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# Theoretical issues in the ‘food desert’ debate and ways forward

Richard Casey Sadler · Jason Andrew Gilliland · Godwin Arku

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**Abstract** Food is essential to life—yet the spatial and economic configuration of the conventional food system does not meet nutritional needs and exacerbates issues of food insecurity. Relevant options for policy change have been explored in light of evaluations of geographic disparities in food access, but the dominant ‘food desert’ discourse often focuses uncritically on insufficient conceptions of access. Understanding the complexity of food deserts is important for moving into meaningful policy action. We present a theoretical position to inspire future empirical research. The ecological model recognizes both endogenous and built environment factors in shaping health. Interventions in the food environment, however, often concentrate exclusively on structural determinants of health (e.g. retail-based initiatives). Yet retail-based interventions are difficult to implement due to governance systems which limit the ability of government bodies to influence private retail development. As well, recognizing the complexity of debates over the influence of structure and agency, we apply structuration theory to food deserts. Behavioral economics further informs both structural and behavioral determinants of health.

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This approach sidesteps the issue of victim-blaming, as all consumers are viewed as ‘predictably irrational’ in decision-making. In combining these theories, we challenge methodological and theoretical assumptions by showing the complexity of food desert interventions. Policy recommendations focus on behavioral determinants of health and the opportunities for empowerment through local food systems. These recommendations recognize the limits of translating research into policy and in devising effective food based interventions, and are sensitive to social, economic, and political constraints uncovered throughout the paper.

**Keywords** Food deserts · Ecological model of health · Structuration theory · Behavioral economics · Food systems planning · Local food networks

## Introduction

Food is a core element of basic economies and quality of life. From its cultivation came the earliest civilizations, and from mechanized farming practices our world has averted Malthusian catastrophes. But many problems exist with the modern food system. On one side, farm subsidies for commodity crops favor monocropping and the conveyance of cheap, unhealthy foods to consumers, creating an apparent disincentive to buy healthy foods (Nestle 2003; Weis 2010). Yet

paradoxically, hunger and food insecurity persist, leading to a push-back against these perverse agricultural subsidies (Niles and Roff 2008). Consumers are also increasingly distrustful of the tendency of the conventional food system to promote spatial and social exclusion and exacerbate the undemocratic nature of capitalism (Murdoch et al. 2000; Weis 2010).

At the neighborhood scale, a core manifestation of the conventional food system is a spatial mismatch in accessibility to healthy foods. A wealth of literature now exists on 'food deserts', a contested idea used to describe areas where healthy, affordable foods are difficult to obtain. The concept of food deserts is an important public health issue because descriptive studies show conflicting health outcomes among those living in so-called food deserts (Wrigley et al. 2002; Seiders and Petty 2004; Morland et al. 2006; Lee 2012). A deeper discussion of the complexity of food deserts and related interventions has been undertaken frequently in recent years (Beaulac et al. 2009; Walker et al. 2010; Escaron et al. 2013; Shannon 2013)—most important to note is that a lack of consensus suggests further methodological investigation is necessary.

As more studies demonstrate the ineffectiveness of various interventions, researchers are recognizing the complexity of interrelated social and spatial processes and are increasingly cautious in their prescriptions for 'fixing' food deserts (Cummins et al. 2014). In this paper, we will thus integrate emerging theoretical perspectives from past research to aid in effective policy formulation around food deserts, beginning with discussion of the theoretical bases from which much existing food desert literature derives inspiration.

### The ecological model of health

One of the fundamental issues prevalent in all food desert literature is the primacy given either to structure or agency in shaping health outcomes, as this theoretical direction shapes methodology, interpretation of results, and policy recommendations. The traditional bent of health research—the biomedical model—focused exclusively on biological factors (Dean 2004). Given that disease was considered uni-causal, social and environmental health determinants were downplayed (Robertson 1998; Gatrell and Elliott 2009). A post-positivistic turn in health research necessitated a proactive model of health promotion

that considered environmental and societal contextual factors (Carpiano and Daley 2005; Dunn 2006). One such theoretical position is the ecological model of health promotion.

The ecological model represents an adaptation of a theory from the natural sciences which focused on the interaction between organisms and their habitat (Green et al. 1996). Over time, this approach was considered viable for research on social outcomes of the human-built environment, including but not limited to obesity and physical activity (Egger and Swinburn 1997; Reidpath et al. 2002). While this model is effective at recognizing the influence of many determinants of health, debate remains over the relative importance of structure and agency (Kearns 1993).

A range of approaches have been considered along this continuum, from constructionist (purely agent-based) to structuralist (purely structure-based) (Walmsley and Lewis 1993). In the middle ground lies Giddens' structuration theory. By suggesting that structures shape social practices and inversely, actions create structures, structure and agency are seen in a duality which relies on a degree of reflexivity and recursiveness between structure and agency (Gatrell and Elliott 2009). In support of this middle ground, Frohlich et al. (2001) reject any one-way relationship between structure and agency. Regarding the relationship between the built environment and health, this perspective embraces the complexity of biological, behavioral, and environmental factors that influence health (Egger and Swinburn 1997). While biological influences are unalterable, behavioral influences can be re-shaped, for instance, by educational programs or changes to the choice environment. Environmental influences, meanwhile, are often best influenced by changes to the regulatory environment (Egger and Swinburn 1997; Sallis et al. 2006; Story et al. 2008).

### Structural determinants of health and methodological issues

Considering these models in light of food desert discourse, a stronger emphasis on either structure or agency could yield a variety of potential intervention ideas. Researchers have been cautious of assigning a uni-causal environmental factor to health-related issues, and some have advocated ecological models as a means of capturing the complexity of the

determinants of health (Lytle 2009; Story et al. 2008), a complexity in causation which suggests suitable alignment with structuration theory. One of the most popular approaches in practice, however, comes from a strong structuralist perspective which supposes that altering the spatial structure of food provision would help ameliorate the inequalities caused by food deserts. These single-dimension interventions are popular primarily because of their simplicity in implementation and the public visibility of retail-based interventions. This focus contributes to the popular misperception (though increasingly less so in research) that re-opening grocery stores in food deserts would create a sufficient condition to improve food consumption.

Simplistic structure-based intervention designs are problematic because the contribution of space as a determinant of health is complex. In ecological studies, for instance, it is difficult to determine the types of environments which most influence exposure levels. Debate exists over the relative influence of food environments around homes versus workplaces (Kumar and Levinson 1995). Population migration in and out of a neighborhood may also problematize the use of area-specific characteristics (Veenstra et al. 2005; Walter 1991). The ecological fallacy also problematizes causality in that poorly designed research may assign population-level characteristics to an individual. But populations are exposed to environmental problems in various ways—for instance, food access is not experienced the same from one person to the next—and different scales of geographic analysis may indicate different outcomes.

By way of one example concerning this subject, we draw on recent research completed by the authors. One study used a variety of GIS-based approaches—combining geographic food environment and socioeconomic data—to define potential food deserts. Significant differences in classification were found when accounting for different food types, when using different geospatial methods, and when neglecting the edge effect (Sadler et al. 2011). The main contribution of this study was to support the literature problematizing overly simplistic assumptions about food deserts based on geographic definitions.

Many researchers of course do focus on the *interaction* between people and the built environment, and how structural factors can both impede and alter choices (Cummins et al. 2007). For instance, the

presence of competing retail in neighboring areas, government policies on taxing and regulating food, and distribution systems of retail chains can influence the opportunities people have to interact with the food environment (Cummins et al. 2007). Beyond the methodological difficulty in proving causality of structural interventions, however, the logistical and political issues of regulation (e.g. of the location decisions of retail chains) and taxation (e.g. of foods considered to be unhealthy) are often simply too difficult to overcome in intervention design. Thus rather than focusing purely on structural factors which impede access to food, researchers studying food environments should engage further with behavioral constraints and therefore employ structuration theory. To understand why considering this interaction is necessary for proposing suitable interventions for food deserts, the following section will present some common issues raised by critics of food desert literature.

## Perspectives on food deserts

### Conventional discourse and emerging research

Despite the increasing recognition that ecologic studies need to consider a range of causal mechanisms, the wealth of literature on food deserts in the public discourse has created a momentum toward overly simplistic intervention designs—with the common claim to re-open grocery stores in food deserts. But even at the beginning of Wrigley's and Cummins' research projects on the food deserts of UK cities (Cummins and Macintyre 2002a; Wrigley et al. 2002), Williams and Hubbard (2001) noted that disadvantaged residents in so-called food deserts did not always experience problems with food procurement purely because of where they lived. Cummins and Macintyre (2002b) echoed this work, cautioning that existing studies may overstate the issue or even fabricate food deserts to support the rationale for subsequent studies. Further research supported the view that “living in a food desert *per se* was not in itself a major misfortune” (Coveney and O'Dwyer 2009, p. 48).

Newer academic literature has examined the complexity of the food desert concept. Donald (2013) has suggested the term is so contested among researchers because many “reject the image of a bleak and

desolate urban landscape” (p. 2). Bedore (2013) illuminates the methodological and conceptual debates in defining food deserts, noting that food deserts must be understood individually as the result of the “time- and place-specific nature of capital” (p. 2), and thus resolving the issues inside them is not so simple.

While a broad view of food deserts is helpful for bringing public awareness to the issue of poverty more generally, it becomes a financial concern when planning and public health policies are modified to accommodate subsidized food retail in inner-city areas (Sadler et al. 2013a; Byrom et al. 2001; Guy 1999). The discourse around the effectiveness of re-opening grocery stores in food deserts and limiting big-box style development, that is, may be trumping empirical evidence on the subject (Guy 1998). This discourse has substantially influenced policy in the United States. First Lady Michelle Obama’s “Let’s Move” Campaign’s Healthy Food Financing Initiative partners with large food retailers to build stores in underserved communities (US HHS 2011). The USDA also makes use of a coarsely grained, nationwide ‘food desert locator’ to bring awareness to the issue and guide retail-based interventions (USDA 2012).

To test the meaningfulness of this structure-oriented program, and foreshadowing Donald’s (2013) recent call to “replicate the kind of critical evidence-based ‘before/after’ assessments” (p. 2) of Wrigley’s team, we also conducted a two-part evaluation of the opening of a new grocery store in a food desert in Flint, Michigan. First, we combined GIS and food basket methods to quantify the geographic and economic impact of retail on a food desert (Sadler et al. 2013b). As expected, a new grocery store marked significant declines in the distance required to reach and cost of obtaining healthy foods in the former food desert, as 1300 homes were brought within walking distance of a grocery store and the cost of a basket of groceries declined from \$183 to \$151. This finding was particularly important because 30 % of residents in the food desert neighborhood did not have a car at their household (Sadler et al. 2013b).

The partner study to this work was conducted with a quasi-experimental design to evaluate a natural experiment in the neighborhood where a grocery store opened (Sadler et al. 2013a). Due to time and resource constraints, we did not pursue additional educational programs at the store site—this had the effect of

focusing the evaluation on the addition of the new store. Compiling survey data on residents in this and a control neighborhood which had similar demographic and built form characteristics, we found a null effect of the new grocery store in terms of diet and food security. Both before and after the study, approximately one-third of the control group experienced some form of food insecurity, while the experimental group actually saw an increase in food insecurity (from 27 to 39 %), suggesting that the market did not serve to abate food insecurity. As measured in consumption of fruits and vegetables, healthy food consumption did not change before and after the store opening: consumption was steady at 2.6 servings per day compared to the control group, which saw an increase from 2.5 to 2.9 servings per day. Follow-up interviews with stakeholders indicated a variety of speculative reasons for the store’s lack of effectiveness, including a lack of engagement with the community (including a lack of educational programs), a lack of knowledge about the local market potential for healthy food (a farmers’ market operates 3 days a week in the same neighborhood—Sadler et al. 2013c), and a lack of advertising (Sadler et al. 2013a; Sadler et al. 2014). Furthermore, the store closed within 2 years of opening, lending further credence to the notion that the store did not engage effectively with the consumer demographic.

Finding this null result in food security and diet suggested that “the issue of unhealthy food consumption pervades more deeply than the standard USDA definition of food deserts might suggest” (Sadler et al. 2013a, p. 3340). Indeed, by consulting previously conducted healthy eating surveys, it was clear that the entire region suffered from poor dietary habits, despite a vast majority of residents reporting good access to grocery stores (Prevention Research Center of Michigan 2009). A disproportionate number of residents also experienced constrained mobility, and cited poorer health status when compared to the general population (Sadler et al. 2013a). Cummins et al. (2014) more recently added further support to the shortcomings of a solely structural approach by finding a similar null result in terms of dietary changes.

Thus, new research continues to contribute to the emerging discourse which questions simplistic conceptualizations of food deserts and physical access-driven interventions. The relative lack of efficacy of

the structural intervention and the lack of government-financed opportunities available to neoliberal cities suggested limits to a purely structural approach within the ecological model for addressing health issues in food deserts. Given that much of the policy discussion remains on the notion of structural change in the food system, however, we carried out additional theorizing to explore ways of integrating other perspectives into the food desert discourse.

### Behavior change and a ‘third way’

The first and most obvious direction was to turn from theories of environmental influences to theories of behavior change. Yet despite the wealth of literature on structural interventions, some researchers see the balance of policy advocacy leaning *too* heavily in the direction of behavior change programs (Guthman 2008). Lang and Caraher (1998) also previously advocated for the restriction of choice in food provision rather than an emphasis on behavior change. Still, these perspectives do not explicitly recognize the issues with effecting structural change in food deserts (e.g. areas where healthy, affordable foods are difficult to obtain will not benefit from having *limits* placed on available food options). And a narrow view on behavior change which only emphasizes restriction of choice can have unintended consequences in other realms of behavior by either “reducing attention about important issues...or increasing focus on only a single corrective action” (Johnson et al. 2012, p. 499).

The criticism of behavioral techniques may be that some educational programs are not approaching the problem from a lens which is critical of both structural and behavioral techniques. Thus while others are critical of behavioral approaches, they frame options along a ‘third way’ given a recognition of the *limits of structural change*. Khan (2011), for instance, suggests that *individual-level* interventions lack effectiveness because of the undue burden placed on personal responsibility. Consequently, selective construction of the food environment at a smaller scale may be effective, whereby healthy choices are optimized but unhealthy choices are not taken away (Khan 2011). Thus, this third way does not rest undue burden on either the political structure or the individual to make changes, but rather emphasizes a compromise where individuals are guided into healthier behaviors.

Knowing the difficulty of proving causality in social scientific studies such as those conducted on food deserts and diet/health, finding a suitable policy response is challenging. Yet there are approaches which recognize the intricacy of food environments and decision-making while being sensitive to political and economic structures which limit feasible options for devising interventions.

### Alternative proposals for food deserts

#### Structuration theory/habitus

One approach which can balance the complex interaction between individual food consumption behavior and the structural elements of the food system is that of structuration theory, where structure and agency are seen as distinct from but also co-creators of one another (Walmsley and Lewis 1993). This approach stems from dissatisfaction with structuralist and neo-Marxian conceptions which ignore the impact of individual choice (Walmsley and Lewis 1993).

Authors provide various reasons for the primacy of structuration theory. Curtis and Jones (1998) suggest that while health behavior is closely tied to structural landscapes, it is often the wealthiest in society who are most able to effect change. And especially among vulnerable populations, many people are virtually unable to act in shaping this environment at all (Lawrence and Swinburn 1993). Although health disparities are partly a consequence of individual choice, they need to be seen in light of social and political forces (Neff et al. 2009): even where people intend to act of their own volition, external influences can lead to imperfect choices (Walmsley and Lewis 1993). Thus structuration theory does not sidestep the structural inequalities in the built environment as a purely agent-based approach might, but instead *embraces* the complexity. Structuration theory can also account for criticisms of ecological approaches that have “treated the environment-individual relationship as a unidirectional one” and which have treated residents as “largely predictable organisms responsive to their environment” (Shannon 2013, p. 4).

Because the theoretical approach of structuration theory suggests it would be unwise to ignore either structural or behavioral factors in re-shaping the food



environment, researchers are increasingly recognizing the importance of a balanced and rigorous methodological approach (Algazy et al. 2010; Neff et al. 2009). Algazy et al. (2010, p. 12) report that single-intervention programs typically induce only modest changes and that there is no “silver bullet” in resolving health issues such as food deserts.

Neff et al. (2009) found that many factors constrain choices, and therefore suggest that “focusing exclusively on individual behavior in the absence of larger systemic changes may not only be less effective or ineffective, but it can also result in victim-blaming” (Neff et al. 2009, p. 284), a practice used to occlude the lack of action on social justice concerns related to healthy food consumption (Dowler and Caraher 2003). Indeed, Cummins and his research team have shown on two occasions (2008, 2014) that even when presented with a new food source, many people do not deviate from their old habits. Assuming that store-switching equates with dietary change ignores the imperfect choice sets enacted when in the shopping environment (Just and Payne 2009). Recognizing that people across the entire socioeconomic spectrum are subject to this imperfection, researchers and practitioners cannot fairly claim that the primary solution to food deserts should be to simply attract retail investment into underserved neighborhoods. Structuration theory thus provides a suitable conceptualization in which to integrate theories on behavior change, because addressing the influence of social structures on an autonomous agent pushes the researcher into devising interventions to address not only imperfections in the built environment, but also imperfections in decision-making.

### Behavioral economics

These findings align closely with the field of behavioral economics. Unlike other theories which focus on social structures as the key determinant of food consumption, behavioral economics emphasizes the systematic discrepancies made by *all* consumers regardless of economic stature due to the presence of subliminal external cues (Just 2006). One example of this error formation in behavioral tendencies is that people forgo available optimal food choices (Just 2006; Cummins et al. 2008, 2014).

While classical economics assumes that consumers make optimal choices (Strauss 2008), researchers

know that behavioral tendencies are subject not only to utilitarian, but also hedonic, motives (Handy and Clifton 2001). Even after educational campaigns to make people aware of, say, healthy eating benefits, long-term planning motives may be overridden by short-term desires (Thaler 1980). Tversky and Kahneman (1981) empirically show how people systematically violate the idea that consumers act rationally, and how these violations are connected to perception. This may explain in part why geographic accessibility to nutritious foods is not always correlated to better dietary practices (Cummins et al. 2005; Pearce et al. 2008). Given the centrality of food to well-being, and the myriad, imperfect ways people interact with their environments, researchers and practitioners need to consider the components impacting consumer choice and, ultimately, consumption by employing behavioral economics-driven interventions (Just and Payne 2009).

Policy responses from the angle of behavioral economics aim to improve diet through a gentle ‘nudge’ rather than a forced shift in behavior, akin to Khan’s (2011) ‘third way’ between purely behavioral and purely structural programs. This response, termed libertarian paternalism, is intended to make better choices more attractive while maintaining the general freedom to choose from alternatives (Downs et al. 2009). Thaler and Sunstein (2003) posit that because ‘food environment architects’ must make some design choices, they ought to optimize behavioral access by highlighting healthier foods to consumers. Indeed, much research has reported on the effectiveness of promotional techniques to encourage consumption of unhealthy foods—techniques which have been so effective that numerous studies have detailed the negative health outcomes of and attendant policy responses to television or in-store advertising of junk foods to population subgroups such as children (Ashton 2004; Chou et al. 2005; Harris et al. 2009). The goal of behavioral economics interventions would be to reframe the object of promotion to a healthier option, rather than taking away advertising altogether. Camerer et al. (2003) suggest that these interventions are more likely to be attractive to the entire political spectrum, and would thus gain more support than food tax or prohibition legislation, as it is a positive rather than punitive measure (i.e. promoting healthy foods versus denigrating unhealthy foods).

As this relates to the concept of food deserts, certain local-level interventions could have a beneficial impact on diet and health. This is compatible with structuration theory because it recognizes that while individuals have some autonomy, the choices they make are intimately tied to social structures. Thus behavioral economics-driven interventions can over time reproduce a social structure which defaults to healthier choices. Changes to food labelling schemes and suggestive advertising toward smaller or healthier portions are two proven examples which can help improve diet (Geyskens et al. 2007; Schwartz et al. 2012).

Even so, researchers concede that libertarian paternalism should not entirely replace more stringent forms of food legislation. Opponents indicate that ‘nudging’ is not effective as a public health strategy because it fails to address the wide range of influences on health (Rayner and Lang 2011). Advocates, meanwhile, are cautiously optimistic of incorporating nudging as part of an overall health strategy, saying these “nudges should be seen as an additional tool to complement regulation by moving society incrementally” (Oliver 2011, p. 898). And in spite of Pykett’s criticism that behavioral economics neglects social norms and individual experience, this approach has yielded more demonstrable positive behavioral change to encourage healthy eating across race, class, and gender than many structural programs (Pykett 2011; as discussed in Shannon 2013). By approaching food deserts from the standpoint of structuration theory, and then employing behavioral economics principles as a tool to improve healthy lifestyles, it is possible to propose solutions which are demonstrably more effective than retail-based or purely educational interventions.

### Local food

Owing to the central constraint within libertarian paternalism that government should not be expected to be the primary ‘mover’ of societal change, but also recognizing that smaller-scale interventions are possible within this approach, a natural tool for behavior change in food deserts is thus the *self*-restoration of healthy foods. This self-restoration entails emphasizing personal empowerment and thus strengthens local food production, rather than emphasizing solely structural interventions in food retailing. Despite a long-growing divide between conventional food

systems and local food governance activities, many studies do not consider that the political economy under which these changes took place creates an opportunity for local food policy advocates. While power shifted away from regulatory agents and toward food retailers, this offers the opportunity for local food systems to wrest this power away from conventional retailers and play a stronger role in intervention activities. Structuration theory can be suitably linked to this idea because of the recognition of the interplay between agent-generated autonomy to gain control in the food system within what can still be a social or political structure which is oppressive or hostile to small-scale food system endeavors.

These networks have a common aversion to the conventional, industrialized food system (Allen and Hinrichs 2007), and therefore policy solutions may instead present opportunities for increasing the role of the agent in food consumption decisions by necessarily involving and empowering individuals to grow their own food. The ability for these networks to address social inequalities is questioned by those who associate local food networks (LFNs) as a middle-class white social movement (Guthman 2008). But social justice advocates have an increasing role in building these networks for the sake of the most at-risk residents in a community, especially in post-industrial cities (Schuering 2011). As well, local food production sidesteps the issue that the labelling of food deserts as somehow deficient forces them to adopt a solely ‘middle-class’ view of what constitutes a better food environment by way of grocery store investment (Shannon 2013).

Thus in the final component of our research project, we engaged participants of a LFN (Sadler et al. 2014). Perhaps most illuminating was that community members were skeptical of food desert labels. In contrast to the typical retail-oriented solution, this group recognized the inefficiency of structural change in the conventional food system and offered a perspective commonly used in practice, if less so in theoretical/policy discussions. The proposal centered on empowering individuals to co-create their own local food system, rather than supporting the conventional food system through retail change. This idea fits neatly with behavioral economics because it focuses on creating pathways to make healthy food the default choice, and research has shown that participants of community gardening see immediate improvements to their



dietary habits, even while maintaining the autonomy to grow and consume their own food (Alaimo et al. 2008).

Policy change in the conventional food system can be an arduous process since stakeholders may lack political clout. Yet elements of *local* food systems such as food gardens, food hubs, and farmers' markets can be effective in re-shaping dietary habits at the local level. Furthermore, local food policy-making can be more accessible or easier to influence than national-level policy-making because the average individual is better able to become acquainted with local issues and decision-makers (Harper et al. 2009).

Organizations such as food policy councils are useful because they promote food policy advocacy at the local level where innovative policy ideas may be tested (Harper et al. 2009). A well-informed and influential food policy council can facilitate changes to land use laws which can strengthen LFNs, and thus tackle the *root* of the problem of food deserts (food insecurity and food consumption) through local policy advocacy. These organizations can aid in the growth of urban agriculture, which has many positive effects on participants, including increased food security, job opportunities, and social ties among participants and residents, as well as decreased gun violence, vandalism, and stress (Branas et al. 2011; Brown and Jameton 2000; Westphal 2003). A food-based intervention which can simultaneously improve dietary habits and curb social issues thus has the potential to spur economic development and improve health through multiple dimensions, since the resulting neighborhoods will be safer, more productive, and more self-sufficient. This proposal is important because it is *not* advocating only market-based local food solutions such as farmers' markets, which have been criticized for perpetuating the tenets of neoliberalism and failing to address racial disparities in food access (Alkon and Mares 2012).

Commercially-oriented LFNs can reproduce neoliberalism “in placing the economic needs of producers above food provisioning [by] turning to market mechanisms to increase food access rather than demanding it of the state” (Alkon and Mares 2012, p. 350). Guthman sympathizes, indicating that the emphasis on “localism...and self-improvement demonstrates the extent to which food politics have been at the cutting edge of neoliberal regulatory transformations” (2008, p. 437). And Delind (2011)

concur that local food too often focuses “on the market potential and economic outcomes of local food...to realize food system reform” (Delind, p. 275), as is common with retail-based interventions. Yet LFNs and urban agriculture present a realistic opportunity to effect change in the food system (DeLind 2011), especially if: (1) the focus of local food production can remain un-commercialized; (2) the power remains in the hands of the growers and the local community (whether in the informal economy or outside of a formal economic mechanism altogether, as discussed in Schindler (2013)); and (3) the emphasis can remain on building up the health and economic well-being of affected citizens.

These LFNs or food advocacy groups are an effective policy solution for several reasons: they are unobtrusive, inexpensive, and generally effective. At the most local level, they promote individual production of food for personal consumption. But local food policy emphasizing individual food production and personal empowerment also reflects changes in the political milieu away from ideas of entitlement. The concept of ‘community food security’ is used by some to describe the idea of empowerment as a long-term, community-wide approach to resolving issues of food insecurity (Allen 1999).

Local food as a strategy to erase food deserts would require further involvement from local government agencies (Guy 1998; Pothukuchi 2005). And because local food production represents a shift in conventional land uses in cities, a challenge remains for convincing city governments to ‘get out of the way’, so to speak, and enable opportunities for food production and/or sale. Furthermore, enabling legislation is made more difficult because many policy-makers simply do not know how to create effective policies, and the wide range of potential options can create a “policy cacophony” (Gortmaker et al. 2011, p. 839).

But even with government buy-in, issues of civic apathy can considerably hinder efforts to grow the local food economy (Winne 2005), and the challenges of engaging disadvantaged populations in local food efforts cannot be understated (Dowler and Caraher 2003). Especially in the authors' study area of Flint, Michigan, which was previously dominated by a single employer—General Motors—and which has experienced considerable economic repercussions by its departure (Jacobs 2009), it is plausible to believe

that sufficient public activism may be difficult to muster change in local food policy (Blanchard and Matthews 2006). In this case, policy change would be directed from higher levels of government and likely would not reflect civic participation, thus resulting in a mismatch in policy implementation. Yet the massive public participation seen from a recent master planning process (City of Flint 2013)—and the establishment of new land use designations within the city with varying degrees of support for local food systems—retains some hope of the general public being engaged in local food policy.

Even so, it is unlikely that any one policy change will immediately or wholly resolve the issue of food deserts, and the vast array of potential solutions can overwhelm policymakers. Although concepts of empowerment and libertarian paternalism are essentially opposite in scope from customary food desert policy proposals which increase regulation and control of the food system, their very presence as unconventional proposals mean that social mores and conflicting policy agendas could impede their implementation (Brownson et al. 2010; Shill et al. 2012).

## Discussion and conclusions

Our research has nested structuration theory under the ecological model of health as a theoretical basis to employ the proposed policy options because both explicitly recognize uncontrollable environmental factors which influence behavior. Gittelsohn and Lee (2013) similarly argued that “a mixed educational-environmental-behavioral economic approach will work because it addresses different components of individual (and group) decision-making. Decisions should be informed (educational), constrained (environmental), and guided (behavioral economics)” (p. 60). Thus, research employing these theoretical bases can also make use of behavioral economics as a theoretical and methodological companion. And given the limitations of large-scale change in the food system using behavioral economic interventions, the local food system was presented as a viable (if not ideal) platform for communities seeking to use these ideas to address the health issues associated with food deserts.

We challenged the theoretical assumptions of built environment and food desert studies which rely too

heavily on geographical-structural solutions. By critically evaluating the effect of a structural intervention on dietary habits, we demonstrated the complexity of addressing food deserts and the need for additional programming to effect change (Sadler et al. 2013a, b, 2014). Reflecting on larger social structures and miscues in individual decision-making, a suite of theoretical bases have been presented to more directly address food deserts. The policy recommendation to employ behavioral economic interventions within the local food system is based on work with stakeholders which suggested a broad recognition of the need for non-structural interventions (Sadler et al. 2014), and allows for consideration of the behavioral determinants of health and macro-level geographic and societal issues. This recommendation recognizes the difficulty of devising effective food-retail based interventions, and is sensitive to social, financial, and political constraints present in a neoliberal society.

We have shown that the conventional food system is socially and spatially exclusionary, and creates inequalities in access to healthy foods (Sadler et al. 2013b). Yet focusing solely on hunger creates a “discourse on need”, while focusing on empowerment nurtures a “discourse on opportunity” (Borron 2003, pp. 4–5). Thus while critical assessments of the neoliberal-era food system are important, tackling the issues of food insecurity based on a worldview of charity may be less useful than embracing the opportunities that exist to make communities healthier.

The policy options presented may be scrutinized by critical social scientists who acknowledge how “relying on the private and voluntary sectors to provide public goods is an essential component of neoliberalism” (Alkon and Mares 2012, p. 354). Especially, exception may be taken by the important idea that “many US community food security and food justice organizations focus on developing support for local food entrepreneurs...The belief that the market can address social problems is a key aspect of neoliberal subjectivities” (Alkon and Mares 2012, p. 349).

But the trouble of research which is critical of neoliberal ideologies is that we need *all* politically and economically viable intervention strategies, especially once they are shown to be effective. Kearns and Moon (2002) have noted that “it may well be that critical research reveals a health policy to be unjust and

discriminatory but, without posing alternatives, the sum benefit to humankind is nil” (p. 617). A key suggestion of our research is that individual behavior change and LFNs (but *also* non-commercialized food production) should be used to address food deserts. Criticizing effective options based on political ideology may be construed as merely an academic exercise, and thus may not do enough to advance the understanding of effective interventions to resolve issues in the food system. Rather, small-scale interventions emphasizing individual decision-making or the power of agency in LFNs may be the best way, in the absence of large-scale structural policy change, to strive toward the public perception that the food environment can be arranged in a way that is conducive to health and inclusive of everyone across the socioeconomic spectrum. And yet these interventions also possibly hold the best chances of *large-scale* change in the food system by building from the grassroots level, so they cannot be ignored. Rather than confronting large food companies from the top with regulations on product creation and taxation of unhealthy foods, these strategies subvert the system and strengthen local and small-scale advocacy. While other options may be desired and definitely should be practiced where feasible, in the short term we must ultimately work within the political system given to us. Again quoting from Kearns and Moon (2002): “Is it more effective to do this through insurgency or collaboration? The challenge, perhaps, is to seek out levers of change beyond the more obvious ones held by those in positions of power” (p. 616).

Food consumption is clearly an issue which affects our physical and economic well-being. While many interventions have been proposed to combat food deserts, many researchers and practitioners question their effectiveness. Thus policy responses were discussed which consider the interchange between structural and behavioral elements. In the absence of fundamental change to the food system and/or the political milieu in North America, the combined theoretical and policy approach discussed here may yield the most likely and effective options. A constant and fervent evaluation of the effectiveness of food system policies is necessary to encourage the end of food deserts.

Particularly because the negative influence of the food environment is amplified among those living in poverty, policy agendas need to be sensitive to

context-specific constraints. The theoretical positions presented here align with three critical reasons given for engaging with food system issues (Lawrence and Swinburn 1993). Behavioral economic interventions address both *food system failure* (by re-shaping the food system) and the *illusion of choice* (by recognizing and embracing the constraints of human behavior and offering alternatives), while local food system interventions address *food system failure* (by building a new food system) and the *protection of vulnerable members of society* (through the empowerment of disadvantaged people constrained by neoliberalism). The policy options presented may be effective at legitimating a public perception that good ideas can translate into effective policy, particularly because they side-step many of the conventional ‘big government’ bureaucratic and regulatory issues. While it is important to recognize the long path toward building healthier communities, this research suggests demonstrably effective options which may be taken to more critically address the issue of food deserts.

## References

- Alaimo, K., Packnett, E., Miles, R. A., & Kruger, D. J. (2008). Fruit and vegetable intake among urban community gardeners. *Journal of Nutrition Education and Behavior*, 40(2), 94–101.
- Algazy, J., Gipstein, S., Riahi, F., & Tryon, K. (2010). Why governments must lead the fight against obesity. *McKinsey Quarterly: Healthcare Payor and Provider Practice*, October, 1–19.
- Alkon, A. H., & Mares, T. M. (2012). Food sovereignty in US food movements: Radical visions and neoliberal constraints. *Agriculture and Human Values*, 29(3), 347–359.
- Allen, P. (1999). Contemporary food and farm policy in the United States. In M. Koc, R. MacRae, L. J. A. Mougeot, & J. Welsh (Eds.), *For hunger-proof cities*. International Development Research Centre: Ottawa.
- Allen, P., & Hinrichs, C. (2007). Buying into ‘Buy Local’: Engagements of United States local food initiatives. In D. Maye, L. Holloway, & M. Kneafsey (Eds.), *Alternative food geographies: Representation and practice*. Elsevier Science: Oxford.
- Ashton, D. (2004). Food advertising and childhood obesity. *Journal of the Royal Society of Medicine*, 97(2), 51–52.
- Beaulac, J., Kristjansson, E., & Cummins, S. (2009). A systematic review of food deserts, 1966–2007. *Preventing Chronic Disease*, 6(3), 1–10.
- Bedore, M. (2013). Geographies of capital formation and rescaling: A historical-geographical approach to the food desert problem. *The Canadian Geographer*, 57(2), 133–153.

- Blanchard, T., & Matthews, T. L. (2006). The configuration of local economic power and civic participation in the global economy. *Social Forces*, 84(4), 2241–2257.
- Borron, S. M. (2003). Food policy councils: Practice and possibility. Congressional Hunger Center, Hunger-Free Community Report. Eugene, OR: FOOD for Lane County.
- Branas, C. C., Cheney, R. A., MacDonald, J. M., Tam, V. W., Jackson, T. D., & Ten Have, T. R. (2011). A difference-in-differences analysis of health, safety, and greening vacant urban space. *American Journal of Epidemiology*, 174(11), 1296–1306.
- Brown, K. H., & Jameton, A. L. (2000). Public health implications of urban agriculture. *Journal of Public Health Policy*, 21(1), 20–39.
- Brownson, R. C., Hartge, P., Samet, J. M., & Ness, R. B. (2010). From epidemiology to policy: Toward more effective practice. *Annals of Epidemiology*, 20(6), 409–411.
- Byrom, J. W., Bennisson, D. J., Hernandez, T., & Hooper, P. D. (2001). The use of geographical data and information in retail locational planning. *Journal of Targeting Measurement and Analysis for Marketing*, 9(3), 219–229.
- Camerer, C., Issacharoff, S., Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Regulation for conservatives: Behavioral economics and the case for “Asymmetric Paternalism”. *University of Pennsylvania Law Review*, 151(3), 1211–1254.
- Carpiano, R. M., & Daley, D. M. (2005). A guide and glossary on postpositivist theory building for population health. *Journal of Epidemiology and Community Health*, 60(7), 564–570.
- Chou, S. Y., Rashad, I., & Grossman, M. (2005). *Fast-food restaurant advertising on television and its influence on childhood obesity* (No. w11879). National Bureau of Economic Research.
- City of Flint (2013). *Imagine Flint Master Plan*. Accessed 8 Feb 2015 from <http://www.imagineflint.com/>.
- Coveney, J., & O'Dwyer, L. A. (2009). Effects of mobility and location on food access. *Health and Place*, 15(1), 45–55.
- Cummins, S., Curtis, S., Diez-Roux, A. V., & Macintyre, S. (2007). Understanding and representing ‘place’ in health research: A relational approach. *Social Science and Medicine*, 65(9), 1825–1838.
- Cummins, S., Findlay, A., Petticrew, M., & Sparks, L. (2008). Retail-led regeneration and store-switching behavior. *Journal of Retailing and Consumer Services*, 15(4), 288–295.
- 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*, 33(2), 283–291.
- Cummins, S., & Macintyre, S. (2002a). “Food deserts”—evidence and assumption in health policy making. *British Medical Journal*, 325(7361), 436–438.
- Cummins, S., & Macintyre, S. (2002b). A Systematic study of an urban foodscape: The price and availability of food in greater Glasgow. *Urban Studies*, 39(11), 2115–2130.
- Cummins, S., Petticrew, M., Sparks, L., & Findlay, A. (2005). Large scale food retail interventions and diet. *British Medical Journal*, 330(7493), 683–684.
- Curtis, S., & Jones, I. R. (1998). Is there a place for geography in the analysis of health inequality? *Sociology of Health & Illness*, 20(5), 645–672.
- Dean, K. (2004). The role of methods in maintaining orthodox beliefs in health research. *Social Science and Medicine*, 58(4), 675–685.
- DeLind, L. B. (2011). Are local food and the local food movement taking us where we want to go? Or are we hitching our wagons to the wrong stars? *Agriculture and Human Values*, 28(2), 273–283.
- Donald, B. (2013). Food retail and access after the crash: Re-thinking the food desert problem. *Journal of Economic Geography*, 13(2), 231–237.
- Dowler, E., & Caraher, M. (2003). Local food projects: The new philanthropy? *The Political Quarterly*, 74(1), 57–65.
- Downs, J. S., Loewenstein, G., & Wisdom, J. (2009). Strategies for promoting healthier food choices. *American Economic Review*, 99(2), 1–10.
- Dunn, J. R. (2006). Speaking theoretically about population health. *Journal of Epidemiology and Community Health*, 60(7), 572–573.
- Egger, G., & Swinburn, B. (1997). An “Ecological” approach to the obesity pandemic. *British Medical Journal*, 315(7106), 477–480.
- Escaron, A. L., Meinen, A. M., Nitzke, S. A., & Martinez-Donate, A. P. (2013). Supermarket and grocery store-based interventions to promote healthful food choices and eating practices: A systematic review. *Preventing Chronic Disease*, 10(120156).
- Frohlich, K. L., Corin, E., & Potvin, L. (2001). A theoretical proposal for the relationship between context and disease. *Sociology of Health & Illness*, 23(6), 776–797.
- Gatrell, A. C., & Elliott, S. J. (2009). *Geographies of health: An introduction* (2nd ed.). Hoboken: Wiley-Blackwell.
- Geyskens, K., Pandelaere, M., Dewitte, S., & Warlop, L. (2007). The backdoor to overconsumption: The effect of associating “low-fat” food with health references. *American Marketing Association*, 26(1), 118–125.
- Gittelsohn, J., & Lee, K. (2013). Integrating educational, environmental, and behavioral economic strategies may improve the effectiveness of obesity interventions. *Applied Economic Perspectives and Policy*, 35(1), 52–68.
- Gortmaker, S. L., Swinburn, B. A., Levy, D., Carter, R., Mabry, P. L., Finegood, D. T., et al. (2011). Changing the future of obesity: Science, policy, and action. *Lancet*, 378(9793), 838–847.
- Green, L. W., Richard, L., & Potvin, L. (1996). Ecological foundations of health promotion. *American Journal of Health Promotion*, 10(4), 270–281.
- Guthman, J. (2008). Bringing good food to others: Investigating the subjects of alternative food practice. *Cultural Geographies*, 15(4), 431–447.
- Guy, C. M. (1998). Controlling new retail spaces: The impress of planning policies in Western Europe. *Urban Studies*, 35(5–6), 953–979.
- Guy, C. M. (1999). Retail location analysis. In M. Pacione (Ed.), *Applied geography: Principles and practice*. London: Routledge.
- Handy, S. L., & Clifton, K. J. (2001). Local shopping as a strategy for reducing automobile travel. *Transportation*, 28(4), 317–346.
- Harper, A., Shattuck, A., Holt-Gimenez, E., Alkon, A., & Lambbrick, F. (2009). *Food policy councils: Lessons learned*. Institute for food and development policy.



- Harris, J. L., Pomeranz, J. L., Lobstein, T., & Brownell, K. D. (2009). A crisis in the marketplace: How food marketing contributes to childhood obesity and what can be done. *Annual Review of Public Health, 30*(1), 211–225.
- Jacobs, A. J. (2009). The impacts of variations in development context on employment growth: A comparison of central cities in Michigan and Ontario, 1980–2006. *Economic Development Quarterly, 23*(4), 351–371.
- Johnson, E. J., Shu, S. B., Dellaert, B. G. C., Fox, C., Goldstein, D. G., Häubl, G., et al. (2012). Beyond nudges: Tools of a choice architecture. *Marketing Letters, 23*(2), 487–504.
- Just, D. R. (2006). Behavioral economics, food assistance, and obesity. *Agricultural and Resource Economics Review, 35*(2), 209–220.
- Just, D. R., & Payne, C. R. (2009). Obesity: Can behavioral economics help? *Annals of Behavioral Medicine, 38*(1), 47–55.
- Kearns, R. A. (1993). Place and health: Towards a reformed medical geography. *The Professional Geographer, 45*(2), 139–147.
- Kearns, R., & Moon, G. (2002). From medical to health geography: Novelty, place and theory after a decade of change. *Progress in Human Geography, 26*(5), 605–625.
- Khan, F. (2011). Combating obesity through the built environment: Is there a clear path to success? *Public Health Reform, Spring*, 387–393.
- Kumar, A., & Levinson, D. (1995). Chained Trips in Montgomery County, Maryland. *ITE Journal, May*, 27–32.
- Lang, T., & Caraher, M. (1998). Access to healthy foods: Part II. Food poverty and shopping deserts: What are the implications for health promotion policy and practice? *Health Education Journal, 57*(3), 202–211.
- Lawrence, M., & Swinburn, B. (1993). The role of policy in preventing childhood obesity. In E. Waters, B. A. Swinburn, J. C. Seidell, & R. Uauy (Eds.), *Preventing childhood obesity: Evidence policy and practice*. Oxford: Blackwell Publishing.
- Lee, H. (2012). The role of local food availability in explaining obesity risk among young school-aged children. *Social Science and Medicine, 74*(8), 1193–1203.
- Lytle, L. A. (2009). Measuring the food environment: State of the science. *American Journal of Preventive Medicine, 36*(4S), 134–144.
- Morland, K., Diez-Roux, A. V., & Wing, S. (2006). Supermarkets, other food stores, and obesity: The atherosclerosis risk in communities study. *American Journal of Preventive Medicine, 30*(4), 333–349.
- Murdoch, J., Marsden, T., & Banks, J. (2000). Quality, nature, and embeddedness: Some theoretical considerations in the context of the food sector. *Economic Geography, 76*(2), 107–125.
- Neff, R. A., Palmer, A. M., McKenzie, S. E., & Lawrence, R. S. (2009). Food systems and public health disparities. *Journal of Hunger & Environmental Nutrition, 4*(3–4), 282–314.
- Nestle, M. (2003). *Food politics: How the food industry influences nutrition and health*. Los Angeles: University of California Press.
- Niles, D., & Roff, R. J. (2008). Shifting agrifood systems: The contemporary geography of food and agriculture; an introduction. *GeoJournal, 73*(1), 1–10.
- Oliver, A. (2011). Is nudge an effective public health strategy to tackle obesity? Yes. *British Medical Journal, 342*(d2168), 898–899.
- Pearce, J., Hiscock, R., Blakely, T., & Witten, K. (2008). The contextual effects of neighbourhood access to supermarkets and convenience stores on individual fruit and vegetable consumption. *British Medical Journal, 62*(3), 198–201.
- Pothukuchi, K. (2005). Attracting supermarkets to inner-city neighborhoods: Economic development outside the box. *Economic Development Quarterly, 19*(3), 232–244.
- Prevention Research Center of Michigan. (2009). *Speak to your health community survey*. Ann Arbor, MI: Prevention Research Center of Michigan.
- Pykett, J. (2011). The new maternal state: The gendered politics of governing through behaviour change. *Antipode, 44*(1), 217–238.
- Rayner, G., & Lang, T. (2011). Is nudge an effective public health strategy to tackle obesity? No. *British Medical Journal, 342*(d2177).
- Reidpath, D. D., Burns, C., Garrard, J., Mahoney, M., & Townsend, M. (2002). An ecological study of the relationship between social and environmental determinants of obesity. *Health & Place, 8*(2), 141–145.
- Robertson, A. (1998). Shifting discourses on health in Canada: From health promotion to population health. *Health Promotion International, 13*(2), 155–164.
- Sadler, R. C., Arku, G., & Gilliland, J. A. (2014). Local food networks as catalysts for food policy change to improve health and build the economy. *Local Environment: The International Journal of Justice & Sustainability*. doi:10.1080/13549839.2014.894965.
- Sadler, R. C., Clark, M. A. R., & Gilliland, J. A. (2013a). An economic impact comparative analysis of farmers' markets in Michigan and Ontario. *Journal of Agriculture, Food Systems, and Community Development, 3*(3), 61–81.
- Sadler, R. C., Gilliland, J. A., & Arku, G. (2011). An application of the edge effect in measuring accessibility to multiple food retailer types in rural Southwestern Ontario, Canada. *International Journal of Health Geographics, 10*(1), 34.
- Sadler, R. C., Gilliland, J. A., & Arku, G. (2013b). A food retail-based intervention on food security and consumption. *International Journal of Environmental Research and Public Health, 10*(8), 3325–3346.
- Sadler, R. C., Gilliland, J. A., & Arku, G. (2013c). Community development and the influence of new food retail sources on the price and availability of nutritious food. *Journal of Urban Affairs, 35*(4), 471–491.
- Sallis, J. F., Cervero, R. B., Ascher, W., Henderson, K. A., Kraft, M. K., & Kerr, J. (2006). An ecological approach to creating active living communities. *Annual Review of Public Health, 27*(1), 297–322.
- Schindler, S. (2013). Understanding urban processes in Flint, Michigan: Approaching 'subaltern urbanism' inductively. *International Journal of Urban and Regional Research, 38*(3), 791–804.
- Schuering, E. S. (2011). "Perennial growth" in a Shrinking City: A case study of urban agriculture policy and planning in Cleveland, Ohio. *Unpublished Master's Thesis*. Chicago, IL: DePaul University.

- Schwartz, J., Riis, J., Elbel, B., & Ariely, D. (2012). Inviting consumers to downsize fast-food portions significantly reduces calorie consumption. *Health Affairs*, *31*(2), 399–407.
- Seiders, K., & Petty, R. D. (2004). Obesity and the role of food marketing: A policy analysis of issues and remedies. *Journal of Public Policy & Marketing*, *23*(2), 153–169.
- Shannon, J. (2013). Food deserts: Governing obesity in the neoliberal city. *Progress in Human Geography*, *38*(2), 248–266.
- Shill, J., Mavoia, H., Allender, S., Lawrence, M., Sacks, G., Peeters, A., et al. (2012). Government regulation to promote healthy food environments: A view from inside state governments. *Obesity Public Health*, *13*(2), 162–173.
- Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health*, *29*(1), 253–272.
- Strauss, K. (2008). Re-engaging with rationality in economic geography: Behavioral approach and the importance of context in decision-making. *Journal of Economic Geography*, *8*(1), 137–156.
- Thaler, R. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior & Organization*, *1*(1), 39–60.
- Thaler, R. H., & Sunstein, C. R. (2003). Libertarian paternalism. *American Economic Review*, *93*(2), 175–179.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*(4481), 453–458.
- United States Department of Agriculture (USDA) Economic Research Service. (2012). *Food Access Research Atlas*. <http://www.ers.usda.gov/data-products/food-desert-locator.aspx> (accessed on 5 January 2013).
- United States Department of Health and Human Services (HHS). (2011). *Healthy Food Financing Initiative*. <http://www.acf.hhs.gov/programs/ocs/resource/healthy-food-financing-initiative-0> (accessed on 5 January 2013).
- Veenstra, G., Luginaah, I., Wakefield, S., Birch, S., Eyles, J., & Elliott, S. (2005). Who you know, where you live: Social capital, neighbourhood, and health. *Social Science and Medicine*, *60*(12), 2799–2818.
- Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. *Health & Place*, *16*(5), 876–884.
- Walmsley, D. J., & Lewis, G. J. (1993). *People and environment: Behavioral approaches in human geography* (2nd ed.). New York: Longman.
- Walter, S. D. (1991). The ecologic model in the study of environmental health. II: Methodologic issues and feasibility. *Environmental Health Perspectives*, *94*(1), 67–73.
- Weis, T. (2010). *The global food economy: The battle for the future of farming*. London: Zed Books.
- Westphal, L. M. (2003). Urban greening and social benefits: A study of empowerment outcomes. *Journal of Arboriculture*, *29*(3), 137–147.
- Williams, P., & Hubbard, P. (2001). Who is disadvantaged? Retail change and social exclusion. *International Review of Retail, Distribution and Consumer Research*, *11*(3), 267–286.
- Winne, M. (2005). *Community food security: Promoting food security and building healthy food systems*. Venice, CA: Community Food Security Coalition.
- Wrigley, N., Warm, D., Margetts, B., & Whelan, A. (2002). Assessing the impact of improved retail access on diet in a 'food desert': A preliminary report. *Urban Studies*, *39*(11), 2061–2082.