

FOOD SYSTEMS AND HEALTH

ADVANCES IN MEDICAL SOCIOLOGY

Series Editor: Brea L. Perry

Series Editor for Volumes 5–6: Gary L. Albrecht

Series Editor for Volumes 7–8: Judith A. Levy

Series Editor for Volumes 9–15: Barbara Katz Rothman

Recent Volumes:

- Volume 7: Emergent Issues in the Field of Drug Abuse – Edited by Judith A. Levy, Richard C. Stephens and Duane C. McBride
- Volume 8: Social Networks and Health – Edited by Bernice A. Pescosolido and Judith A. Levy
- Volume 9: Bioethical Issues, Sociological Perspectives – Edited by Barbara K. Rothman, Elizabeth M. Armstrong and Rebecca Tiger
- Volume 10: Patients, Consumers and Civil Society – Edited by Susan M. Chambré and Melinda Goldner
- Volume 11: Understanding Emerging Epidemics: Social and Political Approaches – Edited by Ananya Mukherjea
- Volume 12: Sociology of Diagnosis – Edited by P. J. McGann and David J. Hutson
- Volume 13: Sociological Reflections on the Neurosciences – Edited by Martyn Pickersgill and Ira van Keulen
- Volume 14: Critical Perspectives on Addiction – Edited by Julie Netherland
- Volume 15: Ecological Health: Society, Ecology and Health – Edited by Maya K. Gislason
- Volume 16: Genetics, Health and Society – Edited by Brea L. Perry
- Volume 17: 50 Years after Deinstitutionalization: Mental Illness in Contemporary Communities – Edited by Brea L. Perry

ADVANCES IN MEDICAL SOCIOLOGY VOLUME 18

FOOD SYSTEMS AND HEALTH

EDITED BY

SARA SHOSTAK

Brandeis University, Waltham, MA, USA



United Kingdom – North America – Japan
India – Malaysia – China

Emerald Publishing Limited
Howard House, Wagon Lane, Bingley BD16 1WA, UK

First edition 2017

Copyright © 2017 Emerald Publishing Limited

Reprints and permissions service

Contact: permissions@emeraldinsight.com

No part of this book may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without either the prior written permission of the publisher or a licence permitting restricted copying issued in the UK by The Copyright Licensing Agency and in the USA by The Copyright Clearance Center. Any opinions expressed in the chapters are those of the authors. Whilst Emerald makes every effort to ensure the quality and accuracy of its content, Emerald makes no representation implied or otherwise, as to the chapters' suitability and application and disclaims any warranties, express or implied, to their use.

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN: 978-1-78635-092-3 (Print)

ISBN: 978-1-78635-091-6 (Online)

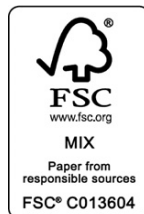
ISBN: 978-1-78714-890-1 (Epub)

ISSN: 1057-6290 (Series)



ISOQAR certified
Management System,
awarded to Emerald
for adherence to
Environmental
standard
ISO 14001:2004.

Certificate Number 1985
ISO 14001



INVESTOR IN PEOPLE

CONTENTS

LIST OF CONTRIBUTORS	vii
ACKNOWLEDGMENTS	ix
INTRODUCTION	xi

PART I FOOD SYSTEMS AND HEALTH OUTCOMES

FOOD SYSTEM CHANNELS, HEALTH, AND ILLNESS <i>Jeffery Sobal</i>	3
RICH FOODS: THE CROSS-NATIONAL EFFECTS OF HEALTHY EATING ON HEALTH OUTCOMES <i>Jane S. VanHeuvelen and Tom VanHeuvelen</i>	27
FOOD INSECURITY AND MENTAL HEALTH: A GENDERED ISSUE? <i>Gabriele Ciciurkaite and Robyn Lewis Brown</i>	59

PART II THE SOCIAL DETERMINANTS OF CONSUMPTION

FOOD PRIORITIES: SOCIODEMOGRAPHIC VARIATION IN CONSTRAINED CHOICES AT THE GROCERY STORE <i>Christy Freadreacea Brady</i>	79
EDUCATIONAL ATTAINMENT AND DIETARY LIFESTYLES <i>Hannah Andrews, Terrence D. Hill and William C. Cockerham</i>	101

- LET THEM EAT CAKE: SOCIOECONOMIC STATUS AND
CAREGIVER INDULGENCE OF CHILDREN'S FOOD
AND DRINK REQUESTS
Brea L. Perry and Jessica McCrory Calarco 121

PART III
ALTERNATIVE FOOD INSTITUTIONS AND IDEOLOGIES

- THE PROMISES AND PITFALLS OF ALTERNATIVE
FOOD INSTITUTIONS: IMPACTS ON AND BARRIERS TO
ENGAGEMENT WITH LOW-INCOME PERSONS IN THE
UNITED STATES AND CANADA
Amy Jonason 149

- EXTENSION OF WHAT AND TO WHOM? A
QUALITATIVE STUDY OF SELF-PROVISIONING
SERVICE DELIVERY IN A UNIVERSITY EXTENSION
PROGRAM
Ashley Colby and Emily Huddart Kennedy 177

- “GROUNDED IN THE NEIGHBORHOOD, GROUNDED
IN COMMUNITY”: SOCIAL CAPITAL AND HEALTH IN
COMMUNITY GARDENS
Sara Shostak and Norris Guscott 199

- RECLAIMING POLICY IMAGINATION: BUEN VIVIR,
POLICY CULTURE, AND THE POLICY DIVIDE
BETWEEN HEALTH AND AGRICULTURE IN PUERTO
RICO
Gabriel Blouin Genest 223

- ABOUT THE AUTHORS 249

LIST OF CONTRIBUTORS

<i>Hannah Andrews</i>	School of Sociology, University of Arizona, Tuscon, AZ, USA
<i>Gabriel Blouin Genest</i>	Department of Political Science, Virginia Tech University, Blacksburg, VA, USA
<i>Christy Freadreacea Brady</i>	University of Kentucky, Lexington, KY, USA
<i>Robyn Lewis Brown</i>	Department of Sociology, University of Kentucky, Lexington, KY, USA
<i>Jessica McCrory Calarco</i>	Department of Sociology, Indiana University, Bloomington, IN, USA
<i>Gabriele Ciciurkaite</i>	Department of Sociology, Social Work and Anthropology, Utah State University, Logan, UT, USA
<i>William C. Cockerham</i>	Department of Sociology, University of Alabama at Birmingham, Birmingham, AL, USA
<i>Ashley Colby</i>	Washington State University, Pullman, WA, USA
<i>Norris Guscott</i>	The Food Project, Lynn, MA, USA
<i>Terrence D. Hill</i>	School of Sociology, University of Arizona, Tuscon, AZ, USA
<i>Amy Jonason</i>	Furman University, Greenville, SC, USA
<i>Emily Huddart Kennedy</i>	Washington State University, Pullman, WA, USA
<i>Brea L. Perry</i>	Department of Sociology, Indiana University, Bloomington, IN, USA
<i>Sara Shostak</i>	Department of Sociology, Brandeis University, Waltham, MA, USA
<i>Jeffery Sobal</i>	Division of Nutritional Sciences, Cornell University, Ithaca, NY, USA

Jane S. VanHeuvelen University of Illinois, Urbana-Champaign,
IL, USA

Tom VanHeuvelen University of Illinois, Urbana-Champaign,
IL, USA

ACKNOWLEDGMENTS

I am grateful to Brea Perry for the invitation to serve as the volume editor for *Food Systems and Health*, and for all of her assistance throughout the review and production process. At Emerald, I thank Christina Irving Turner, who got the volume underway, and Jen McCall, who skillfully brought it to press. I deeply appreciate the work of the anonymous reviewers, whose many brilliant insights and suggestions appear throughout this volume. Lastly, I thank my husband, Matt Glaser, whose endless curiosity about all things related to food and health have become part of my joy in doing this work.

This page intentionally left blank

INTRODUCTION

Standing on the main stage of the Massachusetts (MA) Urban Farming Conference, urban agriculture advocate and entrepreneur Glynn Lloyd greets an audience of 400 attendees. “There are real problems in our national food system,” Lloyd tells us. He describes how the current food system pollutes water with pesticides, depletes the soil, and leads to poor quality food production. It requires significant fossil fuel inputs, both to make fertilizer and to transport food across vast distances. It is also marked by inequalities, he notes, which shape not only who owns land but also who has access to healthy and nutritious food. “Local food systems,” says Lloyd, “are part of the antidote to our ailing current system...and urban agriculture is an important part of local food systems” (Field Notes, UFC 2015; see also [Lyson, 2004](#)).

Lloyd is well-known among urban agriculture advocates in Massachusetts for his role in prompting the review and community consultation process which resulted in Article 89, a city-wide zoning amendment that allows for commercial urban agriculture in Boston. As Lloyd told me, his interest in improving community “understanding and control” of food systems dates back to his time doing Teach for America in Louisiana (Interview, 2015). When he returned to Boston, he became actively involved in local food issues and organizations as both a community member and an entrepreneur. Then, in his role as CEO of City Fresh Foods, Lloyd had “one of those moments” which led him to become an advocate for urban agriculture:

I was driving down Harold [Street, in Roxbury], and literally—there’s a vacant lot, there’s another vacant lot, and there’s another vacant lot, and there’s another vacant lot, a vacant lot ... And it turned out to be, like, an acre and a half of vacant land in this immediate area ... And then ... in my kitchen, that same week, I was my watching my staff cut up romaine lettuce, and I went, “Wait a second. That’s a cold crop. We could be growing this stuff closer. It makes no sense for us to be buying from Southern California.” So that was kind of one of those ... moments, where I was like, “You know what?...We’ve got to do something.” (Interview, 2015)

Lloyd went first to leaders in the community, to explain his vision: “I said, “Here’s the concept. We want to get Black farmers on this land, and we want to create economic opportunity.” With community support, Lloyd reached out to the City to request access to the lots, which is when he learned that commercial farming was not mentioned as an allowable use in Boston’s zoning code. And so, “we went in to talk with the Mayor [Menino],” who formed an Urban Agriculture Working Group and charged it with reviewing the situation and

making recommendations to his Administration. According to the Boston Office of Food Initiatives, the city supports urban agriculture because it improves “access to fresh, healthy, affordable food, with decreased transportation costs and lower carbon emissions...bring[s] communities together, empower[s] small entrepreneurs, and increase[s] access to fresh food for Bostonians.”¹

Food Politics and Population Health

Improving food quality and nutrition have been the foci of efforts to improve public health since the Sanitation Movement (Rosen, 1993). However, in recent years, the ways in which food is produced, distributed, and consumed have emerged as prominent social and political issues (Nestle, 2002). As suggested by Lloyd’s comments at the MA Urban Farming Conference and the City of Boston’s rationale for urban agriculture, critiques of the contemporary food system encompass multiple concerns that bear on human health and illness. These include environmental impacts, dependency on fossil fuels, climate change, and production processes that endanger workers and pose threats to food safety for consumers (Schlosser, 2001). It is in this context that food journalist Michael Pollan has urged his readers to “vote with your fork ... do it three times a day” as a means of transforming the “failed” industrial food system in favor of “something safer, something more sustainable, something more humane and something tastier.”²

Many critiques of the dominant industrial food system emphasize especially its role in the “obesity epidemic” and consequences for population health. In 2004, researchers from the Centers for Disease Control and Prevention published a paper in which they described poor diet and physical inactivity as the second leading cause of death in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004). They estimated that in 2000, poor diet and physical inactivity – as represented by rates of overweight and obesity – were responsible for 400,000 deaths in the United States.³ This marked an increase of 33% from 1990, the largest increase among all causes of death in the study. Additionally, the authors warned that “poor diet and physical inactivity could account for even more deaths (>500,000) when the 1999–2000 prevalence estimates of overweight have their full effect” (p. 1240). In conjunction with an earlier report from the World Health Organization (WHO, 2000), and escalating media coverage, this paper contributed to the framing of obesity as a global “epidemic”⁴ that poses grave risks to public health (Saguy, 2013, pp. 45–46). And, with increasing attention to the health effects of poor diet and physical inactivity came intense scholarly and public interest in their causes.

There are multiple “blame frames” for the increasing prevalence of obesity, each with implications for how we understand and respond to it (Saguy, 2013).

The *biological frame* highlights genetic and other biological factors,⁵ raising the (as of yet unrealized) possibility of pharmaceutical interventions; to date, this frame has remained relatively marginal. The dominant framing of obesity in the United States is the *personal responsibility frame*, which positions obesity as a consequence of poor choices made by autonomous individuals. The solution, from this perspective, is to get individuals to make better choices in regard to diet and exercise. The *sociocultural frame* is both a response to and a critique of the personal responsibility frame. It insists that we understand how people's choices are constrained by social structural factors, "including the food industry, the urban environment, poverty, or cultural factors" which create a toxic food environment, especially for low-income families (Saguy, 2013, p. 75).⁶

A Social Determinants Perspective

Given sociology's commitment to an "imagination" that locates individual biographies in the context of "the larger historical scene" (Mills, 1959) and its long-standing skepticism toward biological explanations of human health and illness (Shostak & Beckfield, 2015), it is not surprising that medical sociologists have been at the forefront of efforts to understand how social and cultural factors contribute to poor diets and physical inactivity. These efforts have generated a rich literature advancing sociological understanding of how gender and the family (Martin & Lippert, 2012), processes of immigration and acculturation (Van Hook, Baker, Altman, & Frisco, 2012), and dynamics associated with both gender and age (Frisco, Quiros, & Van Hook, 2016) shape vulnerability to both obesity and malnutrition. At the same time, sociologists have explicated the roles of neighborhood structure (Kimbrow & Denney, 2013), aspects of the built environment (Lovasi, Hutson, Guerra, & Neckerman, 2009), and environmental injustices (Cutts, Darby, Boone, & Brewis, 2009) in limiting access to healthy food and opportunities for physical activity; this line of research conceptualizes "spatial variations in exposure to aspects of the local food environment as an underlying explanatory factor for social and spatial inequalities in diet and related health outcomes" (Cummins, 2007, p. 196).

In fact, a robust multidisciplinary literature demonstrates that people living in low-income communities and communities of color are less likely to have access to a fully stocked grocery store (Morland et al., 2006; Walker, Keane, & Burke, 2010; Zenk et al., 2005) and that the availability of chain supermarkets in Black neighborhoods is less than that in their White counterparts, even when controlling for neighborhood income (Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007). Grocery stores located in low-income communities tend to carry produce of less variety and lower quality, when compared to stores in more affluent communities (Latham & Moffat, 2007). Moreover, low-income urban communities are more likely to have abundant fast food outlets and

convenience stores (Block, Scribner, & DeSalvo, 2004; Freudenberg & Galea, 2008), where food is typically both more expensive and less healthy (Latham & Moffat, 2007). Consequently, scholars and policy makers have called attention to the problem of *food deserts* – “area[s] with limited access to affordable and nutritious foods, particularly such an area composed of predominantly lower income neighborhoods and communities” (USDA, 2009).⁷

However, recent scholarship on the food environment and diet has found that improving the simple *availability* of healthy food in a specific geographic area is not enough to change individuals’ purchasing and dietary behaviors (Cummins, Flint, & Matthews, 2014; Elbel, Moran, & Dixon, 2015; LeDoux & Vojnovic, 2013). This research indicates that the lived experience of a food environment is shaped also not only by availability, but by *accessibility*, “the location of the food supply and ease of getting to that location,” *affordability*, “food prices and people’s perceptions of worth relative to the cost,” *acceptability*, “people’s attitudes about ... whether the given supply of products meets their personal standards,” and *accommodation*, “how well local food sources accept and adapt to local residents’ needs” (Caspi, Kawachi, Subramanian, Adamkiewicz, & Sorensen, 2012, p. 1173). A related literature explores how *foodways*, i.e., sociocultural processes and preferences regarding “how and what communities eat, where and how they shop and what motivates their food preferences” may mediate the effects of the food environment (Alkon et al., 2013, p. 127; see also Cannuscio, Weiss, & Asch, 2010).

Together, these studies advance a social determinants of health perspective that highlights the inequitable resources with which individuals navigate complex and unequal food environments (Thompson, Cummins, Brown, & Kyle, 2013), resulting in significant disparities in diet and diet-related diseases (Williams, 2012). The potential solutions emerging from this research are varied in type and scale, and include calls for major changes to the industrial food system, including restrictions of food advertising to children, taxes on unhealthy foods, and subsidies for healthy food production and distribution at the local level, among others.

Interventions and Inequality

Across the U.S. – and the globe – governments have enacted both bans and taxes on foods seen as harmful to human health and programs supporting healthy food access. For example, in 2007, the New York City Board of Health adopted a regulation that required restaurants to eliminate their use of partially hydrogenated vegetable oils and spreads, which are the main sources of trans fat consumption in the U.S. diet. Research on the New York City ban found that it was associated with a substantial and statistically significant decrease in the trans fat content of purchases at fast-food chains, without a

commensurate increase in saturated fat (Angell, Cobb, Curtis, Konty, & Silver, 2012). In 2015, the U.S. Food and Drug Administration (FDA) ruled that given the role of trans fats in heart disease, they could no longer be classified as “generally regarded as safe” for human consumption; the FDA gave the U.S. food industry three years to phase out trans fats from food production.⁸ Several U.S. cities (including Berkeley, CA, Boulder, CO, and New York City, NY), Cook County (IL), and several countries (including Mexico, France, Hungary, Ireland, and the United Kingdom) have approved taxes on sugar-sweetened sodas, hoping that increases in the price will lead to decrease in purchases of the high-sugar drinks. Initial evaluations of such taxes suggest that they lead to reduced consumption of soda, with concomitant increases in drinking water (Falbe et al., 2016). Such measures have been controversial, however, with industry and libertarians, alike, arguing against what they see as the overreach of a so-called “nanny state” in the name of public health.⁹

Federal, state, and local governments also have supported programs aimed at increasing healthy food access, which have included efforts to develop local and regional food systems. For example, in October 2015, then U.S. Department of Agriculture Secretary Tom Vilsack announced \$8.1 million in grants for projects in 23 states to enhance the effectiveness of Supplemental Nutrition Assistance Program (SNAP) operations at farmers markets, including “staff training and technical assistance, creating educational materials, and raising awareness among current SNAP participants that their benefits may be used to purchase the healthy, fresh foods at these outlets.”¹⁰ According to the press release about the new funding, “Today’s announcement is part of a USDA-wide effort to support President Obama’s commitment to strengthening local and regional food systems ... [and] to boost affordable access to local, fresh and healthy foods, which ... benefits the health of all Americans, regardless of income levels.” Many cities host farmers’ market incentive programs – e.g., Boston’s Bounty Bucks, New York City’s Health Bucks, and Philly’s Food Bucks – which increase the purchasing power of consumers shopping at farmers markets with SNAP benefits, while providing support for local farmers. Cities and states also support agriculture projects – from community gardens to high-tech vertical farming – in the name of improving food access for low-income people in both urban and rural environments. These programs and policies have been less controversial than the bans and taxes described above; however, scholars warn that focusing on food consumption individualizes responsibility for health and elides structural factors, including poverty and access to health care, which may be more consequential for population health (Lyson, 2014).

Sociologists – often in collaboration with our colleagues in public health and geography – have weighed in on efforts to improve food access, including interventions promulgated by the alternative food movement (AFM), such as farmers’ markets, community supported agriculture, community gardens, and urban agriculture. Much of this research centers on the question of whether

such efforts are reproducing inequality, however inadvertently, and what can be done to advance food justice for all (Alkon & Agyeman, 2011; Reynolds & Cohen, 2016). For example, some scholars see such alternative food institutions as quintessentially neoliberal projects, enacted in the context of the retrenchment of the welfare state (Broad, 2016; Pudup, 2008). Related, scholars have highlighted the ways in which distinctions in food consumption – and variations in body types – can be a powerful mechanism of the reproduction of social class divisions (Bourdieu, 1984; Johnston & Baumann, 2015).¹¹ Sociologists also have called attention the limitations of a “secessionist politics” – i.e., a “prefigurative politics of flight, exodus, or counter power that invests the resources of the AFM into constructing new stand-alone local agrifood systems” – which avoids “direct confrontation with the conventional agrifood system” and thereby “abandons the least privileged and most vulnerable workers and consumers” (Myers & Sbicca, 2015: p. 17). Indeed, scholars writing from a political economic perspective call for collective social action to transform conventional agriculture (Guthman, 2008) and remediate the economic policies that lead to poverty, food insecurity, and health inequalities (Alkon & Mares, 2012). At the same time, there is evidence that community-based AFIs express and advance grassroots political resistance (White, 2011; see also McClintock, 2014).

FOOD SYSTEMS AND HEALTH

Together, critiques of the dominant food system, the demand for better understandings of the causes of poor nutrition and its public health consequences, food policy and program initiatives at multiple levels, and divergent cultural and political responses to policy interventions have created an urgent need for sociological insight in regard to food systems and health. This volume of *Advances in Medical Sociology* was created to create an intellectual space for such engagements. As required by a complex topic that sits at the intersection of multiple disciplines, the authors in this volume draw on research from across subfields of sociology, public health, geography, and public policy. At the same time, they advance important theories within sociology – including Fundamental Causes Theory, Constrained Choice Theory, Health Lifestyle Theory, Human Capital Theory, and theories of gender and culture – and demonstrate powerfully the important perspectives that medical sociologists bring to the study of contemporary food politics.

The volume is divided into three parts. Part I, *Food Systems and Health Outcomes*, introduces the concept of the food system and demonstrates its powerful consequences for both physical and mental health outcomes and health inequalities. The volume opens with “Food System Channels, Health, and Illness,” in which Jeffery Sobal reconceptualizes the food system in terms of the

“channels” through which raw materials become available as food and taken into our bodies. In addition to providing a new level of analysis for studies of food systems, Sobal’s chapter highlights the role of values in the organization and transformation of food systems, as well as their implications for human health and illness. As Sobal explains, this conceptual framework offers medical sociologists new tools for investigating the relationships between food systems and health. Using nationally representative survey data from 31 countries drawn from the International Social Survey Programme’s 2011 Health module, Jane S. VanHeuvelen and Tom VanHeuvelen assess variation in the association between eating nutritionally dense fresh fruits and vegetables and both self-rated health (SRH) and body mass index (BMI) across individual income and country locations in the food system. Their chapter, “Rich Foods: The Cross-National Effects of Healthy Eating on Health Outcomes,” confirms associations between diet and more positive health outcomes, however, it also finds substantial individual- and country-level heterogeneity; simply put, for both SRH and BMI, the largest beneficial effects of healthy eating are concentrated among the most affluent individuals in the most affluent countries. This analysis simultaneously extends and complicates fundamental causes theory (Link & Phelan, 1995) and poses an important challenge to health policy, as it suggests that changing dietary habits must be part of a broader agenda to change food systems at the country level and to provide opportunities for economic prosperity. The third chapter in this part, “Food Insecurity and Mental Health: A Gendered Issue?” expands our understanding of the mental health effects of food insecurity by assessing gender-based disparities among a nationally representative sample of U.S. adults. Gabriele Ciciurkaite and Robyn Lewis Brown’s analysis of data from the combined 2011–2012 and 2013–2014 cycles of the National Health and Nutrition Examination Survey (NHANES) finds that food insecurity is associated with depressive symptoms but not alcohol consumption. Additionally, because they find an association between food insecurity and increased psychological distress among women relative to men, but observe no gender difference in the association between food insecurity and alcohol use, Ciciurkaite and Brown suggest that experiences of food insecurity should be understood as particularly salient for psychological health among women. Their findings underscore the possibility that interventions that target food insecurity will have psychological benefits for women, and highlight the importance of considering food insecurity as a risk factor for depression in women. They also extend important aspects of gender theory to the domain of food systems and health.

Part II – *The Social Determinants of Consumption* – provides insight into a diverse range of factors that affect how individuals and families make decisions about what they feed themselves and their children. In “Food Priorities: Sociodemographic Variation and Constrained Choices at the Grocery Store,” Christy Freadreacea Brady extends Constrained Choice Theory (Bird & Rieker, 2008) to analyze how parents make decisions as they shop at the grocery store.

Brady's analysis finds that a variety of sociodemographic characteristics – including having a higher income, being married or cohabitating, and having more children – correlate to consumers' prioritization of budget, taste, and/or health and nutrition while shopping. Importantly, she concludes that these constraints must be considered in public health programs that seek to improve diet and nutrition, especially among low-income families. Hannah Andrews, Terrence D. Hill, and William C. Cockerham contribute the second chapter in this part, "Educational Attainment and Dietary Lifestyles." Based on analysis of data from the 2005–2006 iteration of NHANES, the authors examine the effects of educational attainment on a wide range of individual dietary behaviors and aggregate dietary lifestyles indices. Their key finding is that having a college degree is associated with a range of healthy dietary behaviors and healthier dietary lifestyles, which is consistent with predictions derived from health lifestyle and human capital theories. As Andrews and colleagues note, further research on whether education might reduce morbidity and mortality by promoting healthier dietary lifestyles would contribute to our understanding of the role of dietary lifestyles as a mechanism of broader health disparities. The third chapter in this part is "Let them eat cake: Socioeconomic status and caregiver indulgence of children's food and drink requests" by Brea L. Perry and Jessica McCrory Calarco. Their analysis centers on the interactions between parents and children around food choices; they ask how socioeconomic status might influence these exchanges, including the nature and outcomes of children's requests for specific foods and drinks. While Perry and Calarco find significant SES differences in the frequency and nature of children's requests for foods, nutritional attitudes and values, and opportunities for caregiver monitoring of children's eating habits, these mechanisms explain little of the observed association between socioeconomic status and caregiver responses. Consequently, the authors suggest that future research investigate the role of cultural mechanisms; for example, symbolic indulgence/deprivation theory offers a means of understanding treats as a symbolic tool which may be used by both less- and more-privileged caregivers, though for different purposes and to different ends. This chapter has important public health implications, insofar as social class patterning of children's requests for snacks and treats, and caregivers' willingness to grant those requests, might contribute to larger disparities in childhood nutrition and health.

The chapters in Part III – *Alternative Food Institutions and Ideologies* – analyse initiatives that seek to improve population health by making changes to food systems, whether through support of community-based programs or broad scale changes to public policy. In "The Promises and Pitfalls of Alternative Food Institutions: Impacts on and Barriers to Engagement with Low-Income Persons in the United States and Canada," Amy Jonason provides a comprehensive review of the impacts of alternative food institutions (AFIs) on low-income communities in the United States and Canada. Assessing this strikingly multi-disciplinary literature, Jonason finds while economic, social

and cultural barriers impede low-income people's engagement with AFIs – limiting their impacts across a range of possible outcomes – they promote positive health outcomes when they meet criteria for affordability, convenience and inclusivity. As Jonason notes, her review also points to the importance of ongoing research that engages with broader questions about the meaning of health and the desires and priorities of low-income communities; in the absence of such engagement, AFIs run the risk of simply transferring the burden of systemic inequality to individuals and communities already suffering from the retrenchment of the welfare state. Ashley Colby and Emily Huddart Kennedy likewise raise important questions about neoliberalism and the reproduction of inequality in their chapter, “Extension of What and to Whom? A Qualitative Study of Self-Provisioning Service Delivery in a University Extension Program.” In their analysis of interviews with agricultural extension service agents in Washington State, the authors find that while demand for education in food production skills is on the rise, there are barriers to the equitable distribution of self-provisioning skills. Despite their long-standing commitment to working with individuals on food production, preservation and preparation, extension services are an understudied aspect of the food system – and efforts to transform food access and nutrition. Colby and Kennedy's work calls attention both to the potential of extension services and to the changes in organization and funding that are needed if they are to adequately and equitably support community demand and improve public health. Some forms of food production may generate public health benefits in addition to healthy food. In our chapter, “Grounded in Neighborhood, Grounded in Community: Social Capital and Health in Community Gardens”: Social Capital and Health in Community Gardens,” Norris Guscott and I examine the processes through which community gardens generate social capital, and with what potential implications for the health of gardeners and their communities. Drawing on data from focus groups with a diverse sample of community gardeners in two Massachusetts cities, we find that gardeners value community gardens, in part, because they build social networks, provide opportunities for resource sharing and social support, preserve cultural knowledge and practice in diaspora, and, reflect and reinforce collective efficacy. We note that these effects often are not limited to the gardeners themselves, but extend to their friends, families, and neighbors. Consequently, our chapter lends support to recent calls to consider community gardening as strategy for amplifying community assets in support of public health. This part closes with a chapter by Gabriel Blouin Genest, entitled “Buen Vivir, Policy Culture, and the Policy Divide Between Health and Agriculture in Puerto Rico.” Genest's historical analysis and insights into the division between agricultural policies and public health policies in Puerto Rico echo the findings of VanHeuvelen and VanHeuvelen (“Rich Foods: The Cross-National Effects of Healthy Eating on Health Outcomes”) about the importance a broader agenda to change food systems at the country level and to provide opportunities for economic prosperity. Specifically, Genest contends

that adequately addressing health inequalities – especially in the so-called “lifestyle diseases” – requires a new policy imagination that reconceptualizes agriculture policies as health policies. Genest proposes consideration of the indigenous Andean concept of *Buen Vivir*, as a means of conceptualizing the production of food, its distribution and its promotion as integral contributions to public health and the “good life.” Thus, the volume concludes by posing fundamental questions about extant policy regimes, and their consequences for population health.

In sum, this volume broadens and advances ongoing conversations about food systems and health, with implications for sociology, public policy, and entrepreneurship and advocacy. The chapters in the volume ask us to consider a wider variety of health outcomes, to attend to novel social and cultural pathways leading to those outcomes, and to evaluate new approaches to improving population health. These intellectual engagements are important to medical sociology as a field, as they build bridges across subfields within the discipline, extend major theoretical frameworks, and provide vivid evidence of the power of a sociological imagination for informing public health policy. Indeed, all of the chapters in the volume have clear implications for public health and public policy, especially in regard to health inequities. As advocates and entrepreneurs, such as Glynn Lloyd, continue to challenge the current food system and develop and evaluate alternatives, medical sociology has a critical role to play.

Sara Shostak
Editor

NOTES

1. At URL: <https://www.cityofboston.gov/food/urbanag/>. Accessed on February 9, 2017.

2. At URL: <https://pollan.blogs.nytimes.com/2006/05/07/voting-with-your-fork/>. Accessed on 2.9.2017.

3. In January 2005, the authors published a letter in *JAMA*, in which they described errors which led to the mis-estimation of this figure: “The number of deaths in 2000 caused by poor diet and physical inactivity thus increased by approximately 65,000 (instead of the 100,000 increase we previously reported) from the 300,000 estimated by McGinnis and Foege for 1990, and accounted for roughly 15.2% of the total number of deaths instead of the 16% previously reported.” Nonetheless, they asserted that “Our principal conclusions, however, remain unchanged: tobacco use and poor diet and physical inactivity contributed to the largest number of deaths, and the number of deaths related to poor diet and physical inactivity is increasing” (2005, p. 293). A debate followed among researchers about the best way to estimate deaths attributable to obesity (Flegal, Graubard, Williamson, & Gail, 2005; Gregg, Cheng, & Cadwell, 2005; Mark, 2005).

4. Saguy notes that the first use of the term “epidemic” to describe obesity was 10 years earlier, in an editorial (Pi-Sunyer, 1994) accompanying an article in *JAMA* which

reported on increasing rates of overweight and obesity in the United States (Kuczmarski, Flegal, Campbell, & Johnson, 1994).

5. In fact, some researchers and activists argue that chemical exposures rather than “poor diet and physical inactivity” are the underlying cause of increasing body weight in the U.S. population (e.g., Guthman, 2011).

6. As Pollan puts it, “While it is true that this system produces vast quantities of cheap food (indeed, the vastness and cheapness is part of the problem), it is not doing what any nation’s food system foremost needs to do: that is, maintain its population in good health.” At URL: <https://pollan.blogs.nytimes.com/2006/05/07/voting-with-your-fork/>. Accessed on 2.9.2017.

7. The USDA’s report to Congress is available at URL: http://www.ers.usda.gov/media/242675/ap036_1_.pdf, Accessed on 12/10/2014. Some food justice activists take issue with this term as “naturalizing” socially constructed inequalities, while others prefer the term “food swamp” as a means of highlighting the excess of unhealthy food in many low-income neighborhoods.

8. At URL: <https://www.nytimes.com/2015/06/17/health/fda-gives-food-industry-three-years-eliminate-trans-fats.html>. Accessed on 3.4.2017.

9. See, for example, on a proposed soda ban in NYC: <https://www.forbes.com/sites/realspin/2013/05/10/the-michael-bloomberg-nanny-state-in-new-york-a-cautionary-tale>. Accessed on 03.04.2017

10. <http://www.fns.usda.gov/pressrelease/2015/027315>. Accessed on 03.04.2017

11. In her ethnographic study of the Tea Party in Louisiana (2016), Hochschild recounts being told by an informant that liberals hurl insults at “Bible-believing Southerners” including that they are “ignorant, backward, rednecks, losers...racist, sexist, homophobic, and *maybe fat*” (p. 23, emphasis added).

REFERENCES

- Alkon, A. H., & Agyeman, J. (2011). *Cultivating food justice: Race, class, and sustainability*. Cambridge, MA: MIT University Press.
- Alkon, A. H., Block, D., Moore, K., Gillis, C., DiNuccio, N., & Chavez, N. (2013). Foodways of the Urban Poor. *Geoforum*, 48, 126–135.
- Alkon, A. H., & Mares, T. (2012). Food sovereignty in US food movements: Radical visions and neoliberal constraints. *Agriculture and Human Values*, 29(3), 347–359.
- Angell, S. Y., Cobb, L. K., Curtis, C. J., Konty, K. J., & Silver, L. D. (2012). Change in Trans Fatty Acid Content of Fast-Food Purchases Associated With New York City’s Restaurant Regulation: A Pre–Post Study. *Annals of Internal Medicine*, 157(2), 81–86.
- Bird, C. E., & Rieker, P. P. (2008). *Gender and health: The effects of constrained choices and social policies*. Cambridge: Cambridge University Press.
- Block, J., Scribner, R., & DeSalvo, K. (2004). Fast food, race/ethnicity, and income: A geographic analysis. *American Journal of Preventive Medicine*, 27(3), 211–217.
- Bourdieu, P. (1984). *Distinction: A Social Critique of the Judgment of Taste*. London: Routledge & Kegan.
- Broad, G. M. (2016). *More than Just Food: Food Justice and Community Change*. Oakland, CA: University of California Press.
- Cannuscio, C. C., Weiss, E. E., & Asch, D. A. (2010). The contribution of urban foodways to health disparities. *Journal of Urban Health*, 87(3), 381–393.
- Caspi, C. E., Kawachi, I., Subramanian, S. V., Adamkiewicz, G., & Sorensen, G. (2012). The relationship between diet and perceived and objective access to supermarkets among low-income housing residents. *Social Science & Medicine*, 75, 1254–1262.

- Cummins, S. (2007). Neighbourhood food environment and diet – Time for improved conceptual models? *Preventive Medicine*, 44(3), 196–197.
- Cummins, S., Flint, E., & Matthews, S. A. (2014). New neighborhood grocery store increased awareness of food access but did not alter dietary habits or obesity. *Health Affairs*, 32(2), 283–291.
- Cutts, B. B., Darby, K. J., Boone, C. G., & Brewis, A. (2009). City structure, obesity, and environmental justice: An integrated analysis of physical and social barriers to walkable streets and park access. *Social Science & Medicine*, 69, 1314–1322.
- Elbel, B., Moran, A., & Dixon, L. B., Kiszko K., Cantor, J., Abrams, C., & Mijanovich, T. (2015). Assessment of a government-subsidized supermarket in a high-need area on household food availability and children's dietary intakes. *Public Health Nutrition*, 26, 1–10.
- Falbe, J., Thompson, H. R., Becker, C. M., Rojas, N., McCulloch, C. E., & Madsen, K. A. (2016). Impact of the Berkeley excise tax on sugar-sweetened beverage consumption. *American Journal of Public Health*, 106(10), 1865–1871.
- Flegal, K. M., Graubard, B. I., Williamson, D. F., & Gail, M. H. (2005). Excess deaths associated with underweight, overweight, and obesity. *Journal of American Medical Association*, 293, 1861–1867.
- Freudenberg, N., & Galea, S. (2008). Cities of consumption: the impact of corporate practices on the health of urban populations. *Journal of Urban Health*, 85(4), 462–471.
- Frisco, M. L., Quiros, S., & Van Hook, J. (2016). One size may not fit all: how obesity among Mexican-origin youth varies by generation, gender and age. *Demography*, 53(6), 2031–2043.
- Gregg, E. W., Cheng, Y. J., & Cadwell, B. L., et al. (2005). Secular trends in cardiovascular disease risk factors according to body mass index in US adults. *Journal of American Medical Association*, 293, 1868–1874.
- Guthman, J. (2008). Bringing good food to others: Investigating the subjects of alternative food institutions. *Cultural Geographies*, 15(4), 387–397.
- Guthman, J. (2011). *Weighing In: Obesity, Food Justice, and the Limits of Capitalism*. Berkeley, CA: University of California Press.
- Hochschild, A. R. (2016). *Strangers in their own land: Anger and mourning on the American right*. New York, NY: The New Press.
- Johnston, J., & Baumann, S. (2015). *Foodies: Democracy and distinction in the gourmet foodscape*. (2nd ed.). New York, NY: Routledge.
- Kimbro, R. T., & Denney, J. T. (2013). Neighborhood context and racial/ethnic differences in young children's obesity: Structural barriers to interventions. *Social Science & Medicine*, 95, 97–105.
- Kuczmarski, R. J., Flegal, K. M., Campbell, S. M., & Johnson, C. L. (1994). Increasing prevalence of overweight among US adults. The National Health and Nutrition Examination Surveys, 1960 to 1991. *Journal of American Medical Association*, 272(3), 205–211.
- Latham, J., & Moffat, T. (2007). Determinants of variation in food cost and availability in two socioeconomically contrasting neighbourhoods of Hamilton, Ontario, Canada. *Health & Place*, 13, 273–287.
- LeDoux, T. F., & Vojnovic, I. (2013). Going outside the neighborhood: The shopping patterns and adaptations of disadvantaged consumers living in the lower eastside neighborhoods of Detroit, Michigan. *Health & Place*, 19, 1–14.
- Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, 80–94.
- Lovasi, G. S., Hutson, M. A., Guerra, M., & Neckerman, K. M. (2009). Built environments and obesity in disadvantaged populations. *Epidemiologic Reviews*, 31, 7–20.
- Lyson, M. (2014). The class politics of alternative food: Informing public health policy and remedying health inequality. *Sociology Compass*, 8/10, 1216–1228.
- Lyson, T. A. (2004). *Civic agriculture: Reconnecting farm, food, and community*. Medford, MA: Tufts University Press.
- Mark, D. H. (2005). Deaths attributable to obesity. *Journal of American Medical Association*, 293, 1918–1919.

- Martin, M. A., & Lippert, A. L. (2012). Feeding her children, but risking her health: The intersection of gender, food insecurity and obesity. *Social Science & Medicine*, *74*(11), 1754–1764.
- McClintock, N. (2014). Radical, reformist, and garden-variety neoliberal: Coming to terms with urban agriculture's contradictions. *Local Environment*, *19*(2), 147–171.
- Mills, C. W. (1959). *The sociological imagination*. Oxford: Oxford University Press.
- Mokdad, A. H., Marks, J. S., Stroup, D. F., & Gerberding, J. L. (2004). Actual causes of death in the United States, 2000. *Journal of American Medical Association*, *291*, 1238–1245.
- Mokdad, A. H., Marks, J. S., Stroup, D. F., & Gerberding, J. L. (2005). Correction: Actual causes of death in the United States, 2000. *Journal of American Medical Association*, *293*, 293–294.
- Morland, K., Wing, S., Diez Roux, A., & Poole, C. (2002). Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine*, *22*(1), 23–29.
- Myers, J. S., & Sbicca, J. (2015). Bridging good food and good jobs: From secession to confrontation within alternative food movement politics. *Geoforum*, *61*, 17–26.
- Nestle, M. (2002). *Food politics: How the food industry influences nutrition and health*. Berkeley, CA: University of California Press.
- Pi-Sunyer, F. X. (1994). The fattening of America. *Journal of American Medical Association*, *272*(3), 238–239.
- Powell, L. M., Slater, S., Mirtcheva, D., Bao, Y., & Chaloupka, F. J. (2007). Food store availability and neighborhood characteristics in the United States. *Preventive Medicine*, *44*, 189–195.
- Pudup, M. B. (2008). It takes a garden: Cultivating citizen-subjects in organized garden projects. *Geoforum*, *39*, 1228–1240.
- Reynolds, K., & Cohen, N. (2016). *Beyond the Kale: Urban agriculture and social justice activism in New York City*. Athens, GA: University of Georgia Press.
- Rosen, G. (1993). *A history of public health*. Baltimore, MD: Johns Hopkins University Press.
- Saguy, A. (2013). *What's wrong with fat?*. Oxford: Oxford University Press.
- Schlosser, E. (2001). *Fast food nation*. New York, NY: Houghton Mifflin Co.
- Shostak, S., & Beckfield, J. (2015). Making a case for genetics: Interdisciplinary visions and practices in the contemporary social sciences. *Advances in medical sociology: Genetics, health, and society*. London: Emerald Group Publishing Ltd.
- Thompson, C., Cummins, S., Brown, T., & Kyle, R. (2013). Understanding interactions with the food environment: An exploration of supermarket food shopping routines in deprived neighbourhoods. *Health & Place*, *19*(0), 116–123.
- Van Hook, J., Baker, E., Altman, C., & Frisco, M. L. (2012). Canaries in a coalmine: Immigration and obesity among Mexican-origin children. *Social Science & Medicine*, *74*(2), 125–134.
- Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to health food in the United States: A review of food deserts literature. *Health & Place*, *16*, 876–884.
- White, M. M. (2011). Sisters of the soil: Urban gardening as resistance in Detroit. *Race/Ethnicity*, *5*(1), 13–28.
- Williams, D. R. (2012). Miles to go before we sleep: Racial inequalities in health. *Journal of Health and Social Behavior*, *53*(3), 279–295.
- Zenk, S., Schultz, A., Israel, B., James, S., Bao, S., & Wilson, M. (2005). Neighbourhood racial composition, neighborhood poverty, and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health*, *95*, 660–667.

This page intentionally left blank

PART I
FOOD SYSTEMS AND HEALTH
OUTCOMES

This page intentionally left blank

FOOD SYSTEM CHANNELS, HEALTH, AND ILLNESS

Jeffery Sobal

ABSTRACT

Purpose – Food system channels are proposed to be major components of the larger food system which influence health and illness.

Methodology/approach – Food system channels are defined, discussed in relationship to other food system components, considered in terms of historical food system changes, examined in relationship to wellbeing and disease, and proposed to have useful applications.

Findings – Food system channels are broad, organized, and integrated pathways through which foods and nutrients pass. Channels are larger in scale and scope than previously described food system structures like chains, stages, sectors, networks, and others. Four major types of contemporary Western food system channels differ in their underlying values and health impacts. (1) Industrialized food channels are based on profit as an economic value, which contributes to a diversity of inexpensive foods and chronic diseases. (2) Emergency food channels are based on altruism as a moral value, and try to overcome gaps in industrialized channels to prevent diseases of poverty. (3) Alternative food channels are based on justice and environmentalism as ethical values, and seek to promote wellness and sustainability. (4) Subsistence food channels are based on self-sufficiency as a traditional value, and seek self-reliance to avoid hunger and illness. Historical socio-economic development of agricultural and industrial transitions led to shifts in

Food Systems and Health

Advances in Medical Sociology, Volume 18, 3–25

Copyright © 2017 by Emerald Publishing Limited

All rights of reproduction in any form reserved

ISSN: 1057-6290/doi:10.1108/S1057-629020170000018001

food system channels that shaped dietary, nutritional, epidemiological, and mortality transitions.

Implications — Food system channels provide varying amounts of calories and types of nutrients that shape wellbeing and diseases. Sociologists and others may benefit from examining food system channels and considering their role in health and illness.

Keywords: Channels; food systems; stages; health; illness

INTRODUCTION

Human food systems are physical, biological, social, cultural, economic, and political entities that include many components and processes that produce nutrients and calories essential for promoting health and preventing illness. In contemporary western societies, food systems are vast enterprises of such great size and complexity that they may appear to be unfathomable. There are a variety of ways to think about food systems, their parts, and their activities, as well as the range and scope of what is included in food systems (Sobal, Khan, & Bisogni, 1998). This raises the question of what are the major divisions in the current food system. This chapter offers one way to conceptualize parts of the food system using the concept of food system channels as components of the larger system that offer different pathways for nutrients and calories to shape wellbeing and disease. Food system channels include multiple foods, span production and consumption and nutrition, and offer a new way to link embodiment of foods with health and illness. Medical sociologists may benefit from thinking about food system channels as they consider historical food system dynamics, present variations in health and medical issues across food channels, and engagement in actions to shape and reform food systems.

In the following sections, I first define and provide support for the concept of food system channels, and then differentiate channels from related conceptualizations of components in the food system. Then I describe how food system channels are involved with health and illness, and consider historical changes in food system channels, wellbeing, and disease. Finally, I suggest how this new concept of food system channels may be applied by medical and other sociologists, policy and program workers, and others who desire to reform the present food system.

FOOD SYSTEM CHANNELS

Food system channels can be defined as broad, organized, and integrated pathways through which foods and nutrients pass. They offer a conceptual tool that

provides a unique perspective for thinking about food systems and health, with different health consequences emerging from different channels. Thinking about food system channels helps understand individual and population processes related to health and illness. Food system channels are larger in scale and scope than most existing conceptualizations of components of food systems, and offer broad views that provide wide perspectives about major changes in health and illness.

It is important to note that food system channels represent flexible pathways that foods take through the system. Channels are not truly distinct. Channels coexist with each other, have fuzzy boundaries, and include intersections, overlaps, and interpenetrations between channels. Mixing and sharing of foods occur across and within channels. Channel sharing and channel swapping occur for some foods and nutrients, showing that pathways through channels are not bound by determinative predictability of paths within and between channels. Specific foods may travel in parallel forms in different food system channels, such as manufactured chickens in an industrialized channel and local free range of organic chickens in an alternative channel (Dixon, 2002). However, even though food system channels overlap, blur together, and operate situationally, their lack of fixed boundaries and rigid processes do not negate their recognizability as entities in human food systems.

Food systems include structures (akin to anatomy) and processes (akin to physiology) that have been previously identified and used to think about food systems. Food system channels are large structures that include other structures like food stages (such as production and consumption) and food sectors (such as the meat sector and the wheat sector). They also involve processes like collaboration and opposition by various actors in the food system (such as farmers and grocers). Channels usually occur across the full scope of a food system, but may operate in only some stages in part of the system. Additionally, food system channels interact and intersect with other factors like culture, socioeconomic status, and gender.

Others have employed the term “channel” in analyzing food systems in narrower ways than it is used here, such as economists focusing on communication through food “marketing channels” (Markowitz, 2008; Renard, 2003). Food system channels are conceptualized here as larger in scale and scope than other food system components like stages, sectors, and chains that will be discussed in the next section.

Four major types of food system channels are proposed to operate in contemporary postindustrial westernized societies: (1) industrialized channels, (2) emergency channels, (3) alternative channels, and (4) subsistence channels. These distinguishable types of food system channels vary in their biophysical and sociocultural characteristics, underlying values, and health outcomes. Each type of channel serves differently as a conduit for varying amounts and types of foodstuffs to become foods that deliver nutrients for consumption and bodily processes that influence health and illness. The major values motivating

participants in these channels differ substantially, and these values shape the ways they deal with health and illness. These four types of channels are described in the following sections.

Industrialized food channels are based on economic values, like profit, that lead to the efficient production and thrifty consumption of acceptable and adequately safe foods. Industrialized channels include entities ranging in scope from corporations supplying seed through growers, processors, distributors, consumers of industrialized foods whose bodies use nutrients that are involved in health and illness. Industrialized food channels dominate the majority of the present western global food system, and are hegemonic as they are seen and treated as conventional, core, and mainstream food structures (Kloppenborg, Lezberg, De Master, Stevenson, & Hendrickson, 2000; Lyson, 2004). It is almost impossible in contemporary western societies for other food system channels not to interact, interpenetrate, or mix with foods or processes in the industrialized channel.

Industrialized food channels are currently based on corporate economic principles that focus on maximizing profit (Stout, 2012). This focus on profit presently outweighs considerations like health and culture, which leads to pressures to produce the least expensive rather than the healthiest or most socially meaningful foods. Profitable foods in the food system often contribute to obesity and major chronic diseases such as diabetes, hypertension, and cardiovascular diseases (Nesheim, Orea, & Yih, 2015).

Emergency food channels are based on altruism as a value, and apply the ethical principal of beneficence to use charity (Poppendieck, 1999) to overcome limitations of industrialized channels and deal with diseases of poverty (Adams & Butterly, 2015). Emergency food channels are diverse entities that extend from planting crops and gardens to feed hungry individuals and families, gleaned wasted foods for redistribution, processing foods to distribute to those who need them, offering food aid and meals to those who are food insecure, and the consumption and embodiment of the nutrients in these emergency foods to produce health and avoid illness. Emergency channels emerged in reaction to gaps in the industrial channel that led to problems with availability of sufficient foods for some individuals (Poppendieck, 1999), especially those who are experiencing or nearly experiencing poverty (Poppendieck, 2014). However, Sen (1981, p. 1) described how “some people not having enough food to eat” is not necessarily caused by “there not being enough food to eat,” and emergency food is needed not because of insufficient food stocks in society as a whole but because of social systems that fail to provide adequate food to all citizens. Emergency food channels help those temporarily in poverty (Rank, Hirschl, & Foster, 2016) experiencing hunger and food insecurity, as well as providing food to people who are impoverished for longer periods as they serve individuals experiencing extended food insecurity.

Medical and epidemiological discussions consider diseases of poverty to be undernutrition, infection, and accidents (Adams & Butterly, 2015), and only in recent decades have people experiencing poverty become widely affected by diseases of overnutrition like diabetes and heart disease. Long food system channels extend from agriculture to the body, and deal with the multiple diseases of poverty including undernutrition (being deprived of society's overall food resources) as well as malnutrition (eating society's leftovers that lead to chronic diseases).

Actors in emergency food channels, such as volunteer groups, foundations, and government agencies, operate under different underlying motivations than those of industrialized channels, being morally rather than economically oriented (Poppendieck, 1999). These value-based moral roots produce different decisions than the profit-oriented industrialized food channel entities, often including health as one (but not the only) goal in providing food.

Much food in emergency food channels is produced in industrialized food channels (Prendergast, 2016). However, emergency food channels are increasingly becoming independent from industrialized food channels, establishing their own vertically coordinated portions of food chains as they try to most efficiently, economically, and effectively offer the most food to the greatest number of hungry and food insecure families and individuals.

Alternative food channels are based on justice and environmental values that promote use of foods that are natural, vegetarian, sustainable, and local in production, consumption, and bodily health. Alternative channels are entities that range in scope from organic farms to humane food processing plants, cooperative groceries, healthy cooking, clean eating, and the pursuit of noncontaminated nutrients that are embodied to achieve health. Cultural and geographical identities are often emphasized in alternative channels to resist industrialized globalization of foods in the worldwide commodity chains (Bowen & Gaytan, 2012). The alternative food channel includes diverse food movements which attempt to present substitutes or replacements for the industrialized food channel, although many of these alternatives are grounded in white, middle-class cultural values and positions (Alkon & Agyeman, 2011).

Alternative food channels are polemic alternatives opposing hegemonic industrialized channel structures and processes (Grey, 2000b; Kloppenburg et al., 2000; Lyson, 2004) that Belasco (2007) labeled "countercuisine." Some actors in alternative food system channels seek to reconstruct the food system to achieve greater justice for all participants in the global food system (Raynolds, 2000; Raynolds, Murray, & Wilkinson, 2007), which would provide sociocultural institutions that enhance health and wellbeing beyond direct changes in food. Values and issues from the larger environmental movement have been incorporated into the operations of the alternative food channel, with many parts of the multifaceted set of ecological concerns relevant to various genders, ethnicities, and classes applied to food systems (Gottlieb, 2005).

The development of consensus around and popularization of the concept of food system sustainability (Brklacich, Bryant, & Smit, 1991; Kloppenburg et al., 2000) helped people in the agricultural food channel coalesce together in opposition to industrialized food channels.

Alternative food system channels also seek to promote wellness. However, many participants in the alternative food channel are less motivated by altruism for the environment or food-worker justice than by self-interest in their own health and wellbeing (Szaz, 2007). Organic food in the alternative channel is largely produced using the same underlying values and processes as the rest of the industrialized food channel (Guthman, 2004), and organic foods have not changed the industrialized system for food provision for most consumers (Guthman, 2003).

Alternative food channels are value driven (like emergency food channels), but the values are based on different goals and operate in divergent ways. Emergency food channel culture seeks to supplement and fill the gaps in industrialized food channel, while alternative food channel culture attempts to reform, displace, or abolish industrialized food structures and processes.

Subsistence food channels are based on self-sufficiency values to obtain, process, prepare, and consume foods in ways that carry on traditions as well as to avoid diseases. Subsistence channels often involve small, self-contained food systems in premodern and contemporary societies (Panter-Brick, Layton, & Rowley-Conwy, 2001) that procure, preserve, and prepare their own foods for individuals and groups by gardening, fishing, canning, drying, home cooking, and eating at home to embody the nutrients in these foods that influence wellness and sickness. The subsistence channel in contemporary western societies is small but attracts committed individuals who strive to obtain, process, prepare, and share their own foods (Coddling & Kramer, 2016). Subsistence and household production often resists vertical integration with food sources from other channels, valuing the autonomy, independence, and self-control of their own food activities. Practices in subsistence food channels are both atomized and individualized locally (like individual hunters) as well as involving informal collective actions of sharing production of subsistence foods within social networks (like shared communal gardens) as reviewed by Birky and Strom (2013).

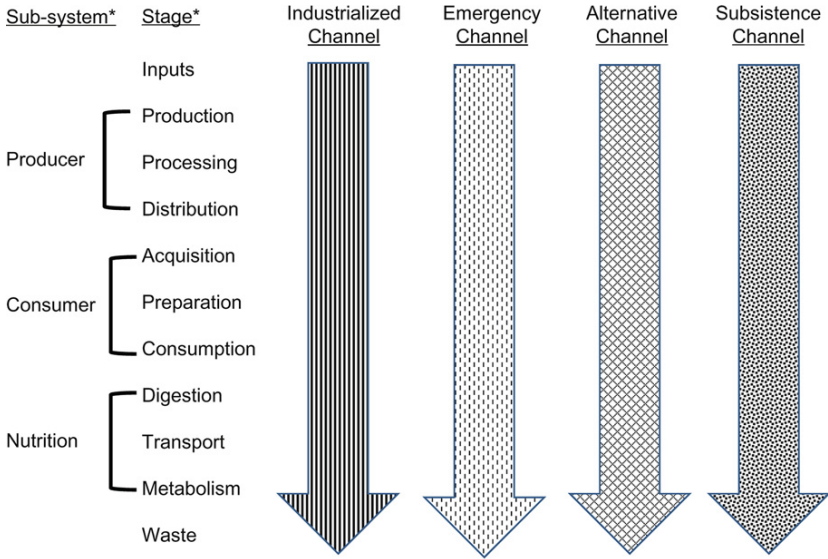
Subsistence food channels are dominated by traditional preindustrialized societies (Kelley, 1995), but were displaced by modernization of the food system. Subsistence channels' current focus on self-sufficiency separates them from industrialized food channels and seeks to maintain self-reliance and the ability to survive to avoid hunger and acute diseases. Worldwide colonialism deformed, diminished, and displaced subsistence food activities with those of the globalized industrial agrofood complex (McMichael, 1994).

FOOD SYSTEM CHANNELS AND OTHER COMPONENTS OF FOOD SYSTEMS

Having described food system channels, it is important to differentiate food channels from other concepts representing components of food systems. Presently no consensus exists about the variety of types of structures comprising of a food system. This section will first consider the scope of food systems and then discuss food channels in relationship to several types of food system structures including circuits, stages, chains, sectors, networks, and others.

There is little agreement about the span of what is included in the scope of food systems. Food system channels represent the fullest scope of all materials involved with food, from the soil for growing foods to the treatment of excretion from foods as human waste. Some food system analysts focus the food system as only including farming and food processing (Barrey, 2009), while others seek to consider everything related to food ranging from seeds to disease (Sobal et al., 1998). To deal with this dilemma of scope, some food system thinkers have proposed the concept of food circuits, with no beginning or end in the processes of continuous food cycles (Cook & Crang, 1996; McMichael, 2009). Food system channels include such food circuits, such as cycles of soil, foods, and food wastes occurring in subsistence agriculture. Other analysts delineate “subsystems” of larger food systems (Sobal et al., 1998), which broadly include a producer subsystem involving agriculture, food processing, and food distribution, a consumer subsystem including food shopping, cooking, and eating, and a nutrition subsystem that represents food incorporation, storage in the body, and physiological use. Food system channels include the full scope of food subsystems, often handled differently by each specific channel.

Food stages are widely used concepts describing structures in food systems (Griffin & Sobal, 2014; Griffin, Sobal, & Lyson, 2009; Sobal, 2004, 2007; Sobal & Lee, 2003; Sonnino, Moragues, & Maggio, 2014). Stages involve linked sets of processes that transform foods in a food system, such as converting corn from farms into specific food products like corn chips that are passed on to distributors like supermarkets, purchased, cooked, and eaten by individuals, and digested, transported, and metabolized by bodies that expel food components not used in the body as human waste. While there is no concordance about how many stages occur in a food system, one review of food system models identified 11 stages: inputs, production, processing, distribution, acquisition, preparation, consumption, digestion, transport, metabolism, and waste (Sobal et al., 1998). It is important to note that inputs like energy and outputs like waste products occur for each stage of the system. Health and illness are considered by some analysts as a final stage in the food system, while others consider wellbeing and disease as separate outcomes of the stages in the food system (Sobal et al., 1998). Food channels include all of these stages, as portrayed in Fig. 1.



*Adapted from: Sobal, J., Khan, L.K., & Bisogni, C. (1998). A conceptual model of the food and nutrition system. *Social Science & Medicine*, 47(7), 853-863.

Fig. 1. Food System Subsystems, Stages, and Channels.

Food chains (Barrey, 2009; Moreira, 2011) are often described as a series of stages operating together in a sequence of differentiated steps where food flows through an ordered (often linear) progression of stage transformations that is often linked with particular outcomes, such as health (Sobal et al., 1998). Thus growing, processing, preparing, eating, and digesting sugar may be treated as sequential stages in a food chain that are linked with a specific illness such as diabetes. Some analysts consider food “streams” (Grey, 2000a) or food “paths” (Marte, 2007) in food systems as operating similarly as food chains, but streams are often seen as less linear and less structured and paths as narrower than food chains (Sobal et al., 1998). Food channels include the full scope of many different food chains.

Commodity chains are a form of food chain analysis that has been widely used to provide an important perspective for thinking about food systems (Dicken, 1998). They are framed and used in a variety of ways (Jackson, Ward, & Russell, 2006) employing the terms commodity chain, commodity system, value chain, or agrofood chain to represent an approach that typically focuses on a single food. The flow and interactions of this food are traced through food production, processing, and distribution (with some consideration of acquisition, preparation, and consumption but fewer links to nutrition and health). For example, a classic food commodity chain analysis by Mintz (1985) studied the historical, cultural, and political economy of sugar. However, while

pursuing one food commodity in depth permits detailed exposition and explanation of the uniqueness and idiosyncrasies of that particular food (Friedland, Barton, & Thomas, 1981), there has been less attention given to groups of similar foods flowing through parallel pathways, like the overlaps between lettuce, cucumber, and tomato commodity chains that share similar but not identical pathways from farm to supermarket to salad to the provision of fiber, vitamins, and minerals to the body that shape health and illness in similar ways. The concept of food channels contributes to commodity chain thinking by providing insights about parallel routes for many foods as they make their passages from agriculture to diseases. Power in commodity chains has shifted in recent decades from producers to a wider range of actors (Dixon, 1999). In particular, the decline in producer-driven commodity chains has been offset by a rise in consumer-driven commodity chains, with major supermarket and restaurant corporations setting production parameters based on consumer sales that govern the operation of actors upstream in a commodity chain like growers and processors (Gereffi, Humphrey, & Sturgeon, 2005). This shift in power toward consumers is more evident in industrialized and alternative food channels than emergency and subsistence channels.

Food sectors (Hendrickson, Heffernan, Howard, & Heffernan, 2001) are related to food chains and are usually used to describe particular parts of a food system that focuses on a specific set of food types or food products that combine chains of similar foods, such as the meat sector (McEachern & Schroeder, 2004), wheat sector (Pritchard, 1998), or dairy sector (Hendrickson et al., 2001). Sectors can vary in level of granularity, with some focusing on the broader dairy sector while others focus on the small-scale yogurt sector of a food system. Food system channels include food sectors of many sizes and scopes.

Food networks are another way to conceptualize structures in food systems, labeling them as “food networks” (Arce & Marsden, 1993), “agrofood networks” (Goodman & Watts, 1997), and “alternative food networks” (Goodman, 2004). Similar to networks are food web models (Sobal et al., 1998) used by Senauer (1992) and others. Food system channels include food networks and food webs as structures within channels.

The concept of food channels proposed here differs from food circuits, stages, chains, sectors, networks, and other concepts because channels are larger in scale and scope, and also include multiple types of foods and beverages from their start to their exit in the food system. For example, an industrialized food channel includes many individual food stages and food sectors (such as meat and cereal) and many processes such as chains and circuits from resource inputs to the treatment of food waste in sewage. Food system channels are groupings of all of these other structures and processes in the food system.

Channels can be distinguished not only by the modes of production and consumption, but even more so by the values that motivate people to participate or not in a particular channel as a producer or consumer. The values of a food

system channel attract some participants to become involved in that channel, like altruists working in the emergency channel. Resources of consumers may allow some to more easily participate in a particular channel, such as those with sufficient financial capital being able to afford the prices and inconveniences of involvement in activities in the alternative food channel, such as buying more expensive and perishable organic produce. Other consumers may possess values based on cultural capital from their early socialization in hunting, fishing, gathering, and growing that facilitate their involvement in subsistence channel activities. Gendered values about caring for others through foodwork also may lead women to be more involved with emergency and alternative channels than men (Sobal, 2017). Thus food values that are both traditional and acquired later acquired shape food channel involvement while intersecting with culture, class, and gender.

FOOD SYSTEM CHANNELS, HEALTH, AND ILLNESS

Food channels influence health and illness in many ways ranging from ingestion of foods and food toxins that cause acute illnesses, intake of food components like saturated fats and refined sugar that contribute to chronic illnesses, and eating of essential nutrients like protein, vitamins, and minerals that promote health and wellbeing (Sobal et al., 1998). Much of the influence of food channels on health and illness occurs through essential nutrients that are used in growth, repair, and metabolism in the body (Committee on Diet and Health, 1989). Food channels differentially provide food constituents, including macronutrients (carbohydrates, proteins, fats), micronutrients (vitamins, minerals), and other ingredients (fiber, water, toxins) to industrialized, emergency, alternative, and subsistence channels. Pingali, Ricketts, and Sahn (2015) discusses how “nutrient streams” flow through food systems into the body to maintain health and prevent disease.

In prior analyses, most food system concepts are not embodied, failing to consider food after it is eaten by individuals and ignoring the nutrients in foods that shape health and illness and the digestion of foods into human waste. Food channels include nutrient streams (Pingali et al., 2015), and the major types of channels may differ in the kinds and volumes of particular nutrients flowing through each channel, although evidence is not consistent. For example, whether industrialized or organic foods have more vitamins, minerals, or other food components is a contested issue with conflicting evidence (Baranski et al., 2014; Smith-Spangler et al., 2012).

Food systems and their channels have undergone important historical changes that have been crucial in shaping many forms of health and illness. These changes can be delineated into several major historical food system periods that have direct consequences for contemporary food channels.

Hunting and gathering food systems dominated a period that existed for most of human history for the many different cultures that have operated in the world (Layton et al., 1991), and hunting and gathering continues in many contemporary developed societies. Foraging, as hunting and gathering, is almost always mixed with other forms of food production in most societies by domestication and cultivation, with pure foragers rare among known cultures (Panter-Brick et al., 2001). Such ancient food systems almost exclusively involved subsistence food channels using food production methods where foodstuffs were obtained through foraging by hunting, fishing, and scavenging (Panter-Brick et al., 2001). Foods were seasonally extracted directly from local environments, and were often difficult to store for long periods, rarely transported very far between settings, and not widely exchanged in quantity with other social groups (Kelley, 1995). A diversity of foods were generally consumed in the food system to provide energy and nutrients to maintain health and prevent illness, although these traditional food systems were subject to the unpredictable vicissitudes of weather, climate, and ecosystem changes (Coddling & Kramer, 2016). Caloric intake was often uncertain, some essential nutrients were scarce at times, and toxins and microorganisms frequently posed risks for maintaining health and preventing acute illnesses. Foraging food system are mainly subsistence channels.

Agricultural food systems emerged in a historical period that developed with the agricultural revolution in the Neolithic era over 10,000 years ago when animals and plants were initially domesticated by humans (Barker, 2006). Large-scale domestication provided new stability and surpluses in the food system, especially the cultivation of plant tubers, rice, wheat, and maize and the domestication of animals for meat, milk, and fertilizer as well as for use in tilling and transportation involved in food production and distribution. However, specialization in major crops narrowed the variety of foodstuffs entering the food system and restricted the diversity of nutrients consumed (Howell, 1986), and some analysts suggest that the emergence of agriculture decreased the health of particular populations (Cohen, 1989). Much early agriculture operated as a subsistence food system channel. Later agricultural food systems expanded to support larger human populations, moving beyond simple subsistence to more complex systems that incorporated greater technology.

Industrialized agricultural food systems were developed in a period that emerged with the harnessing of energy from water and fossil fuels in the industrial revolution of the 1800s in western societies, which permitted enormous increases in the volume of food production, the types and efficiencies of food processing, and the ability to distribute food to wider areas (Sobal, 1999). Tractors, mills, and trains transformed the ability for large populations to have and distribute adequate amounts, and to some extent greater diversity of foods. Surpluses of durable transportable foods in rural agricultural areas permitted larger cities to develop and expand (Thompson & Cowan, 1995). This leap forward in crops, durable foodstuffs, and availability of calories led to

improvements in most types of nutrients that enhanced health and prevented illness. An industrialized food production and processing channel similar to the contemporary industrialized channel emerged early in the 20th century. Later in the 20th century, a broader environmental movement began to recognize the ecological costs of industrialized agriculture and started to generate opposition and propose alternatives to the industrialized food system (Lyson, 2000).

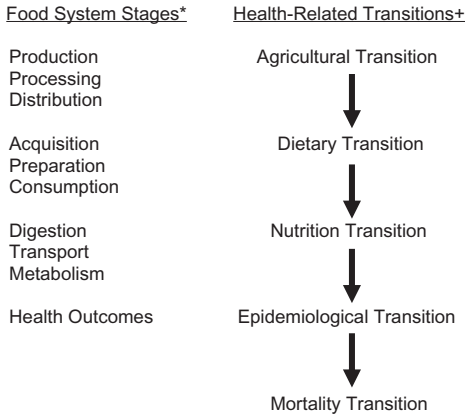
Corporatized food systems are the dominant form of the present period of industrialized agriculture (Pimentel, 2004), where large scale, usually global, corporations have emerged to dominate and control the production and consumption of food (Lyson, 2000). Corporations are currently driven by a focus on maximizing profits for their shareholders (Stout, 2012), which has led to intensive and extensive growth and concentration of activities by a few large multinational food corporations that supply most of the calories and nutrients in industrialized and postindustrialized societies. The late 20th century saw a corporatized and globalized industrial food channel dominate contemporary western and many parts of non-western food systems.

Thus several food system transitions occurred in western societies, and each transition shaped the characteristics of food channels and their component sub-systems, stages, chains, sectors, and networks within food systems. Earlier food channels like subsistence channels persisted (often in adapted forms) after industrialization, and were not completely abandoned. New channels emerged and flourished in reaction to industrialization and the industrialized and corporate food channel, like alternative and emergency food channels. Together all of these channels operate simultaneously in present human food systems.

HISTORICAL HEALTH AND ILLNESS CHANGES AND FOOD SYSTEM CHANNELS

Historical changes in food system channels have shaped health and illness patterns, with shifts in patterns of disease that can be characterized as a system of transitions (Lee & Sobal, 2003; Sobal, 1999). Transitions in one part of food systems are linked to transitions in other parts, including the sequence of agricultural, dietary, nutrition, epidemiological, and mortality transitions (Sobal, 1999). Fig. 2 illustrates how this series of transitions are related to food system stages (Sobal, 1999; Sobal et al., 1998), portraying how transitions in agriculture shape transitions in diet, nutrition, disease, and death.

Agricultural transitions occurred in the producer subsystem of the broader food system, and included transitions in food production, processing, and distribution stages. Agricultural transitions involved shifts in producing food from foraging as hunting/gathering/scavenging to traditional agriculture to industrialized agriculture to corporate agriculture (Coddling & Kramer, 2016). These transitions produced greater volumes of food, increased stability and



*From: Sobal, J., Khan, L.K., & Bisogni, C. (1998). A conceptual model of the food and nutrition system. *Social Science & Medicine*, 47(7), 853-863.

+From: Sobal, J. (1999). Food System Globalization, Eating Transformations, and Nutrition Transitions. In: Grew, R. (ed). *Food in global history*. Boulder, CO: Westview Press. pp 171-193.

Fig. 2. Food System Stages and Health-Related Transitions.

predictability of the food supply, and standardized types of foods, all of which had some health benefits but also led to other health problems (Cohen, 1989).

Dietary transitions (Grigg, 1995) occurred in the consumer subsystem of the food system as people shifted the ways they engage in food shopping, cooking, and eating foods and ingredients. Dietary transitions have occurred for many societies, households, and individuals whose diet moved from predominant consumption of locally produced, seasonal, and perishable foods to high consumption of imported, processed, and durable foods (Thompson & Cowan, 1995). Fresher seasonal foods prepared in households have shifted to preserved food products from manufacturers that are assembled in households or ready to eat foods prepared for consumers by culinary and foodservice professionals (Eeckhout, 2012). Overall, dietary transitions altered the types of foods consumed from staple grains and tubers supplemented by some other plant and animal foods to a variety of processed foods including high proportions of meat, dairy, and manufactured products (Grigg, 1996).

Nutrition transitions occurred as changes in diet provide different nutrients that are incorporated into the body via the nutrition subsystem of the larger food system (Popkin, 2004). Embodiment of nutrients in individuals occur as foods are digested, transported, and metabolized to have myriad effects on multiple physiological processes. Macronutrients consumed by humans in most cultures and societies have shifted from primarily plant-based less processed carbohydrates with higher fiber to more refined plant carbohydrates, animal proteins, and fats and oils, which was accompanied by a shift toward higher

overall food energy intake (Sobal, 1999). Micronutrient consumption has shifted from lower levels of many vitamins and minerals to more than adequate micronutrient intakes, especially with the rise in food fortification and enrichment with nutrients and widespread consumption of nutrient supplements (Caballero, 1998). Overall, nutrition transitions have shifted from low intakes of macronutrients and micronutrients to adequate and surplus levels of vitamins and minerals and excess levels of calories, refined carbohydrates, and fats.

Epidemiological transitions occurred as forms of morbidity shifted patterns of health and illness in populations (Omran, 1971) from acute infectious and insufficiency diseases (like undernutrition and malnutrition) to chronic degenerative diseases (like diabetes, hypertension, cancer, and cardiovascular diseases). Many societies in earlier historical eras experienced widespread food insecurity, famines, chronic hunger, and nutrient deficiency diseases (Omran, 1977). These common acute illnesses decreased in prevalence while chronic illnesses rose in prevalence as overnutrition prevailed and the population suffered from diseases associated with excess intake of fats, calories, and micronutrients like sodium. More recently, epidemiological transition thinking has focused on health transitions (Fenk, Bobadilla, Stern, Frejka, & Lozano, 1991) in policies like food labeling, programs like healthy food access, and behavioral changes like nutritious food intake that are crucial factors in dealing with the food system to promote wellness (Gaziano, 2010).

Mortality transitions occurred as the prevalence, timing, and causes of death shift in populations (Postin & Micklin, 2005). Death rates have fallen dramatically in recent decades in most societies, partly because of improved access to healthier foods more widely across the population. Pregnancy, infancy, and childhood were traditionally periods of high risk of undernutrition and malnutrition that directly led to deaths or facilitated deaths by other causes such as infectious diseases (Caldwell, 2001). As mortality transitions have occurred, lifespan and age at death have increased substantially as slowly progressing chronic “diseases of affluence” like cardiovascular disease, cancer, diabetes, and hypertension have predominated over more rapidly developing “diseases of poverty” like starvation, infection, and accidents (Adams & Butterly, 2015) in mortality rates. However, causes of death are inequitably spread across population and socioeconomic groups, with people who have low incomes and live in areas of low and unreliable access to foods persisting in having higher mortality.

Food system channels have shifted historically in size and type as food systems underwent their own transitions that are related to health transitions. Subsistence channels predominated in traditional small premodern societies (Panter-Brick et al., 2001). In larger modern societies, industrialized food channels displaced subsistence channels with their new focus on technology and efficiency (McMichael, 1994). Industrialized food channels have become by far the pervasive component of the contemporary western food system, and agricultural, dietary, nutrition, epidemiological, and mortality transitions have

lowered prevalence of acute diseases and reduced early mortality but increased chronic diseases while also delaying mortality.

Emergency food channels in contemporary societies grew to fill in parts of the industrial channel poorly served by mechanized corporate processes (Poppendieck, 1999). Emergency channels expanded, and increased vertical integration into a common part of the food system that reveals the limitations of the industrial food channel to fully offer healthy foods and sufficient nutrients to the entire population to prevent diseases and avoid mortality (Poppendieck, 1999). Alternative food channels developed as individuals and groups opposed industrial food system processes (Grey, 2000a) and became a widespread element of the broader food system as actors in the alternative channel seek to promote ethical and environmentally sustainable foods (Belasco, 2007) as well as healthier foods with abundant nutrients that lessen illness and postpone death. The subsistence channel became increasingly rare as a source of foods for most of the society (Panter-Brick et al., 2001), but has persisted in some social groups that emphasize self-sufficiency to avoid illnesses and also follow traditional cultural and ethnic foodways that promote health and forestall illness and mortality using nonindustrialized approaches (Coddling & Kramer, 2016). With socioeconomic development, historical shifts in food system channels have shaped diet, nutrition, epidemiological, and mortality transitions, and current and future dynamics of food system channels will influence future patterns of wellness and illness. Understandings of the dynamics of food system channels have many potential applications.

APPLICATIONS OF FOOD SYSTEM CHANNELS

Applications of the concept of channels can be useful for the sociology of food systems, sociology of health and medicine, other areas of sociology, and work beyond sociology. Food systems analyses can benefit from considering the types and processes of channels that operate using different values as components of the larger food system. For example, examining only the industrialized channel may misrepresent the food system as a whole if information is not gathered and taken into account for the operation of the alternative food channel. Similarly, sociological attention to only emergency or subsistence channels may miss relevant and important issues in the industrialized channel. Thus focusing on activities in only one channel may ignore important aspects of other channels.

Sociology of health and medicine analyses also risk missing important structures and processes if they overlook, disregard, or discount differences in food system channels in socioeconomic class, ethnicity, and gender. For example, Jaffe and Gertler (2006) describe consumer deskilling, particularly among women, as a problem in choosing, preparing, and consuming healthy and ethical foods, with the food industry contributing to this problem. Similarly,

involving men in food shopping and preparation is largely ignored in the present industrialized food channel (Sobal, 2017).

Each type of food system channel deals differently with important health and illness issues such as considering food safety, fortification, and nutrients in the ways food is dealt with as it proceeds through each channel. For example, nutrients are crucial proximate links between food systems, health and illness, and there have been recent calls for more nutrition-sensitive food systems (Jaenicke & Virchow, 2013; Pinstrup-Andersen, 2013). However, each food system channel attends to nutrients differently. Industrialized food channel actors often focus on marketing and consuming nutrients that sell more food products, such as emphasizing protein and calcium that appeal to particular consumer groups and deemphasizing added sugar and sodium in foods that increase risks for chronic diseases in the population (Committee on Diet and Health, 1989). Emergency food channel suppliers and consumers often focus primarily on getting enough calories to people who are food insecure and hungry, with their lack of resources and time leading to less attention to nutrient insufficiencies and excesses in the foods they distribute (Poppendieck, 1999). Alternative food channel producers and consumers frequently focus on seeking popular micronutrients like Vitamin C (even though deficiencies are rare) and shunning tabooed macronutrients like carbohydrates to seek weight loss (Scrinis, 2013). Subsistence food channel participants tend to follow traditional values in producing and consuming foods, with nutrients receiving relatively low attention and consideration in production and consumption (Coddling & Kramer, 2016). Additional important biomedical issues like Genetically Modified Organisms (GMOs), allergies, obesity, and others that are emerging as food-related topics in medical sociology need to consider how industrial, emergency, alternative, and subsistence channels represent substantial segments of the population that differently deal with these social problems.

The linkage of food systems to health and illness through food channels suggests that more attention needs to be given to wellbeing and disease throughout the food system. Increased medicalization of the food system (Mayes, 2014), especially crucial decisions and processes upstream at early stages in food channels, would benefit from considering the medical outcomes of the foods in the bodies of individuals. For example, considering subsidies for planting industrialized channel crops associated with prevalent diseases, like cane sugar and diabetes (Oggioni, Lara, Wells, Soroka, & Siervo, 2014), is undermedicalized because of the emphasis on economics in agricultural policy and inattention to health and disease outcomes of those industry-based decisions. Also, risks of overmedicalization (Conrad, 2007) of the food system in other channels may also occur, such as avoiding some food components like gluten in the alternative food channel because they cause allergic reactions among people with celiac disease (Copelton & Valle, 2009), even though many other individuals would benefit from increasing intake of healthy grains with gluten. The conceptualization of food system channels as considering the full scope of foods from

soil to sewage encourages selective and targeted medicalization to involve health and illness at all stages in the system.

Policy and program implications of food system channels include considering all food channels and their problems and needs. Policies focusing on one food system channel may influence other channels in both anticipated and unanticipated ways (Milio, 1990). Also, it is important to consider policy and program implications at all stages across the spectrum of food system channels, including health and illness outcomes. In particular, food system stages upstream in a channel are more concerned about economics and manufacturing efficiency interests than health and illness interests, so it is important to think about health issues upstream and downstream for specific policies and programs. For example, policies supporting production, processing, and distribution of foods that include high amounts of refined carbohydrates, saturated fats, and high sodium that are risk factors for chronic illnesses (Committee on Diet and Health, 1989), would benefit by considering disease implications further downstream in food channels. Additionally, each channel provides standpoints for evaluating other channels, such as alternative food systems actors offering perspectives for evaluating industrialized food channel practices and policies. For example, agricultural policy supporting sugar production may be critiqued for its impact upon consumers in the emergency food channel.

Other areas of sociology may benefit from considering food channels as components of food systems. It is important to note that food systems and their channels are embedded within societies and many other institutional entities with which they interact. Thus food systems exchange ideas, materials, and energy (Sobal et al., 1998) with systems such as the healthcare system, transportation system, and others that they are bound together within the larger society (Fig. 3). The components and processes of these other systems are not part of the food system but do interact with food system channels. This means that food systems do not operate independently (nor do other societal systems) and food system structures and processes are both similar and independent from other systems. For example, the electronic revolution that has occurred in recent decades has powerful influences on activities in the food system, with some unique to food (like electronic crop monitoring) and others similar in all aspects of society (like use of big data for forecasting).

Other systems in society have components like stages, sectors, and channels and would benefit from understanding how those concepts are used in food systems. For example, health systems have stages of treatment as primary care, secondary care, and tertiary care (Starfield, 1998), sectors like mental health and physical health, and channels like biomedicine and complementary and alternative medicine (Micozzi, 2015). The concept of channels may be applicable, with adaptation, to other institutions beyond food systems, for example seeing mainstream, emergency, and alternative channels in apparel production and consumption, an area that has received much attention in commodity chain analysis (Collins, 2003). Transfer of the concept of channels needs to be careful

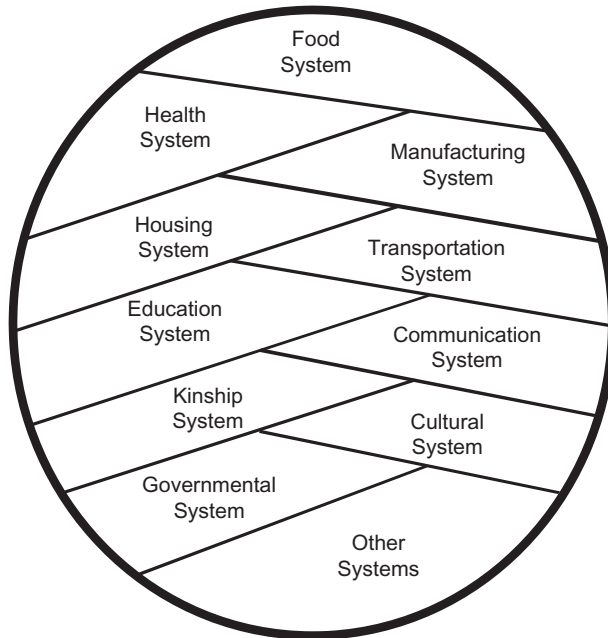


Fig. 3. Systems within Society.

and cautious because entities have substantive peculiarities in different systems, like alcoholic beverage channels differing greatly from tobacco product channels. Overall, within the larger social system, particular events, technologies, and structures of food and health systems are interwoven, interactive, and independent and can benefit from sharing tools for conceptual analysis.

Reforming entire food systems is often advocated (Counihan & Siniscalshi, 2014; Patel, 2012). Major food system change requires mobilization of participants in multiple, if not all, food system channels. The development and operation of social movements for reform (Belasco, 2007; Counihan & Siniscalshi, 2014) is differently distributed between food system channels, being common in alternative channels, existing in emergency channels, and being rare in subsistence and industrialized channels. The differences in underlying values for the different food system channels means that different types of food system reforms may be embraced or eschewed by the participants in each type of channel. For example, while the promotion of environmental values about sustainable food may be appealing to those in the alternative food channel, ecological justifications such as organic food promotion may be ignored or opposed by actors in the industrialized, emergency, and subsistence channels. Consideration of all food system channels is crucial for engaging in food system change.

CONCLUSION

The concept of food system channels provides unique insights about how food systems operate for cultures, societies, communities, families, and individuals to provide calories that provide energy and nutrients that influence health and disease. Food system channels offer a conceptual tool that together with existing thinking about food systems and their components can assist in framing, assessing, and engaging with food systems to understand ways to prevent disease and enhance wellness. Four major types of food channels operate as pathways for foodstuffs to become foods that deliver nutrients for consumption that influence health, illness, and mortality. In early historical eras subsistence channels dominated the food system, but currently industrial channels predominate the food systems in western societies. Understanding contemporary food systems and their relationship to health and illness helps to see how the prevailing food system's industrial channel has both offered benefits as well as created costs for health and illness, and the emergency, alternative, and subsistence channels operate to address the problems of industrial channel by their contrasts and opposition to the dominance of industrial food activities.

ACKNOWLEDGMENTS

The author thanks the Division of Nutritional Sciences at Cornell University for support, and colleagues and reviewers for their valuable suggestions. No external funding was used for this project. An oral version of this chapter was presented to the Association for the Study of Food and Society (ASFS) annual conference in 2016.

REFERENCES

- Adams, L. V., & Butterly, J. R. (2015). *Diseases of affluence, diseases of poverty: Epidemiology, infectious diseases, and modern plagues*. Hanover, NH: Dartmouth University Press.
- Alkon, A. H., & Agyeman, J. (Eds.). (2011). *Craving food justice: Race, class, and sustainability*. Cambridge, MA: MIT Press.
- Arce, A., & Marsden, T. (1993). The social construction of international food: A new research agenda. *Economic Geography*, 69, 293–311.
- Baranski, M., Srednicka-Tober, D., Volakakis, N., Seal, C., Sanderson, R., Stewart, G. B., ... Leifert, C. (2014). Higher antioxidant and lower cadmium concentrations and lower incidence of pesticide residues in organically grown crops: A systematic literature review and meta-analysis. *British Journal of Nutrition*, 112(5), 794–811.
- Barker, G. (2006). *The agricultural revolution in prehistory: Why did foragers become farmers?* New York, NY: Oxford University Press.
- Barrey, S. (2009). Food chains from farmyard to shopping cart. *Review of Agricultural and Environmental Studies/Revue d'Etudes en Agriculture et Environnement*, 90(3), 347–350.

- Belasco, W. J. (2007). *Appetite for change: How the counterculture took on the food industry* (2nd ed.). Ithaca, NY: Cornell University Press.
- Birky, J., & Strom, E. (2013). Urban perennials: How diversification has created a sustainable community garden movement in the United States. *Urban Geography*, 34(8), 1193–1216.
- Bowen, S., & Gaytan, M. S. (2012). The paradox of protection: National identity, global commodity chains, and the tequila industry. *Social Problems*, 59(1), 70–93.
- Brklacich, M., Bryant, C. R., & Smit, B. (1991). Review and appraisal of the concept of sustainable food production systems. *Environmental Management*, 15(1), 1–14.
- Caballero, B. (1998). *The nutrition transition: Diet and disease in the developing world*. San Diego, CA: Academic Press.
- Caldwell, J. C. (2001). Demographers and the study of mortality: Scope, perspectives, and theory. *Annals of the New York Academy of Sciences*, 954, 19–33.
- Codding, B. F., & Kramer, K. L. (Eds.). (2016). *Why forage? Hunters and gatherers in the twenty-first century*. Albuquerque, NM: University of New Mexico Press.
- Cohen, M. N. (1989). *Health and the rise of civilization*. New Haven, CT: Yale University Press.
- Collins, J. (2003). *Threads: Gender, labor, and power in the global apparel industry*. Chicago, IL: University of Chicago Press.
- Committee on Diet and Health. (1989). *Diet and health: Implications for reducing chronic disease risk*. Washington, DC: National Academies Press.
- Conrad, P. (2007). *The medicalization of society: On the transformation of human conditions into treatable disorders*. Baltimore, MD: Johns Hopkins University Press.
- Cook, I., & Crang, P. (1996). The world on a plate: Culinary culture, displacement and geographical knowledges. *Journal of Material Culture*, 1(2), 131–153.
- Copelton, D. A., & Valle, G. (2009). “You don’t need a prescription to go gluten-free”: The scientific self-diagnosis of celiac disease. *Social Science & Medicine*, 69(4), 623–631.
- Counihan, C., & Siniscalshi, V. (2014). *Food activism: Agency, democracy, and economy*. New York, NY: Bloomsbury Academic.
- Dicken, P. (1998). *Global shift: Transforming the world economy* (3rd ed.). London, UK: Paul Chapman.
- Dixon, J. (1999). A cultural economy model for studying food systems. *Agriculture and Human Values*, 16(2), 151–160.
- Dixon, J. (2002). *The changing chicken: Chooks, cooks, and culinary culture*. Sydney, NSW: University of New South Wales Press.
- Fenk, J., Bobadilla, J. L., Stern, C., Frejka, T., & Lozano, R. (1991). Elements for a theory of health transition. *Health Transition Review*, 1(1), 21–38.
- Friedland, W. H., Barton, A. E., & Thomas, R. A. (1981). *Manufacturing green gold: Capital, labor, and technology in the lettuce industry*. New York, NY: Cambridge University Press.
- Gaziano, J. M. (2010). Fifth stage of the epidemiological transition: The age of obesity and inactivity. *Journal of the American Medical Association*, 303(3), 275–276.
- Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, 12(1), 78–104.
- Goodman, D. (2004). Rural Europe redux? Reflections on alternative agro-food networks and paradigm change. *Sociologia Ruralis*, 44, 3–16.
- Goodman, D., & Watts, M. (Eds.). (1997). *Globalising food: Agrarian questions and global restructuring*. London: Routledge.
- Gottlieb, R. (2005). *Forcing the spring: The transformation of the American environmental movement*. Washington, DC: Island Press.
- Grey, M. A. (2000a). The industrial food stream and its alternatives in the United States: An introduction. *Human Organization*, 59(2), 143–150.
- Grey, M. A. (2000b). “Those bastards can go to hell!” Small farmer resistance to vertical integration and concentration in the pork industry. *Human Organization*, 59(2), 169–176.
- Griffin, M., & Sobal, J. (2014). Consumer food system participation: A community analysis. *Ecology of Food and Nutrition*, 53, 579–595.

- Griffin, M., Sobal, J., & Lyson, T. A. (2009). An analysis of a community food waste stream. *Agriculture and Human Values*, 26(1), 67–81.
- Grigg, D. (1995). The nutritional transition in Western Europe. *Journal of Historical Geography*, 21(3), 247–261.
- Grigg, D. (1996). The starchy staples in world food consumption. *Annals of the Association of American Geographers*, 86, 412–431.
- Guthman, J. (2003). Fast food/organic food: Reflexive tastes and the making of “yuppie chow”. *Social & Cultural Geography*, 4(1), 45–58.
- Guthman, J. (2004). *Agrarian dreams: The paradox of organic farming in California*. Berkeley, CA: University of California Press.
- Hendrickson, M., Heffernan, W. D., Howard, P. J., & Heffernan, J. B. (2001). Consolidation in food retailing and dairy. *British Food Journal*, 103(10), 715–728.
- Howell, N. (1986). Feedbacks and buffers in relation to scarcity and abundance: Studies of hunter-gatherer populations. In D. Coleman & R. Schofield (Eds.), *The state of population theory: Forward from Malthus* (pp. 156–187). New York, NY: Basil Blackwell.
- Jackson, P., Ward, N., Russell, P. (2006). Mobilising the commodity chain concept in the politics of food and farming. *Journal of Rural Studies*, 22, 129–141.
- Jaenicke, H., & Virchow, D. (2013). Entry points into a nutrition-sensitive agriculture. *Food Security*, 5, 679–692.
- Jaffe, J., & Gertler, M. (2006). Victual vicissitudes: Consumer deskilling and the (gendered) transformation of food systems. *Agriculture and Human Values*, 23(2), 143–162.
- Kelley, R. L. (1995). *The foraging spectrum: Diversity in hunter-gatherer lifeways*. Washington, DC: Smithsonian Institution Press.
- Kloppenborg, J., Lezberg, S., De Master, K., Stevenson, G. W., & Hendrickson, J. (2000). Tasting food, tasting sustainability: Defining the attributes of an alternative food system with competent, ordinary people. *Human Organization*, 59(2), 177–186.
- Layton, R., Foley, R., Williams, E., Chang, C., Ingold, T., Olszewski, D. I., ... Zvelebil, M. (1991). The transition between hunting and gathering and the specialized husbandry of resources: A socio-ecological approach. *Current Anthropology*, 32(3), 255–274.
- Lee, S., & Sobal, J. (2003). Socio-economic, dietary, activity, nutrition, and body weight transitions in South Korea. *Public Health Nutrition*, 6(7), 665–674.
- Lyson, T. A. (2000). Stalking the wily multinational: Power and control in the U.S. food system. *Agriculture and Human Values*, 17, 199–208.
- Lyson, T. A. (2004). *Civic agriculture: Reconnecting farm, food, and community*. Medford, MA: Tufts University Press.
- Markowitz, L. (2008). Produc(ing) equity: Creating fresh markets in a food desert. *Research in Economic Anthropology*, 28, 195–211.
- Marte, L. (2007). Foodmaps: Tracing boundaries of “home” through food relations. *Food and Foodways*, 15(3-4), 261–289.
- Mayes, C. (2014). Medicalization of eating and feeding. In P. Thompson & D. Kaplan (Eds.), *Encyclopedia of food and agricultural ethics* (pp. 1371–1378). Dordrecht, Netherlands: Springer.
- McEachern, M. G., & Schroeder, M. J. A. (2004). Integrating the voice of the consumer within the value chain: A focus on value-based labelling communications in the fresh-meat sector. *Journal of Consumer Marketing*, 21(7), 497–509.
- McMichael, P. (Ed.). (1994). *The global restructuring of agro-food systems*. Ithaca, NY: Cornell University Press.
- McMichael, P. (2009). A food regime genealogy. *Journal of Peasant Studies*, 36(1), 139–169.
- Micozzi, M. S. (2015). *Fundamentals of complementary and alternative medicine* (5th ed.). St. Louis, MO: Saunders-Elsevier.
- Milio, N. (1990). *Nutrition policy for food-rich countries: A strategic analysis*. Baltimore, MD: Johns Hopkins University Press.

- Mintz, S. W. (1985). *Sweetness and power: The place of sugar in modern history*. New York, NY: Viking Penguin.
- Moreira, M. B. (2011). Changes in food chains in the context of globalization. *International Journal of Agriculture and Food*, 18(2), 134–148.
- Nesheim, M. C., Orea, M., & Yih, P. T. (Eds.). (2015). *A framework for assessing the effects of the food system*. Washington, DC: National Academy Press.
- Oggioni, C., Lara, J., Wells, J. C. K., Soroka, K., & Siervo, M. (2014). Shifts in population dietary patterns and physical activity as determinants of global trends in the prevalence of diabetes: An ecological analysis. *Nutrition, Metabolism and Cardiovascular Disease*, 24(10), 1105–1111.
- Omran, A. R. (1971). The epidemiological transition: A theory of the epidemiology of population change. *Milbank Memorial Fund Quarterly*, 49, 509–538.
- Omran, A. R. (1977). Epidemiologic transition in the United States. *Population Bulletin*, 32(2), 3–45.
- Panter-Brick, C., Layton, R. H., & Rowley-Conwy, P. (2001). *Hunter-gatherers: An interdisciplinary perspective*. New York, NY: Cambridge University Press.
- Patel, R. (2012). *Stuffed and starved: The hidden battle for the world food system*. Brooklyn, NY: Melville House.
- Pimentel, D. (2004). Ethical issues of global corporatization: Agriculture and beyond. *Poultry Science*, 83(3), 321–329.
- Pingali, P., Ricketts, K., & Sahn, D. (2015). Agricultural pathways to improved nutrition: Getting policies right. In D. Sahn (Ed.), *The fight against hunger and malnutrition: The role of food, agriculture, and targeted policies* (pp. 165–192). Oxford: Oxford University Press.
- Pinstrup-Andersen, P. (2013). Nutrition-sensitive food systems: From rhetoric to action. *Lancet*, 382, 375–376.
- Popkin, B. M. (2004). The nutrition transition: An overview of world patterns of change. *Nutrition Reviews*, 62(suppl. 2), S140–S143.
- Poppendieck, J. (1999). *Sweet charity? Emergency food and the end of entitlement*. New York, NY: Penguin Books.
- Poppendieck, J. (2014). *Breadlines knee-deep in wheat: Food assistance in the great depression*. Berkeley, CA: University of California Press.
- Postin, D., & Micklin, M. (Eds.). (2005). *Handbook of population*. New York, NY: Kluwer Academic.
- Prendergast, C. (2016). *The allocation of food to food banks*. University of Chicago Online Report. Retrieved from http://www.faculty/chicagobooth.edu/workshops/micro/pdf/spring_2016. Accessed on April 24, 2017.
- Pritchard, W. N. (1998). The emerging contours of the Third Food Regime: Evidence from Australian dairy and wheat sectors. *Economic Geography*, 74(1), 64–74.
- Rank, M. R., Hirschl, T. A., & Foster, K. A. (2016). *Chasing the American dream: Understanding what shapes our fortunes*. New York, NY: Oxford University Press.
- Raynolds, L. T. (2000). Re-embedding global agriculture: The international organic and fair trade movements. *Agriculture and Human Values*, 17, 297–309.
- Raynolds, L. T., Murray, D. L., & Wilkinson, J. (Eds.). (2007). *Fair trade: The challenges of transforming globalization*. New York, NY: Routledge.
- Renard, M. (2003). Fair trade: Quality, market and conventions. *Journal of Rural Studies*, 9, 87–96.
- Scrinis, G. (2013). *Nutritionism: The science and politics of dietary advice*. New York, NY: Columbia University Press.
- Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. New York, NY: Oxford University Press.
- Senauer, B. (1992). Preparing students for careers in food distribution and marketing: An opportunity for colleges of agriculture. *Journal of Food Distribution Research*, 23(1), 1–7.
- Smith-Spangler, C., Brandeau, M. L., Hunter, G. E., Bavinger, C., Pearson, M., Eschbach, P. J., ... Bravata, D. M. (2012). Are organic foods safer or healthier than conventional alternatives: A systematic review. *Annals of Internal Medicine*, 157, 348–366.

- Sobal, J. (1999). Food system globalization, eating transformations, and nutrition transitions. In R. Grew (Ed.), *Food in global history* (pp. 171–193). Boulder, CO: Westview Press.
- Sobal, J. (2004). Food and nutrition systems. In A. Smith (Ed.), *Encyclopedia of food and drink in America* (pp. 495–498). New York, NY: Oxford University Press.
- Sobal, J. (2007). Using a model of the food and nutrition system for examining whole grain foods from agriculture to health. In L. Marquart, D. R. Jacobs, G. H. McIntosh, K. Poutanen, & M. Reichs (Eds.), *Whole grains and health* (pp. 17–25). Ames, IA: Blackwell Publishing.
- Sobal, J. (2017). Men's foodwork in food systems: Social representations of masculinities and cooking at home. In M. Szabo & S. Koch (Eds.), *Food, masculinities, and home* (pp. 125–143). New York, NY: Bloomsbury Publishers.
- Sobal, J., Khan, L. K., & Bisogni, C. (1998). A conceptual model of the food and nutrition system. *Social Science and Medicine*, 47(7), 853–863.
- Sobal, J., & Lee, S. (2003). A food and nutrition system analysis of South Korea. *Journal of Community Nutrition*, 5(4), 209–217.
- Sonnino, R., Moragues, F., & Maggio, A. (2014). Sustainable food security: An emerging research and policy agenda. *International Journal of Sociology of Agriculture and Food*, 21(1), 173–188.
- Starfield, B. (1998). *Primary care: Balancing health needs, services and technology*. New York, NY: Oxford University Press.
- Stout, L. (2012). *The shareholder value myth: How putting shareholders first harms investors, corporations, and the public*. San Francisco, CA: Berrett-Koehler Publishers.
- Szaz, A. (2007). *Shopping our way to safety: How we changed from protecting the environment to protecting ourselves*. Minneapolis, MN: University of Minnesota Press.
- Thompson, S. J., & Cowan, J. T. (1995). Durable food production and consumption in the world economy. In P. McMichael (Ed.), *Food and agrarian orders in the world economy* (pp. 35–52). Westport, CT: Praeger.
- Van den Eeckhout, P. (2012). Restaurants in Western Europe and the United States in the nineteenth and twentieth centuries: An introduction. *Food and History*, 10(1), 143–153.

This page intentionally left blank