

The role of community-based efforts in promoting sustainable diets: Lessons from a grassroots meat-reduction campaign

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Abstract

Decreasing the consumption of meat and dairy has been identified as an effective strategy for protecting the health of humans and the planet. More specifically, transitioning to diets that are lower in animal-source foods and higher in fruits, vegetables, legumes, and whole grains offers a promising

opportunity to better align consumer behaviors with contemporary nutritional and ecological goals. However, given the limited understanding of how these changes in dietary behaviors can be best promoted, there is a need to explore the merits of

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community-based approaches to meat reduction and their capacity to advance more sustainable practices of eating at the individual, household, and community levels. To address this gap in the literature, we surveyed more than 100 American households participating in a communitywide, 12-week-long Meatless Monday challenge and tracked the changes in their knowledge, attitudes, beliefs, and food choices over a nine-month period. The case study provided herein highlights a number of key findings from our evaluation. Most notably, our results demonstrate the value of community-based efforts in initiating and maintaining dietary behavior change and provide preliminary insights into the unique roles of multilevel interventions and diverse stakeholder engagement in promoting healthier, more sustainable diets.

Keywords

Behavior Change, Capacity Building, Community Engagement, Community-Based Intervention, Climate Mitigation, Dietary Change, Meatless Monday, Health Promotion, Meat Reduction, Sustainable Diets

Introduction

Background

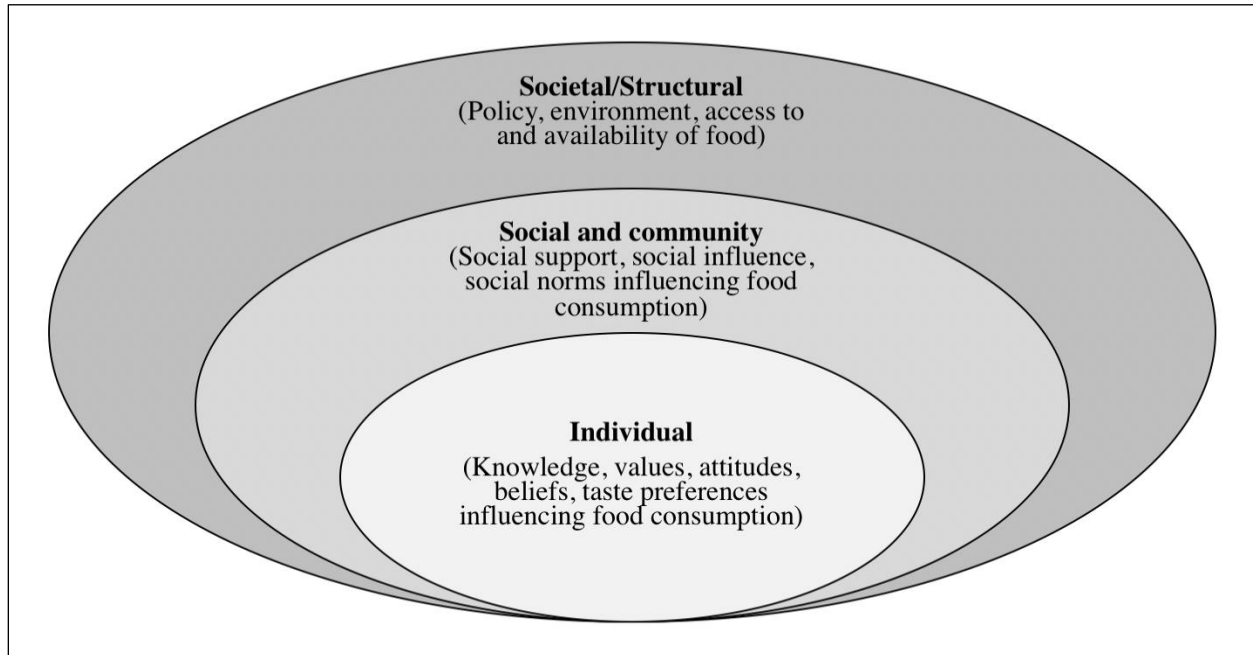
Prior research has indicated that the same eating habits that are associated with higher rates of morbidity and mortality are also frequently the most environmentally damaging (Clark, Springmann, Hill, & Tilman, 2019; Tilman & Clark, 2014; Willett et al., 2019). Dietary patterns involving comparatively more red and processed meats have been known to increase the risk of earlier mortality (Pan et al., 2012; Zheng et al., 2019), obesity (Larsson & Orsini, 2014), and a number of other chronic illnesses, including colorectal cancer (Chan et al., 2011), cardiovascular disease (Micha, Michas, & Mozaffarian, 2012), and type II diabetes (Pan et al., 2011). Furthermore, due to its high resource demands and the negative externalities tied to its systems of production, the global livestock industry is also a major contributor to climate change (Gerber et al., 2013; Herrero et al., 2016; Pachauri et al., 2014), deforestation (Gerber et al., 2013; Keenan, Reams, Achard, de Freitas, Grainger, &

Lindquist, 2015), biodiversity loss (Chaplin-Kramer et al., 2015; Jones et al., 2013; Whitmee et al., 2015), water scarcity (Hoekstra, 2012; Mekonnen & Hoekstra, 2012), and antibiotic resistance (Hardy, 2002; Mathew, Cissel, & Liamthong, 2007). For these reasons, interventions that are able to meaningfully attenuate the demand for meat have the capacity to simultaneously reduce the noncommunicable disease burden and mitigate the effects of livestock-associated ecological degradation (Clonan, Wilson, Swift, Leibovici, & Holdsworth, 2015). This is especially true when these efforts are focused in high-income settings, where meat tends to be consumed at greater rates (Hayek, Harwatt, Ripple, & Mueller, 2020; Kim et al., 2020; Semba et al., 2020).

Despite the positive nutritional and ecological implications associated with shifting to more plant-forward diets, there is a limited empirical understanding of how these transitions can be best promoted (Bianchi, Dorsel, Garnett, Aveyard, & Jebb, 2018a; Bianchi, Garnett, Dorsel, Aveyard, & Jebb, 2018b; Hartmann & Seigrist, 2017). Dietary behaviors, like meat consumption, are influenced by a variety of factors existing at the individual level (e.g., knowledge, values, attitudes, beliefs, and taste preferences), the social and community level (e.g., social support, social influence, and social norms), and the societal or structural level (e.g., policy, environment, access to and availability of food) (see Figure 1) (Beverland, 2014; Graça, Godinho, & Truninger, 2019; Hilliard, Riekert, Ockene, & Pbert, 2018; Jabs, Devine, & Sobal, 1998; Macdiarmid, Douglas, & Campbell, 2016; Pohjolainen, Vinnari, & Jokinen, 2015). Many studies in behavior change have therefore emphasized the importance of context-appropriate, multilevel interventions that target change on multiple socioecological tiers contemporaneously (Bronfenbrenner, 1977; Glass & McAtee, 2006; McLeroy, Bibeau, Steckler, & Glanz, 1988; Schölmerich & Kawachi, 2016; Stokols, 1996).

In the context of dietary behavior change, many studies have specifically explored the significance of individual-level factors on consumers' decision making. The influence of health-related motivations on consumers' decisions to reduce their meat intake, for example, has been well

Figure 1. A simplified socioecological model adapted from Bronfenbrenner (1977) and the Centers for Disease Control and Prevention (CDC, 2020). This conceptual framework illustrates the concentric spheres of influence that have been known to impact dietary behaviors at the individual, community, and structural levels.



documented (Clonan et al., 2015). One nationally representative survey conducted in 2018 by Neff, Edwards, Palmer, Ramsing, Righter, and Wolfson found that considerations related to personal health (50%) and cost (51%) were consumers' two most frequently cited reasons for reducing their consumption of meat, while other factors, like concerns over the environment (12%) and animal welfare (12%), were significantly less pronounced (2018). That being said, other studies have found environmental motivations to be an increasingly salient factor in Americans' decisions to reduce their meat intake—a phenomenon that has been particularly evident in populations already taking steps to engage in more sustainable behaviors (de Boer, Schösler, & Aiking, 2017; Mullee et al., 2017; Stoll-Kleemann & Schmidt, 2016). There is additional evidence to support that individuals' concerns over climate change may be predictive of their attitudes toward meat reduction, with higher levels of concern being associated with a greater willingness to adopt more plant-forward diets (de Boer, de Witt, & Aiking, 2016). It is important to consider, however, that many of the findings

discussed herein are based on cross-sectional data and therefore do not provide meaningful insights into how these attitudes and behaviors can evolve over time.

Past research has indicated that eating behaviors—those related to meat consumption, in particular—are not easily changed (Glanz, 1999; Graça, Calheiros, & Oliveira, 2015; Hartmann & Siegrist, 2017). Interventionists have therefore taken vastly different approaches toward accomplishing this end. Based on our review of the existing literature, we concluded that many of these documented efforts can largely be categorized into one of two groups: (1) interventions that target individual-level factors through educational messaging, usually by highlighting how specific food choices may negatively impact human and environmental health (Bianchi et al., 2018a); and (2) interventions that target societal or structural factors, usually by drawing on behavioral economic principles (e.g., nudging techniques) to either physically alter the retail environments where food items are purchased or to improve individuals' access to different types of food (Bianchi et al., 2018b; Garnett,

Balmford, Sandbrook, Pilling, & Marteau, 2019). While these studies have provided important insights into the benefits and limitations of each of these categories of approaches, notably less empirical attention has been given to the relevant social- and community-level factors that can similarly play a salient role in facilitating these changes in consumer behaviors.

A recently published systematic review conducted by Bianchi and colleagues suggests that individual-level behavior change methods that target the conscious determinants of human decision making alone can be difficult to scale or offer few, if any, long-term effects on dietary preferences over time (2018a). These findings underscore a well-founded asymmetry between individuals' self-reported intentions and their observed behavioral outcomes (Marteau, 2017; Roberto & Kawachi, 2015). Interventions that have utilized nudging techniques, on the other hand, have demonstrated some success in altering individuals' meat purchasing behaviors (Bianchi et al., 2018b; Garnett et al., 2019; Roberto, Larsen, Agnew, Baik, & Brownell, 2010), but they are highly spatially constrained and unlikely to motivate change outside the physical limits of these decision contexts. Furthermore, they do little to educate audiences about why these behaviors are socially and environmentally preferable—an interventional trait that may be critical in priming other pro-environment lifestyle changes (Byerly et al., 2018; Cavaliere, De Marchi, & Banterle, 2018).

When practiced in isolation, these strategies do not always take into consideration the larger social and community contexts in which individuals engage in their dietary behaviors. Neglecting these factors can undermine the success of these interventions, either by muting their effects or making them unlikely to lead to long-term change (Schölmerich & Kawachi, 2016). Prior research has suggested that identifying and understanding the ways in which these contextual factors differentially influence behavior at various socioecological levels can be helpful in guiding the design and implementation of more appropriate and more durable health promotion strategies (Schölmerich & Kawachi, 2016). Several community-based interventions seeking to promote dietary change, like

the Shape Up Somerville campaign (Folta et al., 2013) and the Veggie Thursday campaign (Hunter College New York City Food Policy Center, 2017), have leveraged these principles to develop programs that target change through multiple channels: by working with local community networks, fostering community buy-in, coordinating with community organizations, and altering the built and local policy environment (Ashfield-Watt, Welch, Godward, & Bingham, 2007; De Cocker, De Bourdeaudhuij, Brown, & Cardon, 2007; Folta et al., 2013; Pekka, Pirjo, & Ulla, 2002;). While there is evidence to suggest that these interventions have been effective in bringing about behavior change, more robust evaluation measures are needed, both to fully understand the mechanisms of their success and to determine whether they are capable of maintaining these changes in diet in the long run.

For the reasons outlined above, there is a growing interest in the role of community-based efforts in advancing public support for meat reduction initiatives, but there are inconsistencies in how the term has been operationalized (Alexander, Reddy, Brown, Henry, & Rounsevell, 2019; Caro, Frederiksen, Thomsen, & Pedersen, 2017; Moberg, Andersson, Säll, Hansson, & Rööös, 2019; Springmann et al., 2018; Zhang, Giabbanelli, Arah, Zimmerman, 2014). As we have elected to understand them, communities encapsulate both the physical settings and the social networks of people that occupy a specified space (McLeroy, Norton, Kegler, Burdine, & Sumaya, 2003). Communities are sites where individuals, organizations, and structures intersect. It is in communities where people make decisions, interact with their networks, and exert social influence. In addition to comprising the settings where individuals generate the vast majority of their carbon emissions, communities encompass complex social, economic, and political landscapes, which can be vitally important in addressing both the real and perceived barriers that can inhibit dietary behavior change (Israel, 1985; Trickett et al., 2011; Wandersman & Florin, 2003). Municipal climate action plans, for example, allow communities to experiment with low-risk and low-cost campaigns that can create lasting changes to the physical and social environments in which

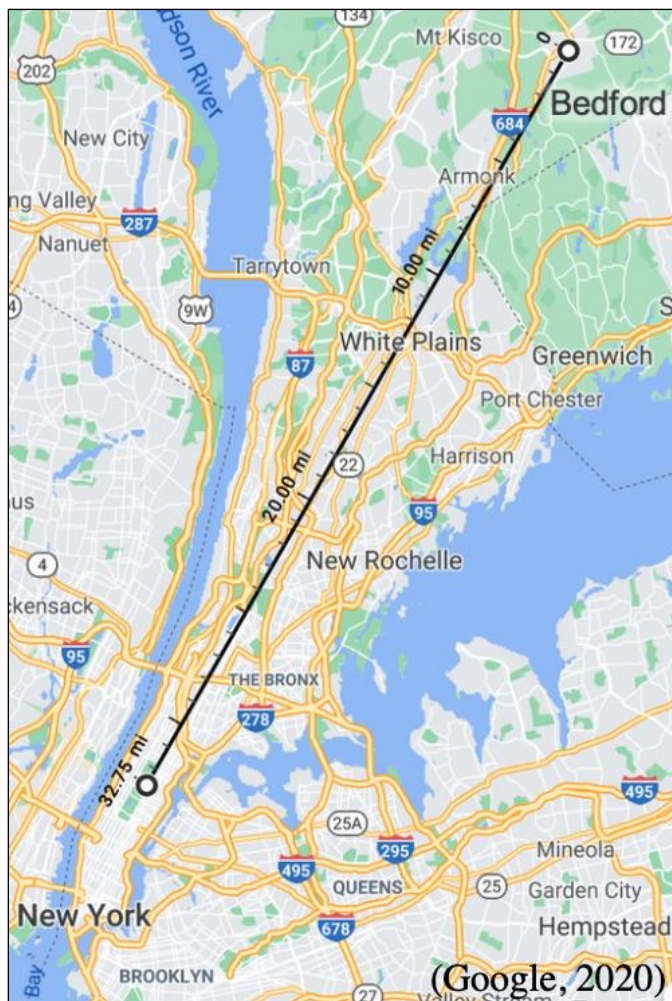
people live and eat. Community-based interventions can be effective in this domain because they exert influence on three fronts (1) by prompting individual agents to make more sustainable food choices (i.e., at the individual level), (2) by engaging stakeholders and encouraging organizations to lend supportive action (i.e., at the social and community level), and (3) by altering the choice architecture of the environment in ways that make certain food choices more accessible and automatic (i.e., at the societal or structural level) (Rose, 2018; Wandersman & Florin, 2003). In this article, we define community-based interventions as those that work across multiple levels within a given setting by

fostering and engaging existing relationships, networks, resources, and structures to improve people's health and well-being (McLeroy et al., 2003). Below, we provide an overview of a community-based intervention that worked at multiple levels to reduce meat consumption in the town of Bedford, New York: the *Bedford 2020 Meatless Monday Campaign*.

The Bedford 2020 Meatless Monday Campaign

Bedford 2020 is a 501(c)(3) organization headquartered in Bedford, New York (see Figure 2). It was formed in 2010 with the mission of lowering municipal greenhouse gas emissions by 20% before the year 2020. It was later tasked with fulfilling the sustainability goals outlined by the town's Climate Action plan. The organization includes a total of nine task forces collectively responsible for implementing community programs that address mitigation targets across a number of environmental domains. Earlier programs undertaken by the coalition included campaigns that sought to reduce residential energy use, increase municipal recycling efficiency, preserve local land and water resources, and strengthen the regional food system by supporting local agricultural producers. In March 2017, the coalition hosted a food forum focusing on the importance of meat reduction as a strategy for climate change mitigation. The town then held an environmental summit a year later in collaboration with Meatless Monday¹ and the Johns Hopkins Center for a Livable Future to educate residents about contemporary climate issues and to begin assembling a constituency of local advocates to lead and organize a new sustainability initiative focused on reducing the community's meat consumption. As a result of this summit, the coalition launched the *Bedford 2020 Meatless Monday Campaign* (hereafter, the *Campaign*), a meat reduction campaign advocating for a one-day weekly abstention from meat to raise awareness about the environmental and climate-related consequences associated with both individual- and community-level food choices.

Figure 2. Google Satellite Image Depicting Bedford and its Relative Proximity to New York City



¹ Meatless Monday is a nonprofit public health initiative with the goal of reducing meat consumption by 15%.

The *Campaign* recruited households to join the challenge for a total of 12 weeks. During this time, the messaging strategy focused primarily on educating audiences about the health-promoting and carbon-saving qualities associated with more plant-forward diets, as well as the benefits posed for animal welfare and the environment. By working with a team of volunteers to solicit the support of local businesses, media outlets, and government organizations, the *Campaign* was able to engage community stakeholders across a diverse set of professional and personal networks within Bedford, allowing its reach to extend beyond the households who initially signed onto the pledge. As demonstrated in Table 1, these stakeholders within

the community were responsible for managing different components of the initiative.

The *Campaign* utilized several different strategies to promote dietary behavior change among the pledged participants and the broader Bedford community. Priming, for instance, was an important component of the *Campaign* that helped generate preliminary interest in the initiative by leveraging the momentum of the sustainability programs that had been previously implemented within the community (Papies, 2016; Roberto & Kawachi, 2015). Because residents had already been oriented to these environmental issues prior to the start of the *Campaign*, this approach was used to target individual-level factors by capitalizing on the

Table 1. Partners involved in the Bedford 2020 Meatless Monday campaign

Partnership Category	Description of Involvement
Volunteers	A team of 25 volunteers helped design and implement the Bedford 2020 outreach strategy. They invited community members to take the pledge and took promotional flyers to local restaurants to sign them on as partners. Volunteers also tabled at local events, including the Climate Action Summit, and contributed content to social media and weekly newsletters.
Restaurants	All 26 of the restaurant partners had already offered vegetarian options in their eateries, but some agreed to incorporate additional fare on Mondays to highlight the partnership between Meatless Mondays and Bedford 2020. Bedford 2020 presented restaurant managers with graphics and captions for social media posts, which provided them with marketing assets they could distribute through their channels.
Businesses	For most businesses, the more interesting aspects of the campaign were the cross-promotional opportunities it generated and the marketing assets it provided them with. Businesses hung up posters, gave out brochures, and posted assets related to the campaign on their social media channels. Concurrently, Bedford 2020 shared these posts, promoted participating businesses, and posted recipes provided by local chefs and wellness experts.
Town library	The town library set up a display of vegetarian and plant-based cookbooks, posted information about the campaign on social media, displayed flyers, and hosted a movie night featuring <i>Wasted: A Food Waste Story</i> , which was followed by a panel discussion that invited chefs, farmers, and restaurant owners to talk about the nexus between food and climate. Bedford 2020 volunteers tabled to promote Meatless Monday both before and after the event.
The local hospital	The local hospital invited Bedford 2020 representatives to attend their Wellness Committee and Employee Congress meetings to share information about the campaign in their cafeterias and to encourage employees to take the pledge and participate.
Schools and houses of worship	Local schools and houses of worship put up flyers promoting plant-based eating.
Food pantry	The local food pantry worked with Bedford 2020 to translate a Meatless Monday flyer and brochure into Spanish and promoted the campaign to its clients.
Town board	Bedford 2020 approached the Town Board and successfully convinced them to pass a resolution supporting the Meatless Monday campaign as an important effort among willing participants to reduce greenhouse gas emissions. All of the members of the Town Board also took the pledge. The story was run in local press outlets, which helped the <i>Campaign</i> gain exposure.

community's past efforts to align the behaviors of the town's members with its Climate Action plan.

Bedford 2020's communication strategy also targeted community-level factors by leveraging the social influence of various stakeholders within the town (Farrow, Grolleau, & Ibanez, 2017; Wallen & Romulo, 2017). The *Campaign* collected photos, recipes, and feedback from pledged participants and shared those materials with the broader community through social media, physical postings, newsletters, and the local press. By posting assets that were developed by local chefs and demonstrating that restaurants and other organizations within the community were participating in the initiative, Bedford 2020 sought to challenge the norms around meat reduction through strategic efforts to highlight the level of support and favor the *Campaign* had gained within the community.

Bedford 2020 also used a collective impact model to demonstrate how individual lifestyle changes could meaningfully contribute to global climate and environmental action (Farrow et al., 2017). The *Campaign* actively championed the community members who had taken the pledge and reported their progress to the larger community, both to instill social accountability in the participants and to motivate others to adopt similar behaviors. After the *Campaign*, Bedford 2020 disseminated a series of projected climate impacts to signal how small commitments, when taken together, can create meaningful impacts. For example, the campaign staff deduced the estimated carbon savings from the challenge by adding the number of individuals that participated and concluded that the town's collective carbon footprint as a result of this initiative was reduced by 22,894 kg CO₂eq. The *Campaign* team subsequently provided a number of equivalencies to better illustrate the magnitude of these savings in more accessible terms, stating that this effort was akin to driving 56,113 fewer miles, using no electricity in nearly 3.5 homes for 1 year, or recycling 8 tons of waste.

Objectives

The *Campaign*, a community-based intervention, worked at the individual, social, and community levels to remove social and physical barriers to dietary behavior change in Bedford, New York.

This case study presents quantitative evidence from an independent evaluation of changes in participants' knowledge, attitudes, beliefs, and food choices over time as a result of the *Campaign*. We highlight the potential mechanisms through which participatory engagement in community-based interventions can aid in the promotion of dietary behavior change.

Methods

Setting

The town of Bedford, located in the northeastern region of New York State's Westchester County (Google, n.d.) (see Figure 2), is home to 17,755 residents and an estimated 5,792 households (U.S. Census Bureau, 2018). Among Bedford residents, 81.6% identify as White, with 58.5% of individual aged 25 and older having earned at least a bachelor's degree—27.6% higher than the national average (U.S. Census Bureau, 2018). The median household income among Bedford residents is more than double the national average for the 2013-2017 period at US\$121,797 (U.S. Census Bureau, 2018).

Study Design

In order to more fully understand the individual, social, and community impacts of the 12-week campaign, the research team conducted an independent evaluation to examine the extent to which the effort was successful in initiating and maintaining dietary change. This was accomplished through a series of quantitative surveys administered three times over a nine-month period. The surveys were administered to track quantitative changes in participants' attitudes and beliefs around meat reduction and gauge the frequency at which households participating in the *Campaign* consumed meat.

The first survey was administered prior to the start of the campaign to gather a baseline assessment of pledgers' initial attitudes and behaviors. There were two subsequent post-intervention follow-up surveys: one that was administered immediately after the campaign's conclusion (12-weeks) and another that was administered six months later to assess whether these behavior changes persisted in the medium term. The surveys

were collected anonymously using a link to a Qualtrics platform sent via email. Because some researchers have found the effects of meat reduction campaigns to diminish over time (Amiot, El Hajj Boutros, Sukhanova, & Karelis, 2018), the nine-month span of the study allowed the research team to investigate how these reported shifts in knowledge, attitudes, and dietary patterns evolved after the resources available during the *Campaign* became less visible.

In order to obtain a more detailed account of individuals' experiences and gain further insight into the campaign's effects on the community, follow-up phone interviews were conducted with five key informants who were identified and recommended by the Bedford 2020 Leadership team. The participants' affiliations with the *Campaign* were as follows: one Bedford 2020 board member, two mothers, one chef, and one restaurant owner. Each of these individuals was interviewed by a student research assistant using a semi-structured interview guide. A summary of these qualitative findings, which elaborate on the findings presented here, can be found in Appendix A.

Recruitment Strategy

Household pledges

In January and February 2018, trained community volunteers recruited households to sign the Bedford 2020 Meatless Monday pledge at in-person community forums and local businesses. Representatives from 320 households signed the pledge and provided their email addresses. They were asked to complete a baseline survey about their knowledge of Meatless Monday, any past efforts they have taken to reduce their meat consumption, and basic socio-demographic information. The follow-up surveys were sent to a representative from each household that signed the pledge. Surveys collected information about changes in knowledge, attitudes, and dietary practices that they experienced as a result of their participation in the Meatless Monday challenge. For the 12-week follow-up survey, households that had not completed the baseline survey were also given the option of completing four questions that addressed their baseline knowledge of Meatless Monday.

Study population

Survey responses collected from participants aged 17 years or younger were screened from our analysis, as were the forms submitted by respondents who exited out of the survey prematurely. There were a total of 468 responses across the three surveys, with 171 responses at baseline, 145 at 12 weeks, and 152 at the six-month follow-up. Because the survey was anonymous, we were unable to determine which of the three surveys households had completed and, thus, their responses were not paired for our analysis.

Data analysis

Descriptive analyses were performed to assess the extent to which community members' knowledge, attitudes, and behaviors around meat consumption changed at different points over the 9-month period. Furthermore, sociodemographic information was used to identify differences between each of the three cohorts and assess whether they were representative of the larger sample population. This information was also compared to census tract data to assess the extent to which our sample was representative of the larger Bedford population. Statistical significance was assessed using Stata version 14 (StataCorp LP, College Station, Texas) and Microsoft Excel 2016. More specifically, chi-square tests were run with an alpha level of 0.05 and 0.01 to determine the instances where there were significant between- and within-group differences in respondents' knowledge, attitudes, and behaviors across the three timepoints.

Results

Socio-Demographic Characteristics of Participants

Table 2 outlines the sociodemographic characteristics of participants at each round of data collection. Survey respondents at the three timepoints were similar in their age and their self-reported racial and ethnic composition, with the majority of participants being between 35-54 years old and Caucasian. Across all three surveys, significantly more individuals identified themselves as female as compared to male. The racial and ethnic composition was similar across timepoints. There were no significant differences in educational attainment

across the three samples. Most survey respondents across the three time points were highly educated, with most holding either a bachelor's degree from

a traditional four-year college or a more advanced degree. The majority of the respondents at all three points of data collection had an income level above

Table 2. Participant Socio-demographic Characteristics at Baseline, 12 Weeks, and Six-month Follow-up

Socio-demographic characteristic	Baseline (n=171)	12 weeks (n=145)	6 months (n=152)	Bedford population (n=17,955)
Age				
20–24	2 (1%)	1 (1%)	0 (0%)	994 (6%)
25–34	6 (4%)	1 (1%)	1 (1%)	1,982 (11%)
35–44	25 (15%)	12 (8%)	10 (7%)	2,478 (14%)
45–54	51 (30%)	46 (32%)	31 (20%)	2,975 (17%)
55–64	53 (31%)	48 (33%)	63 (41%)	2,217 (12%)
65+	32 (19%)	36 (25%)	42 (28%)	2,517 (14%)
Prefer not to say	2 (1%)	1 (1%)	2 (1%)	–
Gender				
Male	14 (8%)	23 (16%)	32 (21%)	8,341 (47%)
Female	157 (92%)	120 (83%)	117 (77%)	9,614 (54%)
Race and ethnicity				
American Indian or Alaska Native	0 (0.0%)	2 (1%)	1 (1%)	31 (0%)
Asian	2 (1%)	0 (0%)	0 (0%)	567 (3%)
Black/African American	4 (2%)	0 (0%)	2 (1%)	744 (4%)
Native Hawaiian or Pacific Islander	1 (1%)	2 (1%)	0 (0%)	0 (0%)
White/Caucasian	146 (85%)	130 (90%)	135 (89%)	14,659 (82%)
Other	4 (2%)	1 (0%)	2 (1%)	1,582 (9%)
Prefer not to say	8 (5%)	11 (8%)	7 (5%)	–
Education level				
High school graduate/GED	3 (2%)	1 (1%)	2 (1%)	2,195 (12%)
Some college/trade school	5 (3%)	7 (5%)	6 (4%)	2,326 (13%)
Associate (two-year) degree	9 (5%)	3 (6%)	4 (32.6%)	–
Four-year college degree	64 (37%)	67 (46%)	55 (36%)	7,478 (42%)
Graduate school degree or higher	92 (54%)	67 (46%)	84 (55%)	–
Occupation				
Primary (farming, fishing, mining, etc.)	1 (1%)	1 (1%)	1 (1%)	22 (0%)
Selling, distribution and retailing	8 (5%)	7 (5%)	6 (4%)	850 (5%)
Finance and banking	6 (4%)	4 (3%)	6 (4%)	742 (4%)
Other service industries	14 (8%)	17 (12%)	19 (13%)	4,531 (25%)
Civil Service and local government	8 (5%)	5 (4%)	10 (7%)	233 (1%)
Professions in private practice	19 (11%)	19 (13.1%)	17 (11%)	–
Education	37 (22%)	23 (15.9%)	28 (18%)	919 (5%)
Other	78 (46%)	67 (46%)	60 (40%)	–
Income (USD\$)				
≤\$24,999	3 (2%)	1 (1%)	1 (1%)	539 (9%)
\$25,000–\$49,999	7 (4%)	2 (1%)	2 (1%)	838 (15%)
\$50,000–\$99,999	23 (14%)	15 (10%)	13 (9%)	1,062 (18%)
\$100,000–\$149,999	15 (9%)	15 (10%)	20 (13%)	833 (14%)
\$150,000–\$199,999	19 (11%)	16 (11%)	20 (13%)	619 (11%)
≥\$200,000	53 (31%)	50 (34%)	41 (27%)	1,901 (33%)
Not sure	3 (2%)	2 (1%)	4 (3%)	–
Prefer not to answer	47 (28%)	43 (30%)	47 (31%)	–
Marital status and household structure				
Single, never married	14 (8%)	8 (6%)	6 (4%)	4,367 (24%)
Married	129 (75%)	112 (77%)	115 (76%)	8,309 (46%)
Separated or divorced	15 (9%)	8 (6%)	15 (10%)	1,216 (7%)
Widowed	7 (4%)	9 (6%)	7 (5%)	603 (3%)
Living with partner	2 (1%)	1 (1%)	2 (1%)	172 (1%)
Prefer not to say	3 (2%)	5 (4%)	3 (2%)	–
Children ≤ 18 years	72 (42%)	48 (33%)	48 (32%)	2,180 (38%)

US\$150,000 ($p < 0.01$), which was also true of the samples of participants who participated in the 12-week ($p < 0.01$) and the six-month follow-up surveys ($p < 0.01$). Across all three samples, the majority of respondents reported that they were married ($p < 0.01$), with roughly a third indicating that they had at least one child that was 18 years of age or younger (see Table 2).

Behavioral Surveillance

Individual attitudes, motivations, and intentions to reduce meat consumption

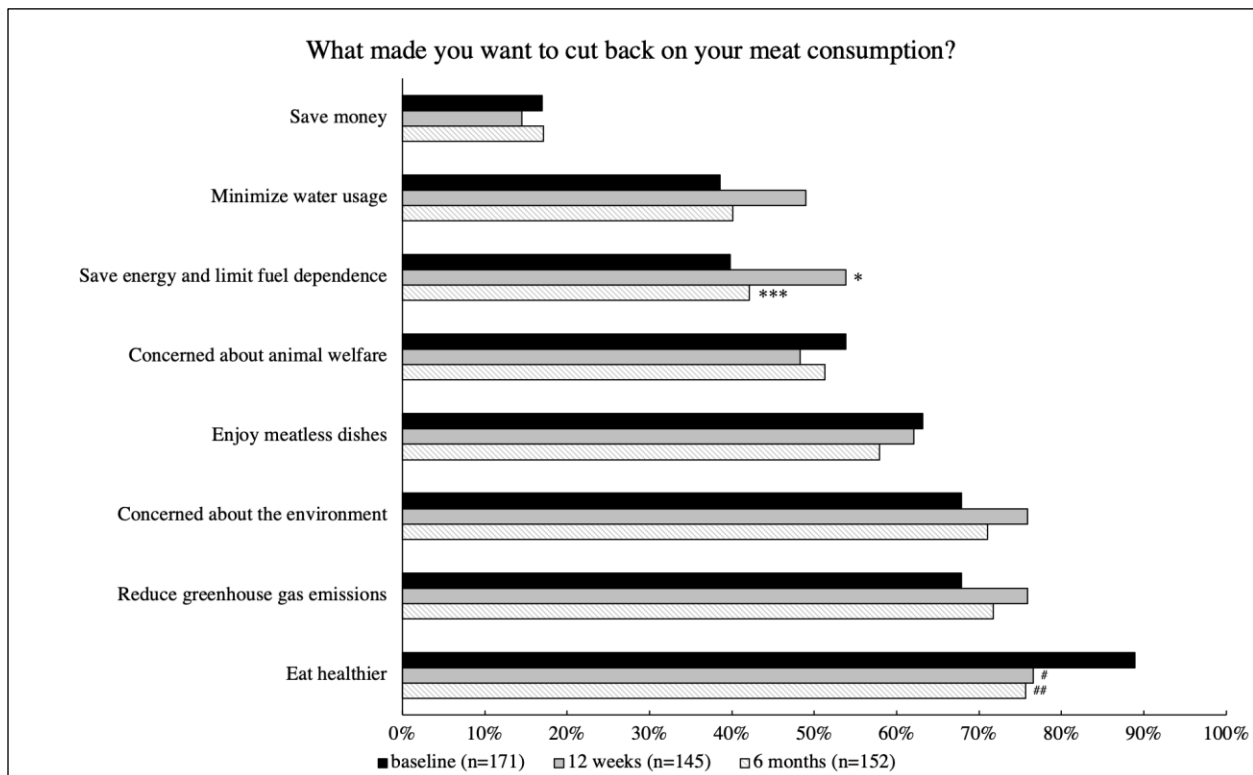
At all three time points, participants identified why they had wanted to take steps to reduce their meat consumption. At baseline, the largest proportion of participants cited wanting to eat healthier as a key motivator for changing their dietary habits (89%). Other notable reasons included a desire to reduce greenhouse gas emissions (68%), general concern about the environment (68%), enjoyment of

meatless dishes (63%), concern over animal welfare (54%), and wanting to limit fuel dependence (40%), minimize water usage (39%), and save money (17%) (see Figure 3).

Across all time points, participants most frequently listed personal health as a motivation for taking steps to actively reduce their meat consumption. However, there was a significant reduction in the proportion of respondents who cited health reasons as a motivation for reducing their consumption of meat, both from baseline to 12 weeks ($p < 0.01$) and from baseline to six months post ($p < 0.01$). At the same time, there were significant increases in the proportion of individuals who reported reducing their intake for the purposes of saving energy and limiting fuel dependence at 12 weeks ($p < 0.05$) and six months post ($p < 0.01$) (see Figure 3).

At both points of follow-up, the majority of respondents suggested that their participation in the campaign had made them more aware of the

Figure 3. Meat Reduction Rationales at Baseline, 12 Weeks, and Six-Month Follow Up



* denotes a significant difference ($p < 0.05$) between baseline and 12 weeks; *** denotes a significant difference ($p < 0.05$) between 12 weeks and 6 months; # denotes a significant difference ($p < 0.01$) between baseline and 12 weeks; ## denotes a significant difference ($p < 0.01$) between baseline and 6 months ($p < 0.01$)

Table 3. Attitudes, Motivations, and Intentions to Reduce Meat Consumption at 12 Weeks and Six-Month Follow Up

Question	Response	12 weeks (n=145)	6 months (n=142)
Did signing the Meatless Monday pledge change the way you think about:	The environmental effects of meat consumption	86%	66%
	Your family's meat consumption	85%	70%
	Your own meat consumption	83%	66%
	Meal planning and food shopping	76%	58%
	How animals are raised for consumption	68%	49%
	Meat's impact on health	66%	49%
	Eating in restaurants	37%	32%
In your experience, what have been the most positive outcomes for you by going meatless at least once a week?	Feeling good about helping the environment	77%	66%
	Feeling healthier	36%	39%
	Learning that I like meatless dishes	19%	21%
	Saving money	12%	15%
	Losing weight	10%	15%
Do you plan to continue reducing your meat consumption at least once a week going forward?	Feeling less hungry	5%	5%
	Yes, it is likely	97%	90%
	No, it is unlikely	3%	7%

social and environmental benefits of reducing meat consumption at the household level. Furthermore, during both follow-up periods, most respondents cited feeling good about the environment as a positive outcome of participating in the campaign, with 77% saying so at 12 weeks and 66% at six months. Importantly, at the 12-week and six-month follow-up points, most respondents (97 and 90%, respectively) indicated that they were likely going to continue reducing their meat consumption going forward (see Table 3).

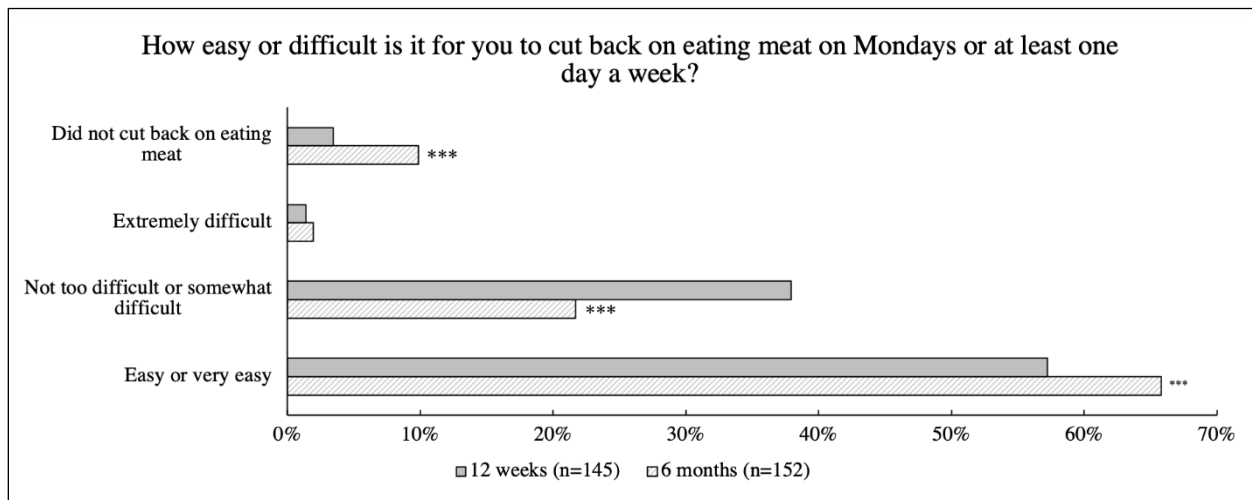
For the two points of follow-up, the research team examined respondents' self-efficacy to reduce their meat consumption at least one day a week. On both occasions, the highest proportion of respondents considered the task easy or very easy, with 57% saying so at 12 weeks and 66% saying so at six months post. Coincident with the significant increase in the proportion of participants who reported the task being easy or very easy at 12 weeks and six months post ($p < 0.05$) were concurrent decreases in the proportions of individuals who described the task as not too difficult or somewhat difficult ($p < 0.05$) (see Figure 4).

Individual meat consumption

Prior to the start of the Bedford 2020 campaign,

roughly 55% of the 171 participants at baseline had heard of Meatless Monday. Of the 55% that were familiar with the campaign, 47% indicated that they were practicing or had practiced it in the past. More generally, 42% of all participants reported that they were actively trying to cut back on their meat consumption, either through Meatless Monday or some other form of meat reduction, with another 37% reporting that they had tried to reduce their meat consumption previously. The remaining 21% indicated that they either do not eat meat (11%) or they have not reduced their consumption but have considered doing so (7%) (see Table 4).

At all three timepoints, participants were asked about the frequencies at which they consumed meat, with responses ranging from "every day" to "once a month or less" or "I do not eat meat." Among the 171 respondents included in the baseline survey, the largest proportion of participants reported eating meat somewhere between three to five days each week (57%), followed by those who reportedly ate meat roughly one to two days each week (18%). At the two points of follow-up, however, between-group comparisons revealed significant reductions in the proportion of participants who consumed meat three to five days each week,

Figure 4. Participants' Self-Efficacy to Reduce Their Meat Consumption at Least One Day a Week At 12 Weeks and Six-Month Follow Up

*** denotes a significant difference ($p < 0.05$) between 12 weeks and 6 months post

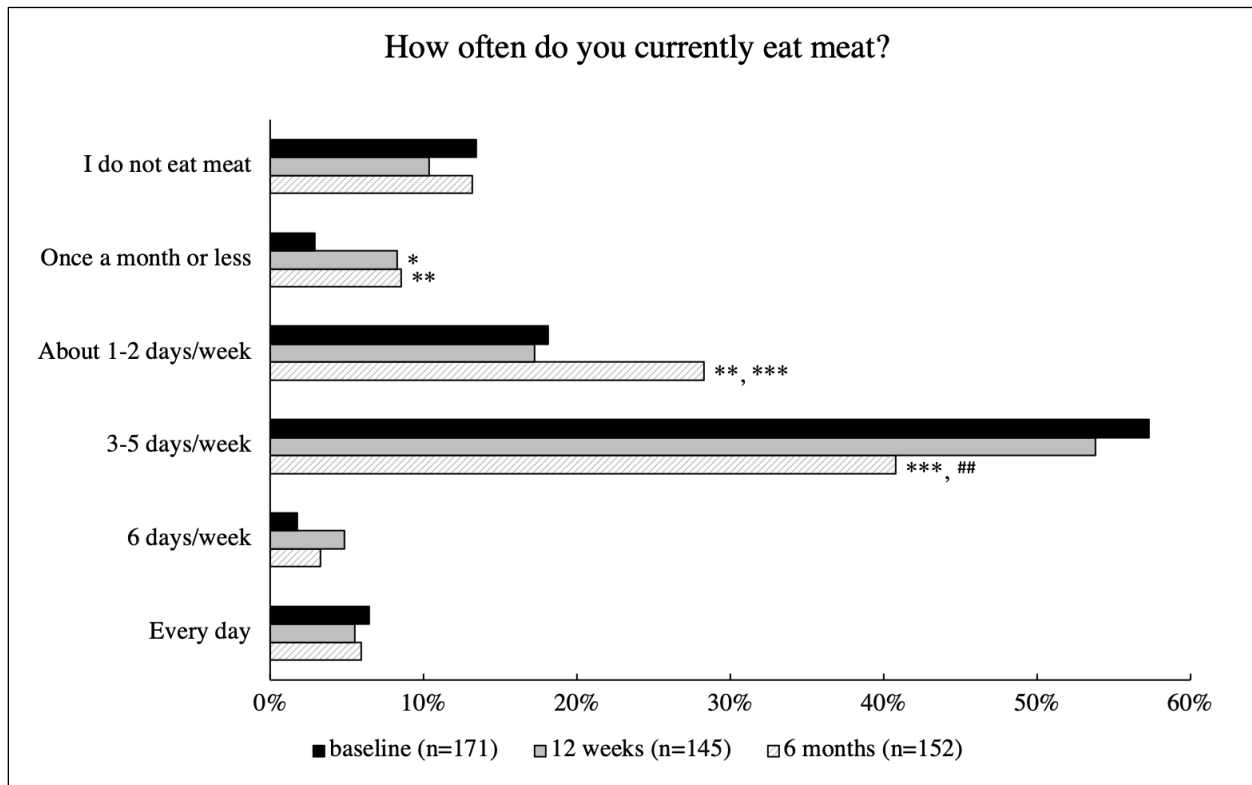
both from baseline to 12 weeks ($p < 0.01$) and from 12 weeks to six months post ($p < 0.05$). Significant increases in the proportions of participants who consumed meat one to two days each week as well as once a month or less were also observed, both

from baseline to 12 weeks ($p < 0.05$) and from baseline to six months post ($p < 0.05$). No significant changes were observed across the three timepoints in those who ate meat every day, six days each week, or not at all (see Figure 5).

Table 4. Meat Consumption and Behavioral Changes Following the Campaign

Question	Response	Baseline (n=171)	12 weeks (n=145)	6 months (n=152)
Before signing the Bedford 2020 pledge, had you ever tried to cut back on the amount of meat you eat?	Yes, I am actively trying to cut back	42%	-	-
	Yes, I have cut back on meat in the past	37%	-	-
	No, but I considered cutting back	7%	-	-
	No, I have not tried cutting back	3%	-	-
	I do not eat meat	11%	-	-
How has participating in the Meatless Monday pledge changed your eating habits?	I've tried more meatless dishes	-	83%	84%
	I eat more fruits, vegetables, whole grains, bean, and nuts	-	63%	55%
	I eat less meat	-	41%	48%
	Meatless Monday has not changed my eating habits	-	16%	22%
Compared to before the Bedford 2020 Meatless Monday Campaign, how has the amount of meat you eat changed?	I eat less meat	-	-	56%
	I eat the same amount of meat (including no meat)	-	-	40%
	I eat more meat	-	-	1%
What did you replace meat with?	Vegetables	-	90%	91%
	Eggs	-	83%	78%
	Grains	-	80%	74%
	Lentils or beans	-	79%	71%
	Nuts	-	73%	72%
	Cheese or other dairy	-	71%	69%
	Tofu, seitan, or tempeh	-	38%	35%
	Meat-like substitutes	-	29%	26%

Figure 5. Meat Consumption Frequency at Baseline, 12 Weeks, and Six-Month Follow Up



* denotes a significant difference ($p < 0.05$) between baseline and 12 weeks; ** denotes a significant difference ($p < 0.05$) between baseline and 6 months post ($p < 0.05$); *** denotes a significant difference ($p < 0.05$) between 12 weeks and 6 months post; ## denotes a significant difference ($p < 0.01$) between baseline and 6 months post ($p < 0.01$)

In order to confirm a reduction in meat consumption over time, a question was added in the six-month follow-up asking if the amount of meat the respondent consumed had changed since the beginning of the campaign. Fifty-six percent of respondents said they were eating either a lot or slightly less meat, with just 1% reporting that they ate more meat (see Table 4).

Across the follow-up surveys, respondents reported that the campaign had changed their eating habits mostly by influencing them to try more meatless dishes (84%), eat more fruits, vegetables, whole grains, legumes, and nuts (59%), and eat smaller portions of meat (45%), with only about a fifth reporting that the campaign had not changed their eating habits at all. At both points of follow-up, respondents indicated that in addition to being significantly more likely to seek out restaurants with more vegetarian menu options ($p < 0.05$), they were far more likely to select non-meat items from

restaurant menus ($p < 0.05$) (see Table 4).

Meat was most commonly replaced with vegetables (91%), followed by eggs (81%), whole grains (77%), lentils or beans (75%), nuts (73%), and cheese and dairy (70%). Interestingly, tofu, seitan, and tempeh (37%) and imitation meats (28%) were the least likely to be consumed as a replacement for meat (see Table 4).

Social and community influence

Respondents' decrease in meat consumption corresponded with similar decreases in other household members' meat consumption behaviors. Of the 152 individuals surveyed after the 12-week campaign, the significant majority (76%; $p < 0.05$) reported that they had discussed their pledge to Meatless Monday with other members of their community. More specifically, within this same cohort, 59% reported that their participation in Meatless Monday led other family members to

commit to eating less meat. A similar pattern emerged at the six-month follow-up. Of the 275 total household members identified by the 152 respondents, 62% were said to eat less meat than before the campaign, with 3% stopping their meat consumption entirely (see Table 5).

Conversely, the most common challenges that respondents experienced while reducing their meat

consumption were the preferences of family and friends. This was particularly true six months after participants took part in the pledge (23%), compared to when they were asked at the 12-week follow-up (17%) (see Table 5).

To understand what resources helped facilitate their success in reducing their meat consumption, participants were asked at the 6-month follow-up

Table 5. Participants' Discussion about the Campaign, Influence on Others' Meat Consumption, and Barriers to Behavior Change

Question	Response	12 weeks (n=145)	6 months (n=142)
Have you discussed your pledge to Meatless Monday with others?	Yes	76%	-
	No	24%	-
Has your participation in the campaign led to any family members committing to not eating meat on Mondays or at least once a week?	Yes	59%	-
	No	41%	-
Has your participation in the Bedford 2020 campaign led any household members to change the amount of meat they eat?	Eats less meat than before	-	62%
	Eats more meat than before	-	0%
	Eats the same amount of meat	-	25%
	Stopped eating meat altogether	-	3%
What challenges did you face while trying to reduce your meat consumption one day a week?	My friends and family prefer meat over meatless meal options	17%	23%
	My family doesn't like how meatless meals taste	8%	14%
	There were not enough appealing meatless meal choices when dining out	11%	11%
	I don't believe I get enough protein without eating meat	12%	9%
	I don't have good recipes for making meatless meals	9%	6%
	I believe a healthy diet includes meat	9%	5%
	It feels like a meal is not complete without meat	9%	5%
	Meatless meals are not filling	8%	5%
	I don't have the knowledge to prepare meatless meals at home	7%	5%
	Friends/family want to eat meat on Monday	5%	4%
	I couldn't find appealing ready-to-serve meatless meals	5%	3%
	I am not a big vegetable eater	3%	3%
	I don't have the cooking skills to prepare meatless meals at home	6%	2%
Meatless meals are boring	3%	1%	
I don't like how meatless meals taste	2%	1%	
Preparing meatless meals is more time consuming than preparing meals with meat	0%	13%	
What resources were helpful?	Bedford 2020 website	-	28%
	Cookbook	-	63%
	News, journals, and/or magazines	-	16%
	Recipe and food blogs	-	40%
	Signs, posters, and notices around the community	-	1%
	Social media	-	16%
	Meatless Monday website	-	16%

where they had gotten resources to aid in their efforts to reduce their meat consumption. The highest proportion cited that they used cookbooks (63%), with many others disclosing that the Bedford 2020 website (28%), as well as other recipe and food blogs (40%) were used (see Table 5).

Discussion

This case study highlights changes in individuals' attitudes, motivations, and intentions; reductions in meat consumption; and empirical evidence in support of the value of social and community factors for the success of the *Campaign* in Bedford, New York.

Attitudes, Motivations, and Intentions to Reduce Meat Consumption

Consistent with earlier studies that have evaluated the influence of ecological considerations on consumers' willingness to adopt more plant-forward diets, participants within our sample reported an increase in the influence of environment- and climate-related factors on their decisions regarding meat consumption over the span of the campaign (de Boer et al., 2017; Stoll-Kleemann & Schmidt, 2016). Interestingly, while health was consistently the most important consideration in community members' decisions to reduce their meat intake over the nine-month period, its relative lead over other competing factors, such as the motivation to reduce greenhouse gases, fell from a 21% difference at baseline to just 4% at the six-month follow up. These findings support the potential effectiveness of community-based interventions that incorporate the co-benefits of meat reduction into their messaging, rather than just health-motivated appeals alone.

Reduction in Meat Consumption

There was a significant reduction in frequency at which meat was consumed. It is noteworthy that this effect did not diminish over time. Over 90% of respondents indicated that they intended to continue reducing their meat consumption at least once a week at the six-month follow up. However, because we did not have a referent group to compare these results against, it is difficult to conclude whether such differences were caused by their

participation in the pledge or other extraneous factors. It is possible, for instance, that influences beyond the scope of our investigation, like the effects of seasonality on the availability of different types of fruits and vegetables, may have contributed to some of the changes observed here.

People who participated in Meatless Monday made changes in how they cooked, how often they ate out at restaurants, and the frequency at which they consumed meat. Consistent with earlier, nationally representative survey data collected by Neff and colleagues (Neff et al., 2018), vegetables and dairy were the two food categories that were most frequently used as substitutes, while imitation meat and tofu products were less popular. Individuals took varying approaches to reducing meat, from reducing the portion size of the meat they ate to substituting meat altogether. Future attempts to replicate this work may therefore wish to prospectively evaluate which approaches community members find most preferable. These findings could inform the design and implementation of resources and assets that can more appropriately support participants in these efforts. Of note, a significant proportion of respondents noted that it was either easy or very easy to reduce meat consumption after participating in the *Campaign*. These findings support the importance of providing skill-building opportunities, as the resulting increase in self-efficacy may play a role in promoting longer-term adherence to meat reduction (Stretcher, McEvoy DeVellis, Becker, & Rosenstock, 1986). Finally, the majority of respondents reported that environmental issues were a strong motivating factor in their decision to continue reducing their meat consumption after the *Campaign*, which provides further evidence for the merits of highlighting the co-benefits associated with meat reduction when designing these types of programs.

Social and Community Influence

Findings presented in this case study supported our assumption that social and community factors can play an important role in initiating and maintaining dietary behavior change. Twelve weeks after the campaign, 76% stated that they talked about the campaign within their family and/or community, and over 59% reported that others in their

household had also committed reducing their meat intake. These findings suggest that these types of initiatives could have socially transmittable effects that may modulate dietary norms at the household and community levels. However, more robust analyses of these social network dynamics are needed to more comprehensively understand these relationships.

The findings presented herein also provide some evidence in support of stakeholder engagement and grassroots volunteerism and their shared role in initiating and maintaining dietary behavior change at the community level. The development of these public-private partnerships between the organizing committee and the various local entities that offered to support the Campaign were instrumental in extending the program's outreach and influence. The robust volunteer program was responsible for soliciting the support of business partners, community members, and local media outlets, which not only allowed the Campaign to reach a broader audience but also provided them with important collaborative opportunities to promote plant-forward eating within their built environment. Therefore, in addition to removing some of the social and physical barriers that could prevent individuals from taking part in the meat reduction initiative, this effort also gave individuals the impression that the Campaign had gained broad favor and support within the community. In fact, a significantly higher proportion of survey respondents reported perceiving that cutting back on meat was easy or very easy at the six-month follow up (66%) compared to immediately post-campaign (57%). This suggests that more interventions involving widespread community engagement may be key to maintaining these kinds of behavior changes in the long run.

Equally important to consider are the challenges participants reported experiencing while trying to reduce their meat consumption. As stated previously, the most salient and persistent barrier that respondents identified were the preferences of their friends and family. In both the 12-week and six-month follow-up periods, the tendency of friends and family to prefer meat over meatless meal options was the most frequently reported challenge, increasing from 17% at 12 weeks to 23%

at six months. Indeed, prior research has found that this positive affinity towards meat consumption, sometimes called 'meat attachment,' can often be a limiting factor for these types of initiatives (Graça, Calheiros, & Oliveira, 2015). The next-most frequently reported challenge was family members' distaste of meatless foods, independent of whether they had a comparative preference for meal options containing meat. Importantly, the proportion of respondents who indicated this factor as a barrier also increased between follow-up periods, from 8% at the 12-week mark to 14% at the six-month mark. Relatively few participants indicated experiencing other issues related to the availability of meatless meal options, or challenges resulting from misconceptions about the nutritional and dietary value of plant-based food options (see Table 5). This may be attributed to the increased availability of meatless meal options provided through the public-private partnerships that were sought out between the campaign and the town's local businesses and eateries. Furthermore, the weekly newsletter, which circulated tips, recipes, and nutritional facts associated with different plant-forward dishes may have also played a role in alleviating some of these anticipated challenges.

Strengths and Limitations

This case study describes the implementation of the *Campaign* in a higher-income community with participants who had been exposed to climate issues prior to the Meatless Monday campaign through the Bedford 2020 Coalition. The Bedford community is unique in that their efforts to reduce their meat consumption were part of a larger, more coordinated effort to encourage environmentally conscious behaviors through the Bedford 2020 Climate Action plan. Their familiarity with the subject area, then, was likely greater than most general audiences. Awareness of Meatless Monday was high at baseline: 55% of pledgers had heard of Meatless Monday before the campaign, which was higher than a nationally representative survey showing 28% consumer awareness (Data Decisions Group, 2017). Furthermore, 79% indicated that they were actively reducing or had cut back on their meat consumption in the past, either through Meatless Monday (26%) or some other means, thus

indicating a high level of interest within the community to engage in meat reduction initiatives and activities. While priming appeared to be an important modulating factor with respect to the respondents' willingness to engage in the pledge, it is difficult to disentangle these effects from the effects of the campaign itself.

On a similar note, it is important, too, to consider the potential for certain response and sampling biases that may have influenced our results. The possibility of self-selection bias, for instance, may have compelled household representatives who were more engaged with the campaign to be overrepresented in our samples. The survey had an average response rate between the three timepoints of 49%, and while we were able to assess how similar these cohorts were to each other, we were unable to make any concrete determinations about how representative each of the samples were of the larger sample population. Furthermore, our results predominantly relied on self-reported data, which could potentially be subject to social desirability bias, compelling respondents to answer survey items in ways that aligned better with the expectations of the research team than their own internal beliefs. Future research may wish to consider other surveying methods that could supplement basic food frequency questionnaires with paired observational data.

Changes were also more accessible for this audience because of the greater availability of plant-based options at local food retail sites due to the broader community-wide aspects of the campaign. In addition, the town of Bedford has higher education levels and higher income levels than the general United States population. As a result, the findings presented in this case study may not be generalizable to populations where such priming has not taken place or to lower income communities. The nationally representative survey conducted in 2018 by Neff and colleagues, for example, after stratifying by income levels above and below US\$40,000 per year, found that cost, for instance, was much less of a motivation for reducing meat intake among those earning more than US\$40,000 per year (2018). Similar results are observed here where the cost-saving potential of reduced meat diets were uniformly the lowest

ranked motivation across all three time points. Secondly, those who participated in the surveys were also higher income, older, and female as compared to the general population of Bedford, suggesting self-selection bias among participants. It is possible that those who participated in the surveys were more likely to report changes in attitudes and behaviors as compared to those who did not participate. Thirdly, there was also no control or comparison group to assess the effects of the *Campaign* on changes in attitudes and behaviors related to reducing meat consumption, which limits the internal validity of the evaluation results presented here. Future studies should build on these findings to conduct more rigorous evaluations to assess the effects of community-based interventions that integrate health and environmental concerns to reduce meat consumption.

Finally, the *Campaign* was short, and the evaluation only included the 320 household that had signed the pledge rather than the entire Bedford community. However, despite these potential barriers to success, the *Campaign* raised awareness about climate and food choices and brought new constituents into the community-wide goals of reducing climate change.

Strengths of the *Campaign* include its simple, clear, and wide-reaching communications. Furthermore, the *Campaign* provided citizens with an actionable step toward alleviating climate change and conserving water and other environmental resources. The organizers demonstrated that a campaign such as this can maintain people's actions beyond the initial implementation. A large part of this effect may likely be the large community engagement and the campaign's visibility in the community, which helped normalize potentially unpopular behaviors. While this campaign may be translated into similar settings with appropriate modification and contextualization, future research is needed to assess whether it can be extended to other communities with different sociodemographic characteristics.

Conclusion

This case study illustrates how one community drew connections between diet and environmental concerns to inspire individual, social, and commu-

nity changes. Our analysis of this municipal sustainability initiative, which assessed changes in residents' attitudes, behaviors, and food choices over a nine-month period, demonstrates the strategic merits and the enduring value of community-based efforts in initiating and maintaining healthier and more sustainable practices of eating at the individual, household, and community levels. More specifically, our results showed a decrease in meat consumption as well as increased awareness of the connection between meat and climate change among participants. Additionally, our findings provide empirical evidence in favor of multilevel approaches to dietary behavior change that can leverage latent community assets, like grassroots volunteerism, public-private partnerships, and residents' social networks, to educate audiences on

how to make more informed food choices and alter the physical and social environments in ways that make those selections more accessible and automatic. This campaign serves as an example and framework for how other communities can engage their citizens beyond policies toward voluntary, achievable actions at the community level that contribute locally to mitigating climate change globally.

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Appendix A. Key Informant Interviews

While the household surveys provided quantitative insights into the effects of the campaign, follow-up phone interviews were completed to support these efforts to obtain more detailed accounts of individuals' experience. These in-depth interviews were conducted with five key informants that were recommended by the Bedford 2020 Leadership team. The participants' affiliations with the *Campaign* were as follows: one Bedford 2020 board member, two mothers, one chef, and one restaurant owner. Each of these individuals were interviewed by a student research assistant using a semistructured interview guide.

Findings from these interviews are summarized below according to themes:

Shifts in Individual-level Attitudes

Key informants noted that the *Campaign* helped make a connection between the environment and what they ate. Although they were somewhat aware of the harms of industrial agriculture practices before the *Campaign*, the dots had not yet been connected between high meat consumption and greenhouse gas emissions, or disproportionate use of natural resources. The *Campaign* also spread awareness of actions that people can take to decrease their climate footprint and provided resources and email reminders that helped them reduce meat.

- According to one participant and volunteer, the impacts of greenhouse gas emissions were discussed frequently throughout Bedford 2020, but it was not until the convergence with the Meatless Monday campaign that she made the connection between climate change and cattle and food production.
- Another volunteer appreciated that the *Campaign* highlighted the multifactorial aspect of food production including the unseen costs. Her three young children loved meat, and though they still consumed meat every week, they were very interested in Meatless Monday. The *Campaign* helped to spark conversations about where their food was coming from and the costs behind it.
- A restaurant operator and participant noted that though his meat consumption did not decrease much, the main takeaway was the shift in his thinking. "The campaign kind of coincided with, for me personally, a new attitude about eating," he said, adding that the environmental impact of meat production, particularly beef, in combination with the health benefits of vegetarian diets encouraged him to eat less meat.

Ease of the Campaign

Key informants elaborated on the ease of the campaign, noting how its simplicity encouraged adherence.

- One participant and volunteer recalled that she and her husband ate meat most days of the week because they could not think of alternatives. According to her, their meat consumption decreased considerably during the *Campaign*, and she credited better education and increased accessibility to meatless options. Participating restaurants in town made it easy to find a delicious meat-free meal. She stated that they now frequent their favorite local restaurant every Monday specifically because of the meatless options they offer on Mondays. Reflecting on her experience, she said going meatless on Mondays turned out to be quite easy, and that they ended up going meatless more than one day a week.

Social and Community Influence

Key informants viewed family and community involvement as an enabling factor for successfully implementing Meatless Monday.

- One stakeholder, whose family ate about three or four meals with meat each week, reported that during the campaign she saw a decline in her family's meat consumption. While it was not always Monday, they made sure to eliminate meat at least one day a week. She commented that her children were aware of Meatless Monday during the campaign and would even excitedly ask, "Is today Meatless Monday?!" Although they were not yet old enough to prepare their own meals, she believed her kids had been largely influenced by their conversations surrounding energy consumption and waste.
- Restaurants also facilitated community engagement in Meatless Monday. One cafe operator stated that they had meatless dishes on their menus before the *Campaign*; however, the Bedford 2020 offered another opportunity to market their meatless dishes and offer new specials on Mondays. The head chef of a local restaurant was approached by Bedford 2020 and asked if his restaurant would participate in Meatless Monday for a couple of months, but he said now it seems like it is there to stay. New dishes introduced as Meatless Monday specials are now permanent menu items, per customer request. The *Campaign* provided the motivation to create new menu items and promote exciting plant-based dishes, and now the servers have the knowledge to inform people about the delicious meatless menu items and the benefits of eating less meat. "We dare to try a lot of new techniques and new ways to approach all these foods," said the head chef. Judging from the returning customers, his creative approach toward Meatless Monday has been a success.
- According to one key informant, anecdotal stories and experiences regarding meat alternatives resonated with people looking for encouragement to reduce meat consumption. Interesting ideas for incorporating vegetables into dishes and positive testimonials about meat substitutes were helpful, especially for those wary about trying new products or replacing foods they like. He found discussions and brainstorming sessions with friends to be impactful and inspiring.

Multilevel Barriers

Participants recalled several common barriers, such as the higher cost of organic produce, difficulty finding nutritious alternatives to meat, and the extra time required to plan and prepare fresh meals with more vegetables.

- One participant mentioned that the preparation time required to produce vegetarian meals was a definite deterrent. "It involves a lot more foresight than just throwing something on the grill." She also noted that buying organic fruits and vegetables can be expensive, especially when buying for a family.
- Several restaurant operators noted that consumers expected meatless entrees to be lower in cost, which was a misconception given the higher price of quality produce, the limited availability of meatless products, and the more intensive labor involved in preparing vegetables, compared to meat. One local chef lamented the difficulty of providing innovative vegetarian meals to customers. "You know it is a challenge because sometimes people just think that it's meatless so it should be less expensive, it's a vegetable. But we put a lot more work into it to make sure the vegetables are delicious."

- Another common barrier was the pressure felt to make lifestyle changes, which can feel overwhelming given the various actions encouraged by the larger Bedford 2020 work, especially to the older population. “People get anxious. They feel like everything is changing, either they feel guilty or they’re not doing enough. It’s just a lot... It’s a gradual change in behavior and deliberately thinking about what we do and how we act in every facet of our lives.”

Summary and Recommendations

Insights from the interviews conducted with key stakeholders confirmed that the value community members placed on the environmental benefits associated with the *Campaign* increased as it progressed. This supports the potential effectiveness of community-based interventions that incorporate health and environmental concerns into their messaging in changing individuals’ attitudes, motivations, and intentions related to reducing their meat consumption. Furthermore, much of the success of this program was attributed to the community and social influences. From the robust volunteer program to the support of business partners, media, and community members, community engagement was key to the success of the campaign. Businesses and restaurants promoted the *Campaign* and “normalized” plant-based choices and acceptability of making meatless food choices on Monday and other days. Social media and online recipes and resources made practicing meat reduction an easier and more common practice due to the convenience. This community-wide initiative provided the sense that others nearby were also doing Meatless Monday; no one was on their own.

Beyond our primary survey findings, key informants identified a number of potential barriers that could limit the ability of community stakeholders to engage in these types of initiatives in the long term. Barriers mentioned by key informants included, for example, difficulty preparing cost-effective, plant-based meals. More education is therefore needed on meatless meals so that people can feel empowered to practice this diet pattern. Participants commented on the high price of organic vegetables, and while organic produce may be ideal for environmental and possibly human health, simply the choice of purchasing conventional produce over meat has many beneficial outcomes (Dangour, Dodhia, Hayter, Allen, Lock, & Uauy, 2009; Dangour, Lock, Hayter, Aikenhead, Allen, & Uauy, 2010; Reganold & Wachter, 2016; Rigby & Cáceres, 2001). One possible reason for difficulty finding fresh plant-based options is that the campaign occurred during the winter months when fresh, local food was less available. Organizers of the campaign have suggested doing it during the summer months when farmers’ markets and local produce stands are open. Participants’ concerns with finding nutritious alternatives to meat could also suggest the need for more information about healthy substitutions aside from processed and refined grain products.

Beyond the scope of the quantitative surveys, key informant interviews further illuminated that the broad focus of the *Campaign* was intrinsic to its success. The *Campaign* serves as an example and framework for how other communities can engage their citizens toward voluntary, achievable actions at the community level that contribute locally to mitigating climate change globally.