where the critical points that need attention are.

Liedtka (2015) argued that the visualization methods applied in design thinking have a positive effect on the outcome because they improve researchers' ability to envision other peoples' experiences. Visualizations, such as personas and customer

journey sketches, help "decision-makers take in and hold onto the rich details of the lives of those for whom they seek to create value" (Liedtka 2015, p.9). Visualizations stimulate decision-makers' imaginations, reducing reliance on their own past, broadening their field of vision, and helping them to acknowledge that different groups may have different preferences, which are all good for idea-generation and problem-solving.

16.6 Multidisciplinary Collaboration for Promoting Healthy Eating

The third core element of design thinking we wish to highlight is collaboration. Design thinking promotes collaboration, both within different departments in an organization and across organizations. Even co-creation with users, as in engaging users in generating, developing, and testing new ideas, is common within design thinking (Liedtka 2015). One of the design thinking slogans is to develop *with* users, not *for* them (Olsen 2015). Users are perceived as resourceful actors who have a first-hand understanding of the problem, and they should therefore collaborate with designers to transform the situation. Multidisciplinary collaborative teams consisting of people with different knowledge and skills are more likely to result in successful innovations compared to homogeneous groups consisting of like-minded people (Micheli et al. 2019). The underlying principle is that heterogeneous teams are necessary to sort out complex problems.

Food production is clearly a multidisciplinary industry. To be able to promote healthy food consumption among vulnerable groups, many actors need to collaborate. Medical competence needs to team up with food competence. In addition to knowledge about the body and the food product, knowledge about peoples' behavior and sensory experiences should be included. Regarding the latter, psychologists, social scientists, and sensory scientists are more knowledgeable than medical doctors or food technologists. Depending on which vulnerable group we focus on, other experts may also be included. For malnourished elderly people, nutritionists, geriatricians, other family members, or chefs from institutional kitchens (like hospitals or nursing homes) might be relevant actors.

One of the factors to be aware of when promoting multidisciplinary collaboration is the common finding in the organizational behavior literature that collaboration with similar others produces smoother and more harmonious group processes, improves willingness to share information, and gives homogeneous groups an advantage over heterogeneous groups (Veflen et al. 2019). However, what is more important than smooth collaboration is that sharing unique information has a significant positive effect on team performance (Mesmer-Magnus and DeChurch 2009). Sharing information that is not commonly known among all team members builds up the available stock of knowledge and improves the outcome.

16.7 Implications for Design Thinking Scholars, the Food Industry, and Public Policy

The practical implications of design thinking can be illustrated using an example from a research project led by a food industry company in Norway. The aim of the project was to design a complete daily menu for retired older adults, 67 years and older, living at home. The designed and developed food concepts needed to meet the group's needs with regard to dietary requirements, taste, acceptability, and usability.

The first task was to be empathetic with the users—here, uncovering the older adults' own experiences, thoughts, and needs. A university course on design thinking was the basis for tackling the challenge, and through the students' work to follow the design thinking process, they developed a number of concepts demonstrating a variety of solutions ranging from apps to social facilitation to advertising to food and meal concepts. The development of these solutions involved a wide range of actors, including information technology (IT) specialists, social welfare actors, marketers, and food producers. The outcome of the design thinking project was perceived as being valuable both for the users and for the food industry initiating the project. The users, in this case vulnerable older adults living at home, liked what the designers developed for them. The food industry was also satisfied, since it got suggestions for new products to offer. The designers involved in the project claimed that the project provided them with new insights that they could not have encountered by other means. The university students were satisfied since they learned the design thinking approach by doing.

This project had clear practical implications for many actors, and other design thinking projects may have other implications. Design thinking projects may, for instance, empower people by developing products or services that make them less dependent on help from others, or by developing less expensive solutions that low-income people can also afford. Design thinking has also been applied to public policy problems, such as developing good food experiences in hospitals. By making the dining room into a social area that created a home-kitchen feeling with familiar interior design and the smell of food, a Norwegian hospital greatly improved patients' food experience and consumption.

Design thinking has proven useful in many practical situations. What is needed now are empirical studies investigating when design thinking should be applied and when it should not. Most approaches have their limitations—so does design thinking. Some researchers even compare design thinking to syphilis (Vinsel 2017). We need to move on from the many anecdotal success stories and start collecting scientific evidence of the usefulness of design thinking. Few studies have empirically investigated the effect of design thinking (the exceptions are Leenders et al. 2007; Seidel and Fixon 2013; Roper et al. 2016). To be able to develop theoretical explanations for why design thinking works, we need more empirical studies. A good starting point could be to test conceptual design thinking papers, such as those by Liedtka (2015) and Thompson and Schonthal (2020).

16.8 Conclusion

Applying design thinking to promote healthy eating in vulnerable groups provides a new dimension to an area characterized by many traditional approaches. The advantages lie in design thinking combining insight and knowledge from widely different areas in ways that are understandable beyond that separate scientific disciplines have set. Three aspects of design thinking are particularly relevant: empathy, visualization, and collaboration.

- Empathy places the target group at the center, with knowledge and new ideas revolving around them.
- Visualization provides the tools that bring understanding and ideas to tackle the challenge.
- Collaboration ensures that relevant actors are involved, and that the process covers necessary steps to a successful outcome.

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