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IN THIS ISSUE

THEMED SECTION

Introducing meat studies
Ryan J. Phillips, Elisabeth Abergel

Meat politics at the dinner table: Understanding differences and similarities in Canadians' meat-related attitudes, preferences and practices
Emily Kennedy, Shyon Baumann, Josée Johnston

Producing protein: Fractionation of animal bodies, mass consumption of cheap protein, and the value of protein sourced from industrial hog operations
Katie MacDonald

Protein politics: Sustainable protein and the logic of energy
Maro Adjemian; Heidi Janes; Sarah J. Martin, Charles Mather, Madelyn J. White

How to promote the consumption of plant proteins: A literature review
Coralie Gaudreau, Laurence Guillaumie, Emmanuelle Simon, Lydi-Anne Vézina-Im, Olivier Boiral

Beef, Beans, or Byproducts? Following Flexitarianism's Finances
Kelsey Speakman

Industrial meat in Canada, growth promoters and the struggle over international food standards
Elizabeth Ann Smythe

Is cell-based meat a climate solution for Canada? Interpreting lifecycle footprints within the domestic agri-food context
Ryan M. Katz-Rosene

PERSPECTIVE

Opportunities and challenges for school food programs in Canada: Lessons from the United States
Amberley T. Ruetz, Janet E. Poppendieck

RESEARCH ARTICLES

Food insecurity in books for children: A qualitative content analysis
Dian Day

Envisioning a community food hub to support food security: A community engagement process at a post-secondary institute
Sarah Clement, Sara Kozicky, Cassandra Hamilton, Rachel Murphy

The framing of food in Canadian university classrooms: A preliminary analysis of undergraduate human nutrition sciences, dietetics, and food studies syllabi
Andrea Bombak, Michelle Adams, Sierra Garofalo, Constance Russell, Emma Robinson, Barbara Parker, Natalie Riediger, Erin Cameron

BOOK/ART/EVENT REVIEWS

"Distasteful: Sexual Harassment in the Restaurant Industry — Showcasing the Dark Side of Food Service"
Stefanie Foster

Review of Ultra-processed people: Why we can't stop eating food that isn't food
Jennifer Sumner

CHOUX QUESTIONNAIRE

The CFS Choux Questionnaire
Chat GPT





A growing, though still loosely connected, body of academic work has started placing meat at the centre of critical discourses regarding climate change and environmental sustainability, human health, economic wellbeing, food futures, and animal and ecological ethics. This special themed issue seeks to bring these multi-disciplinary scholars into direct conversation with one another under the umbrella of 'Meat Studies' as an emerging sub-field of study. Indeed, the recent establishment of Vegan Studies necessitates a parallel effort to better understand meat's persistent social, economic, political, and cultural status in human societies. By situating meat at the centre of critical analysis, we identify, articulate, and address the challenges that meat poses in the twenty-first century. More generally, Meat Studies allows us to critically re-examine our cultural conventions regarding the ways in which we classify different foods, diets, identities, and culinary practices.

Guest editors: Ryan J. Phillips and Elisabeth Abergel

The articles outside of the themed section are firmly focussed on and around the classroom. Amberley Ruetz and Jane Poppendieck look to the United States for lessons on the design and implementation of a national school food program. Dian Day examines children's fiction from elementary school curricula and interrogates their assumptions about children, poverty, food, and hunger.

Sarah Clement et al. examine the whys and wherefores of developing a community food hub at UBC-Victoria that moves beyond emergency food relief services to address food insecurity with a more dignified, holistic, systemic, and justice-oriented approach. And finally, Andrea Bombak et al. explore how food pedagogies in Canadian university classrooms are prioritizing inclusion, diversity, and sustainable, resilient communities.

Stefanie Foster offers us a review of Annika Lusi's contemporary art piece, "Distasteful: Sexual Harassment in the Restaurant Industry," while Jennifer Sumner reviews Chris van Tulleken's *Ultra-Processed People: Why We Can't Stop Eating Food that isn't Food*.

And finally, we close this issue with a third installment of the Choux Questionnaire, featuring... ChatGPT.



Editorial

Introducing meat studies

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Abstract

A growing, though still loosely connected, body of academic work has started placing meat at the centre of critical discourses regarding climate change and environmental sustainability, human health, economic wellbeing, food futures, and animal and ecological ethics. This special themed issue seeks to bring these multi-disciplinary scholars into direct conversation with one another under the umbrella of ‘Meat Studies’ as an emerging sub-field of study. Indeed, the recent establishment of Vegan Studies (see: Wright, 2015 and

2017) necessitates a parallel effort to better understand meat’s persistent social, economic, political, and cultural status in human societies. By situating meat at the centre of critical analysis, we identify, articulate, and address the challenges that meat poses in the twenty-first century. More generally, Meat Studies allows us to critically re-examine our cultural conventions regarding the ways in which we classify different foods, diets, identities, and culinary practices. The abstract, and all the body text is formatted as style ‘Paragraph’.

Keywords: Meat; meat studies; plant-based; cell-based; protein; socio-cultural dimensions; production; consumption

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Résumé

Un nombre croissant de travaux universitaires, bien qu'encore peu reliés entre eux, ont commencé à placer la viande au centre des discours critiques concernant les changements climatiques et la conservation de l'environnement, la santé humaine, le bien-être économique, l'avenir de l'alimentation et l'éthique animale et écologique. Ce numéro thématique vise à faire dialoguer ces chercheurs et chercheuses multidisciplinaires directement à la table du sous-domaine émergent que pourraient être les « études sur la viande ». En effet, la création récente des études

véganes (voir Wright, 2015 et 2017) nécessite un effort parallèle pour mieux comprendre le statut social, économique, politique et culturel persistant de la viande dans les sociétés humaines. En plaçant la viande au centre de l'analyse critique, nous identifions, articulons et abordons les défis que pose la viande au XXI^e siècle. Plus généralement, les études sur la viande nous permettent de réexaminer de manière critique nos conventions culturelles concernant la manière dont nous classons les différents aliments, régimes, identités et pratiques culinaires.

A summer of meat

The summer of 2022 was our Summer of Meat. Not because either of us purchased, cooked, or consumed a particularly large quantity of animal-based food products, but rather because of the sheer volume of meat-related texts we absorbed (and from which we learned) during this time. Before formally meeting, we were both simultaneously (yet independently) researching “meat” within the social sciences and humanities. Throughout our respective research, we were humbled by the rapidly rising number of likeminded scholars all interrogating meat and its (often contentious) relationship with human societies and cultures. In just the last couple of years, we have seen the publication of hundreds of journal articles and dozens of meat-based books, with titles such as *Changing Meat Cultures*, *Global Meat*, *Meat Planet*, *Meatsplaining*, *The Meat Question*, *Red Meat Republic*, *Meat Makes People*

Powerful, and (the frankly titled) *Meat!*.

Meat, it seems, is now prominently featured on the academic menu. And yet, despite the implicit emergence of a Meat Studies sub-field of scholarship, no one has yet explicitly conceptualized or articulated what Meat Studies *is or could be*. Thus, the field itself remains something of an abstraction and nameless presence. Emerging from our Summer of Meat, we aim to articulate Meat Studies as an identifiable sub-field of critical scholarship and bring together some of the scholars currently working within this area of inquiry. Only by naming and introducing “Meat Studies” can we provide a home base for the myriad (though, until now, loosely connected) scholars interested in critically interrogating “meat”.

Why meat studies now?

We are living through an unprecedented cultural shift regarding our collective relationship with meat. Meat consumption is decreasing in North America yet increasing in other regions of the world. Meat-rejecting lifestyles such as veganism and vegetarianism are entering mainstream discourses and markets, after having long been relegated to the peripheries of culinary and dietary conversations. The COVID-19 pandemic has played an important role in how we came to view industrial meat production. During that time, a series of zoonotic diseases (such as swine fever and avian flu) affected the meat supply and brought to the fore the potential links between industrial animal farming and its role in the emergence of animal-to-animal and animal-to-human transmission of pathogens (Wallace, 2016).

At the same time, the current cultural juncture is forcing us to categorically rethink and refine our conventional understandings of what meat *is*—a phenomenon instigated by the recent developments of plant-based meats, the perennial promises of lab-grown meat technologies, the explorations of alternative meats and proteins (such as mycelium meat and insect protein), and a growing number of legal challenges brought forth by traditional meat industries. More generally, we are beginning to reveal and critically interrogate meat’s inherent (though often invisible) ambiguity as a cultural form: How do Indigenous hunting and fishing traditions differ from more colonial understandings of meat and animal agriculture? Why are some animals considered “meat” and others “not meat”? What are the socio-political implications of these categorical distinctions? What are the ethical, cultural, and symbolic boundaries between what is considered edible and what is not? And finally, what can meat consumption or its negation inform us

about biopolitics?

Perhaps unsurprisingly, meat has also become a focal topic of analysis for a growing number of scholars in the social sciences and humanities over the past two decades. Recent projects, for example, have investigated consumer perceptions of prototypical meat-eaters (Oleschuk, Johnston, and Bauman, 2019); the role of ‘fake meats’ as transitional foods towards more plant-based diets (Mehta et al., 2020); consumer attitudes towards lab-grown meat (Bryant & Dillard, 2019); and the rhetorical strategies used by animal agriculture industries (Hannan, 2020). Meat’s many materialities have also started being interrogated at an increasing rate, including the connections between meat and bodies (whether human or non-human) (e.g., Adams, 2010; Adams, 2018; Sergentanis et al., 2021); the various political economic dimensions of meat and animal agriculture (Simon, 2013; Warren, 2018; Wurgaft, 2019; Specht, 2019); and the cases for (Katz-Rosene & Martin, 2020) and against (Kevany, 2020) meat’s potential role in future sustainable agricultures. Given meat’s ubiquity across time and space in human cultures, in conjunction with the rising scholarly attention being paid to meat, our aim with this edited volume is to identify, articulate, and conceptualize a new sub-field of critical food scholarship: “Meat Studies”.

A growing, though still loosely connected, body of academic work has started placing meat at the centre of critical discourses regarding climate change and environmental sustainability, human health, economic wellbeing, and animal and ecological ethics. This special themed issue seeks to bring these multi-disciplinary scholars into direct conversation with one another under the umbrella of “Meat Studies” as an emerging sub-field of study.

Indeed, the recent establishment of Vegan Studies (see: Wright, 2015 and 2017) necessitates a parallel effort to better understand meat's persistent social, economic, political, and cultural status in human societies. By situating meat at the centre of critical analysis, we identify, articulate, and address the challenges that meat poses in the twenty-first century. More generally, Meat Studies allows us to critically re-examine our cultural conventions regarding the ways in which we classify different foods, diets, identities, and culinary practices.

The socio-cultural and socio-economic dimensions of meat feature prominently in Bourdieu's critical works, which we treat as a sort of proto-meat studies. Bourdieu's approach to meat has been expanded upon by a number of contemporary scholars (e.g., Kamphuis et al., 2015; Oleschuk et al., 2019). The study of meat itself, however, remains less of a comprehensive sub-discipline and more of a topic or area of focus in food studies, cultural studies, sociology, science and technology studies (STS), and critical consumer studies. Given the significant amount of recent works devoted to studying and critically analyzing meat in human cultures (e.g. Zaraska, 2016; Sexton, 2016; Warren, 2018; Buscemi, 2018; Wurgaft, 2019; Oleschuk et al., 2019), we conceptualize "Meat Studies" as a specified sub-discipline of food studies. Generally speaking, we argue that meat studies ought to be understood as a sub-discipline within the social sciences and humanities wherein meat and human cultures, economics, and politics intersect. While vegan studies already exist as an established sub-discipline (see Wright, 2015), it does not always ground itself in the epistemological and ontological questions of meat's persistent cultural significances. In other words, vegan studies often fall short of interrogating what we mean by "meat". Our conceptualization of Meat Studies is thus a theoretical intervention informed by the commonalities in topical focus, critical insights (reflecting a continuation of

Bourdieu's earlier cultural analyses and criticisms), and philosophical contemplations throughout the works of various (loosely) connected critical authors. Hence, we may ask (as some authors have done), "who is meat?", which brings into focus the wider array of ontological and ethical issues associated with what and who constitutes sources of meat (Chatterjee et al., 2021). This [critical turn?] challenges established notions of what or who qualifies as meat and asks us to reevaluate our relationship with the many living beings that are involved into meat production.

The idea of a "Meat Studies" sub-discipline is new, yet warranted given the significant increase in scholarly attention to meat's cultural significance over the last two decades. Rifkin's (1993) *Beyond Beef* serves as a sort of proto-meat studies work, in the same sense that Adams' (1990) *Sexual Politics of Meat* serves as an early-entry point into what eventually became vegan studies, thus bringing a feminist examination of power dynamics and patriarchal constructs surrounding meat consumption. Zaraska's (2016) *Meatbooked* offers a generalized and accessible exposé of humanity's persistent relationship with meat, beginning with the bio-social evolution of our meat-based diets and concluding with current trends in meat consumption. Buscemi's (2018) *From Body Fuel to Universal Poison* delves into the bio-semiotics of meat's cultural history, showcasing and theorizing the symbolic significances of meat in Western cultures from 1900 to the present. Finally, Johnston's many project collaborations over the past decade have produced foundational groundwork in investigating the cultural sociology of meat in the twenty-first century, with a recurring emphasis on the relationships between meat consumption and social status. Indeed, while Zaraska and Buscemi implicitly engage with Bourdieu's cultural criticisms of meat consumption, Johnston's ongoing research on the cultural sociology of meat is a more direct

(and often explicitly stated) continuation of Bourdieu's earlier work on class-based dimensions of meat. Meat studies as a sub-discipline can thus be characterized by engagements with—and expansions on—Bourdieu's culturally-situated analyses of meat consumption. Each of these authors' works (in addition to the myriad other articles, chapters, and texts from the past several years), when taken together, suggest the existence of a meat studies sub-discipline (in practice, if not yet in name). The goal of this special themed issue, then, is to articulate meat studies as a sub-discipline and bring likeminded scholars into conversation with one another. Interest in Meat Studies enables scholars to critically inquire about the changing nature of norms, practices and ideologies surrounding both conventional meat and alternative meats in the contexts of evolving dietary preferences, cultural shifts, political movements, and ecological pressures. It seeks to have real-world relevance and impact, addressing pressing social, environmental, and ethical issues. Scholars in the field aim to bridge the gap between academia and broader public discourse, contributing to policy discussions, activism, and public awareness efforts.

Meat Studies holds significant importance in terms of interdisciplinary research. The articles included in this special issue all address different aspects of the production, distribution, consumption, and societal, ethical, and environmental implications of "meat". The articles vary in their contribution to the formation of Meat Studies yet each offers a unique Canadian perspective, thus also contributing to Canadian Food Studies scholarship more broadly. Considering the significance of meat production, distribution, consumption, and its symbolic representations, the different articles bring together a variety of perspectives and novel approaches to the study of meat.

The personal politics of food and eating can be contentious, particularly when meat enters the

discussion. Meat's production, consumption, and regulation intersect with complex social, economic, environmental, and ethical considerations that shape public perceptions and behaviours. Thus, in no small undertaking do Kennedy et al. ask: "To what extent do Canadians across the political spectrum agree that meat is a problem? Where is there overlap and where is there disagreement?". Their analysis identifies points of divergence and convergence along political lines, and provides a constructive means of initiating discussions around policy aimed at reducing meat consumption. Their study focusses on analyzing survey data about the meat-eating practices, preferences, and perceptions of Canadians as they relate to political ideology, providing a comparative gauge of liberals' and conservatives' attitudes towards meat consumption. By identifying some areas of attitudinal consensus about meat production and consumption that transcend the liberal/conservative spectrum, the authors are able to generate Canada-specific data that might prove useful for policymakers working in food policy.

Through the widespread use and cultural adoption of euphemistic language, we increasingly find individual animals being made purposefully absent—what Adams (2018) calls the absent referent—from discussions about meat production and consumption. Katie McDonald's article critically interrogates the substitutionism, appropriationism, and nutritionism at work in the industrial production of hog meat, wherein "protein" comes to serve as a stand-in for "hog meat" (which itself serves to rhetorically separate the practice of converting an individual animal's flesh into food). Using a content analysis of existing literature and in-person interviews, McDonald identifies the developing cultural juncture in which hog farming (along with other industrial animal agricultural practices) has become a process for "producing protein" rather than "making meat".

Following a similar thread of critical inquiry, Adjemian et al. critique the protein politics at play in the repurposing of metrics in industrial salmon farming. The authors argue that, by spectacularizing the public-facing metrics, calculations, and indicators of efficiency, industrial salmon producers have adopted a fashionable greenwashing logic in alignment with other industrial meat producers. Furthermore, and perhaps more insidious, they argue that industrial salmon farming's preoccupation with the rhetorics of quantification (expressed most commonly as "sustainable protein") perpetuates what Daggett (2019) calls the logic of energy—a phenomenon that has exploded over the past decade.

Commercial plant-based meat has gained momentum over the past decade, coinciding with the larger expansion of the plant protein market and industries. In their literature review and meta-analysis, Gaudreau et al. explore the efforts undertaken by various organizations to promote plant-based dietary choices and reduce animal-based meat consumption. Through an analysis of press articles from Canada and French-speaking European countries (between 2015-2020), the researchers compile a diverse array of initiatives, interventions, and policies aimed at promoting plant-based proteins. Of particular interest is the examination of the EGalim law in France, which mandates public institutions such as schools, hospitals, and government services to offer vegetarian options. Ultimately, their comprehensive review offers insights into a range of potential initiatives (from educational campaigns to legislative changes) for promoting alternative proteins in Quebec.

On the promotional and consumption side of the current meat-to-protein cultural juncture, Kelsey Speakman expands our understanding of the constitutive positioning of flexitarians (as well as investors in flexitarian and flexitarian-adjacent

companies) as part of the "citizen-consumer hybrid" (Johnston, 2008, p. 229). Drawing from a larger, exploratory project that involves critical discourse analysis of public archives, corporate websites, and various corporate promotional materials, as well as interviews and focus groups with Canadian food retailers and shoppers, Speakman critiques the hegemonizing implications of corporations highlighting greater choices for consumers—rather than appealing to potentially disruptive or revolutionary identities like "hardcore" vegetarians or vegans.

Elizabeth Ann Smythe's article delves into the power dynamics and conflicts surrounding the regulation of growth promoters at the international level (through the lens of the Codex Alimentarius Commission (CAC)), with a particular focus on Canada's significant role as meat producer and exporter. Central to her analysis are the debates involving the development and adoption of global food standards within the CAC, aligning with the interests of key stakeholders such as meat industry producers, processors, and pharmaceutical companies regarding the use of beta agonists and their health impact on both animals and humans. Smythe underscores the importance of these standards in terms of their trade implications and the complex interplay of power dynamics between dominant actors that impact the use of these drugs despite limited scientific data as well as their contested framing of "sound science".

Ryan Katz-Rosene examines the potential of cell-based meat to mitigate greenhouse gas emissions in Canada's agriculture and food industry. He compares the environmental impact of traditional meat production methods with those of cell-based meat using a life cycle assessment (LCA) for various meats consumed by Canadians.

Although cell-based meat production has not reached commercialization, Katz-Rosene considers various hypothetical scenarios that factor in energy use and land use patterns in order to generate Canadian-specific LCA footprint values as a means of contextualizing its potential as a replacement of conventional meat. Considering controversies surrounding the climate-friendliness of both conventional and cellular

meat, including the challenges posed by the limited number of environmental impact studies derived from hypothetical production models, his analysis suggests that cell-based meat could potentially contribute to mitigating climate change, provided certain conditions—that extend beyond the carbon footprint of cell meat—are met within Canada’s larger agri-food sector.

Conclusion

Meat Studies offers a wide array of possible lenses and methodologies that might help us better understand the centrality and relevance of meat as a polysemic object/subject. We strongly believe that the diverse works compiled in this special themed issue are indicative of a larger trend within academic analysis, which interrogates the categorical, (bio)political, institutional, corporeal, environmental, techno-

scientific, and sociocultural aspects of “meat”. As this collection of articles demonstrates, meat can be studied from a variety of approaches and theoretical standpoints. The Canadian focus on Meat Studies shows the richness and vigour of Canadian Food Studies scholarship, as well as demonstrates its heuristic potential as a dynamic field of novel inquiry.

Ryan J. Phillips is a Lecturer in Politics and Public Administration at Toronto Metropolitan University, where he teaches courses related to Canadian politics, public policy, and the politics of technology. His research focuses on advertising and promotional cultures, with specific emphases on the promotional rhetoric of plant-based meat companies and the agenda-setting elements of vegan/vegetarian discourses. Outside of food studies, he also interrogates advertising and audience commodification in Canadian hockey broadcasting.

Elisabeth Abergel is an environmental studies scholar who is currently teaching in the Sociology department and at the Institute for environmental sciences (ISE) at the Université du Québec à Montréal (UQAM). She teaches courses in environmental sociology, science and technology studies, the Anthropocene, and sustainable food systems. Elisabeth’s area of expertise is on the politics and science of Genetically Modified Organisms (GMOs). Her research focuses on life technologies and agricultural transformation, technocapitalism and the de/rematerialization of life (from cell to whole organism), food and agriculture biotechnologies and more generally, she studies the relations between promissory economies of technoscientific development, rural futures, and the environmental crisis. She is the research director of GReTA (Research Group on Agricultural Labour) and recently published a report on Quebec’s women farmers and invisible labour for Quebec’s Secrétariat pour la Condition Féminine (SCF). She is currently writing a book about cell-based meat and Anthropocene diets.

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Original Research Article

Meat politics at the dinner table: Understanding differences and similarities in Canadians' meat-related attitudes, preferences, and practices

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Abstract

Few food groups are subject to the same depth and scope of critique as meat. Yet little is known about how the Canadian public feels about meat production and consumption. In other jurisdictions, meat has been a politically polarizing topic; thus, we focus our analysis on political differences (and similarities) in orientations toward meat. In this paper, we draw on survey data collected on a quota sample of Canadians (n=2328) in order to address the following questions: to what extent do Canadians across the political spectrum agree that meat is a problem? Where is there overlap, and where is there disagreement? We find that, despite small but statistically significant differences

across political ideology in Canadians' meat-related attitudes, preferences, and practices, there is widespread agreement that meat is delicious, that it poses risks to health, and that many livestock production practices violate animal welfare ethics. The majority of Canadians would prefer to source meat that is locally-produced and raised on a small farm. These patterns illustrate high levels of discomfort with large-scale animal agriculture. This study fills an important gap in Canadian food studies by interrogating public perceptions of meat and identifying areas of political convergence and divergence on meat-related attitudes, preferences, and practices.

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Résumé

Peu de groupes d'aliments font l'objet d'une critique aussi profonde et étendue que la viande. Pourtant, on sait peu de choses sur ce que pense le public canadien de la production et de la consommation de viande. Dans d'autres pays, la viande a été un sujet politiquement polarisant. C'est pourquoi nous concentrons notre analyse sur les différences (et les similitudes) politiques dans les orientations à l'égard de la viande. Dans cet article, nous nous appuyons sur des données d'enquête recueillies auprès d'un échantillon de personnes canadiennes (n=2328) afin de répondre aux questions suivantes : dans quelle mesure les Canadiens de l'ensemble du spectre politique s'accordent-ils à dire que la viande est un problème ? Quels sont les points de recoupement et les points de désaccord ? Nous constatons que, malgré des différences faibles mais statistiquement significatives selon l'idéologie politique

dans les attitudes, les préférences et les pratiques en matière de viande chez les personnes canadiennes, il existe un large consensus sur le fait que la viande est délicieuse, qu'elle présente des risques pour la santé et que de nombreuses pratiques d'élevage sont contraires à l'éthique du bien-être animal. La majorité des personnes canadiennes préféreraient s'approvisionner en viande produite localement et élevée dans une petite ferme. Ces tendances illustrent un niveau élevé de malaise à l'égard de l'élevage à grande échelle. Cette étude comble une lacune importante dans les études sur l'alimentation au Canada en interrogeant les perceptions du public à l'égard de la viande et en cernant les domaines de convergence et de divergence politiques quant aux attitudes, aux préférences et aux pratiques liées à la viande.

Introduction

Few food groups are subject to the same depth and scope of critique as meat. Critiques of meat are based on concerns about its impacts on human health, the environment, labourers, and animals. Health risks range from acute and intermittent risks like bovine spongiform encephalopathy (BSE) infections, *E. coli* contamination, and listeriosis bacterial outbreaks (Farber et al., 2011; Leiss & Nichol, 2006) to chronic concerns linking consumption of nitrates and nitrites in processed meats to cancer and consumption of cholesterol, particularly in

red meat, to heart disease (Bouvard et al., 2015; Sebranek & Bacus, 2007). There are also numerous environmental issues linked to meat production, most prominently (but not limited to) climate change. The United Nations Food and Agriculture Organization estimates that 14.5% of global greenhouse gas (GHG) emissions result from livestock (Gerber et al., 2013), and studies suggest these patterns could intensify in the coming decades. Tilman and Clark (2014) argue that, if global patterns of meat consumption continue at current rates, by 2050 meat-

based diets “would be a major contributor to an estimated eighty per cent increase in global agricultural greenhouse gas emissions from food production and global land clearing” (p. 518). Meat has also sparked concerns for workers’ rights and animal welfare. For instance, in his ethnographic study of slaughterhouse work, Timothy Pachirat (2011) describes the physical and emotional tolls of the work of slaughtering animals for consumption. During the Covid-19 pandemic, workers at slaughterhouses were exposed to high levels of risk of contracting the coronavirus (Struthers Montford & Wotherspoon, 2021). Animal welfare concerns are primarily connected to intensive farming practices, which leave little space for animals to move and result in disease and injury (Gregory & Grandin, 2007).

Despite widespread evidence that meat is increasingly viewed as a socio-ecological problem, it is also a staple on the plates of most Canadians and is widely accepted as part of a normal, daily diet (Bateman et al., 2019). This ambiguity presents somewhat of a paradox when it comes to addressing the socio-ecological problems associated with meat production and consumption. Indeed, what scholars call the “meat paradox” reflects the ironic pairing of the following: 1) positive ideas towards animals including public support for animal welfare, affection towards animals, and concern about the practices of industrialized animal husbandry, combined with 2) positive and persistent attitudes towards consuming animals as meat (Loughnan & Davies, 2019). Accounting for the meat paradox is an essential prerequisite to developing sound policy.

Consensus in public opinion about social problems is rare. At the same time, the more agreement exists on issues, and the more salient the issue is perceived to be, the easier it is for policy-makers to address those problems. In his review of decades of research on the relationship between public opinion and policy-making, Burstein (2003) concludes that this research

demonstrates most policy decisions are influenced by public opinion. For example, Snow (2016) points to the construction of a sense of “national consensus” about the immorality of commercial surrogacy in Canada and in Australia, resulting in criminalization in each jurisdiction. In addition to consensus, the question of the relevance of an issue to the public is also important to consider (Burstein, 2003). Givens and Luedtke (2005) examine the salience of immigration as an issue across different European countries and find that salience among the public influences the enactment of restrictive immigration policies. To the extent that there is high agreement about an issue, and to the extent that the issue is considered highly relevant by the public, there is greater likelihood for legislative action.

We get a sense of the high salience of the issue of meat consumption and production from recent news stories reporting concerns that proposed policies might limit American consumers’ access to meat. The (unwarranted) fear that President Biden’s climate plan would prohibit beef consumption caused a media storm and generated strong public concern among Republican voters (Beauchamp, 2021; Dale, 2021). While Canadians eat, on average, a little less meat than Americans, they are still among the world’s more voracious carnivores, suggesting that meat is a contested product for Canadians as well. The difficulty of enacting policies to address the unsustainable level of meat we consume is illustrated in the recent case of France’s attempt to lower national levels of meat consumption. As reported in an article in *The Guardian*, the French government found it difficult to make progress in policy development, in part because of a lack of consensus among the public that meat production and consumption are problematic (Harvey, 2021).

Although there is a great deal of Canada-specific research on meat within agricultural and health sciences, there is a surprising dearth of social science scholarship

on consumers' concerns and priorities with respect to meat. The lack of robust data on how the Canadian public perceives and problematizes meat represents a barrier to developing policy grounded in social values and practices. As Biden's (fictitious) burger ban and the contested French meat reduction policy illustrate, there is a risk that meat-related policies can be divisive and polarizing. This begs the question of what political differences exist in consumers' orientations to meat consumption in Canada. In this study, we use survey data from a quota sample of Canadians to understand meat-eating practices, preferences, and perceptions. Because past research suggests that political ideology is a salient axis along which policies are both designed and

contested (e.g., Burstein, 2003), we examine similarities in and differences between liberals' and conservatives' orientations to meat. Specifically, we ask: to what extent do Canadians across the political spectrum agree that meat is a problem? Where is there overlap, and where is there disagreement? This allows us to point towards policies that would be more likely to receive support across the political spectrum. Although we find political differences, we also identify promising areas of consensus, which suggests there may be some fruitful ways of initiating bipartisan conversations about the environmental and ethical implications of meat.

Meat and meat policy: An overview

Meat production is a major industry in Canada and has significant impacts on greenhouse gas (GHG) emissions. Canada's meat industry consists largely of two sectors, red meat and livestock and poultry and eggs. Within the red meat and livestock industry, pork and beef / veal comprise the largest share of profits and production (Agriculture Canada, 2021). According to Agriculture Canada, in 2019 there were 13.93 million hogs on 7,640 farms, located mostly in Ontario, Quebec, and Manitoba. Hog sales in 2019 generated \$4.6 billion. In the same year, there were "12.24 million cattle and calves on 72,860 farms and ranches in Canada", with the majority located in Alberta. Sales of non-dairy cattle generated \$8.3 billion in farm cash receipts (Agriculture Canada, 2021). In 2019, poultry and egg sales generated \$6.3 billion among 4,279 commercial poultry and egg production facilities in Canada (Agriculture Canada, 2023).

Globally, animal agriculture accounts for roughly 14.5% of global GHG emissions (Gerber et al., 2013), and beef is the most greenhouse gas-intensive of all livestock (Dyer et al., 2010). Kebreab et al. (2006) and Ominski et al. (2021) both demonstrate that the agricultural sector, which also includes crop production, accounts for 8% of GHG emissions in Canada. In terms of the impacts of meat production on climate change in Canada, recent estimates suggest that emissions from livestock comprise 3.3% of GHG emissions (Ominski et al., 2021). Legesse et al. (2015) report that, from 1981 to 2011, GHG emissions from the beef industry have decreased by 15%. However, because of increased consumption, GHG emissions from cattle between 1981 and 2001 rose from twenty-five million tonnes CO₂e to thirty-two million tonnes CO₂e (Vergé et al., 2008). The emissions intensity of chicken is only 10% that of beef, although emissions from the poultry industry rose by 40% between 1981

and 2006 due to increases in chicken production (Vergé et al., 2008). Although meat makes up a relatively small proportion of national GHG emissions, it is the most carbon-intensive element of people's diets (Center for Sustainable Food Systems, 2020; Dyer et al., 2010), and reducing meat production and consumption constitutes a key ingredient for reforming Canadian diets to address climate change.

Research reveals several important trends in meat consumption in Canada in recent decades. First, levels of meat consumption remain high relative to most other countries and are dramatically higher than the global average (OECD, 2020). For instance, globally, the average consumer eats 15.1 kg of poultry per year. In Canada, we eat 37.6 kg per capita (OECD, 2020). This pattern continues to hold true across consumption of beef and pork as well. Prior research on Canadian consumers confirms that meat is a staple of the vast majority of Canadians' diets. For example, based on the 2015 Canadian Community Health Survey, Valdes et al. (2020) find that only 1.3% of Canadians follow a vegetarian diet and 0.3% follow a vegan diet, with the remainder eating meat. Using the same survey, Frank et al. (2020) find that, on any given day, 66% of Canadians report eating meat. Johnston et al. (under review) find that over 26% of Canadians report eating meat daily, and more than half report eating meat five or more days per week. There is some evidence that interest in plant-based diets is on the rise, as is identifying as a vegetarian or vegan (Charlebois et al., 2018). However, most evidence points toward consistently high levels of meat consumption. In addition to the environmental harms described above, such high levels of meat consumption are linked to significant health risks (Bye et al., 2021), with research supporting the idea that reductions in rates of meat consumption would reduce negative health outcomes such as cancer (Ruan et al., 2019),

although some (e.g., Leroy & Cofnas, 2020) contest claims that meat consumption constitutes a health risk.

There are, therefore, compelling reasons to understand the potential to reduce meat consumption in Canada. While research shows that the vast majority of Canadians frequently consume meat, what is less well understood is what Canadians know about issues pertaining to meat production and consumption, or Canadians' beliefs and values regarding meat consumption. Although it might be tempting to interpret Canadians' high levels of meat consumption as strong support for the status quo, that would be a mistake. As a great deal of research has shown, consumers' attitudes and behaviours often do not align (Blake, 1999; Zanna et al., 1980), including those related to environmental attitudes (Kennedy et al., 2009). There is scant research, though, on Canadians' attitudes about meat production and consumption. Although research within the US context exists (e.g., Guenther et al., 2005; Spain et al., 2018), we cannot assume Canadians' attitudes are equivalent to Americans', especially given that levels of meat consumption are lower in Canada than in the US. In the only study we could find that employs broadly representative survey data (data are from a convenience sample of 504 Canadians), Charlebois et al. (2016) write that 37.9% of respondents self-reported reducing or entirely eliminating beef from their diet in the last twelve months. When asked what motivated this decision, the most commonly cited reasons were financial, and the next most common reasons were health and food safety related. The authors did not report specific estimates of the proportion of their sample motivated to reduce meat consumption for altruistic reasons, but altruistic motivations were described as being "much lower" and "not as significant" as other reasons. Charlebois et al. (2016) used a series of cross-tabulations to examine contrasts in

these attitudinal and behavioural outcomes, but limited their socio-demographic comparisons to gender, age, and education. They did not include political orientation in their survey. In general, there is a surprising lack of Canadian peer-reviewed literature on the subject of attitudes toward and behaviours around meat consumption. Even in *Canadian Food Studies*, we could only identify two research papers that focus on meat. Sterne and van Duren (2019) analyse the supply management system in Ontario with an eye to how regulation affects meat processors, and Katz-Rosene's (2020) essay reflects on the difficulties associated with developing universal dietary advice, drawing on the case of meat to underscore the complexities of eating for health and sustainability. The lack of descriptive evidence of Canadians' attitudes toward meat presents a significant barrier for designing and implementing policies to reduce meat consumption.

Because successful policy interventions require some degree of political consensus, it is important to understand how Canadians across the political spectrum perceive meat production and consumption. To our knowledge, there are no national, provincial, or

municipal policies in place that aim to reduce Canadians' meat consumption. To the contrary, there are many policies in place to assist the meat industry, which is a major economic resource in Canada. There are some initial policy interventions in other jurisdictions such as France (Harvey, 2021), while the very idea of meat reduction has caused controversy in the American context, as indicated by the fake burger ban story (Beauchamp, 2021). Any efforts toward developing policies for meat reduction would likely also be controversial in the Canadian context. The feasibility of such policies is uncertain, but, to the extent that they might be politically tenable, they would need to be designed to minimize conflict with consumers' values and beliefs. Current research on this topic is scant. In this article, we examine Canadians' values and beliefs about meat production and consumption. We analyse these beliefs in relation to Canadians' political ideology, because policies that align with values and beliefs for which there is more agreement across the political spectrum are more likely to succeed.

Data & methods

We employ survey data collected in the fall of 2019 from a quota sample of Canadians. After data screening for quality control (e.g., eliminating responses completed in less than one third of the average completion time), the sample size is 2328. The sample was matched to national distributions of gender, age, race, income, education, and province of residence, as reported by Statistics Canada. We relied on the survey research firm Qualtrics for the online panel from which respondents were drawn (see Peer et al., 2015 for details

on online panels). The survey is part of a broader research project on understanding issues of taste, politics, and risk in the meat industry. This research received approval from the Research Ethics Board of the University of Toronto. The survey included a large number of questions about people's preferences and practices relevant to eating meat and their knowledge and attitudes about the production of meat. The survey was pre-tested on 100 respondents, allowing us to verify that the questions were interpreted as intended. We

therefore have information about attitudes and behaviours as well as about meat consumption and meat production. In addition to questions about meat production and consumption, we also asked questions about political ideology.

In this paper, we analyse the relationship between political ideology and a range of measures of practices and attitudes about eating meat. As discussed above, we are interested in developing knowledge about Canadians' practices and attitudes about meat in order to have a foundation for understanding the potential for developing policy interventions to reduce meat consumption. Because political consensus is a key mechanism for enacting policies, we focus on how Canadians' attitudes and practices are related to variation in political ideology, looking to highlight where there is divergence vs. overlap for Canadians of more liberal and more conservative political ideologies. We examine a series of cross-tabulations of political ideology with various indicators of attitudes and practices about meat consumption and production.

Attitudes and practices

We measure attitudes and practices related to meat through several different types of questions. Some of our questions inquire about respondents' tastes and ask them to report their level of agreement (strongly agree to strongly disagree) with statements about taste in meat. Likewise, our questions around attitudes about health and animal welfare ask respondents to report

their agreement, as do questions designed to measure respondents' preferences for different methods of meat production. In contrast, our questions about practices rely on measures of frequency, where respondents report the frequency of different kinds of behaviours related to their meat consumption (never to always).

Political ideology

To measure respondents' political ideology, we posed two questions. The first question asked, "How would you describe your political opinions on SOCIAL issues (e.g., environment, women's rights, religion, multiculturalism)?" The seven response options ranged from "very liberal" to "very conservative," with the middle category labelled "centrist". Our second question asked, "How would you describe your political opinions on ECONOMIC issues (e.g., taxes, government programs)?" The response options were the same as for the first question. We averaged respondents' scores on these two questions to provide an overall measure of political ideology, assigning the "very liberal" option a score of one and the "very conservative" option a score of seven. In our analyses, we use the average score to assign each respondent to one of three categories. Respondents who scored less than the "centrist" label score of four were placed in the liberal category, and respondents who scored more than four were placed in the conservative category. Respondents who scored exactly four were placed in the centrist category.

Results

Before we present our results on Canadians’ meat-related attitudes, preferences, and practices, we summarize our sample. Half (50.2%) of our survey participants identify as politically liberal, 21.7% describe their views as politically centrist, and 28.1% identify as conservatives (see Table 1 for these figures and other sample statistics). Roughly half of our sample is female and nearly three-quarters identify as White, with Asian (10.1%) and Indigenous (7.0%) comprising the next largest categories of race and ethnicity. Although our sample represents every province and territory, the largest proportion (38.6%) resides in Ontario, with only seven respondents (0.3%) located in the Territories. A large proportion of our sample (41.9%) is employed full time and over one-fifth (21.1%) are retired. Only about one-third of our respondents have a Bachelor’s degree or higher. In terms of income, our sample is quite evenly distributed, with 17.8% earning less than \$30,000 annually and roughly one-quarter reflecting

higher income categories. Less than seven percent earns over \$200,000 per year. The mean age of our survey respondents is forty-seven years.

Turning next to meat-related descriptive statistics for our sample, we note that the majority (79%) of our respondents selected the label “omnivore” to describe their diet, 14.3% call themselves “flexitarian”, 2.9% vegetarian, 2.3% pescatarian and 1.5% vegan (see Table 1). These estimates are similar to results from nationally-representative surveys (Valdes et al., 2020). The Canadians in our sample eat meat quite frequently: over one quarter (26.3%) eat meat every day, and a further 27.3% eat meat five or six times per week. Only 3.9% do not eat any meat in a typical week. Among those who eat meat and fish, 43.2% say they buy chicken most of the time or always, with slightly fewer regularly purchasing beef (39.5%), fewer still (33.9%) regularly buying pork, and the smallest proportion (25.2%) regularly buying fish.

Table 1: Descriptive statistics of the sample (n=2328)

	N, %	Mean (std. dev)
Political Ideology		
<i>Liberal</i>	1169, 50.2%	-
<i>Centrist</i>	505, 21.7%	-
<i>Conservative</i>	654, 28.1%	-
Female	1162, 49.9%	-
Age	-	47.34 (16.96)

Race & Ethnicity		
<i>White</i>	1702, 73.4%	-
<i>Indigenous</i>	163, 7.0%	-
<i>Black</i>	36, 1.5%	-
<i>Asian</i>	235, 10.1%	-
<i>South Asian, Indian</i>	107, 4.6%	-
<i>Arab</i>	53, 2.3%	-
Region		
<i>BC</i>	282, 13.2%	-
<i>Prairies</i>	393, 16.9%	-
<i>Ontario</i>	826, 38.6%	-
<i>Quebec</i>	491, 23.0%	-
<i>Maritimes</i>	140, 6.5%	-
<i>Territories</i>	7, 0.3%	-
Employment Status		
<i>Full time</i>	976, 41.9%	-
<i>Part time</i>	298, 12.8%	-
<i>Retired</i>	492, 21.1%	-

<i>Unemployed</i>	252, 10.8%	-
<i>Caring for children, family</i>	125, 5.4%	-
<i>Student</i>	368, 15.8%	-
Education		
<i>High school or less</i>	820, 35.2%	-
<i>Trades certificate, college diploma, less than Bachelor's</i>	844, 36.3%	-
<i>Bachelor's degree</i>	425, 18.3%	-
<i>Postgraduate degree</i>	238, 10.3%	-
Income		
<i>Less than \$30,000</i>	414, 17.8%	-
<i>\$30,000-59,999</i>	580, 24.9%	-
<i>\$60,000-99,999</i>	580, 24.9%	-
<i>\$100,000-199,999</i>	596, 25.6%	-
<i>\$200,000 or more</i>	158, 6.8%	-
Diet Label		
<i>Omnivore</i>	1840, 79.0%	-
<i>Flexitarian</i>	332, 14.3%	-
<i>Pescatarian</i>	53, 2.3%	-

<i>Vegetarian</i>	67, 2.9%	-
<i>Vegan</i>	35, 1.5%	-
Days per week eating meat	-	4.61 (1.98)

Our first cross-tabulation contrasts political ideology with various attitudes about meat. We asked survey respondents to tell us how strongly they agreed or disagreed with statements about the taste of meat, the health values or risks from meat, and the impacts of meat production on animal welfare. With respect to taste, there are no statistically significant contrasts across political ideology for the item about meat being delicious, with a full 92% of respondents agreeing with this idea. However, we found that fewer conservatives (30.1%) are grossed out by meat than liberal (37.6%) and centrist (39%) respondents (see Table 2, section 1). For the health attitude statements, we found that more conservatives agree that eating meat is necessary for a healthy diet. Although most people in the sample believe eating processed meat increases the risk of cancer, a smaller proportion of conservatives (61.4%) and centrists (57.5%) agree with this statement compared with liberals, 48.6% of whom agree that eating processed meat increases people’s risk of getting cancer. We see similar patterns for the statement about the risk of eating red meat. Overall, a larger proportion of liberals agree that reducing meat consumption is

healthier for most Canadians (77.4%) compared with centrists (68.5%) and conservatives (64.2%). We also see political differences in our respondents’ attitudes about the threats to animal welfare from meat production. Nearly three-quarters (73.2%) of liberals agree it is unethical that many animals live in crowded conditions, while 67.4% of centrists and 61.9% of conservatives agree with this statement. We see similar patterns for the statement about the ethics of eating animals who spent their lives indoors (see Table 2, section 1). In general, we find that a larger proportion of liberal (36%) than centrist (32%) or conservative respondents (27.3%) feel bad for animals when they eat meat. Despite these differences, we note that it is nonetheless quite illuminating that between half and three-quarters of respondents *across* political categories express concerns about animal welfare, and roughly one-third in each category feel personally uncomfortable about harming animals through their meat consumption. Pro-humane meat or meat reduction is not only a cause among liberals, but is also a sentiment shared among centrists and conservatives.

Table 2: Political contrasts in meat attitudes, production preferences, and consumption practices

	Liberal	Centrist	Conservative	Total (Chi-square)
1. Attitudes toward meat	% agree/ strongly agree			
<u>Meat can be delicious</u>	91.6%	94.8%	92.0%	92.4% (12.322)
Sometimes I'm grossed out by meat	37.6%	39.0%	30.1%	35.8% (21.749**)
Eating meat is necessary for a healthy diet	45.1%	50.9%	54.3%	49.2% (35.880***)
Eating red meat increases the risk of getting cancer	48.6%	40.6%	39.2%	44.3% (20.125**)
<u>Eating processed meat increases the risk of getting cancer</u>	70.8%	57.5%	61.4%	65.6% (26.475***)
<u>Reducing meat consumption is healthier for most Canadians</u>	77.4%	68.5%	64.2%	71.8% (44.432***)
<u>It's unethical that many animals live in crowded conditions</u>	73.2%	67.4%	61.9%	56.1% (34.792***)
<u>It's unethical that many animals we eat spend their entire lives indoors</u>	60.3%	54.8%	49.7%	68.8% (30.916***)

I feel bad for animals when I eat meat	36.0%	32.0%	27.3%	32.7% (20.097**)
2. Meat Production Preferences	% agree/ strongly agree			
I feel better about eating meat sold at an independent butcher shop	47.8%	46.7%	42.5%	46.0% (20.502**)
<u>I feel better about eating meat that is locally produced</u>	73.0%	66.7%	72.1%	71.4% (25.023**)
<u>I feel better about eating meat that is raised on a small farm</u>	62.4%	56.6%	59.5%	60.3% (18.992*)
3. Meat Consumption Practices	% always/ most of the time			
Past month, bought meat from an independent butcher shop	21.7%	20.9%	21.1%	21.4% (36.403***)
Past month, bought meat from a farmers' market	13.0%	15.3%	13.3%	13.6% (41.271***)
	% extremely important			
Reservations about eating meat: health concerns	30.9%	28.9%	28.0%	29.7% (12.192)
Reservations about eating meat: animal welfare concerns	22.1%	23.4%	17.6%	21.1% (31.860**)

Reservations about eating meat: environmental concerns	18.0%	17.1%	13.6%	16.6% (32.220 ^{***})
Notes: *, p< .050, **, p< .010, ***p<.001				
Underlined questions are those for which there is 50% or more support across the political spectrum				

When we look at meat production preferences and meat consumption practices, we see a similar pattern of general agreement, with small contrasts across political ideology (see Table 2, sections 2 and 3). Nearly half of our respondents feel better eating meat sold at an independent butcher (ranging from 42.5% for conservatives to 47.8% for liberals), and well over half of respondents feel better eating locally-produced meat (ranging from 66.7% for centrists to 73% for liberals). The majority of our respondents also feel better about eating meat raised on a small farm: 56.6% of centrists agree or strongly agree with this statement, compared with 59.5% of conservatives and 62.4% of liberals. These political differences are even smaller when we look at meat consumption practices. Roughly one-fifth of respondents told us they always or mostly bought meat at an independent butcher shop (20.9% of centrists, 21.2% of conservatives, and 21.7% of liberals). Thirteen percent of liberals bought meat from a farmers’ market, which is slightly smaller than the proportion of conservatives (13.3%) and centrists (15.3%). Finally, when we asked respondents about the factors that make them uncomfortable with eating meat, we saw no

significant contrasts in concerns about health impacts, with about one third of respondents noting health-related concerns about meat (Table 2). A smaller and more variable share of respondents reported concerns about animal welfare and the environment. For animal welfare, 17.6% of conservatives, 22.1% of liberals, and 23.4% of centrists have concerns, while 13.6% of conservatives, 17.1% of centrists, and 18.0% of liberals are worried about the environmental impacts of meat.

To highlight areas of consensus, in Table 2, we have underlined the questions for which there is 50% or more support across the political spectrum. Doing so emphasizes that people of all political persuasions find meat delicious, but they also have important reservations about meat. First, people across the political spectrum appear to recognize a connection between meat consumption and health risks. Second, a majority of our respondents want animals to be raised in humane conditions, and have concerns about animals that spend much or all of their lives indoors. Finally, well over half of our respondents feel better about meat production that is local and comes from small farms.

Discussion

Across academic and public discourse, evidence about the place of meat in Canadian culture is ambiguous. On the one hand, there are representations of meat as risky for personal and planetary health and harmful to workers and animals (Bateman et al., 2019). On the other hand, the vast majority of Canadians regularly eat meat, and meat is also portrayed as normal and benign in other representations (Bateman et al., 2019; Valdes et al., 2020). Despite a strong literature on the health effects of meat on Canadians (e.g., Bye et al., 2021) and the value of meat production to the Canadian economy (e.g., Agriculture Canada, 2019), there is a surprising paucity of robust data on how Canadians perceive meat. Such data are an essential foundation for policy development, and the extent to which meat production and consumption constitute a socio-ecological problem indicates that such policy development is both warranted and overdue. Our goal in this paper was to determine the extent to which Canadians across the political spectrum agree that meat is a problem and to note areas of overlap and disagreement among Canadians' meat-related attitudes, preferences, and practices.

The general conclusion of this study is that, despite some small but significant differences between political conservatives and liberals, there is generally a high level of political consensus on meat—a consensus that supports the idea of a meat paradox in Canada that combines enthusiasm towards meat-eating with concerns about eating animals as meat. The vast majority of Canadians across the political spectrum agree that meat can be delicious. At the same time, over half of Canadians express concerns about the health risks of meat and the harm inflicted on animals within the meat industry. Although we see some differences in attitudes about meat across the three political

ideological categories, these differences become smaller as we shift our focus to preferences and practices. In this discussion, we explore several themes from the survey results: variation and consensus on meat as a health risk, widespread preferences for meat produced outside the conventional food system, and the relationships among attitudes, preferences, and practices.

Media coverage of meat frequently emphasizes the health risks associated with meat consumption (Bateman et al., 2019), but how do consumers interpret such risks? While half of the people we surveyed believe that meat is a necessary part of a healthy diet, a large proportion of our respondents believe reducing meat consumption is healthier for most Canadians. More specifically, many of our respondents see processed meats and red meat as presenting health risks. These health concerns are also motivating our respondents to reflect on how much meat they consume. When we asked our respondents to describe their reservations about eating meat, health risks represent the most common cause for reflection on meat-eating practices: roughly one-third of those surveyed pointed to concerns about the health risks of eating meat. For the most part, variation in these patterns is either non-significant across political ideology (as is the case for reservations) or the differences are slight (as is the case for health risks from red meat and processed meats). Overall, more Canadians seem to see meat as risky rather than beneficial from a health perspective, and, in most instances, these patterns are not significantly different across political ideology.

Another area of political consensus that stands out in our data is the strong preference among Canadians for meat produced outside the conventional meat industry. Most Canadians feel better about eating meat

that is locally produced, and roughly 60% feel better about eating meat that was raised on a small farm. Nearly half of Canadians would prefer to buy meat at an independent butcher shop. These patterns suggest (but do not confirm) that one way in which Canadians are reconciling the tension between meat as normal and delicious on one hand and risky and ethically concerning on the other is to aim to source meat from vendors who sell “happy meat.” This trend has been noted among surveys of “conscientious omnivores” in North America and elsewhere (Rothgerber, 2015). The possibility that some meat might present reduced environmental and health risks and afford less suffering to animals creates space for consumers to enjoy the taste of meat without experiencing the guilt of eating a problematic food. From a policy perspective, these patterns suggest that Canadian consumers may feel negatively toward subsidies and incentives for large players in the meat industry and feel positively toward incentives and policies seeking to support small-scale producers selling to local customers. However, any policy that aims to reduce meat consumption or shift toward more humane meat must contend with consumers’ limited knowledge of the conditions under which their meat is produced.

As a final take-away point from our empirical analyses, we note the relationships between meat attitudes, preferences, and practices. A broad pattern in our data is that we see more (attitudinal) concern about meat and preferences for alternatives to conventional meat than (behavioural) rejection of meat. Barr (2006) identified a similar pattern in the context of waste minimisation in the United Kingdom, where he noted that far more people expressed a strong willingness to reduce waste than the proportion of people who actually engaged in waste reduction behaviours (see also Trattner and Elswiler, 2019 for a similar gap between intended and actual eating habits). This seems to be a

space that requires effective and clear policy. For instance, while roughly half of our respondents feel better about eating meat from an independent butcher shop, only one-fifth bought meat from a butcher in the past month. Likewise, between 56% and 73% of respondents feel better when eating meat that is locally produced or raised on a small farm, but only about 14% bought meat from a farmers’ market in the past month. Interestingly, while there are small but significant differences in meat-related attitudes across political ideologies, these differences become nonsignificant when the focus shifts to practices: liberals are no more likely than centrists or conservatives to have shopped for meat from small-scale, local vendors. These patterns reflect similar findings about consumer preferences beyond meat (Schoolman, 2020). Estimates of our respondents’ discomfort around animal welfare and meat further illustrate this pattern. A surprisingly large share (between 50% and 73%) of the people we surveyed said they felt it was unethical that animals live indoors and in crowded conditions. Yet only about a third of respondents feel bad for animals when they eat meat, and roughly 20% report that animal welfare concerns underlie their reservations about eating meat. The gap between preference and practice may point to barriers related to cost, time, or access (Kennedy et al., 2009)—barriers that could be reduced with effective policies.

If Canadian policy makers were to take their cue from US media stories like the fake burger ban, they would be overlooking what may be quite distinct Canadian patterns when it comes to public perceptions of meat. If we want to address the problems of conventional meat production, we should consider targeting changes that conform to preferences and beliefs where there is existing overlap across the political spectrum. Our findings reveal statistically significant differences in many attitudes and behaviours between political liberals and conservatives. At the same time,

these differences are small relative to the overall degree of consensus that exists on these issues, where the majority opinion is shared across the political spectrum. For example, despite their differences, the majority of both liberals and conservatives feel that it is unethical that livestock is raised in crowded conditions. There is also a clear majority preference across the political spectrum for meat that is locally produced and raised on a small farm. This is a preference that contrasts with, for example, the current system of quotas for the production of chicken, which has resulted in most of the chicken Canadians consume being raised industrially. Our data show that policies explicitly aimed at supporting small, sustainable, pastured animal operations would likely be strongly endorsed by the public.

Although a great deal of evidence points to the environmental harms created by the meat industry, more of our respondents had reservations about eating meat as a result of health or animal welfare concerns than environmental concerns. Regardless of political ideology, we observed a larger share of respondents expressing attitudes that convey meat as a problem and preferences for meat that is not sourced from conventional meat producers than reporting engagement in practices that reflect these attitudes. Rather than simply interpret this as a value-action gap, we interpret it as a policy gap, indicating a need for municipal, provincial and territorial, and federal governments to design policies that make it easier for

Canadians to purchase meat deemed healthy and humane, for animals, people, and the planet.

There are several limitations of this study and avenues for future research on Canadians' perceptions of meat and engagement in meat-eating practices. First, more fine-grained data are needed on attitudes toward the environmental impacts of meat production and consumption. Given a growing awareness of the GHG emissions from global animal agriculture (Bateman et al., 2019), it is important that these data are collected from robust Canadian samples. Second, future research should interrogate Canadians' views on labour issues in the meat industry, particularly in light of the Covid-19-related crisis in slaughterhouses across the country (Struthers Montford & Wotherspoon, 2021). Third, although our intention in this paper was to highlight areas of convergence and divergence across political ideologies, future studies should employ multivariate analyses in order to identify other factors that might impact the relationship between political beliefs and people's meat-related attitudes, preferences, and practices. Fourth, it is extremely difficult to gather representative survey data. Although our use of a quota sample is an improvement on existing research relying on convenience samples, Canadian policy makers would ideally have access to questions about meat-related attitudes and preferences on surveys like the Canadian Community Health Survey, which currently only asks about meat-eating practices.

Conclusion

We believe this paper represents the most comprehensive study of Canadians' attitudes about meat, preferences for meat, and meat-eating practices to date. Canada-specific data are required, we suggest,

because it is unlikely to be accurate to impute from US-centric accounts of consumers' perceptions of meat and of political polarization. In identifying patterns of convergence and divergence in meat attitudes,

preferences, and practices across political categories, we are addressing a significant gap in the literature. Canadians eat a considerable amount of meat and eat meat frequently (see also Valdes et al., 2020). The contrast between the ubiquity of meat on the Canadian dinner table and the gap in social scientific literature on meat practices and preferences in Canada is striking. When we compare the lack of robust social scientific analyses of Canadian meat consumers with the prodigious Canadian literature on meat production, it is clear that much more research is needed on everyday engagement with meat, as scholars have already endeavoured to do for other elements of Canadian diets (e.g., Baumann et al., 2019). Doing so is a necessary step in designing food policy grounded in Canadians' attitudes, preferences, and practices.

Public policies are more likely to be enacted if there is relative agreement across the political spectrum and if the issue is one that is salient to citizens. We find that, in the face of some significant differences in attitudes about meat, there is nonetheless sufficient consensus for the purposes of enacting policies designed to promote a more sustainable, small-scale meat industry. Regarding the ways that livestock are treated and meat is produced, a large majority of Canadians of all political leanings are in favour of meat production where crowding is reduced and animals' time outside is increased. Moreover, Canadians prefer that meat

production is local and comes from small farms. There is a clear policy opportunity here to design regulations that promote small-scale, localized modes of production. Regarding meat consumption, it is clear that many Canadians are thinking about their health, presenting another policy opportunity that could seek to reduce meat consumption through referencing the health risks of meat, especially processed meat. As with all social policies, regulations on meat production would need to remain sensitive to economic constraints, particularly as they apply to less advantaged consumers, and especially given the Canadian context of significant levels of food insecurity.

There are, of course, other factors that influence food policy. We have learned a lot from the recent changes in the Canada Food Guide, which was long influenced by industry lobbying and corporate interests (Clapp & Scrinis, 2017; Deckha, 2020). Surely these same forces will come into play regarding any efforts to change the ways that meat is produced or to reduce Canadians' meat consumption. Such issues are beyond the scope of our research. However, by generating knowledge about Canadians' attitudes and behaviours regarding meat, we hope to add to the ability of policymakers to address the social problems associated with current levels and modes of meat production and consumption.

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Original Research Article

Producing protein: Fractionation of animal bodies, mass consumption of cheap protein, and the value of protein sourced from industrial hog operations

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Abstract

This article claims that the pursuit of *protein* specifically, not *meat* in general, is woven into the very fabric of industrial hog farming and the devalued animals at its centre. Further, this piece forces a critical lens and reclassification of the value of protein sourced from confined animal feeding operations (CAFOs), using Goodman, Sorj and Wilkinson's (1987) concepts of substitutionism and appropriationism as a framework to unpack how hog production in Canada is structured on

producing protein for mass consumption. Lastly, this article categorically extends the work of Goodman et al., (1987) to argue that hogs are not only industrialized within a capitalist food system, but now hog flesh is able to supplant or be used interchangeably with other forms of protein – a sort of *proteinaceous substitutionism*: the creation of generic, atomized, protein inputs.

Commodity hogs are so valueless, the animal now exists to be a source of cheap protein.

Keywords: Protein; meat; hogs; CAFOs; substitutionism; Canada

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Résumé

Cet article affirme que la recherche de protéines en particulier, et non de viande en général, fait partie intégrante du tissu même de l'élevage porcin industriel et de la dévalorisation des animaux qui en est le centre. En outre, cet article impose un regard critique et une reclassification de la valeur des protéines provenant des exploitations d'engraissement d'animaux confinés, en utilisant les concepts de substitution et d'appropriation de Goodman, Sorj et Wilkinson (1987) comme cadre pour expliquer comment la production porcine au Canada est structurée pour produire des protéines destinées à la consommation de masse. Enfin, cet article

élargit catégoriquement les travaux de Goodman et al. (1987) pour affirmer que les porcs ne sont pas seulement industrialisés au sein d'un système alimentaire capitaliste, mais que la chair de porc peut désormais supplanter d'autres formes de protéines ou être utilisée de manière interchangeable avec celles-ci – une sorte de *substitution protéique* par la création d'intrants protéiques génériques et atomisés. Les porcs élevés comme marchandises sont si peu précieux que l'animal n'existe plus qu'en tant que source de protéines à bas prix.

Introduction

The consumption of animals and their derivatives is an evolving and contentious issue. Current industrial hog farming practices in central Canada have been problematically sculpted and rationalized. The perhaps once-rural idyll of grunting, pastured pigs has rapidly been supplanted by industrial efficiency that demands a precarious labour force and uniformity via state-of-the-art genetics to raise those animal bodies until they are sufficiently plumped for harvest. I propose that the pursuit of *protein* specifically, and not *meat* in general, is woven into the fabric of industrial hog farming, devaluing the animals at its centre. I use pork as an example of a food that, through a series of economic, social, and political processes, has given way to a reductionist reimagining of the distinction between meat and protein (Scrinis, 2008), typifying a broken food system that proliferates poor animal welfare and limited consumer choices.

With this article, I aim to explore the distinction between meat and protein, drawing on Scrinis' (2008) understanding of *nutritionism*, an ideology or paradigm based on a reductive emphasis on both the nutrient value of food components and bodily health impacts. This article also aims to encourage eaters to consider the frames and metrics with which they sculpt their own dietary practices. At a broader scale, this piece contributes a critical lens and reclassification of the value of protein sourced from confined animal feeding operations (CAFOs), using Goodman et al.'s (1987) concepts of substitutionism and appropriationism; I use their framework to unpack how hog production in Canada is structured on producing protein for mass consumption. Lastly, this article extends the work of Goodman et al. (1987), arguing that hogs are not only industrialized within a capitalist food system, but also that hog flesh is now able to supplant or be understood as interchangeable with other forms of protein—a sort of

proteinaceous substitutionism that makes protein inputs to the human body both generic and atomized. The modern iterations of hog bodies have been refined for maximum protein output, existing the entirety of their lives in confinement as well as in abstraction—protein content to be harvested and remixed into nearly

anything. Hogs have become meaty cogs in an unrelenting food factory, their nature re-sculpted by a few corporate players.

Which came first: The chicken or the pig?

While this article focusses on industrial pork, it is useful first to consider the path of industrially raised chicken, as its place in the de-animalization of meat production has been extensively addressed (Drabenstott, 1998; Stull & Broadway, 2004; Lawrence & Stott, 2010). In his seminal piece on the subject, “Making Meat,” Boyd (2001) outlines the post-WWII boom in the consumption of poultry. The article outlines the tensions of reformulating and subordinating biological organisms as agricultural commodities in the pursuit of capital. Boyd shows how technoscientific gains

emerging from the exploitation of broiler chickens’ biological productivity and genetic improvements have resulted in a “highly efficient machine” (2001, p. 638) for turning grain into meat. Following the marketing success of ultra-low fat chicken in the late 1980s, hogs’ genetics have also been tweaked to express leanness. While this and many other parallels exist between industrialized chicken and hog farming, in this text I argue that commodity hog farming is no longer in the business of *making meat*, as Boyd describes it, but is instead in the business of *producing protein*.

Methods

Towards these objectives, I have conducted extensive content analysis of existing literature on intensive animal agricultural practices, hog development and production, and data on food-based commodity chains (Boyd & Watts, 1997; MacLachlan, 2001; Barndt, 2008; Stull & Broadway, 2008). MacLachlan’s (2001) pivotal contribution to unpacking the Canadian agro-industrial meat chain served as a key document to track the structural elements of industrial animal production and killing. His piece traces the history of beef-calf production, cattle feeding, and the changing meat

processing and retailing sectors and pays particular attention to the changing hands within Canada’s concentrated slaughter/processing industry (MacLachlan, 2001). Within the social sciences, content analysis and in-depth interviewing stand as prominent qualitative research methodologies (Van den Hoonaard, 2015; Jackson & Verberg, 2007). I draw extensively on forty-four in-person, in-depth interviews followed by transcript content analysis and the coding of interview data for manifest/explicit and latent/implicit themes, which provided a rich, qualitative data set for the basis

of discussion in this paper. Interviewees included twenty-six pork producers, primarily from Southwestern Ontario and eighteen key industry informants, many of whom spoke/operated at a national scale. The counties of Bruce, Middlesex, Oxford, Wellington, Perth, and Huron, and the Municipality of Waterloo in Southwestern Ontario were specifically targeted, which together represented

more than half of all hogs produced in Ontario at time of data collection (Statistics Canada, 2014). These seven counties currently account for more than 70 percent of all hogs in Ontario (Statistics Canada, 2021). Industry interviewees were intentionally selected based on the prominence of their roles and place of employment within the industry.

Substitutionism and appropriationism as categorical framework

Substitutionism has been put forward as industry players' efforts to reduce, replace, or entirely supplant agricultural components needed as inputs (Goodman et al., 1987). Similarly, *appropriationism* describes industrial capital used to reconfigure and restructure agricultural production processes including labour (Goodman et al., 1987). Together, the two concepts provide insight into the industrialization of agriculture and subsequent displacement/disenfranchisement of rural-based farm work. A number of agro-industrial processes that are now commonplace in modern food manufacturing embody the development of substitutionism. They include: the application of research and development and high-capital investments; the decoupling of place of production and place of consumption, of both inputs and final-use products; the reduction of agricultural outputs to otherwise interchangeable industrial inputs; and the "fractionation" of agricultural products into their constituent parts to permit reconstitution into value-added items. Additional conditions for the proliferation of substitutionism are economy of scale and standardization. Substitutionism counters, effectively, concepts such as terroir, localized cuisine, and "short"

food chains, which seek to re-establish more intimate linkages between producers and eaters. Hog farming, like most industrialized meat production, is already a form of precision agriculture. Stull and Broadway (2004) have noted that meat production has been transformed through agricultural industrialization, specifically through intensification, concentration, and specialization, which have emerged as major drivers. However, massive capital, technological, and cultural investments are also required for living, breathing organisms to be reduced to mere macronutrients.

Boyd, too, conceptualizes the techno-scientific underpinnings required for the industrialization of modern meat production (2001). Boyd's emphasis on the blending of biological organism and mechanical efficiency evokes a much earlier work—Ruth Harrison's *Animal Machines* (1964)—in which the author argues that food animals have been forced to exist robotically and hollowly for human uses. Modern industrial commodity hog production has been materially supplanted via the same processes of substitutionism and appropriationism presented by Goodman and colleagues (1987). The commodity hog industry has fully embraced high capital investment,

furthering the concentration of power within transnational food companies due to a series of mergers and acquisitions with aims of capitalizing on opportunistic trends in the mass consumption of generic protein (iPES, 2022). In addition, the fractionation of industrial hogs and the protein they produce can be demonstrated by intentional, technocratic carcass leaning that has given shape to an industry run on high-volume, low-margin, cheap protein inputs for value-added profit. National retailers and large integrators, like Maple Leaf Foods (who have shifted focus away from pig slaughter and toward pork processing), exercise tremendous power over both

production and consumption. Appropriationism and the subsequent disenfranchisement of rural-based farm work is also occurring as hog producers bend to processor demands for lean and uniform carcasses or else find their animals unsellable after slaughter. Further—as many of the producers I spoke with confirmed—farmers often do not even own the animals they raise, and instead participate in contractual arrangements for barn space and labour with large agro-food companies (MacDonald, 2016). As such change takes place, hog farmers are increasingly “the equivalent of wage labourers on their own land” (Page, 1997, p. 102).

Protein-ification of animal derivatives

Protein is one of three macronutrients essential to human health and a cornerstone of dietary intake; fat and carbohydrate are the other two. Proteins in the body create and regulate insulin, produce lactase (a digestive enzyme), maintain fluid balance in the blood, and build structural components like muscle, hair, bone, and organ tissues. Protein in the diet is assessed by its amino acid profile. There are twenty amino acids, nine of which are essential, meaning that the body cannot produce them and must be sourced from food. Animal-based products like meat and eggs are termed “complete protein sources,” since they contain all nine essential amino acids.

In contrast, non-animal sources of protein are labeled “incomplete” sources of protein. This is not because they are insufficient sources, but because some of the nine essential amino acids are not present. While all whole foods contain some protein, and a varied diet supports multiple health benefits (Lichenstein et al., 2021; Health Canada, 2019), animal-based sources of

protein are often lauded for their protein content. Nonetheless, foods such as grains and legumes eaten in combination (e.g., rice and beans) mutually supplement their amino acid profiles, creating a complete protein in the diet.

While nutritional science is a fairly new field of study, early publications from the meat industry promote the value of meat in the diet. One 1933 publication targeted at housewives, titled *Tasty Meals For Every Day*, claims that “because the protein found in meat so closely resembles the protein contained in the human body, it is particularly adaptable to human uses” (Canadian Packers Limited, 1933, p. 4). Nutrition policy in Canada until the 1920s stated that animal-derived products, particularly cow’s milk—which emerged as a substitute for breast milk as awareness of vitamins and trace minerals grew—were deemed to be protective and healthful (Ostry, 2006). It is notable that this emphasis on the *likeness* between animal tissue and human tissue seems obscure in today’s context, as

consumers grow increasingly distanced—and intentionally so—from the notion that meat comes from the body of a killed animal. The rhetoric about protein has shifted to how vital it is and how eaters should consume more of it. Moreover, as food and technology continue to mingle, messaging about protein and its sources (plants, insects, cell cultures) further disrupt our preconceptions of and relationship to food.

Another macronutrient around which messaging has become increasingly difficult to understand is fat. Fat, particularly trans fats, and saturated animal fats, have in particular been blamed for the onset of several chronic health conditions (MacLachlan, 2001; Guasch-Ferré et al., 2019; Weis, 2013). As a result, there has been a drastic reduction in domestic red meat consumption in Canada, Britain, and the US since the 1970s, where research has linked increased risk of cardiovascular disease to fattier red meats, especially beef and pork (MacLachlan, 2001; Guasch-Ferré et al., 2019; Weis, 2013). Cordain and colleagues noted the high occurrence of chronic disease such as hypertension, type II diabetes, and cardiovascular disease (Cordain et al., 2005). Taking an evolutionary approach to human health and nutrition, they note how domesticated food species and processing techniques have altered the conditions and quality of much of the food found in a Westernized diet. Cordain et al. (2005) further assert that drastic changes in the composition of human health emerged with the development of agricultural practices and animal husbandry approximately 10,000 years ago, and that one of the most drastic shifts is in animal carcass fat and the fatty acid composition of animal products.

As nutritional sciences continue to investigate the nature and effects of macronutrients in human bodies, a number of new dietary regimes have emerged, such as the keto diet. Early twentieth-century research on

fasting for improvement in epilepsy patients was expanded upon by R.M. Wilder in the 1920s who coined the “ketonemia diet” (Kim, 2017; Masood et al., 2023). The ketonemia diet was intended to mimic the benefits of fasting seen in epilepsy patients, but over a longer term though high fat consumption and severe carbohydrate restriction (Williams & Cervenka, 2017). Today, the “keto diet” for weight loss is intended to induce *ketosis*, a metabolic state in which the body is starved of carbohydrates as an energy source and shifts to using fat as fuel (Dowis & Banga, 2021). Fat stores in the body are metabolized by the liver and turned into ketones as an alternate source of energy (Dowis & Banga, 2021).

A similar metabolic process takes place when the body is inundated with high levels of protein. In the absence or near-absence of carbohydrate and fats, the amino acids in dietary protein must be processed by the liver into urea and excreted by the kidneys, a process that can cause stress to both the kidneys and liver (Thompson, Manore & Sheeshka, 2007). That is, while protein is an essential part of the diet in combination with other macronutrients, it is not a pure, clean fuel to be consumed abundantly, as some diets promote. The average human needs just 0.8 grams of protein per kilogram of body weight for positive physiological maintenance (Institute of Medicine, 2002). Because almost all whole foods contain some protein, this level of intake is achievable without relying on an ultra-high protein diet.

It is within this context of nutritional research, science communication, and the popularization of commercialized diets that hogs have been systematically developed and promoted by industrial agribusiness as a cheap, macronutrient-siloed input for food processing, exploiting the value that consumers now attribute to lean protein. Lean meat production—particularly pork and the systematic “leaning” of hogs—has been

instigated as a move toward capital protection for large corporations, rather than concern for consumer health. To echo Goodman et al. (1987), hogs have gone through fractionation. Today, there is a seemingly

endless supply of uniform animals due to overproduction, genetic research and development, and prolific reproduction rates (MacDonald, 2016).

Fractionation: Hog carcass leaning

Historically, there were two varieties of hogs raised for human consumption: bacon hogs and lard/butcher hogs (Canada Packers Limited, 1943). The former yielded a more muscled carcass, the latter a fatter, lard-rich carcass. Throughout the 1930s, continuous calls for hog improvement from slaughterhouses were made and, in 1938, the Whyte Packing Co. developed an “on the rail” grading system (Rennie & Meat Packers Council of Canada, 1969, p. 58). This rail grading system allowed for animals to be hoisted into the air by their back legs immediately following stunning and allowed the carcasses to move through the plant along an overhead rail, which stationary workers then individually assessed and disassembled (MacLachlan, 2001). By 1940, rail grading of individual hogs became the standard method of carcass grading. On December 30, 1968, a new rail grading system arose from the joint efforts of the Canadian Swine Council, the Meat Packers Council of Canada, and Agriculture and Agri-Food Canada (AAFC) and was implemented after a “definite relationship was proven between the total backfat and the yield of lean meat in the hog carcass...to determine grade” (Rennie & Meat Packers Council of Canada, 1969, p. 64). In addition, Canada Packers Limited claimed that grading hogs was done to “stimulate the production of hog of the type that will make high quality Wiltshire sides for shipment to Britain” (1943, p. 95).

With an export market based on leaner bacon hogs established early in history of the Canadian hog

industry, the conditions were in place for expansion as advancements in machinery and agricultural technology took place. In particular, there is an argument to be made that the modern commercial livestock industry developed in tandem with the boom in cheaply produced vegetable oils, such as palm and canola, alongside the industrial mono-cropping of feed grains like corn and soybeans. Weis has termed this process “the industrial grain-oilseed-livestock complex” (2013, p. 93). Specialized industrial livestock production sites, housing thousands of animals within a confined area, could only be possible through the plethora of grains produced for use as animal feed. Only through the mass production of cheap oils and grain could the mass production of animal-derived protein occur. Similarly, the cheap grains used to feed lean hogs can also be supplemented with cheaper fats at the processing level—themselves having gone through the process of substitutionism—improving the mouth feel, palatability, and appeal of processed meat products. Faced with the demand for leaner protein and the need to grow hogs in large numbers due to low margins, commodity producers have little choice about the breed of pig they house in their barns. Because these same lean hogs are individually graded, the machine that is the commercial pork industry must be fed by a continuous influx of uniformly sized, rapid-growing, high-littered, and genetically perfected hogs. Such specificity of breed and genetic tinkering has enabled hog genetics companies to create *the* benchmark meat hog: an F1

cross. The F1 cross is touted as the premium hybrid for commercial production as the pigs grow uniformly. A number of producer interviewees reporting raising a three-way cross F1 breed, a landrace crossed with a Yorkshire female, bred to a Duroc boar. Producer associations echo that the F1 cross genetics produce “the most uniform commercial growing finishing pig, as well as the most consistent carcass in the slaughterhouse” (Canadian Swine Exporters Association, 2023, para.3). However, Weis (2013) notes that despite the rapid rationalization of inputs to produce flesh, eggs, and milk, there are “inescapable biophysical limits” (p. 115) in commercial livestock production. When the genetics of a perfectly sculpted hog meet innovative pharmaceuticals intended to result in perfect, rational efficiency, both the provenance of that animal, and the larger system of which it is a part, become distanced from the consumer. National retailers and large integrators like Maple Leaf Foods, exercise tremendous power over both production and

Fractionation of meaty, animal bodies

Despite acknowledgement from numerous producers and industry personnel with whom I spoke that a fatter hog is also a tastier hog, processors continue to drive demand for generic lean protein. One industry interviewee, situated high within the Ontario Pork marketing board, noted that despite producers’ feelings on the dilemma of producing commodity-grade protein, “until the model changes, producers will produce lean.” Because further processors and value-added pork products require cheaper material for processing, the model central to the industry is for producers to *supply* processors like Maple Leaf Foods and Olymel with a consistent source of cheap, generic,

consumption, and stand as a model of problematic production processes.

Kill plants have become incredibly costly to operate, requiring labour, health and safety personnel and regulatory oversight, specialized equipment for each component of the carcass breakdown, and many inputs, such as the water needed for frequent cleaning and electricity for refrigeration units (MacLachlan, 2001). Where labour costs have been rationalized, expensive automation has emerged. The substantial cost of operating a kill plant and increasing regulatory hurdles such as phytosanitary regulation, residue testing, and third-party welfare audits also contribute to the speed and scale of operation (MacDonald, 2016). Plants must operate ceaselessly at capacity to ensure maximum efficiency and maximum return on investment (MacLachlan, 2001; Stull & Broadway, 2004). Frequent COVID-19 outbreaks and even deaths from transmission traced to slaughter facilities around the world further evidence how tightly these facilities must operate (Dryden, 2020; McEwan et al., 2020).

animal protein for their wares. While producers raising pastured animals are often able to reach emergent markets and consumers willing to pay more for better taste (but less volume), commodity producers are limited in their options. Even fresh meat retail sales are affected by the perpetual cheapening of pork, setting consumer prices far below producers’ own costs. This further reinforces the notion that pork is just *cheap protein*.

Four key production processes contribute to the current commodity “model”: (1) Fat costs more in terms of feed volume and grow times, adding more days to finishing hogs before they reach market; (2) Lean,

tough, or otherwise unpalatable cuts of meat can be “fat-corrected” during processing, meaning that high-quality fat is “unnecessary” for industrially transformed products; (3) Highly processed pork products such as hot dogs, sausages, and deli meats have longer shelf lives and therefore can be shipped further and be stocked longer on retailer shelves than fresh product; (4) Highly processed, value-added items also generate larger profit, being based on cheap, lean hogs, further decreasing producers’ control over their animals’ standards.

Processor-driven monetary bonuses and penalties have also influenced the type of hogs that producers raise in-barn. While domestic pork consumption is declining, up to 70 percent of all processed meats in

Canada are made with pork (Agriculture and Agri-Food Canada, 2022). As noted above, because meat processing can enhance, correct, and amplify flavours with a plethora of additives, such value-added goods can provide variety and taste while also exploiting consumers’ perceptions of the value of a high-protein diet. Together, these processes and contexts continue to reinforce the demand for hog leanness across the pork industry. The leaning of hogs for generic protein has thus provided capital protection for large integrator-processors, guarding against many of the issues that arise from fresh meat sales, such as perishability and profitability.

Rural appropriationism: Bend or bankruptcy

Breeding for uniformity, in both animals and crops, has become a defining feature of large-scale, corporate, monoculture food production (Howard, 2016; Boyd, 2001; Weis, 2013). However, in parallel to the move to breed broiler chickens with heavier (and more valuable) breast meat, genetics companies have targeted a number of desirable traits in hogs (Ufkes, 1995, 1998). These include improved feed-conversion rates for rapid growth (using a primarily corn-based diet), sturdy feet and legs for growth on concrete flooring slats (through which feces and urine fall), prolific litter sizes, and, as discussed, leanness (Canadian Swine Breeders Association, 2015; MacDonald, 2016, 2018).

Hog leanness is a device for reinforcing the value of protein within the hog value chain, and the mechanics of measuring hogs’ backfat (in order to determine overall leanness) contributes to the reduction of animal bodies to structures that grow protein. Backfat is graded while hogs are alive in order to adjust feeding schedules before slaughter using ultrasound. Not all hogs are

graded for leanness, but through sampling and assumption that genetic lines are uniform, fat grade is extrapolated throughout the barn. Once a crop of hogs are leaned to the desired weight and backfat, they are sent to slaughter. Hogs with more backfat receive a lower grading, meaning producers are paid less (OMAFRA Swine Team, 2015; MacDonald, 2016).

Other factors are also considered in constructing hog prices. Dutkiewicz (2020) outlines how futures markets and speculative pricing are built upon the illusory notion that “the market” exists as a physical actor, rather than as a constructed framework. Hogs, while at the centre of pork production and pork pricing schemes, merely serve as a standardized “biological instrument of market intervention” (Dutkiewicz, 2020, p. 283). For many commodity producers, the base price is set in American dollars (USD) and United States Department of Agriculture (USDA) cash number products for select pork cuts that are released on a daily basis upon the Chicago Mercantile Exchange (CME), a

speculative hog futures stock exchange (Grier, 2007). As a result, the projected prices are often set months ahead of time. Processors take this array of numbers and, using a similar formula, establish a price based on the market they are servicing at that time (Ontario Pork, 2021). Many grading grids are proprietary information, maintaining competition among slaughterhouses and allowing different plants to serve different protein markets (MacDonald, 2016). Today, there is an increasing demand from processors for heavier hogs, at times exceeding 300 pounds, a weight that would have been excessive and heavily penalized just fifteen years ago (MacDonald, 2016). To the processor, therefore, it makes more financial sense to buy heavier hogs, which increases profit.

These issues mean that producers must either adapt to the processor-driven changes in demand or be penalized. If a hog is deemed too small, too large, or too fat, producers may be paid just 10 percent of the 100 percent Formula Price, a rate set by pork marketing boards and used to dictate prices paid at slaughterhouses¹ (Ontario Pork, 2021). Although the term “precision agriculture” is often associated with crop farming, it is evidently applicable to hog production. As hogs’ genetics are constantly tweaked to produce more piglets per sow, more lean carcass meat, and in less time with less feed, advanced technological systems are also emerging in-barn (MacDonald, 2018). Those unable to keep up with the advancements in technologically precise growth methods end up having greater feed costs relative to tremendously volatile returns.

Sophisticated equipment and technical systems are becoming necessary to compete in this industry. Electronic sow feeding (ESF) systems are just one example of what comprises the “technological treadmill” (Buckland, 2004, p. 152). Seeing greater gains in efficiency or productivity, producers adopt cutting-edge technologies with hopes of improved returns on larger farms with less labour. However, larger production sites, particularly those that are vertically integrated, also have a greater ability to source the capital needed for such investments (Drabenstott, 1998). Much like the advancements of threshers and tractors in crop agriculture, which encouraged the use of larger parcels of land to make operational costs worthwhile, ESF systems also favour expanded hog production, with the corollary effect of disadvantaging smaller producers who cannot compete at that scale. While such changes are normative to capitalist agriculture, hog producers tend to associate the increasing consolidation of their industry as reflective of poor individual production decisions. One interviewee stated that, throughout his time hog farming, “We made a ton of money, we lost a ton of money, we made a ton of money, but it’s, it’s the game I know, right?... Yes, there was casualties along the way...we lost some good producers, you know the first casualties are always the bad producers so some of that’s not the end of the world.” Another interviewee stated, “farmers are their own worst enemies, and instead of having a single voice, when the prices are down, you should hear them at the meetings we have.” A similar sentiment was echoed by yet another producer, who noted that he has grown to

¹ Pork marketing boards utilize US Department of Agriculture swine data to construct the following pricing formula to pay producers at time of slaughter: CME Constructed 201 Price = (Producer Sold Negotiated Hogs (Head Count * Average Net Price * Average Carcass Weight) + Producer Sold Swine or Pork Market Formula hogs (Head Count * Average Net Price * Average Carcass Weight)+Negotiated Formula(Head Count * Average Net Price * Average Carcass Weight)) divided by (Producer Sold Negotiated Hogs (Head Count * Average Carcass Weight) + Producer Sold Swine or Pork Market Formula hogs (Head Count * Average Carcass Weight)+Negotiated Formula (Head Count * Average Carcass Weight) (Ontario Pork, 2021).

dislike interacting with other farmers throughout his time in the hog industry. He stated, “I don’t like working with farmers because they’re the toughest bunch to work with, they’re never satisfied, there is always something wrong” to describe the difficulty of

working co-operatively with other hog producers. Despite processors’ demand for lean, protein-rich inputs from hog bodies consumers’ demand for the ultimate in greasy, salty, pork—bacon—is booming.

Bacon boom

The sharp increase in consumer demand for bacon in the 1990s is linked to lobbying efforts by the Illinois Pork Producers’ Association, an effort to combat slumping pork belly prices (Sax, 2014). Sax (2014) notes that “because the belly was the largest single cut on the pig, the corresponding prices of hogs slumped, and farmers tried to salvage what they could from leaner loins and chops by breeding thinner, more muscular pigs” (para.11). Earlier, in the 1980s, the US National Pork Board—the national lobbying voice of US hog producers—used the “Pork: The Other White Meat” campaign to appeal to increasingly fat-conscious consumers (Sax, 2014; National Pork Board, 2015). To overcome the resulting belly price slump, the Pork Board approached fast food restaurateurs, who had also begun offering leaner options, to encourage the addition of bacon to sandwiches for added flavour (Sax, 2014, np). This fractionation of pork into both ultra-low *and* ultra-high fat cuts further illustrates the bifurcation of the “modernized” pork industry.

Despite acknowledgement from many of the producers that I spoke with that they are being guided by processors to produce leaner, yet larger hogs, there was disagreement as to the origins of this preference. Many producers noted that consumers were afraid of fat, and that processors, in an attempt to satisfy those consumers, were demanding lean hogs. Others tended to blame consumers directly, noting a lack of savviness in the kitchen, rather than an entire industry that built

on lean protein creation. Despite individual opinions, broader consideration of market trends illustrates that processor-led demand for leanness, embracing uniformity and economies of scale, resounds throughout the entire North American hog market (Ufkes, 1995, 1998). As one Iowa hog farmer put it: “We are being told that consumers are constantly demanding high quality pork that is consistently lean. Unfortunately, the pork being produced by the industrial units meets the packing plants’ qualifications for lean pork, but does not meet the consumers’ desire for high quality meat... consumer demand is not driving the hog industry today” (Braun & Braun, 1998, p. 53).

Some US-based producers go on to claim that producers are being penalized for higher quality, fatter hogs, and that “the poorer quality meat being produced by the industrial producers exacts a premium price at the packing plant, but then is sold at discounts or is made into sausages because much of it is of such low quality” (Braun & Braun, 1998, p. 54). Processors do indeed see “fat profits in lean meat” (Ufkes, 1998, p. 241) as processed pork, which can be used in a variety of commodity meats like hot dogs, deli meats, and sausages, and serves as cheap protein filler that can be corrected via processing for increased palatability. Sugar, fat, seasonings, cheaper added-oils like canola and palm, and flavour enhancers like smoke, maple, and hickory flavouring can all be included during further-processing (Winson, 2013). Though research into

breeding, feed ratios, and feed components has generated hogs with less backfat, it also led to the

breeding out of intramuscular fat, which gives cooked meats both flavour and juiciness.

High capital investments: New proteins, same conglomerates

North American animal protein companies are recognizing shifts in consumer demands and see success in marketing entirely plant-based and alternative proteins. This shift in focus by large animal-based companies is not an approach based on conscientiousness but is instead a move to capitalize on trends in the mass consumption of generic protein (iPES, 2022). In keeping with my framework of substitutionism and appropriationism, such high capital investments and decoupling places of production and consumption are apparent in protein creation conglomerates, even as they pivot to alternatives to pork protein. Howard and colleagues' recent report titled the "Politics of Protein" notes how rhetoric of an alternative protein transition serves to further reinforce corporate concentration of transnational conglomerates (iPES, 2022).

The purchase of Field Roast Grain Meats (a plant-based meat and cheese company) by Maple Leaf Foods is one illustration of this industrial shift. In December of 2017, Field Roast announced its acquisition for US\$120 million (Maple Leaf Foods, 2018a), which followed Maple Leaf's previous acquisition of Lightlife Foods, another plant-based protein company acquired in early 2017 for US\$140 million (The Canadian Press, 2017). Maple Leaf now positions itself as "the most sustainable protein company on earth" (Maple Leaf Foods, 2018b, para.1).

To accommodate their growing portfolio of plant-based protein options, Maple Leaf developed a new, independent subsidiary called Green Leaf Foods (Green Leaf Foods, 2022). There is no mention of Maple Leaf

Foods anywhere on the Green Leaf Foods, Lightlight, or Field Roast Grain Meat's company websites. These mergers provide opportunities for increasing retail shelf space, brand recognition, and distribution channels for plant-based products, and distancing them from Maple Leaf's well-recognized, animal-based brands is likely to support their success. While not contained within any of Maple Leaf Foods' current product lines, the company has also provided venture capital financing to Entomo Farms, a large cricket protein producer and farm in North America (Entomo Farms, 2018).

Similar ventures are also happening outside of Canada. Tyson Foods, one of the largest hog and chicken operators in the continental US, joined Cargill, the largest beef producer, in purchasing Memphis Meats, a cellular meat venture by billionaire philanthropist Richard Branson (Tyson Foods, 2018). Tyson has also taken a stake in Beyond Meat, a plant-based protein company (Tyson Foods, 2016, 2017). Cargill has also invested in plant-based protein creation with the 2018 purchase of PURIS, the largest pea protein producer in North America (Cargill, 2018).

Taking a step back, these animal-based protein companies are themselves tightly consolidated. JBS, based in Brazil, is currently the largest meat company in the world (Schneider & Sharma, 2014). JBS acquired pork company Swift & Company in 2007 and Cargill's pork business in 2015 (Schneider & Sharma, 2014). Tyson Foods is currently the second largest meat company after JBS (Schneider & Sharma, 2014; Howard, 2019). Tyson acquired Iowa Beef Processors in 2001, and now owns stakes in both Beyond Meat

and Memphis Meats (Barboza & Sorkin, 2001; Howard, 2019). WH Group, previously named Shuanghui Group, is based in China and acquired Smithfield in 2013, then the largest hog processor in the US (Schneider & Sharma, 2014).

Acquisitions, mergers, and increasing consolidation are a cornerstone of agribusiness (Howard, 2016; iPES, 2022). Aptly referring to such concentration of power within transnational food companies as “Big Protein,” Howard and colleagues note that food supply chains must be restructured to strengthen truly alternate options (iPES Food, 2022). Agricultural inputs like seeds, fertilizers, and genetic patents have also become incredibly concentrated, due to a series of mergers

during the 1990s and 2000s. For example, as of 2016, there were just six input companies dominating agricultural seed (Clapp, 2017), and even further mergers now leave three mega-corporations: Bayer-Monsanto, Dow-Dupont, and ChemChina-Syngenta. As the alternate protein trend continues, it appears that the concentration of power over agricultural inputs will be still largely controlled by the very few. If the standards of leaning and grading of hog bodies plays out in the alternative-protein market as well, these massive corporations hold enormous power to shape industry research and development across multiple protein-creation sectors.

Conclusion

Though the rationalized processes and demands of industrial efficiency, leaned hog flesh has become a device for reinforcing the value of protein within the hog commodity chain. Using the framework of substitutionism and appropriationism presented by Goodman and colleagues (1987) and Scrinis’ (2008) concept of nutritionism, this article has argued that hog farming is in the business of *producing protein*, rather than *making meat*, and can supplant other forms of generic protein inputs to the human body with aims of capitalizing on the mass consumption of siloed macronutrients.

Even as North American eaters grapple with the risks of overconsumption to individual and collective health, contemporary dietary advice about eating macronutrients in isolation from one another has served to distance and deskill us (Scrinis 2008). Protein consumption is central to this discourse, yet eaters remain highly removed from all the ways those proteins are grown within animal bodies. As new industries emerge, particularly those producing lab-grown proteins, consumers and producers alike should embrace opportunities to increase transparency and reveal what has for too long operated in unseen spaces and processes (Pachirat, 2011).

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Original Research Article

Protein politics: Sustainable protein and the logic of energy

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Abstract

Powerful actors associated with intensive livestock production are repositioning industrially produced meat and farmed fish as “sustainable protein.” This repositioning, we show, involves justifying the production of meat through a range of metrics, calculations, and valuations. These metrics and associated indicators underpin claims that sustainable protein is more efficient and less wasteful than conventional meat production. Our analysis questions the relationship between efficiency and sustainability in industrial meat production. We show, first, that the industrial meat sector has always focussed on efficiency and the reduction of waste. What is new is that metrics, calculations, and indicators on efficiency and waste reduction are being repurposed and made public to

consumers and investors to underpin claims for sustainable and “climate friendly” meat. While this practice is apparent across the animal agriculture sector, it is especially evident in the production of farmed salmon. Our second argument frames sustainable protein metrics as a political logic. While these metrics have been justifiably criticized as a form of environmental “greenwashing” by environmental non-governmental organizations and others, our own critique builds on Cara Daggett’s recent analysis of energy and its political logic. Building on Daggett’s work, we aim to provide a more fundamental critique to the efficiency and waste metrics that are used to support claims for sustainable protein, while simultaneously providing the conceptual and political foundation for more progressive futures.

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Résumé

De puissants acteurs associés à l'élevage intensif sont en train de repositionner la viande et le poisson produits industriellement comme des « protéines durables ». Nous montrons que ce repositionnement implique de justifier la production de viande par un ensemble de mesures, de calculs et d'évaluations. Ces mesures et les indicateurs associés sous-tendent des affirmations selon lesquelles les protéines durables sont plus efficaces et génèrent moins de déchets que la production de viande conventionnelle. Notre analyse amène à s'interroger sur la relation entre l'efficacité et la durabilité dans la production industrielle de viande. Nous montrons, d'abord, que le secteur de la viande industrielle a toujours misé sur l'efficacité et la réduction des déchets. La nouveauté, c'est que les mesures, les calculs et les indicateurs relatifs à l'efficacité et à la réduction des déchets sont réutilisés et rendus publics pour les consommateurs et les investisseurs afin d'étayer les

allégations de viande durable et « respectueuse du climat ». Si cette pratique est observable dans l'ensemble du secteur de l'agriculture animale, elle est particulièrement évidente dans la production de saumon d'élevage. Notre deuxième argument présente les indicateurs de protéines durables en tant que logique politique. Alors que ces mesures ont été critiquées à juste titre comme une forme d'« écoblanchiment » par des organisations environnementales non gouvernementales et d'autres, notre critique s'appuie sur l'analyse récente de Cara Daggett concernant l'énergie et sa logique politique. En nous appuyant sur le travail de Daggett, nous visons à fournir une critique plus fondamentale des mesures d'efficacité et de gaspillage utilisées pour soutenir les allégations de protéines durables, tout en fournissant la base conceptuelle et politique pour des horizons plus progressistes.

Introduction

“A shift in energy cultures and epistemologies, or ways of knowing energy, will entail a thorough transformation of habits of energy production and consumption” (Daggett, 2019, p. 3).

Powerful actors associated with intensive livestock production are repositioning industrially produced meat and farmed fish as “sustainable protein”¹ in response to

the long recognized and devastating socio-ecological problems of industrial meat production. These actors include transnational agrifood corporations (TNCs), non-governmental organizations, scholars, and tech start-ups² and they are proposing a range of sustainable protein solutions from more efficient and circular (e.g. no waste, net zero) protein produced through animal

¹ Sustainable protein is undefined in this paper. Rather our aim is to interrogate industry and its critics claims and the work that these claims take on.

² There are also numerous multi-stakeholder initiatives such as the Forum for the Future “protein challenge” (Forum for the Future, 2016)

agriculture, to new plant-based products and to the speculative promise of lab-produced, cell-cultured meats. There is a growing food studies literature that is critically engaging with how the global meat problem is articulated, as well as the promissory politics and ethical challenges associated with new developments in alternatives to conventionally produced animal proteins (Broad & Biltekoff, 2023; Guthman et al., 2022; Guthman & Biltekoff, 2020; Katz-Rosene & Martin, 2020; Sexton, 2018; Sexton et al., 2019).

Our aim in this paper is to critically assess “sustainable protein,” a product promoted by industry as an alternative to meat and fish produced through conventional animal agriculture. To this end, we identify two key matters of concern associated with the emergence of sustainable protein as an alternative to industrial animal agriculture—the concerns of efficiency and waste, and the convergence of both supporters and critics around the metrics of efficiency and waste. First, we show how efficiency and improved resource use, and especially the reduction of waste, underpin the claims for sustainable protein (Finlay, 2003; Guthman, 2022; Landecker, 2019; Weis, 2014). In the farmed salmon sector, for example, the claim of sustainable protein is justified through “eco-efficient” marine based production systems. The global aquafeed company Skretting has described farmed salmon as “the world’s most efficient protein generator” (Skretting, 2024 para 3). Geir Molvik, CEO of Cermaq a major salmon farming company declared salmon to be “an essential vector to convert new ocean protein through feed into delicious and healthy food contributing to human and planetary health” (Ocean Panel, 2020, para 31). Woven into industry claims are reductions in greenhouse gas emissions and improvements in feed conversion efficiency. The executive director of Atlantic Canada Fish Farmers claimed that “salmon farming has the lowest carbon footprint of any animal protein farming

method and the lowest feed to protein conversion ratio” (Farquharson, 2021, para 10). Farmed salmon is measured *against terrestrial* animal protein, and distinguished by its lower carbon footprint, higher energy efficiency based on its lower feed conversion ratio. Farmed fish, as sustainable protein, is thus justified through an industrial logic, and is supported by a range of efficiency metrics and indicators that assess resource inputs like feed against production outputs like market-ready fish. Yet, as we argue below, equating efficiency with sustainability is problematic, and the use of metrics and indicators for efficiency and waste reduction raises critical questions about how contemporary claims for sustainable protein rely on a longstanding industrial logic in animal agriculture.

The second issue we examine is the convergence by industrial animal agriculture and their critics on the metrics of efficiency and waste. While industry uses metrics to illustrate environmental improvements through efficiency and the reduction of waste, reports from concerned foundations and environmental NGOs highlight agro-industrial meat production as inefficient and wasteful. The Changing Markets Foundation, for example, highlights how in the production of farmed fish, “using wild-caught fish to feed farmed fish is an inefficient use of protein and a scandalous waste of precious natural resources” (2020, p. 56). Similarly, Greenpeace’s report on West African food security in relation to fishing titled “A Waste of Fish” underpinned by the argument that producing fish feed for animals is inefficient compared to using pelagic fish for humans (Greenpeace International, 2019). Our aim is not to argue that industry metrics cannot or should not be challenged. On the contrary, we support the recent International Panel of Experts on Sustainable Food Systems (IPES) report, which has made a crucial contribution to what it aptly calls the “politics of protein,” and the uncertain evidence, misleading

statements and overgeneralizations that often underpin recent industry claims (IPES-Food, 2022). We also see significant value in calling out corporations for the uncertainties, generalizations, and exaggerations associated with claims for sustainability when it comes to meat (Christen, 2021; IPES-Food, 2022; Sherrington et al., 2023). At the same time, we are concerned by the convergence around the metrics of efficiency and waste. Salmon farming companies are experts in generating the metrics of efficiency and waste, and we suggest critics entanglement with these metrics has the potential to constrain and limit effective critique.

In response to these two matters of concern, our paper draws inspiration from Cara Daggett's *The Birth of Energy* (2019), and her articulation of the "logic of energy." Daggett's insightful analysis is based on the claim that energy is not a transhistorical object or concept. Instead, energy was "born" in the 1840s when it became tied to the science of thermodynamics and, crucially, to the Protestant ethic of work and waste. The result is a logic of energy that, as Palmer writes, "sutured thermodynamics to Protestantism" and has functioned since then as a political rationality and mode of domination for humans and more-than-human assemblages (2020, p. 2). We draw on Daggett's insights and apply her concepts on the logic of energy to industrial animal production's longstanding concern

with efficiency and waste. In turn, we connect the logic of energy, applied through efficiency and waste metrics, to the contemporary context of sustainable protein. Specifically, we argue that the metrics and claims that justify animal protein as sustainable (or not) are, at root, about *energy logics*. By engaging with Daggett's work, we hope to provide a more fundamental challenge to the underlying logic of efficiency and waste metrics that substantiate sustainable protein, while simultaneously providing the conceptual and political foundation for more progressive futures.

Our paper is structured as follows: we begin with a brief overview of the debates within food studies on alternatives to industrially produced meat and we trace the emergence of sustainable protein in farmed fish and in meat produced on land. We then critically examine the underlying logic of the claims for sustainable protein through Daggett's logic of energy. In the third section, we explore the implications of the logic of energy as they apply specifically to sustainable protein and the metrics and indicators that are used to support claims for an alternative to conventional animal agriculture. We conclude by exploring the broader implications of framing sustainable protein and alternatives to industrial animal agriculture through the political rationality of energy.

Mapping the rise of "sustainable protein"

Our analysis aims to contribute to a burgeoning body of scholarship that is critically assessing the social, political, environmental, and welfare claims of emerging alternatives to conventional, industrially produced meat. This rapidly growing body of work has examined

the range of alternatives to industrial meat (Katz-Rosene et al., 2022; Katz-Rosene & Martin, 2020; Tourangeau & Scott, 2022; Weis & Ellis, 2022), the role of large corporations in meat alternatives (Sexton et al., 2019), and the significant limitations and

simplifications of proposed alternatives in terms of environmental, welfare, and social indicators (IPES-Food, 2022).

In response to the problem of (un)sustainable livestock production, we see the emergence of two closely connected processes associated with “sustainable protein.” The first is the shift within the highly concentrated industrial meat sector from “*meat*” to “*protein*,” combined with new claims for sustainability and resource efficiency. The second process involves the articulation of a range of metrics, calculations and indicators that support claims of sustainability.

In the last six years, there has been a significant shift within the large and highly concentrated industrial animal agriculture sector from meat to protein. Tyson Foods, one of the world’s largest meat companies, re-branded itself as “a protein-focused food company” in 2018 (Little, 2018, para 1).³ Perdue Farms followed shortly thereafter, committing itself to being the “most trusted name in protein” (Shankar & Mulvany, 2018, para 2). Canada’s Maple Leaf Foods has perhaps gone furthest in this shift, declaring as its vision to “be the most sustainable protein company on earth” (McCain & Maple Leaf Foods, 2018). JBS calls itself a diversified protein company, while Cargill, the largest privately owned agrifood TNC in the U.S., is remaking itself as an “ingredients business” that includes protein (Parker & Blas, 2018). In addition, all the large formally meat companies have now invested in alternative and analogue proteins (Guthman et al., 2022; IPES-Food, 2022).⁴

As others have argued (Guthman et al., 2022), the focus on *protein* has the discursive effect of obscuring the problems with meat while upholding the nutritional advantages of protein. The significance of focussing on protein, however, goes beyond obscuring the problems with meat.

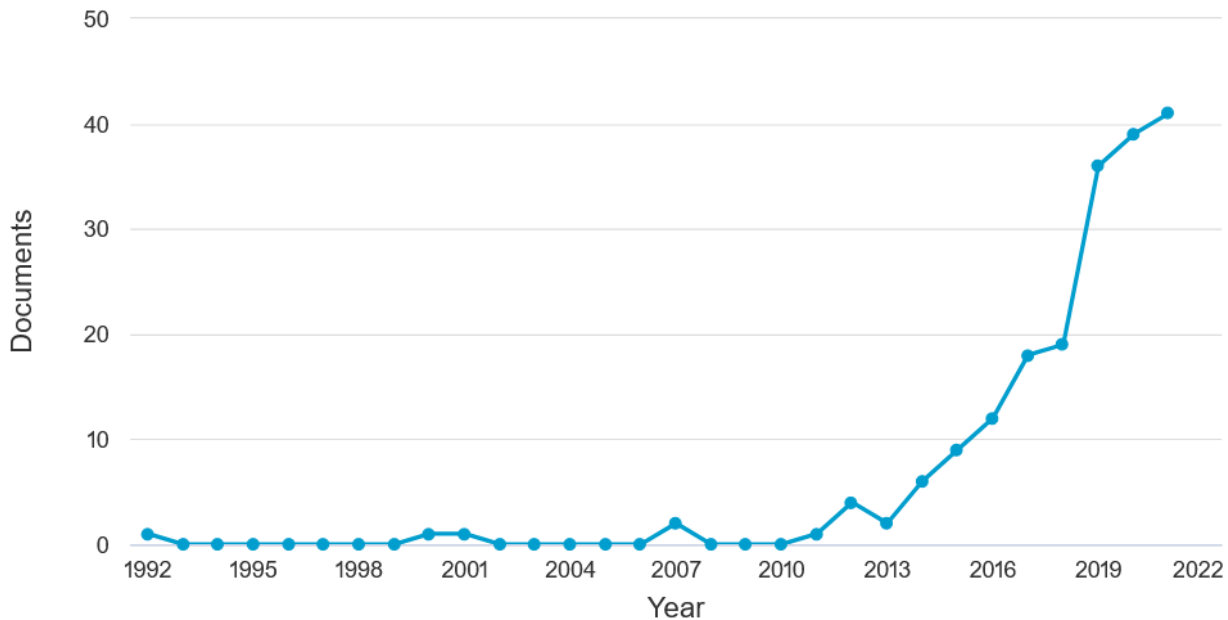
“Big protein” is attracting large institutional investors (IPES-Food, 2022). Notable in this context is the Farm Animal Investment Risk and Return (FAIRR) Producer Protein Index, which assesses the world’s largest listed protein companies against environmental, social, and governance criteria (FAIRR, 2019). The head of FAIRR has warned institutional investors to avoid conventional meat production and the risk of “stranded assets” associated with conventional meat production (FAIRR, 2018a), instead the aim of the index is to inform investors where best to put their money. Salmon farming corporations are consistently at the top of the Coller FAIRR Protein Producer Index (FAIRR, 2018b, 2023). The harnessing of investment interest, especially institutional investors is an indication of the financialization of the food industry according to Howard and the IPES report (Howard, 2019, 2022). This move to sustainable protein is also now reflected in academic scholarship, which has seen a rapid growth in the debates on this new way of describing the production of meat in industrial animal production systems (Figure 1).

³ Tyson seems to be pulling back from the protein focus with a series of CEO changes, especially since 2021.

⁴ There are indications that the alt-protein (Hui, 2022; Terazono & Evans, 2022) market is softening, and with it, the major meat corporation’s focus.

Figure 1: Scopus and Google Scholar results of documents containing the term “sustainable protein” in the title, abstract, or keywords (our analysis).

Documents by year



Our discussion here focusses mainly on farmed salmon, which is of particular interest because the industry presents itself as producing a more sustainable protein than land-based equivalents, and this is supported by the FAIRR reports. However, the move to step away from meat’s myriad of problems and toward sustainable protein is widespread. We also draw on recent efforts by the industrial animal agriculture sector to “change the narrative” on meat’s environmental impact in the lead up to the most recent global climate change conference in Dubai in 2023 (Sherrington et al., 2023). The particulars of the farmed salmon case are best situated within the wider trends throughout industrial animal agriculture towards sustainable protein.

In only a few decades, the farmed salmon industry grew into a big global business. Compared to other CAFO systems it is young although it is founded on traditional industrial animal agriculture principles

(Lien, 2015). The industry’s sustainability claims, and underpinning metrics primarily rely on the role of fish feed, and the feed conversion ratio (FCR). The FCR is the key measure of efficiency for industrial animal agriculture. At its simplest FCR is a measure of the weight of feed consumed to the weight of animal produced. The faster and greater the accumulation of animal mass, measured by feed weight in and animal weight out, the greater the FCR efficiency. Lien (2015) shows the large effort the industry applies to managing, calculating, and improving its feed systems with the primary aim to improve feed efficiency and reduce waste. And for good reason: feed is by far the largest single cost for the industry and has long been a primary concern for the global salmon sector.

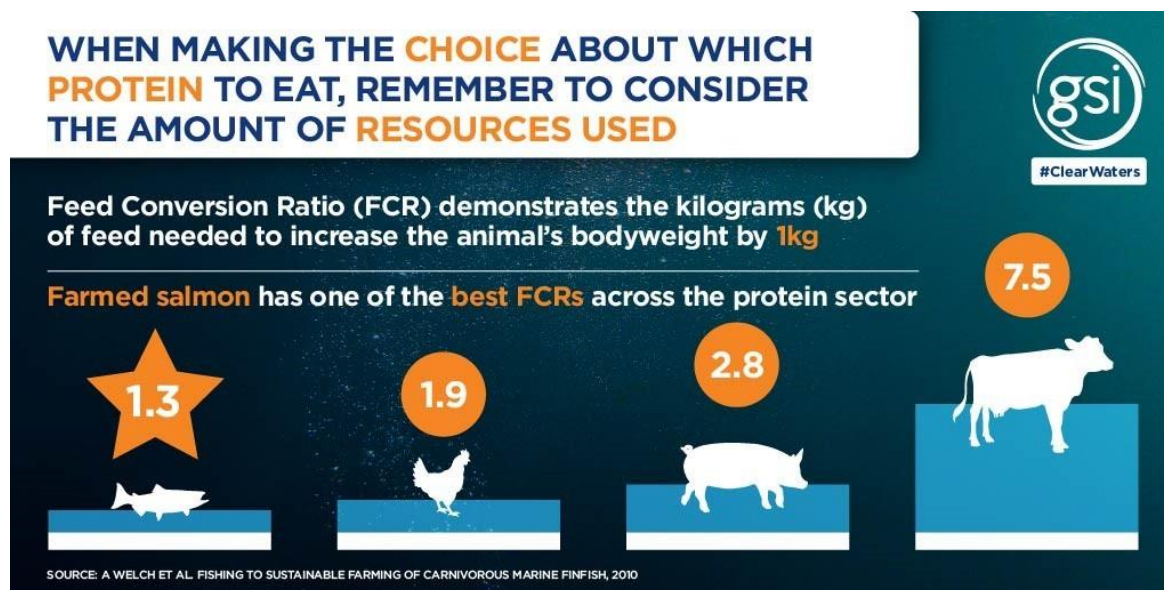
In the last several years, key players in the global salmon sector—including feed companies and salmon grow-out companies—have focussed on promoting

farmed salmon as a sustainable protein.⁵ While this messaging is promoted by individual companies, the claims are articulated most clearly through the Global Salmon Initiative (GSI), an organization that describes itself as a “pre-competitive” platform representing many, but not all, of the farmed salmon producers in Europe, North America, Chile, and Tasmania (GSI, 2024, para 5). The GSI’s mandate is to represent the industry and to “drive real and measurable improvements in the sustainability profile of the farmed salmon industry” (GSI, 2023, para 2). While the GSI does not represent MOWI, the world’s largest salmon farming company, GSI’s messaging is largely consistent with this company’s overall strategy. Indeed, many of the metrics currently produced by the GSI originate in MOWI’s own set of reports produced from the early 2010s.

The GSI’s effort to promote farmed salmon as a “climate friendly,” efficiently produced protein is supported by metrics and attractive visualizations that

emphasize the difference between livestock production on land and in the ocean (Figure 1). The comparisons require standardizing a portion of protein from farmed salmon, chicken, beef, and lamb and then applying a range of indicators including carbon footprint, land use, protein retention, calorie retention, and edible yield, which are then further compared across land and sea protein production systems. The results across these indicators, according to GSI, are remarkably consistent: producing animal protein in the ocean generates fewer greenhouse gases, it is more efficient, and it is less energy intensive. The data and simplified graphics that are used across the sector play a critical role in the GSI’s claim that farmed salmon is a “climate friendly” protein, and substantially more climate friendly than comparable systems producing protein on land and this is highlighted through FCRs (Figure 2).

Figure 2: Feed Conversion Ratio (FCR) (GSI, 2023)



⁵ We have argued elsewhere that the farmed salmon industry has a myriad of environmental problems (Martin et al., 2021; Martin & Mather, 2023).

The global farmed salmon sector is notable for the work and resources they have dedicated to supporting claims that this fish is an “eco-efficient” protein. The images that compare the environmental impact of proteins across land and sea are regularly used by the salmon industry to promote farmed fish as a sustainable alternative to meat produced on land.

While the land-based livestock sector does not appear as coordinated in developing a single message about meat produced on land, the situation is changing quickly as the sector becomes a key area for debate within climate change forums (GRAIN & IATP, 2018). Indeed, there have been important developments in the last five years or so as animal meat production is identified as a key obstacle in meeting national and global climate change targets. Industry and various industry organizations in North America and Europe have, in response to these challenges, embarked on an aggressive effort to develop metrics and indicators to “change the narrative” about meat. Changing the narrative from the industrial livestock sector’s perspective involves promoting meat as a “sustainable nutrition” that can be produced more efficiently and with lower environmental impacts while at the same time providing the world with a nutrient that is critical to human health (Christen, 2021). Several of these efforts have been well publicized including the development of a new metric for greenhouse gas emissions, widely condemned as an attempt to greenwash the environmental impact of meat production (IPES-Food, 2022; Rogelj & Schleussner, 2019).

Industry efforts to “change the narrative” have intensified in the context of recent food and climate change forums including the Congress of the Parties (COP) climate change meetings in Paris (2022) and Dubai (2023). In the lead up to the 2023 COP meeting in Dubai, journalists gained access to leaked documents

produced by the Global Meat Alliance (GMA), an organization representing some of the biggest livestock and animal feed producers, outlining an aggressive plan to provide “scientific evidence” that animal agriculture’s contribution to climate change is overstated and that industry has the potential to provide the world with sustainable protein (Sherrington, 2023). The documents reveal a coordinated plan to release this science to refute what the industry describes as “ideologically driven” arguments against meat production and consumption with a view to showing how “producers can ‘play a key role in environmentally sustainable food systems’ and that the sector is ‘continuously driving towards carbon-friendly farming’” (Sherrington 2023, p. 2). While the land-based livestock sector may be several years behind the farmed salmon sector, it is quickly adopting a similar strategy of developing metrics, indicators and using “scientific evidence” to convince the public and regulators on the sustainability of industrially produced meat.

The rise of sustainable protein—or “sustainable nutrition” in recent industry reports (Sherrington, 2023)—is coordinated around two key pillars. First is the shift from meat to protein, a shift that we argue detracts from the environmental problems associated with meat in favour of a charismatic nutrient, protein (Guthman et al., 2022; Kimura, 2013). Second, and relatedly, it depends on a range of metrics, indicators, and data that aim to demonstrate that the protein produced in these industrial systems is more efficient and sustainable (Martin & Mather, 2023). While metrics and indicators are perhaps more developed within salmon aquaculture, the evidence suggests that the global land-based livestock sector is also attempting to coordinate around messaging that challenges the existing consensus on the environmental and climate change impacts of industrial livestock production.

In the next section, we attempt to make sense of these claims and the efficiency indicators and metrics by drawing on Daggett’s genealogy of energy. We aim to

Energy as “geo-theology”

Developing metrics and indicators to assess the environmental impact of animal agriculture on land and in the ocean is central to what the IPES has called the “politics of protein” (IPES-Food, 2022). Industry and industry supported organisations are developing and using metrics and indicators to contest rigorous analysis on animal agriculture’s significant contribution to climate inducing greenhouse gases and pollution. While industry generated metrics aim to demonstrate sustainability, they do so by relying almost exclusively on claims that these new systems and technologies conserve and use energy more efficiently. Consider, for example, how the salmon aquaculture sector explains why farmed fish achieve a lower feed conversion ratio than animals raised for meat on land. As we noted earlier, the lower FCR for farmed salmon is fundamental to the industry’s claims for “eco-efficiency.” A key factor that accounts for the differences between land and sea production systems—according to industry experts—has to do with the “bio-energetics” of fish and fish farming (Smil, 2013). Because fish are cold blooded, they require less energy in the form of feed to sustain and grow their bodies. Unlike warm blooded livestock like chickens, cows, and pigs, fish do not need to maintain a steady temperature, which requires additional energy, and by implication greater use of feed (Marine Harvest & Mowi, 2018). There are other additional “energy savings” that come

show that these metrics and calculations, that aim to justify meat as sustainable protein, do so through a logic of energy.

from farming fish for protein, according to industry and aquaculture experts. Farmed fish do not face the same energy demands associated with gravity that affects farmed animals on land. In industry reports, this supports the argument that farmed fish have a “natural advantage in terms of energy efficiency...compared with terrestrial protein equivalencies” (Mowi, 2019, para 4). Energy is used more efficiently because “fish are neutrally buoyant in their watery world and thus do not devote as much food energy to maintain bones/posture against gravity as do land animals” (Costa-Pierce, 2010, p. 96). In other words, the argument goes, fish require less energy to grow in the form of feed than animals on land, and are therefore more efficient protein generators.⁶

The farmed salmon industry centres the role of energy in sustainable protein, which has led us to Cara Daggett’s (2019) work on energy and its political logic. Central to her analysis is the claim that energy is not a transhistorical concept, but instead needs be understood in its historical and geographical context. Using this approach, she shows how a new understanding of energy was “discovered” in the mid-1800s, primarily through the efforts of northern British engineers and scientists. Daggett examines the encounter between engineers and steam engines as they puzzled over how coal was converted into movement. Out of this encounter came the “laws” of

⁶ It goes without saying that the emphasis on the bioenergetics of fish places less emphasis on genetics, breeding, and the quality of feed, all of which are crucial to sustaining low feed conversion ratios in farmed salmon and other intensive livestock production systems.

thermodynamics (or heat and movement), and with them a new “logic,” likened to a kind of mystery of “life.” The puzzle of the steam engine produced broad and universal ideas about the essence of energy for machines, and the laws were and applied to other life spheres.

The physical sciences were critical to understanding the transformation of energy in things like the steam engine, but the logic of energy is also indelibly marked by the Protestant ethic. The British engineers and scientists’ strong religious beliefs played a central role in shaping the discovery of energy and the formulation of its political logic. In this way, the logic of energy is best understood as a “geo-theology,” where the science of thermodynamics joins up with the Protestant priorities of hard work and the reduction of waste (Daggett, 2019). In this marriage of science and religion, energy that is used efficiently is valued while wasted energy is abhorred. The discovery of energy in the mid-1880s thus had a political and religious rationality which continues to shape how we understand energy and its use (or misuse) today.

While Daggett’s genealogy of energy relies heavily on scientists and engineers working on the steam engine, the logic of energy as political rationality quickly extended beyond this device. As she writes, the logic of energy began with the steam engine, but it quickly extended to other machines and living systems: “From an initial desire to improve steam engines, scientists and administrators could now apply energetic metaphors to such problems as the design of factories, the nutrition of laborers, the laying of underwater telegraph cables, the freshwater needs of imperial trade and military ships, the availability of healthy and vigorous workers for steam engines, or disease outbreaks in burgeoning, polluted, and filthy industrial cities. Energy was a unit through which all these problems could be connected,

measured, charted, and managed” (Daggett 2019, p. 78).

The significance of applying “energetic metaphors” to energy exchanges beyond the steam engine is that it connects energy and work in a very particular way, and in a way that continues to shape contemporary industrial life. According to the logic of energy, work—both human and nonhuman—demands the efficient use of energy and with little waste. At the same time, energy that is not utilized is also considered wasteful because it remains “unworked” and “idle” and represents a human failure to use “freely provided gifts from God” (Daggett, 2019, p. 75). While efficiency and the reduction of waste have become common-sense approaches to work in Western society, Daggett’s historical analysis exposes it as a very particular way of governing work, and its entanglement with the logic of energy (2019). In turn, energy was a measure that helped explain, manage, and connect work, industry, and lifeways.

Measurement and calculation underpin the logic of energy. If energy’s logic demands the increasingly efficient transformation of energy and the minimization of waste, then measuring, calculating and monitoring these energy exchanges becomes critical. Daggett traces the rise of these measurement systems and their increasing standardization over time, which allowed for comparisons of different energy transformations ranging from the scale of individual bodies and machines to much larger systems of energy exchange (2019). Daggett’s intervention on energy and its underlying political logic helps to explain the unquestioned value that is placed on the metrics of efficiency and waste in industrial systems (2019). We now turn to extend and develop her analysis in the context of sustainable protein.

Industrial meat production, sustainable protein, and the logic of energy

Daggett's analysis of energy and its political logic draws primarily from industrial production and initially, the steam engine. However, as we noted earlier, her argument has far broader purchase; it offers, for example, important tools to explain how animals, including horses and humans, came to be understood as "energy transformers" and in turn, their "power (or rate of work) and efficiency (minimization of energy wasted) could be compared" (Daggett, 2019, p. 87). Of course, the idea that animals are energy transformers also applies to industrial animal agriculture where feed provides the energy for animal life, work, and growth.

The metrics and indicators used by the animal agriculture industry to justify sustainable protein are based on a vision of systems that are more efficient and less wasteful at transforming energy in the form of feed into a protein product. These claims are most obvious in industrial aquaculture where, as we have shown, farmed salmon is argued to be an efficient generator of protein through low feed conversion ratios. But these claims about energy efficiency and waste minimization are also evident in land-based production systems that involve chickens, pigs, and cattle. Energy logics are, therefore, central to how the production of animal protein is justified as sustainable.

If energy logics, as conceptualised by Daggett, is central to how sustainable protein is justified, why is this a problem? *First*, and most obviously, improvements in efficiency in animal aqua-agriculture are not necessarily consistent with sustainability. Reisman's (2019) analysis of water use in California's almond sector reveals how claims to efficiency have led to the significant expansion of production in this water-stressed state and to the spread of production into more arid regions thereby undermining any gains through more efficient use of water. Similarly, claims to

improved efficiency through sustainable protein by big meat corporations like JBS need to be critically assessed against their public commitments to shareholders to significantly increase the scale of meat production to meet global demands (GRAIN & IATP, 2018). These two examples, as Guthman notes, reveal a common problem where more efficient use of resources is "often conflated with environmental benefits in a whole host of current prognostications of optimal food futures" (2022, p. 73).

There is a *second* problem with the industry claims of sustainable proteins improved measures of efficiency and waste. These claims are presented as new innovations in animal agriculture, but the reality is that the industrial animal agriculture has always focussed on efficiency and waste. A rich political economy scholarship describes the interactions between capital, agriculture and animals, whether Friedmann's (1992) "grain-livestock complex" built on the seemingly efficiently produced grain surpluses in temperate regions, Specht's (2019) "cattle-beef complex," a set of institutions stretching back to the nineteenth-century that relied on technologies, capital and political struggle to efficiently produce cheap beef for U.S. eaters, or Boyd and Watt's (1997) "southern broiler complex," which adopted just in time chicken production to maximise material and time efficiencies in the latter half of the twentieth-century. Indeed, as the nineteenth-century and twentieth-century history of industrial meat production has revealed, the sector has always worked towards improving efficiency and waste reduction by commodifying waste and enfolded all parts of the animal into market relations (Cronon, 1992; Guthman, 2022; Shukin, 2009; Sinclair, 2016). In Cronon's words, "the packers worshiped at the altar of efficiency, seeking to conserve economic resources by

making a war on waste” (Cronon, 1992, p. 249). The management and focus on efficiency and waste, as the scholarship has shown, is the history of industrial meat production.

Recent scholarly work has demonstrated industrial animal agriculture’s laser focus on efficiency and waste and the production of highly standardized animals, but with significant welfare implications (Blanchette, 2020), “efficiencies so great they produce death and deformity” (Guthman, 2022, p. 82). The drive for efficiency in feed and feeding and the constant effort to reduce waste through system efficiencies is illustrated most starkly through Blanchette’s (2020) analysis in *Porkopolis* with the thousands of product codes for parts of pigs’ bodies that are transformed into a variety of commodities. The commodification of animals in CAFOs leads to detachments (Emel & Neo, 2015) and obliterates any real links to society (Winders & Ransom, 2019). In turn, the disassembly of animals into parts or components is a precondition for the emergence of waste (Shukin, 2009 p. 71-2). The drive for efficiency reaches into all aspects of industrial meat production from seeing animals as machines, or “things” (Weis, 2018) that convert energy into body mass, disassembled into parts, and then transformed into cheap meat. Industry values animals as workers whose purpose is to produce as much meat as possible, as quickly as possible, and with as few inputs as possible (Specht, 2019)—a serious manifestation of efficiency.

Mark Finlay’s (2003) analysis of the industrialization of hog production in the U.S. after the Second World War provides key evidence on how the logic of energy operated. Finlay shows how the focus on “controlling labour and energy inputs” resulted in a shift from animal husbandry to industrial management (2003, p. 238). Industrial animal production “compressed the time, space, labour and energy associated with hog production along the lines of an efficient industry”

(Finlay, 2003, p. 238), or in Cronon’s words the “annihilation of space”(Cronon, 1992, p. 96). Any industrial undertaking relies on intense energy “inputs” to efficiently produce “outputs” with as little waste as possible. Within this logic of energy and work, animals were machines, and could be improved through genetics because one cannot have “poor machinery to put the raw product [or feed] through” (Finlay, 2003, p. 242).

If the emphasis on efficiency and waste minimization is longstanding in industrial meat production, how has it become central to claims for sustainable protein? The example of Maple Leaf Foods in Canada illustrates how agri-food capital has focussed on promoting processed meat as sustainable but based on a more longstanding concern with efficiency. Maple Leaf Foods undertook the creation of an extensive sustainability program that culminated in their “Raise the Good in Food” blueprint (Maple Leaf Foods, 2021, p. 6). Embracing the message “you manage what you measure” (Maple Leaf Foods, 2021, p. 9), sustainability’s promise of a value shared equally amongst its stakeholders produced a newly calculable arena for Maple Leaf Foods to manage their efficiency, though it had been a distinct area of concern for the company for decades. For instance, before it was consolidated into Maple Leaf Foods Inc. in 1990, Canada Packers Ltd. developed an accounting framework unique to the company called the “opportunity cost metric”, that measured the “true profit performance” of various departments based on a fixed rate of capital invested in each plant, plus its “working capital” (MacLachlan, 2016, p. 191). This allowed calculations of a rate of return measured as a percentage of the capital employed, showing that the greater the slaughter capacity of a plant the higher its return. Profitability became distinctly tied to volume, a “clear demonstration of the economies of scale in meat

packing” (MacLachlan, 2001, p. 190). It was these economies of scale that justified the current highly concentrated meat production industry, and before it aimed to be the “most sustainable,” Maple Leaf Foods’ goal was to aim for efficiency through competitor buy outs and worker pay cuts (Mahood, 1997). That the hire of a new VP of Sustainability & Shared Value in 2015 was explicitly mandated to oversee efforts to become an even “more efficient” operator (Maple Leaf Foods, 2021, p. 9) hints at the energy logic behind the never-ending work of meat’s pursuit of both efficiency, and now, sustainability.

The *third* problem with the logic of energy has to do with the enumerative politics of efficiency and waste. The critical social science scholarship on industrial agriculture has convincingly demonstrated that animal agriculture is enormously inefficient and wasteful. Indeed, critical scholars regularly point out that industrial livestock production is a massively inefficient way to produce protein for human consumption in contrast to plant proteins (Sexton et al., 2022; Weis, 2014; Weis & Ellis, 2022). Weis (2014) highlights the industry’s inefficient use of resources such as feed that is a “systemization of waste.” The inefficient “ecological hoofprint” extends to its reliance on resource intensive feed monocultures, and its disastrous production of waste and greenhouse gas (GHG) emissions (Weis, 2014). Industry critics, then, use metrics and indicators to reveal agriculture’s enormous environmental “hoofprint.” Yet industry also uses metrics and indicators—including the environmental footprint of animal agriculture—to make claims for efficiency and waste minimization in the production of sustainable protein. In other words, the critics of industrial animal agriculture and the defenders of “sustainable protein” *both* rely on indicators and metrics of animal agriculture’s environmental hoofprint (or “finprint;” Martin & Mather, 2023).

Daggett addresses this problem of a shared concern around metrics and indicators in the conclusion to her book. She writes that critical scholars and activists are at risk of becoming “mired in a back-and-forth over accounting logics that, in the spirit of neoliberalism, sidelines normative and political claims” (Daggett, 2019, p. 192). In other words, both sides of the political debate on animal agriculture operate within and through energy’s political logic. It allows industry to set targets and to claim improvements in efficiency and waste reduction as a way of addressing environmental concerns that are difficult to challenge because they appeal to energy’s logic and its commitment to efficiency and the reduction of waste. At present, corporations that manage industrial animal systems continue to value and rely on the logic of energy and its metrics. A recent example from the GSI sustainability report: “the lower the FCR, the more efficient an animal is in retaining the protein and energy from the feed and converting it into food for humans” and ‘harnessing...waste to become a resource” (GSI, 2021, para 10). The devastating environmental and social problems associated with these systems seem to be left untroubled as animal agricultural proponents continue to highlight improvements rather than any fundamental change. Instead, as Daggett argues, progressive alternatives require “new ways of thinking about, valuing and inhabiting energy systems” (2019, p. 3).

The *fourth* problem with the logic of energy as it applies to sustainable protein has to do with Daggett’s argument about how the logic of energy should be understood as a mode of domination. In the second part of her book, Daggett extends her analysis of energy’s logic as emerging out of a specific industrial context to examine how it plays a key role in shaping and guiding European imperialism from the late 1880s to the early twentieth-century. Her aim is to use this

evidence to show how “putting the world to work” through the logic of energy guided and justified Western imperial conquests from the mid-1800s and beyond (Daggett, 2019, p. 1). Through this analysis, she makes the case for energy as a political rationality that served imperial domination, as providing yet another framework, or “Western code,” with which to organize a world of different, and usually subjugated, people and things (Daggett, 2019, p. 136). This is an opportunity to think through how we are implicated in putting animals and humans to work in industrial systems, and the modes of domination that subject animals and humans.

The “logic” of sustainable protein, and industrial animal agriculture more generally, can be reframed and illuminated with Daggett’s conception of the logic of

energy. If energy logics are central to both conventional animal agriculture and more claims for alternative systems for sustainable protein, then we need to see these systems as dependent on the domination of animals who must perform the role of efficient “energy transformers” and supported by the labour of human workers. The making of sustainable protein involves shifts at the corporate level with potential significant implications for flows of investment, combined with the production of new metrics and associated claims for sustainability and circularity in resource use. While existing scholarship has justifiably challenged these metrics and claims, we point to the deeper logics that justify these claims and that are consistent with a deeply held Western epistemology on energy and efficiency.

Conclusion: Beyond the logic of energy

The logic of energy, with its emphasis on efficiency and the effective use of waste, has long shaped industrial livestock production. Our claim is that these same goals of efficiency and the minimization of waste are fundamental to contemporary justifications of sustainable protein. In other words, the same logics that shaped the industrialization of *meat production* with all its environmental, social, and animal welfare problems are being used to justify *sustainable protein production*. We reach this argument through a detailed engagement with Daggett’s work on the logic of energy, by building on an existing body of scholarship on the history and contemporary dynamics of industrial livestock production, and through a close analysis of recent claims by the farmed salmon industry that this fish represents the ideal sustainable protein. Sustainable protein is also justified through commitments to reducing waste or to using waste productively either by

producing new commodities for exchange or by recirculating waste back into production.

The problem with the logic of energy is that it suspends the political and makes it impossible or difficult to speak about alternatives that do not frame efficiency and waste as a central concern. This framing also entangles proponents of more efficient “alt-proteins” and less wasteful “circular” economies. In the conclusion to his book, *Porkopolis*, Alex Blanchette bemoans the way in which the goal of efficiency dominates both the humans and non-humans in the industrial pork sector in the U.S. (2020). He ends by calling for “a positive politics of inefficiency,” and notes how the idea of an unworked animal has become unthinkable (Blanchette, 2020, p. 237). This is the power of the logic of energy, where inefficiency is deeply political, and where leaving something “unworked” is a radical proposal.

Daggett ends her book more hopefully by reminding us that “there are other (scientific, political, spiritual) modes of knowing and experiencing energy that do not elevate productivity as a primary goal for human well-being” (2019, p. 195). She encourages us to disrupt and displace the logic of energy that demands efficiency, and argues that, in so doing, “we open up space to judge technology and automation according to other energy and ecological imaginaries of what constitutes a good life, or a well organism” (2019, p. 195). By disrupting the logic of energy, we can begin to value life over efficiency. When we break away from the logic of energy and acknowledge the many other ways

of knowing and experiencing, we can escape what Vandana Shiva has called “monocultures of the mind (1993).” Importantly, to Daggett’s conceptions, energy is a mode of domination and to that end reconceptualising our relationship with animals should be a central concern. Otherwise, we will continue to be locked into the logic of energy, and its co-conspirators efficiency and waste. A displacement of the energy logic makes space for the many alternative possibilities of food production that centre life rather than efficiency, abundance rather than waste, and relations rather than domination.

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Review Article

Comment promouvoir la consommation de protéines végétales : une revue de la littérature de presse

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Résumé

La consommation de protéines végétales présente plusieurs bénéfices sur le plan de la santé, de l'environnement et du développement du secteur agro-alimentaire. Malgré les avantages liés à la consommation de protéines végétales, la consommation de viande demeure souvent privilégiée. Cet article présente une revue de la littérature de presse visant à répertorier les interventions de promotion de la consommation de protéines végétales mises en place au Canada et dans des pays européens francophones. L'identification des documents s'est faite à partir de la banque de données Eureka pour les articles de journaux de quotidiens francophones en provenance du Canada et d'Europe et sur le moteur de recherche Google Actualités. Les

articles publiés entre le 1er janvier 2015 et le 11 mai 2020 ont été retenus. Au total, 49 articles ont été inclus dans l'étude. Six types d'intervention ont été recensés (sensibilisation, conférences, législation, formation, partenariats/programmes de reconnaissance et offre d'un repas végétarien en restauration collective). L'intervention la plus populaire était l'offre de repas végétariens en restauration collective. Les barrières à l'implantation de ces interventions étaient souvent d'ordre organisationnel (ex : manque de temps), financier, matériel et culturel. Les forces des interventions impliquaient généralement le caractère participatif et volontaire du public cible et l'inclusion de diverses parties prenantes. Cette revue de la

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littérature de presse peut orienter les acteurs œuvrant dans le domaine de la nutrition afin de

favoriser la mise en place d'actions de promotion de la consommation de protéines végétales.

Mots-clés : Protéines végétales, alimentation durable, interventions communautaires, revue de la littérature

Abstract

The consumption of plant proteins has several benefits in terms of health, the environment and the development of the agri-food sector. Despite the advantages linked to the consumption of plant proteins, the consumption of meat often remains favored. This article presents a literature review aimed at listing those interventions that promote the consumption of plant proteins implemented in Canada and French-speaking European countries. Documents were identified using the Eureka database for newspaper articles from French-speaking daily newspapers from Canada and Europe and the Google News search engine. Articles published between January 1, 2015 and May 11, 2020 were selected. A total of 49 articles were included in the study. Six types of

intervention were identified (awareness raising, conferences, legislation, training, partnerships/recognition programs and provision of a vegetarian meal in collective catering). The most popular intervention was the provision of vegetarian meals in collective catering. The barriers to implementing these interventions were often organizational (e.g., lack of time), financial, material and cultural. The strengths of the interventions generally involved the participatory and voluntary nature of the target audience and the inclusion of diverse stakeholders. This literature review can guide stakeholders working in the field of nutrition to promote plant protein consumption.

Introduction

L'alimentation durable désigne un ensemble de pratiques alimentaires fondées sur les principes de respect de la biodiversité et des écosystèmes, de sécurité alimentaire, de qualité nutritionnelle, de rémunération adéquate des travailleurs et de respect de la diversité culturelle (Allen et Proserpi, 2016). L'une des principales recommandations pour tendre vers l'adoption d'une alimentation durable consiste à diminuer la consommation de protéines animales et à augmenter la consommation de protéines végétales (Alsaffar, 2016 ; Nelson et al., 2016 ; Willett et al., 2019). Au Canada, 63,4 % de la population âgée d'un an et plus consommeraient de la viande tous les jours,

tandis que seulement 14,2 % et 33,7 % consommeraient respectivement des légumineuses ou des graines et des noix (Statistique Canada, 2018).

La consommation de protéines végétales et, par extension, la diminution de la consommation de protéines animales comportent de nombreux avantages sur les plans de la santé, du bien-être animal et de l'environnement. Tout d'abord, les protéines végétales sont considérées comme un excellent indicateur d'une alimentation saine (Camilleri et al., 2013) surtout grâce à la richesse en fibres, en antioxydants et en vitamines B de ces aliments (Guéguen et al., 2016). De plus, il est

démontré qu'une alimentation végétarienne équilibrée et bien planifiée, c'est-à-dire comprenant une variété de légumineuses, de noix et graines, de grains entiers, et de fruits et légumes, est parfaitement nutritive (Melina et al., 2016 ; Thomas et al., 2016) et peut contribuer à la prévention de maladies cardiovasculaires, du diabète de type 2 et de certains cancers (Kahleova et al., 2017 ; Dinu et al., 2017). Ensuite, les légumineuses sont une source abordable de protéines végétales dans un contexte où l'insécurité alimentaire touche près d'un ménage canadien sur six (Tarasuk et al., 2022). Une tasse de légumineuses a un coût estimé à 0,39 \$ CAN, alors que les viandes de bœuf et de poulet ont un coût estimé à 2,74 \$ CAN et 1,50 \$ CAN par tasse, respectivement (Santé publique d'Ottawa, 2016). Les légumineuses sont donc une source de protéines économique, même en considérant que leur prix a augmenté de 17 % entre 2021 et 2022 (Dispensaire diététique de Montréal, 2022). Pour ces caractéristiques avantageuses, le Guide alimentaire canadien, paru en janvier 2019, a recommandé d'augmenter la consommation de protéines végétales (Santé Canada, 2019).

La substitution des protéines animales par des protéines végétales contribuerait également à la préservation de l'environnement. La production alimentaire représente 30 % des émissions de gaz à effet de serre mondiales (Willett et al., 2019) et la moitié de ces émissions serait attribuable à la production de viande (Malek et al., 2019). En comparaison, la production de 100 g de protéines entraîne des émissions brutes bien supérieures pour la viande rouge (15 à 30 kg en équivalent CO₂) que pour les protéines végétales issues de légumineuses (2-3 kg) (Duru et al., 2021). En outre, il est considéré que la production de 1 kg de protéines provenant des haricots rouges nécessite 18 fois moins de terres cultivables, 10 fois moins d'eau et 9 fois moins de carburant que produire la même quantité de protéines provenant du bœuf (Sranacharoengpong et al., 2015).

Malgré les avantages liés à la consommation de protéines végétales, la consommation de viande demeure souvent privilégiée, que ce soit en raison de son goût (Valli et al., 2019), d'un manque de connaissances ou de capacités quant à la manière de cuisiner un repas sans viande (Valli et al., 2019), de la croyance qu'une alimentation sans viande est inadéquate (Malek et al., 2019), de la norme sociale (Lai et al., 2020) ou de l'absence de motivation à modifier sa consommation (Malek et al., 2019 ; Valli et al., 2019). Parmi les facteurs influençant la consommation de protéines végétales, on distingue des motifs altruistes et sociaux (ex. : pour l'environnement et le bien-être animal) (Morin et al., 2019), des raisons liées à la santé (ex. : hypercholestérolémie, hypertension) (Cramer et al., 2017), ainsi que l'âge, le niveau de scolarité, le revenu et le genre (Wozniak et al., 2020).

Quelques études scientifiques ont documenté les interventions les plus efficaces pour promouvoir la consommation de protéines végétales. Les initiatives soulevées agissaient sur trois plans différents, soit l'environnement alimentaire, le contexte législatif et politique, ou le plan individuel par la sensibilisation ou l'éducation. Une revue systématique a souligné l'efficacité des interventions visant l'environnement alimentaire et améliorant la disponibilité physique des aliments d'origine végétale, par exemple dans les supermarchés ou les restaurants (Taufik et al., 2019). Les initiatives d'ordre législatif ou politique, telles que la taxation, la réduction des subventions de l'État dans le domaine de l'alimentation animale, la modification des normes d'étiquetage et l'inclusion des protéines végétales aux lignes directrices en saine alimentation, ont été décrites comme des mesures prometteuses (Vinnari et Vinnari, 2014). Enfin, plusieurs revues systématiques ont suggéré d'investir dans des activités de sensibilisation ou d'éducation sur l'effet de la consommation de viande sur l'environnement, la santé et le bien-être animal (Bianchi

et al., 2018 ; Hartmann et Siegrist, 2017), et sur la préparation de repas comprenant moins de viande et leurs qualités sensorielles (Tucker, 2018).

En parallèle, plusieurs initiatives ont été mises en œuvre sur le terrain pour promouvoir la consommation de protéines végétales. À titre d'exemple, au Québec, cela a donné lieu au déploiement du mouvement Lundi sans Viande, qui encourage à réduire la consommation de produits animaux au moins une journée par semaine. En France, la loi EGalim, promulguée en 2018, a imposé à toutes les cafétérias scolaires d'offrir au moins un repas végétarien par semaine aux élèves. Cependant, ces initiatives appliquées sur le terrain dans les organisations privées ou publiques des communautés n'ont pas été recensées, à notre connaissance, par la littérature

scientifique. Pourtant, leur portrait permettrait d'identifier une variété d'initiatives pertinentes et qui pourraient être implantées dans divers milieux. Dans ce contexte, l'objectif de cette revue de la littérature de presse était de répertorier les interventions et politiques de promotion de la consommation de protéines végétales et/ou de la réduction de la consommation de viande implantées dans des organisations privées ou publiques et qui ont été rapportées dans des articles de presse du Canada et de pays européens francophones. Ultiment, le répertoire ainsi élaboré a pour visée de dégager un portrait des interventions qui pourraient être mises en place au Québec.

Méthodes

Une recension de la littérature de presse a été effectuée selon l'approche « d'examen de portée » (*scoping review*) (Grimshaw, 2010 ; Tricco et al., 2018). Cette approche a été privilégiée parce qu'elle permet de dresser de façon systématique un portrait des données disponibles sur une question de recherche et de mettre en lumière la diversité des interventions (Grimshaw, 2010). Le choix de recenser les articles de presse a été guidé par l'approche d'analyse comparative (dite aussi *benchmarking*), qui consiste à documenter les initiatives mises en place dans d'autres organisations et à s'en inspirer pour en retirer les meilleures pratiques (Sacks, 2021). La recension d'articles de presse et parfois de sites Web ou de blogues est de plus en plus recommandée pour dresser un portrait complet des connaissances et des pratiques (Coleman et al., 2020 ; Heath et al., 2022 ; Tricco et al., 2018). La version révisée du protocole PRISMA-ScR (*Preferred Reporting Items for Systematic*

Reviews and Meta-Analyses – Scoping Reviews), qui tient compte des documents tirés de la presse et d'Internet, a été utilisée pour guider la présentation de la démarche méthodologique et les résultats (Grimshaw et al., 2010 ; Page et al., 2021). Les détails sur cette recherche sont également disponibles en ligne (Simon, 2020).

Stratégie de recherche

La recherche de la littérature grise a été réalisée à partir de deux sources de données. Premièrement, la banque de données Eureka a été utilisée afin d'identifier les articles de journaux de quotidiens francophones en provenance du Canada et d'Europe. La base de données Eureka donne accès à des articles de revues et de journaux d'actualité publiés à l'échelle internationale, en texte intégral et sans restriction disciplinaire. La

recherche a été menée en utilisant des mots-clés liés au végétarisme, tels que « végétarien » et/ou ses synonymes, comme « sans viande », « végété », « végane » ou « flexitarisme » (voir la stratégie de recherche présentée dans le matériel supplémentaire 1). Ensuite, une recherche similaire, avec les mêmes mots-clés, a été menée sur le moteur de recherche Google Actualités afin de compléter les données issues des articles de presse identifiés dans Eureka.

Ces sources de données ont été privilégiées parce qu'elles sont les principales sources d'articles de presse rédigés en français et qu'elles permettent de documenter les interventions actuellement mises en œuvre dans les milieux non académiques. Dans la présente étude, les articles publiés entre le 1^{er} janvier 2015 et le 11 mai 2020 ont été retenus afin de documenter les interventions récentes. Cette période de cinq ans a aussi été établie pour des raisons pratiques, considérant la quantité considérable d'articles recensés au cours de cette période.

Critères d'inclusion

La recherche documentaire a ciblé les articles de presse issus de journaux généralistes et de journaux spécialisés dans l'alimentation et/ou les activités entrepreneuriales afin de dégager des actions concrètes, de terrain et le plus possible locales ou régionales. Les autres journaux spécialisés, les magazines et les sites Web ont été écartés. Considérant que la recherche visait à influencer les pratiques dans la province francophone de Québec et que les documents inclus étaient partagés avec les parties prenantes francophones du projet, seuls les documents publiés en français ont été retenus. Ils devaient également : 1) présenter une description détaillée des interventions ou des politiques mises en œuvre pour la promotion de la consommation de protéines végétales ou la réduction de la consommation

de viande et 2) faire état des forces, des défis et des limites de ces interventions ou politiques. Les documents discutant des représentations de la population, des effets de leur consommation et les documents présentant des prises de position d'auteurs ou d'organisations sur l'alimentation végétale (ex. : éditoriaux, énoncés de position) ont été exclus de la revue de la littérature. Les critères d'inclusion et d'exclusion ont d'abord été appliqués aux titres et chapeaux des articles de presse. Les articles ont ensuite été lus dans leur intégralité afin de juger de leur pertinence et du respect des critères d'inclusion et d'exclusion (voir la figure 1).

Extraction des données

L'extraction des données des documents inclus dans la revue de la littérature a été faite par un membre de l'équipe à l'aide d'un tableau Excel préalablement testé afin d'en vérifier le caractère exhaustif. Les données extraites (extraits copiés-collés sans reformulation) comprenaient les caractéristiques contextuelles du document (ex. : titre, auteur, année, pays), la description de l'intervention principale présentée dans le document, incluant le type d'intervention, le type d'organisation et la population ciblée ainsi que les forces et limites rapportées.

Synthèse et analyse des résultats

Un tableau de synthèse divisé en quatre parties (identifiant de l'article, caractéristiques contextuelles de l'article, description de l'intervention/politique, et forces et limites de l'intervention/politique) a été construit. Une analyse thématique des informations extraites a été effectuée afin de dégager une synthèse des principales caractéristiques des interventions identifiées.

Dans un premier temps, cette analyse a été réalisée indépendamment par deux membres de l'équipe de recherche (ES et LG) afin d'extraire les principaux

thèmes et sous-thèmes qui se dégagent des données. Dans un deuxième temps, après plusieurs discussions, une version consensuelle a été établie.

Résultats

La stratégie de recherche a permis d'identifier 2 362 citations à partir de la banque de données Eureka. Sept documents additionnels ont été identifiés à l'aide du moteur de recherche Google Actualités. Après le retrait des doublons, un total de 49 articles répondaient à l'ensemble des critères d'inclusion et ont été inclus dans la synthèse qualitative (voir la figure 1).

La majorité des articles retenus ont été publiés après 2016. Au total, 80 % des documents inclus ont été publiés en France, ce qui se comprend aisément par le fait que ce pays regroupe la plus grande communauté francophone. La population cible la plus importante était le jeune public, soit les enfants et les adolescents (53 %). Dans la plupart des cas (35 %), les organisations municipales avaient pris l'initiative des actions mises en place et l'intervention la plus fréquente était l'implantation d'un repas végétarien en restauration collective (57 %) (ex. : en milieu scolaire). Les caractéristiques descriptives des documents inclus sont présentées dans le tableau 1.

Le tableau 2 présente l'éventail des interventions identifiées visant à promouvoir la consommation de protéines végétales. Une classification de ces interventions en six catégories a été proposée : 1) les actions de sensibilisation ponctuelles (allant au-delà de l'organisation d'une conférence ou d'une rencontre d'échange) ; 2) les conférences et rencontres d'échange ; 3) la mise en place d'une législation favorable à la consommation de protéines végétales dans les organisations publiques ; 4) les offres de stage ou de

formation dans le milieu de la restauration collective ; 5) les partenariats interorganisationnels et les programmes de reconnaissance ; et 6) la mise en place d'un repas végétarien en restauration collective (ex. : établissements scolaires ou universitaires).

Le tableau 3 présente des exemples de modalités d'application pratique pour chaque type d'intervention et permet de rendre compte de la diversité des interventions recensées. La mise en place d'un repas végétarien en restauration collective est apparue largement favorisée par rapport aux autres types d'action et se trouve souvent accompagnée d'un discours de sensibilisation et/ou de pédagogie à destination du public cible. Les milieux scolaires sont également apparus comme les milieux privilégiés pour mettre en œuvre ces différentes initiatives.

La mise en œuvre des interventions présentait des forces et des limites détaillées dans le tableau 4. Parmi les principales contraintes, on observe le frein culturel, les ressources humaines, matérielles et financières requises à l'organisation d'activités simples et ponctuelles, le temps d'adaptation et les difficultés logistiques liées à l'offre d'options végétales dans les services de restauration, et le manque de clarté des directives, le cas échéant. Les principaux éléments positifs rapportés touchent l'enthousiasme et la réceptivité du public cible, le contexte participatif et d'échange créé à cette occasion, ainsi que l'appui et la collaboration interorganisationnelle nécessaire à la mise en œuvre des interventions.

Discussion

Cette revue de la littérature de presse avait pour objectif de dresser un portrait des différentes actions visant à promouvoir la consommation de protéines végétales ou la réduction de la consommation de viande dans les organisations au Canada et dans les pays européens francophones. Les résultats de cette étude ont d'abord permis de constater que l'offre de repas végétariens en restauration collective, c'est-à-dire le fait de les rendre disponibles dans l'environnement alimentaire, était le type d'intervention le plus largement rapporté. La principale raison est la promulgation de la loi EGalim en France en 2018, qui a imposé à toutes les cafétérias scolaires de proposer au moins un repas végétarien par semaine aux élèves et le fait que la majorité des documents recensés avaient été publiés en France (80 %). Cette prépondérance de l'offre de repas végétariens en restauration collective dans les articles de presse contraste avec ce qui est observé dans la littérature académique. En effet, deux revues systématiques portant sur les interventions de réduction de la consommation de viande ont déterminé que la majorité des interventions (60 %) ciblaient des facteurs personnels (ex. : connaissances, compétences), alors que 22 % ciblaient des facteurs environnementaux (ex. : rendre les aliments végétariens plus visibles ou disponibles) (Kwasny et al., 2022) et que l'offre d'information était encore la stratégie privilégiée (Harguess, 2020).

D'après notre recension, l'application de la loi EGalim en France a permis de renforcer la légitimité d'offrir des options végétales au menu, de développer l'offre de formation et d'accompagnement dans ce domaine, et d'opérer des changements rapides et de grande envergure dans l'offre alimentaire ayant des effets sur l'ensemble de la communauté (Ministère de

l'Agriculture et de l'Alimentation, 2019). Au Québec et dans le reste du Canada, il apparaît prometteur d'explorer la pertinence et la faisabilité d'une législation visant à renforcer l'offre d'options végétales dans les menus des services de restauration des organisations publiques, incluant les écoles, les hôpitaux et les administrations publiques. Ce type de mesure pourrait par exemple s'arrimer favorablement à la stratégie conçue à l'automne 2020 par le gouvernement du Québec consistant à réglementer la part d'approvisionnement local dans les services de restauration des organisations publiques, laquelle intègre un objectif d'approvisionnement en options végétales (Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec, 2020). Il est aussi à noter que les politiques alimentaires au palier national ou provincial, incluant les lignes directrices en saine alimentation qui impliquent des démarches volontaires (ex. : guides alimentaires) ou celles à caractère obligatoire (ex. : taxation, cibles à atteindre), ont été démontrées efficaces pour influencer les habitudes alimentaires (Afshin et al., 2014 ; Mozaffarian et al., 2018).

Cette revue de la littérature a également fait ressortir le potentiel des programmes de reconnaissance pour promouvoir l'offre d'options végétales dans les services de distribution et de restauration. Au Québec, ces programmes sont portés par des associations comme Le Lundi sans Viande ou l'Association végétarienne de Montréal, qui proposent, entre autres, des services d'accompagnement et de formation ainsi que du matériel de communication et de marketing. Des études académiques ont démontré que ces programmes de reconnaissance contribuaient à l'offre de menus plus durables dans les organisations publiques (ex. : en

incluant des aliments locaux, des protéines végétales ou en encourageant le compostage) (Dagenais, 2019). Ces programmes de reconnaissance favorisent aussi des partenariats multisectoriels rassemblant des acteurs autour d'intérêts communs, des initiatives visant la durabilité environnementale et l'équité (Khan et Bell, 2019) et des systèmes alimentaires plus favorables à la santé (Mozaffarian et al., 2018). Donner une plus grande visibilité à ces programmes et renforcer leurs capacités de communication seraient des pistes à privilégier afin d'encourager l'adhésion d'organisations variées (ex. : villes, entreprises, restaurants, écoles culinaires).

Finalement, la proportion d'articles publiés après 2016 (93 %) indique que le nombre d'interventions visant à promouvoir les protéines végétales n'a cessé de croître dans les cinq années à l'étude, ce qui montre un intérêt grandissant pour leur promotion. Aschemann-Witzel et al. (2021) soulignent notamment que le contexte actuel serait favorable au marché des protéines végétales pour les transformateurs alimentaires et les distributeurs, considérant que les personnes qui réduisent leur consommation de viande représentent une part de plus en plus importante des consommateurs. Dans le contexte inflationniste où les prix des aliments en magasin ont connu une hausse de 11,4 % en 2022 (Fradella, 2022), il est estimé que la part des protéines végétales parmi l'ensemble des ventes passera à 14,9 % en 2024, alors qu'elles étaient à 6,3 % en 2019 (Légaré, 2020). Les organisations privées ou publiques pourraient aussi donner davantage de visibilité aux initiatives visant à promouvoir les protéines végétales et aux facteurs pouvant influencer leur déploiement. Cette revue de la littérature a fait ressortir que le manque de temps, de financement et les barrières culturelles apparaissent comme des facteurs limitant la mise en œuvre de ces initiatives. Il est aussi apparu que ces initiatives favorisent la participation

citoyenne, l'inclusion de diverses parties prenantes et le déploiement de compétences et d'attitudes positives à l'égard des protéines végétales. Enfin, le fait de bénéficier de l'accompagnement d'une personne ayant une expertise professionnelle en matière d'alimentation végétale et de préparation des menus est apparu comme une force. Les données disponibles n'ont cependant pas permis de déterminer l'influence du Guide alimentaire canadien publié en 2019 sur cette augmentation des interventions mises en œuvre dans le Canada francophone.

Forces et limites

Cette étude comporte plusieurs forces. Elle porte sur un sujet d'actualité et répond aux besoins des acteurs du terrain de préciser les pistes d'action à leur portée et éprouvées dans d'autres milieux. De plus, cette étude a été conduite en utilisant une méthodologie rigoureuse permettant de dresser un portrait des types d'actions les plus fréquemment implantées, soit l'offre d'un repas végétarien en restauration collective, la sensibilisation, les conférences, la législation, la formation et les partenariats ou programmes de reconnaissance. Cependant, des limites peuvent être dégagées. En effet, les deux moteurs de recherche utilisés, Eureka et Google Actualités, ne permettent pas d'apprécier les initiatives implantées à très petite échelle. Celles-ci ne font pas souvent l'objet d'une communication de presse ou institutionnelle et ne sont pas toujours discutées dans la littérature académique. Pourtant, ces initiatives peuvent constituer des sources d'innovation très riches. Ensuite, l'inclusion d'articles scientifiques dans cette recension, en complément aux articles de presse, aurait pu permettre de mettre en lumière un plus grand nombre d'initiatives et d'approfondir leur analyse. Il aurait aussi pu être envisagé de compléter les résultats par des entretiens ciblés auprès d'organisations locales engagées

dans la promotion de l'alimentation durable. Par ailleurs, il a été privilégié de mettre en évidence les types d'interventions ainsi que leurs forces et limites, telles qu'elles émergeaient de l'analyse thématique des données, sans tenir compte de cadres théoriques a priori. Néanmoins, l'analyse des données aurait pu être bonifiée par le recours à des cadres théoriques (ex. : the *Theoretical Domain Framework* documentant les facteurs qui influencent l'implantation d'interventions) (French et al., 2012). Enfin, cette étude s'est limitée aux ressources francophones pour favoriser la contribution des partenaires à l'analyse des documents et s'est concentrée sur les pays à revenu élevé afin d'assurer la comparabilité avec le Québec. La recension des articles de presse publiés dans le reste du Canada anglais et dans des pays présentant un climat rigoureux similaire à celui du Québec (ex. : dans les pays scandinaves, ayant une saison de production agricole plus courte en raison du climat), aurait pu être une source d'information pertinente afin de présenter un portrait plus complet des initiatives prometteuses à implanter au Québec.

Pertinence pour la pratique

Cette revue de la littérature de presse a permis de dégager six grands types d'interventions en promotion de la consommation de protéines végétales et de la réduction de la consommation de viande mises en œuvre dans différentes organisations (sensibilisation, conférences, législation, formation, partenariats/programmes de reconnaissance et offre d'un repas végétarien en restauration collective). Ces six types d'interventions ont été établis à partir de l'analyse thématique des documents. Ces interventions peuvent être comparées à celles qui existent au Québec et encourager leur mise en œuvre dans cette province. Hormis le frein culturel (c'est-à-dire la résistance au changement des habitudes alimentaires) et les obstacles organisationnels et logistiques qu'implique toute gestion du changement, les initiatives recensées ont démontré de nombreux avantages, dont l'engouement et la satisfaction du public ciblé. Les recherches ultérieures devraient viser à promouvoir ces interventions et à en documenter l'effet dans une perspective systémique, en incluant des initiatives législatives, des programmes de reconnaissance et de la formation sur la consommation de protéines végétales.

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Annexe

Figure 1 : Diagramme PRISMA illustrant le processus de sélection des articles

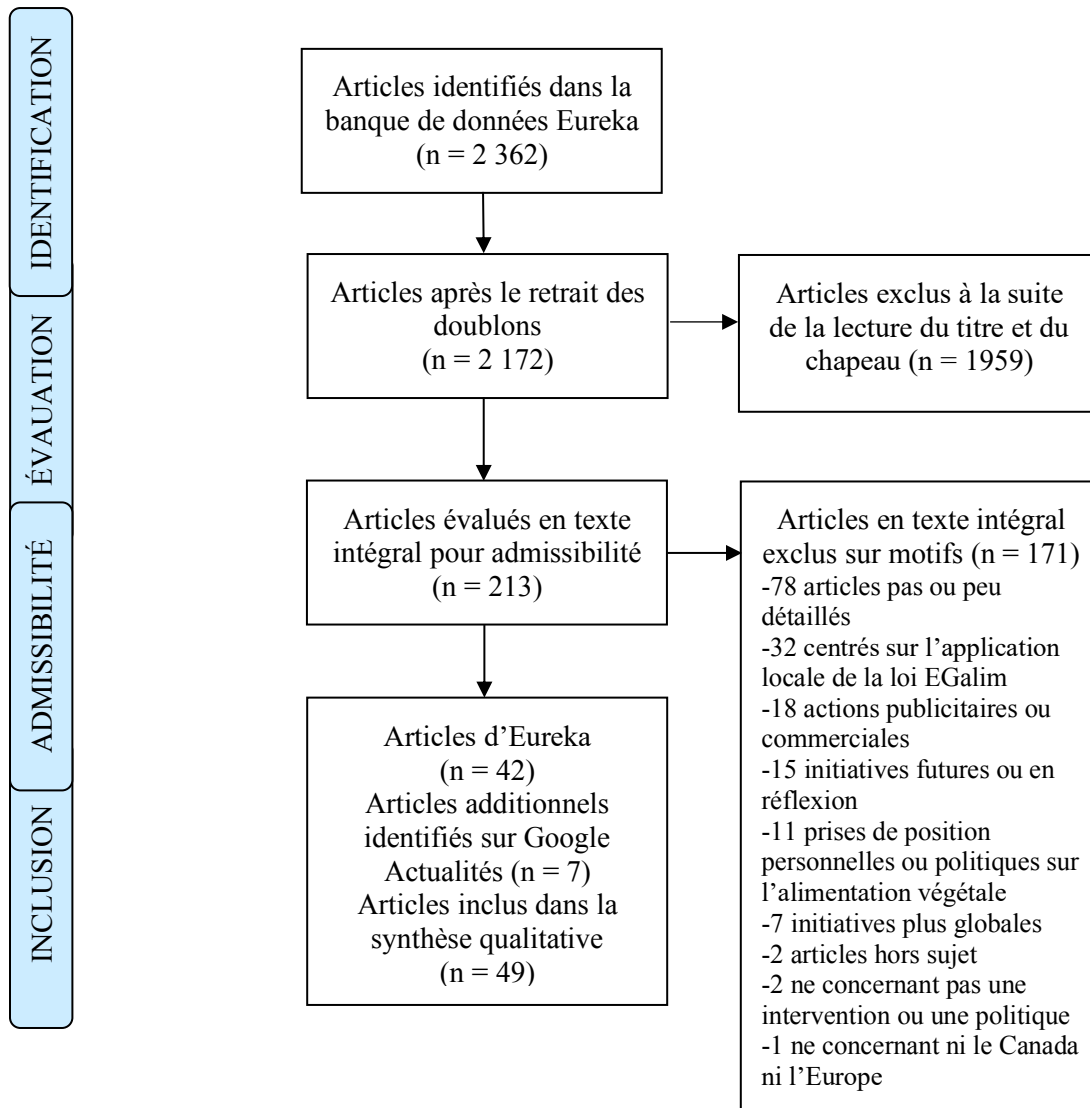


Tableau 1 : Analyse descriptive des documents inclus dans la revue de la littérature

Caractéristiques		Nombre d'articles	Pourcentage
Année	2015	3	6 %
	2016	5	10 %
	2017	7	14 %
	2018	11	22 %
	2019	19	39 %
	2020	4	8 % ¹
Pays d'implantation	France	39	80 %
	Canada	4	8 %
	Belgique	2	4 %
	Suisse	2	4 %
	Royaume-Uni	1	2 %
	États-Unis	1	2 %
Population ciblée	Jeunes générations - enfants, adolescents	26	53 %
	Grand public	13	27 %
	Jeunes générations - étudiants	7	14 %
	Gestionnaires de service alimentaire	1	2 %
	Personnes âgées	1	2 %
	Salariés	1	2 %
Type d'organisation	Organisations municipales	17	35 %
	Établissements scolaires	13	27 %
	Associations à but non lucratif	7	14 %
	Établissements universitaires	6	12 %
	Entreprises privées	4	8 %
	Organisations gouvernementales	2	4 %
Type d'intervention²	Repas végétarien en restauration collective	28	57 %
	Actions de sensibilisation ponctuelles	8	16 %
	Conférences et rencontres d'échange	6	12 %
	Offres de stage et de formation	3	6 %
	Actions législatives	2	4 %
	Partenariats/Programmes de reconnaissance	2	4 %

¹ La recherche a été réalisée en mai 2020 et comptabilise pour cette année seulement 5 mois de publications.

² Chaque document était associé à un seul type d'intervention (l'intervention principale décrite dans le document).

Tableau 2 : Description des principaux types d'interventions recensés dans les documents

Types d'interventions	Documents de référence	Description
Actions de sensibilisation ponctuelles	(Lemieux, 2018 ; OV, 2019 ; Ouest-France, 2017, 2018, 2020 ; Razafintsalama, 2016 ; Rousser, 2016 ; Le Télégramme, 2018)	Les organisations sont amenées à organiser des actions pédagogiques visant à sensibiliser, en particulier les jeunes générations, aux bienfaits de l'alimentation végétale et de la réduction de la consommation de viande. On les sensibilise aussi bien à l'impact environnemental de la consommation de viande qu'aux effets sur la santé et aux questions liées à l'éthique animale. Les actions sont ludiques, prennent la forme de jeux, de concours ou de « journée spéciale » dédiée à cette thématique.
Conférences et rencontres d'échange	(Henry, 2016 ; Hutin, 2017 ; Lemieux, 2018 ; Plante, 2019 ; Royez, 2020 ; Le Télégramme, 2019 ; Valette, 2018)	Souvent encouragés par le milieu associatif, ces temps d'échange, de partage et d'information sont organisés soit ponctuellement, soit à l'occasion d'événements publics (foires ou expositions), pour sensibiliser la population aux bienfaits de l'adoption d'une alimentation plus végétale. Le but principal des interventions est d'accompagner et de guider les personnes intéressées dans un esprit de convivialité.
Actions législatives	(Graveleau, 2019 ; DH Les Sports+, 2018)	Ces réglementations sont imposées par une instance gouvernementale. La décision est centralisée et bien souvent destinée aux organismes publics pour prendre le virage de l'alimentation végétale à une échelle nationale et ainsi lutter contre les changements climatiques (répondant aussi à une demande en croissance de la population).
Offres de stage et de formation	(L. L., 2018 ; Midi Libre, 2019b ; Ouest-France, 2019)	Pour répondre aux questions et à la curiosité du grand public quant à l'alimentation végétale, les organisations organisent des événements de type « stage » pour apprendre à cuisiner et découvrir une nouvelle façon de manger et de nouvelles saveurs. La proposition de repas végétariens dans les restaurants collectifs passe également et nécessairement par la formation et la sensibilisation des chefs cuisiniers, pas toujours habitués à ce type de cuisine. Les organisations choisissent de les former et de les accompagner dans cette démarche pour agir progressivement sur toute la chaîne alimentaire : de la production à la création et à la confection des menus.
Partenariats et programmes de reconnaissance	(Chauvel, 2015 ; Lherm, 2016)	Souvent mis en œuvre par des organisations de taille considérable et à l'échelle régionale ou nationale (collectivité ou entreprise privée), la signature d'un accord, d'une convention ou d'un partenariat permet de fixer une règle qui n'a pas une valeur légale, souvent sur la base du volontarisme, qui vise à encourager l'alimentation végétale. Elle implique systématiquement au moins deux parties prenantes, inclut souvent un programme de reconnaissance et bénéficie d'un important effet de communication, car elle est souvent fortement publicisée par les deux parties (articles, conférence de presse, campagne grand public, etc.).

Repas végétariens e restauration collective	(Auditeau, 2019; Centre Presse Aveyron, 2020 ; Bouquerot, 2019; Bourgois, 2018; Chabaud, 2019 ; Chalom, 2018 ; Da Cunha, 2017 ; Esvant, 2019 ; Agence France-Presse, 2019 ; Garcia, 2015 ; Gentile, 2019 ; Gilles, 2018 ; Gollard, 2018 ; Henry, 2017 ; Kappès-Grangé, 2015 ; Larouche, 2020 ; Léa, 2017 ; Midi Libre, 2019a ; Meslin, 2019 ; Mhiri, 2019 ; Nolwenn, 2017a, 2017b ; Ouest-France, 2017 ; Paris-Normandie, 2019 ; Speroni, 2019 ; SW, 2016 ; Varela, 2019 ; Y. T., 2018)	En restauration collective, l’offre d’un mets végétarien au menu reste l’intervention la plus prisée, notamment pour les jeunes enfants. Elle est souvent accompagnée d’une campagne pédagogique de sensibilisation. Seule la fréquence de disponibilité de ce mets change en fonction de l’approche adoptée, qui la plupart du temps reste progressive.
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Tableau 3 : Exemples d'interventions recensées

Actions de sensibilisation ponctuelles
<ul style="list-style-type: none">• À la cafétéria de l'école, l'équipe du cuisinier et les services municipaux ont lancé un concours de recettes végétariennes. Les cinq meilleures recettes seront réalisées et servies à la cafétéria.• En collaboration avec une association pro-environnementale, un groupe d'élèves travaille sur la confection d'un repas végétarien peu consommateur d'eau pour la cafétéria de l'établissement.• À l'occasion de la semaine étudiante du développement durable, un restaurant universitaire décide de relever le défi de l'association militante de défense des animaux L214 et de composer un menu 100 % végétal.• Une association végétarienne produit et diffuse un annuaire des commerces végétariens et végétaliens de la ville.• Confection d'un repas du soir végétarien biologique pour la Maison Familiale Rurale par des élèves invités à imaginer « le type de monde dans lequel ils souhaitent vivre ».
Conférences et rencontres d'échange
<ul style="list-style-type: none">• Organisation d'une exposition annuelle spécialisée sur la thématique du manger santé et responsable de créer un changement durable et progressif dans l'alimentation de la population.• Intervention d'une diététicienne-nutritionniste et d'un représentant d'association végétarienne pour offrir des conseils en matière de santé et de sécurité alimentaire dans le cadre d'un régime végétarien.• Événement de lancement d'une association végétarienne locale visant à promouvoir les plats végétariens ou végétaliens dans les restaurants et à proposer des ateliers au grand public.• Organisation d'un débat sur le véganisme avec l'intervention d'une nutritionniste-diététiste dans un centre social pour répondre à toutes les interrogations sur ce régime.
Actions législatives
<ul style="list-style-type: none">• Expérimentation de deux ans en lien avec la promulgation d'une loi : toutes les cafétérias scolaires devront proposer au moins un repas végétarien par semaine aux élèves.• Réception d'une initiative citoyenne par une institution intergouvernementale réclamant l'étiquetage obligatoire des produits alimentaires comme non végétariens, végétariens ou végétaliens.
Offres de stage et de formation
<ul style="list-style-type: none">• Formation de quatre jours répartis sur l'année pour épauler les cuisiniers des écoles dans leur adaptation à l'obligation de proposer des menus végétariens dans les écoles.• Stage associatif alliant cuisine végétarienne et yoga pour valoriser l'art de cuisiner végétarien avec saveur.• Organisation d'un stage de cuisine biologique végétarienne par une association de familles rurales.
Partenariats et programmes de reconnaissance
<ul style="list-style-type: none">• Signature formelle d'un accord entre plusieurs parties prenantes (ex. : la mairie, les épiceries, les restaurateurs) qui choisissent de s'allier pour promouvoir l'alimentation végétale. L'accord se substitue à une réglementation et oblige les signataires à des actions définies entre eux au préalable.
Repas végétariens en restauration collective
<ul style="list-style-type: none">• Proposition d'un mets végétarien en restauration scolaire, universitaire ou centre spécialisé (centre de loisirs, garderie, etc.). Le repas est souvent accompagné d'une démarche de sensibilisation sur les enjeux d'une alimentation végétale (environnement, santé, éthique animale). Il est cuisiné autant que possible avec des produits frais, locaux et biologiques.

-
- Suppression de la viande au menu des restaurants d'une entreprise privée et du remboursement des salariés pour les repas à base de viande pris à l'extérieur.
 - Offre de repas végétariens savoureux dans les CHSLD pour répondre à une demande croissante des résidents.
 - Bannissement de la viande des menus d'une université pour lutter contre les changements climatiques et atteindre la carboneutralité.
-

Tableau 4 : Forces et limites des types d'interventions rapportées dans les documents analysés

Types d'interventions	Forces	Limites
Actions de sensibilisation ponctuelles	<ul style="list-style-type: none"> • Aspect participatif • Implication et enthousiasme des parties prenantes 	<ul style="list-style-type: none"> • Activité souvent offerte à un nombre très restreint de personnes, difficile à mettre en œuvre auprès de grands groupes • Nécessite un temps d'échange supplémentaire pour procurer un réel retour appréciable sur l'action
Conférences et rencontres d'échange	<ul style="list-style-type: none"> • Facile à mettre en œuvre • Le public participant est déjà intéressé/averti. 	<ul style="list-style-type: none"> • Nécessite plusieurs parties prenantes organisatrices • Nécessite l'intervention d'un expert pour la crédibilité de l'intervention
Actions législatives	<ul style="list-style-type: none"> • Permet d'observer des résultats à grande échelle • Implique une obligation, donc une uniformisation, une équité et une égalité quant à la mesure prise • Accélération du processus de transition et résultats quasi immédiats 	<ul style="list-style-type: none"> • Suscite des interrogations sur la qualité des repas concernés par la mesure • Nécessite un temps d'organisation et d'adaptation pour les établissements concernés • Difficile à mettre en œuvre dans le cas où les directives sont floues • Freins culturels à dépasser étant donné que l'intervention touche un large public (le processus d'appropriation d'une nouvelle alimentation peut prendre du temps) • Les directives doivent faire l'unanimité au sein de la collectivité ou du gouvernement pour être mises en place.
Offres de stage et de formation	<ul style="list-style-type: none"> • Informations, conseils et formation de qualité : le public cible bénéficie souvent d'une expertise professionnelle • Intervention participative volontariste qui suscite souvent l'engouement et/ou l'enthousiasme des participants • Échanges et contacts directs et très concrets 	<ul style="list-style-type: none"> • Besoins humains, financiers, matériels • Frein culturel si l'offre est basée sur une approche obligatoire plutôt que volontariste
Partenariats et programmes de reconnaissance	<ul style="list-style-type: none"> • Les parties prenantes signataires peuvent s'appuyer sur l'expertise des unes et des autres pour rendre les actions liées au partenariat plus efficaces et pertinentes. • La diversité des parties prenantes permet de toucher une plus large portion de la population. 	<ul style="list-style-type: none"> • Nécessité de mobiliser et de susciter l'engagement continu des parties prenantes • Accord valorisant sur papier, mais difficile à mettre en œuvre de manière concrète, nécessite des moyens humains et financiers
Repas végétarien en restauration collective	<ul style="list-style-type: none"> • Pédagogie et échanges entre les gestionnaires de services alimentaires et les populations ciblées • Intervention valorisante et novatrice pour les chefs 	<ul style="list-style-type: none"> • Difficultés à se procurer les produits nécessaires (peu d'offres) • Organisation, temps d'adaptation à prévoir, revue de la logistique, peut engendrer du travail supplémentaire pour les équipes de cuisine

-
- Résultats appréciés, suscitant l'enthousiasme; demande en hausse selon les premières expérimentations
 - Offre sans contrainte financière pour le consommateur
 - Bénéficie souvent d'une expertise professionnelle pour la création des menus
 - Incite à l'amélioration du choix des produits: biologiques, locaux, de qualité, etc.
 - Permet de mettre l'accent sur de nouveaux goûts et saveurs
- Freins culturels / idées reçues, notamment sur le goût
 - Les plats doivent être adaptés le plus possible à la population ciblée, ce qui demande une révision précise des menus.
 - Parfois moins accessible aux petites structures qui ont moins de moyens
 - Suscite la méfiance quant à la qualité des repas, à l'apport protéinique suffisant
 - S'accompagne souvent du choix de produits biologiques et donc d'un surcoût financier
-

Matériel supplémentaire 1 : Requête saisie dans la banque de données Eureka

Requête Eureka :

Mots-clés :

TIT_HEAD= (Végé | végétale%4protéine* | végétari* | végan* | vegan* | flexitar* | "sans viande" | "dimin*%4viande" | "rédu*%4viande" | fausse viande)*

⊗ LEAD= (végétar)*



Original Research Article

Beef, beans, or byproducts? Following flexitarianism's finances

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York University

Abstract

Flexitarianism was one of the top food trends of the summer in 2020. Characterizing reductions in meat eating as representative of the reflections on personal and societal health that were taking place at the time, Canada's largest food retailer, Loblaw situated the company's expanded plant-based offerings as a response to a "new us" that was emerging from the COVID-19 pandemic. This article explores the protein pathways that Loblaw opens and closes by promoting "flexitarian choices for our changing lifestyles". Focussing on reduced beef consumption as a target of flexitarian intervention, I situate flexitarianism in relation to calls for a "protein transition", which would address the risks

the dominant beef industry poses to animal, human, and planetary wellbeing. Drawing from a larger case study on beef shopping at Loblaw supermarkets, I consider the extent to which the version of flexitarianism on display at Loblaw supermarkets might support the status quo in the dominant beef industry. As a flexible framework, flexitarianism holds potential to respond contextually to the needs of varying food networks in Canada. As a defined consumer demographic, however, flexitarianism is poised to reroute this flexibility away from diverse food systems toward adaptable investments, which would insulate financial portfolios from the risks of intensive animal agriculture without requiring meaningful changes within those industries.

Keywords: Flexitarianism; Canadian supermarkets; Canadian beef; plant-based substitutes; meat shopping; ESG; financialization

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Résumé

Le flexitarisme a été l'une des principales tendances alimentaires de l'été 2020. Considérant la réduction de la consommation de viande comme représentative des réflexions sur la santé personnelle et sociétale qui avaient lieu à ce moment, le plus grand détaillant alimentaire du Canada, Loblaw, a situé son offre élargie de produits à base de plantes comme une réponse au « nouveau nous » qui émergeait de la pandémie de COVID-19. Cet article explore les voies protéiques que Loblaw ouvre et ferme par sa promotion de « choix flexitariens pour nos modes de vie en évolution ». En mettant l'accent sur la réduction de la consommation de bœuf comme cible de l'intervention flexitarienne, je relie le flexitarisme aux appels à une « transition protéique » qui s'attaquerait aux risques que l'industrie dominante du bœuf fait courir au bien-être des

animaux, des humains et de la planète. À partir d'une étude de cas plus vaste sur l'achat de bœuf dans les supermarchés Loblaw, j'examine dans quelle mesure la version du flexitarisme exposée dans les supermarchés Loblaw pourrait favoriser le statu quo dans l'industrie dominante du bœuf. En tant que perspective flexible, le flexitarisme a le potentiel de répondre de manière contextuelle aux besoins des différents réseaux alimentaires au Canada. Cependant, en tant que groupe démographique défini de consommateurs, le flexitarisme tend à détourner cette flexibilité : celle-ci n'est pas adressée à divers systèmes alimentaires, mais concerne des investissements adaptables, qui isoleraient les portefeuilles financiers des risques de l'élevage intensif sans exiger de changements significatifs au sein de ces industries.

Introduction

Flexitarianism was one of the top food trends of the summer in 2020 according to Canada's largest food retailer, Loblaw (President's Choice [PC], 2020a).¹ Describing flexitarianism as “a style of eating” that focusses on plant-based foods and includes animal-based foods “in moderation” (PC, 2020b, para. 7), Loblaw invited “future flexitarian[s]” (PC, 2020a, subtitle) to experiment with products from its new private label line, President's Choice (PC) Plant Based. While a

concentration on plants typifies the diets of a large proportion of the world's population for whom animal foods are not widely accessible, the term “flexitarianism” combines “flexible” and “vegetarian” to describe patterns of eaters primarily in the global North who have been moving away from animal foods since the late-twentieth century because of concerns about animals, health, and the environment (Flail, 2011; Oxford English Dictionary [OED], 2023). Products in the PC Plant Based line are

¹ An “Editor's note” on the PC *Insiders Project* website reads: “The opinions shared in the articles and videos featured on the INSIDERS PROJECT platform are the respective author's or host's, as applicable, as published by our content partner, and do not necessarily represent the views of Loblaw's Inc. or its affiliates” (PC, n.d.). Regardless of the intentions of individual authors, the site remains a valuable resource for exploring the discourses that surround the company. Similarly, the views expressed in this article are my opinions based on evidence from my case study, and they do not necessarily represent the perspectives or intentions of Loblaw Companies Ltd.

part of a “new generation” (Zhao et al., 2022, p. 2) of plant-based substitutes that trouble the economic and ontological definitions of “meat” as a retail category by using plant-derived ingredients to mimic the texture and flavour of animal-based products (International Panel of Experts on Sustainable Food Systems [IPES-Food], 2022; Jönsson et al., 2019; Mudry & Phillips, 2022).

Characterizing the flexitarian choice to reduce meat consumption as representative of personal reflections during the COVID-19 pandemic on “what’s essential [and] what we could do without” (Weston, 2020, para. 3), Loblaw situated the company’s expanded plant-based offerings as a response to an improving “new us” that was emerging from the crisis (PC, 2020b, para. 3).

This aspirational discourse invokes the deliberations that are taking place in academic, industry, and policy circles about a potential “protein transition” from food systems’ overreliance on intensive animal agriculture to more sustainable, ethical forms of protein provisioning (IPES-Food, 2022; Katz-Rosene et al., 2023). As demonstrated by recommendations from the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO), agreement is growing about the benefits for humans, other organisms, and environments that could follow from a global rebalancing of animal- and plant-based proteins (FAO & WHO, 2019). The details of such a transformation are the subject of debate, however, as concerns circulate about who stands to win and to lose in various transition scenarios (IPES-Food, 2022; Katz-Rosene et al., 2023). As powerful players in contemporary food systems, supermarkets have significant voices in shaping the ways in which these discussions are expressed in formal policies and everyday practices.

This article peruses the protein pathways that Loblaw opens and closes by promoting “flexitarian choices for our changing lifestyles” (PC, 2020b, subtitle). The exploration is part of a larger case study of shopping

at Loblaw supermarkets, which examines supermarkets’ roles as mediators, specifically in relation to the risks and ethics of the beef industry’s infrastructures in Canada. Located at key political economic bottlenecks between ranchers and eaters (IPES-Food, 2017), supermarkets regulate not only the material flow of beef as a foodstuff but also the sociocultural norms of the environments in which beef is experienced as a cuisine. While flexitarian dietary patterns vary, they tend to include less beef than other meats (Malek & Umberger, 2021; Peschel & Grebitus, 2023), and studies indicate that flexitarians use plant-based substitutes most frequently to replace beef dishes (Good Food Institute [GFI], 2022). Flexitarianism emerges in the case study research as a noteworthy practice that Loblaw leverages to address public critiques about the ethics of beef consumption.

Focussing on reduced beef consumption as a target of flexitarian intervention, I assess the extent to which Loblaw’s flavour of flexitarianism is poised to contribute to an ethical “protein transition” in Canada. First, I situate calls for a “protein transition” in relation to the risks the dominant beef industry poses to animal, human, and planetary wellbeing. After describing the methodology of the qualitative case study, I proceed by outlining the characteristics of flexitarianism that surfaced as themes in the research. I consider how the version of flexitarianism on display at Loblaw might support the status quo in the dominant beef industry. Overall, I argue that Loblaw reroutes the potential resilience that flexitarianism offers as a flexible framework that can be adapted to support diverse food systems; as a defined consumer demographic, flexitarianism instead promises to insulate financial portfolios from the risks of intensive animal agriculture without requiring meaningful changes within those industries.

Background

Loblaw (2022) has made a “commitment to environmental, social and economic sustainability in the Canadian beef industry” (p. 18) in light of beef’s status as an “at-risk commodit[y]” (p. 44). Not only are the natural materials and conditions required to produce beef under stress as the climate changes, but contemporary methods of beef production also add to these pressures. In this context, flexitarianism operates as a form of risk management in that it enacts a strategy to mitigate the individual and societal consequences of excess beef consumption.

Beef and risk society

Beef-cattle production systems take a wide variety of forms, several of which are associated with benefits for ecological resilience, human nutrition, and livelihoods (IPES-Food, 2022; Qualman & National Farmers Union [NFU], 2019). As the beef industry has consolidated since the mid-twentieth century, however, an industrialized model has become the norm in Canada. In this integrated system, most cattle move from birth on pastures to feedlots where they eat grain-based feed before being shipped to slaughter in centralized meatpacking plants (MacLachlan, 2001). Concentration intensifies along the beef supply chain: Canada has over fifty thousand cow-calf operations, but less than four thousand feedlots (Canfax Research Services, 2022), and just nineteen federally inspected slaughter plants (Agriculture and Agri-Food Canada [AAFC], 2022).

Critics argue that this situation has led to power imbalances between farmers and processors. As processing infrastructure diminishes, farmers must increasingly meet terms set by large processors if they

want to remain in business. In contrast, meatpackers’ economies of scale benefit Canada’s similarly powerful big food retailers as they provide a supply of uniform products from which to stock stores across the country (NFU, 2008). Loblaw, for instance, sources beef from Canadian meatpacking plants owned by American agribusiness company, Cargill. Two Cargill plants and a plant owned by Brazilian company, JBS, account for approximately 85 percent of Canada’s beef processing capacity (Finnigan, 2021; Patrice & Lamboni, 2020). These arrangements were tested during the COVID-19 pandemic when outbreaks stalled operations at all three of the plants, such that beef availability in retail locations became sparse (Finnigan, 2021; Patrice & Lamboni, 2020).

The simultaneous enormity and fragility of Canada’s beef retail system illustrates the conditions of “risk society”—theorized by Beck (1992) and Giddens (1990) as the contemporary period of modernity wherein societies organize activities according to predictions about how large-scale consequences of modernity might evolve. Eating has always been accompanied by a degree of uncertainty given humans’ biological history as opportunistic omnivores (Levenstein, 2012); however, the ability of food system authorities to provide veneers of certainty is collapsing in a novel way in global risk society, as the modern institutions that promised to provide order have become sources of disorder instead (Beck, 2009). Whereas big meatpackers declared that centralized processing would lead to heightened food safety in the mid-twentieth century, the scale of subsequent consolidation in the industry has introduced new, increasingly uncontrollable risks as the bodies of

hundreds of cattle are ground together and shipped all over the world (Specht, 2019).

To begin, the system poses intersecting threats to human and nonhuman health. Cattle are exposed to physically and psychologically stressful experiences as they are separated from herds and transported through supply chains (Weis, 2013). The contained environments in which animals are reared also provide ideal conditions for creating virulent microbes, which can spread through global networks of trade and travel (Canadian Integrated Program for Antimicrobial Resistance Surveillance [CIPARS], 2007; United Nations Environment Programme [UNEP], 2016). Furthermore, illnesses are becoming more difficult to treat as antimicrobial resistance intensifies, due in part to the routine use of antibiotics for livestock (UNEP, 2016). Aside from the dangers of contamination, high levels of beef consumption have been associated with increased risks of noncommunicable diseases, such as cardiovascular problems and cancers (Bouvard et al., 2015; Willett et al., 2019). To put beef into circulation, human workers face physical, mental, and economic challenges including high rates of debt on farms, hazardous working conditions in slaughterhouses, and unstable employment in fast food and retail (Black, 2022; Food Processing Skills Canada [FPSC], 2019; Qualman & NFU, 2019).

Throughout the system, the most marginalized members of society pay the highest prices for beef's externalized costs. Whereas supermarkets with fresh, organic foods are located disproportionately in the affluent neighbourhoods of urban centres and suburbia (Yang et al., 2020), for instance, industrial production and processing facilities have set up shop in rural areas where they often employ low-income, racialized workforces. Although these institutions promise to

bring jobs to struggling rural economies, they tend to bring pollution as well (Struthers Montford, 2020).

The environmentally strained landscapes that surround industrial animal production operations are just the tip of the iceberg in terms of the industry's ecological effects. Not only are large amounts of land and water used for raising cattle and growing feed, but these practices also degrade landscapes and waterscapes through heavy use of chemical inputs and ineffective disposal of waste (Qualman & NFU, 2019; Weis, 2013). Moreover, cattle-related industries “are the largest source of Canadian agricultural GHG emissions” (Qualman & NFU, 2022, p. 6). Justifiably or not, beef is therefore gaining a reputation as an irresponsible food choice that threatens the planet and its organisms (Charlebois, 2016).

Protein and just transitions

In response to these risks, calls for a “protein transition” have taken shape. Recognizing that current intensities of meat consumption in the global North are unsustainable (especially if expanded to a global scale), the proposals offer divergent recommendations on how best to move away from these practices (IPES-Food, 2022). Some scenarios position new technologies as a bastion of sustainability whether innovations take place within the animal-protein (e.g., sustainable intensification) or plant- and alternative-protein sectors² (e.g., cellular agriculture). Other visions find hope in the reclamation of local, regenerative agricultural practices that incorporate animals and plants as mutually nourishing parts of a holistic system (e.g., agroecology) (Katz-Rosene et al., 2023). Nevertheless, the perspectives converge in suggesting

² In addition to plant-based meat analogues, lab-grown animal foods and insects are also regularly included under the “alternative” protein umbrella (IPES-Food, 2022).

that the transition could be supported by a shift in the dietary norms of the global North to include more plant-based proteins in place of animal-based proteins. Various studies claim that a movement toward plant-focussed diets could improve nutrition, reduce zoonotic disease outbreaks, minimize animal suffering, and mitigate environmental strain (Parodi et al., 2018; Ranganathan et al., 2016; Smetana et al., 2015).

Flexitarianism is cited specifically as a consumption practice that might carry forward the “protein transition” in Canada (Ernst & Young LLP [EY] & Protein Industries Canada [PIC], 2023), as it is more accessible and attractive than other forms of meat restriction (Dakin et al., 2021). While the vegetarian and vegan percentage of the population in Canada holds steady, eaters indicate growing interest in reducing their consumption of meat, particularly beef (Charlebois et al., 2018; Doucette, 2019). Catering to this emergent group, new and increasingly meaty plant-based substitutes, like PC Plant Based, are highlighted as significant “transition” foods (Canadian Press, 2018) that can ease dietary adjustments for eaters accustomed to meats.

More than a vehicle to deliver the end goal of a global dietary shift, flexitarianism has potential to encourage equity within the local transition processes that make up these larger changes. First used by American trade unions to navigate new environmental regulations in the late-twentieth century, the idea of a “just transition” argues that economic transformations must be enacted in ways that support workers as well as environments. Since then, the scope has broadened beyond considerations of livelihoods to take into account a range of potential repercussions on humans, other organisms, and ecologies during socioeconomic shifts. “Just transitions” make sure that costs and benefits are equitably distributed, so that groups marginalized by existing systems do not bear the weight

of structural reforms. The concept has gained traction over the past decade in relation to plans to transition the energy sector from fossil fuels to renewable sources (Blattner, 2019; Ruder et al., 2022; Verkuijl et al., 2022).

More recently, attention has turned to agriculture—particularly animal agriculture—as another industry to which the “just transition” approach could be applied to manage equitably the risks involved in necessary transformations. While a “protein transition” could bring overall improvements to the health of humans, animals, and ecologies, for example, it could also cause harm to farmers, rural communities, food insecure people, and other vulnerable groups if it is not implemented carefully. In addition to assessing the equity of potential outcomes then, the “just transition” framework advocates for inclusive governance that incorporates the meaningful participation of all affected parties throughout transition processes. Accordingly, “just transitions” manifest differently depending on the environments in which they are taking place, even if they may share common values and a recognition of their entanglements in larger systems (Blattner, 2019; Ruder et al., 2022; Verkuijl et al., 2022).

Flexitarianism could be part of ensuring that the “protein transition” is also a “just transition”, as it is a heterogenous, non-prescriptive practice that can respond to individual needs and local contexts while acknowledging the limitations of the planet’s food systems (Dagevos, 2021). A variety of flexitarian enactments could also add strength to food systems overall as they could draw on a diversity of food sources rather than overtaxing singular pathways from land to table. Reviewing the literature on protein and food systems transitions, Katz-Rosene et al. (2023) find promise in approaches that pursue multiple versions of sustainable protein, even as they heed the notes of

caution that have been raised about the potential for transitions to be stalled by disagreements: “Our assessment is hopeful that in reflecting the heterogenous nature of protein foods and the protein subsystem itself, protein pluralism may serve as a resilient response to the wicked problem of unsustainable protein. The challenge is to find a way for diverse pathways in food sustainability to overcome ideological determinism, policy incoherence, and collaborate on shared objectives” (p. 13).

Might flexitarianism offer an appropriate response to this tension? Like the supple strength of a tree bending in the wind, is the inherent flexibility of flexitarianism adaptable enough to accommodate diverse perspectives without breaking its foundations?

Observing that flexitarianism does not have a singular definition, studies have investigated the range of motivations and behaviours that make up the tendency toward meat reduction that has become a notable pattern in high-income countries (Dagevos, 2021). In Canada, Lacroix and Gifford (2019) determine that “meat-reducers” are motivated by a combination of personal benefits (e.g., health) and social responsibilities (e.g., environment) to eat vegetarian meals at least once per week. While only 10 percent of respondents self-identify as flexitarian in Charlebois, et al.’s (2018) survey of consumers in

Canada, the study shows that more than 50 percent of respondents are “willing to reduce...meat consumption over the next 6 months” (p. 13). Sijtsema et al. (2021) argue that “characteristics of the social and physical environment” (p. 14) should be studied alongside individual motivations to understand flexitarian activities, given that external factors can promote and/or hinder the expression of stated intentions.

Further to this emphasis on context, I turn attention to supermarkets as mediating environments that shape and are shaped by flexitarianism and the “protein transition” it may prefigure. In doing so, I notice a presupposition in the literature on flexitarianism that positions flexitarians as consumers, even as studies add nuance to describe the various ways in which consumption habits are expressed. Exploring this discursive construction’s materialization in shopping practice, I consider how the identity of the flexitarian as a consumer might limit the responsiveness—or flexibility—that flexitarianism exhibits in relation to shifting socioecological needs. While “hopping onto the flexitarian trend couldn’t be easier for [the] summer” (PC, 2020a, para. 2), sustaining flexitarianism’s disruptive potential is a harder, but more essential, practice for the long-term future.

Methods

This article presents a selection of findings on flexitarianism from a larger research project on food retailers’ roles in addressing the risks of beef consumption in Canada, which takes the form of a case study of beef shopping at Loblaw supermarkets. Food retailers are situated at vital junctures in food systems.

In Canada, three supermarket companies take in approximately 70 percent of the industry’s revenue; as the largest of these companies, Loblaw alone holds over 30 percent of the market share (McGrath, 2022).³ Loblaw was thus selected as a site for the case study, as it represents a common space where people encounter

³ This calculation excludes supercentres, warehouse clubs, and convenience stores (McGrath, 2022).

beef. While meatpackers and other concentrated industries also represent powerful nodes at the centre of food networks (IPES-Food, 2017), retailers display unique qualities amongst these players, as they are public-facing institutions that connect everyday people with the specialized expertise involved in running global supply chains (Giddens, 1990). As such, they have ready access to both the material resources of suppliers and the discursive resources of public opinion, which can be used in combination to shape food system norms. In investigating how risk arises in food systems, I study both the contents and the formal qualities of supermarkets. As mediators, supermarkets hold notable power to (re)distribute the risks of beef consumption by (re)organizing food system relations around themselves.

The case study was exploratory in nature. Rather than gathering data for the purpose of establishing a representative example that could be replicated elsewhere, it sought to create a conversation that might inspire further improvisations on the research (Viveiros de Castro, 2019). Following from the approaches of situated intersectionality (Yuval-Davis, 2015), I constructed the study with a combination of qualitative methods that offered (partial) access to the placed perspectives of various actors involved in the practice of beef consumption in Canada. My empirical research involved: visits to private and public archives and company websites to view promotional magazines, articles, flyers, and advertisements; observations at thirty-six supermarkets in Toronto; expert interviews with two company executives and five store managers; and four focus groups with supermarket shoppers. Pseudonyms are used for focus group participants and interview respondents. The study was approved by the Office of Research Ethics at York University.

My approach to analyzing the data was informed by critical discourse analysis, which reads texts as discursive events that simultaneously inform and are informed by their contexts (Willig, 2013; Wodak, 2004). I adopted this analytic attitude to examine textual materials, including promotional resources, labels, signage, and transcribed exchanges with workers and shoppers. As the framework does not limit “texts” to written words and verbal utterances, I also analyzed the images, sensations, and architectural spaces that I encountered, including archival photographs, drawings, and audio recordings, as well as notes and sketches about the sensory information that I gathered in the field (Banks, 2007; Rose, 2001). On the whole, the analysis examined how actors involved in beef consumption relate to one another via Loblaw as a medium.

This article specifically draws on the case study’s investigations of how Loblaw uses environmental, social, governance (ESG) initiatives to manage concerns about the risks associated with beef. A variation on corporate social responsibility (CSR) that has become increasingly common since the late 2000s, ESG is an investment-focussed framework that assesses a company’s performance not only in terms of financial metrics, but also in relation to environmental, social, and governance issues (Knoepfel & Hagart, 2009). Flexitarianism appears in the case study data as an opportunity for Loblaw to align its sales of beef with its ESG goals despite criticisms of the beef industry. Presenting thematic qualities of flexitarianism from the case study, the next section of the article discusses how flexitarianism is being shaped as a consumer demographic at Loblaw’s stores.

Results and discussion

Loblaw has been tracking vegetarian products as an emerging trend for years. The company's promotional magazine, *Insider's Report*, named tofu "the food of the future" (PC, 1984a, p. 12) in the 1980s and "food for the new millennium" (PC, 1999, p. 6) in the 1990s. It presented "wholesome and delicious" vegetarian patties and sausages as indicative of "a state of mind beyond meat" (PC, 1998, p. 8) well before the Beyond Meat brand name became a catchall moniker for plant-based substitutes. Loblaw's recent promotion of the PC Plant Based line and other plant-based products builds on this history in dialogue with contemporary trends. In the ESG era, the wholesomeness of plant-based foods has gained meaning beyond individual nutrition to reference plant-based products' well-rounded contributions to environmental, social, and economic sustainability. With the launch of the PC Blue Menu flexitarian burger in 2020, Loblaw gave shoppers the opportunity to enjoy the "Best of both burgers" (PC, 2020c, 0:04) by combining beef and vegetables into a single patty. Allowing shoppers to have their beef and eat it, too, this burger "hack" is representative of how flexitarianism appears at Loblaw.

Optional flexitarianism and consumer choice

Flexitarianism is optional at Loblaw's stores. As opposed to invoking meat reduction as a sacrifice, Loblaw presents flexitarianism as an expansion of options to "suit any palate" (PC, 2020b, para. 13). During my store observations, I visited an interactive display that was part of Loblaw's (2017) "Taste the New Next" campaign on emerging food trends. It invited shoppers to "Tap into the ongoing revolution in protein possibilities and take your palate beyond traditional options" by "Swing[ing] by for a sample" of

"Alternative proteins you didn't know you you'd love." The setup included bowls and decorative jars filled with protein-packed legumes, grains, and insects. Referencing this diversity of proteins as well as the importance of food waste reduction, a chalkboard-style sign read: "Eat it all".

The inclusivity of flexitarianism allows Loblaw to gain favour with the largest possible array of eaters. Having observed the plant-focussed market since the first explicitly labelled vegetarian products were introduced to the PC lineup in the 1990s, retired Loblaw executive, Adrian predicts future changes during our interview: "There will always be the hardcore vegetarian...like three to five percent of the market...[which is] an important piece of the equation. But I think actually a bigger piece of the equation is the omnivore...a large percentage of the everyday consumer who just is eating less meat. And that will make up ten times what the vegetarian piece is. And if you can offer that consumer who wants to eat less meat good vegetarian options, then you're really hitting the ball out of the park."

Flexitarianism is not an all-or-nothing proposition. In comparison to vegetarianism and veganism, flexitarianism appears to be easier to maintain (Dakin et al., 2021) and less steeped in negative connotations (Flail, 2011). Echoing Adrian's words, Loblaw assures potential flexitarians: "this food philosophy embraces flexibility. In other words, no one's going to mistake you for a hardcore vegan" (PC, 2020a, para. 2).

Meats are not excluded from the flexitarian cornucopia. The PC flexitarian burger allows eaters to combine meat and vegetable intake and to choose between different meats. In an article on the PC *Insiders Project* website, product developer, James Cranston explains: "For those who prefer poultry to

beef, we are also launching a chicken flexitarian burger featuring the same vegetables as the beef burger. It's all in the spirit of providing more choice" (PC, 2020d, para. 23).

This flexitarian diversity aligns with the contemporary celebration of consumer choice as both a fundamental freedom and a central mechanism to create an ethical society. Observing a societal identity shift from citizens to consumers since the late-twentieth century, scholars argue that the public has been encouraged to articulate political interests predominantly through the marketplace (Bauman, 2007; Cohen, 2003). This pattern corresponds with the rise of neoliberalism as a dominant political economic formation, which proposes that social prosperity is best advanced by the innovation that emerges from a competitive, deregulated market (Harvey, 2005). Neoliberalism has been accompanied by the increasing financialization of industries including food and agriculture wherein the buying and selling of financial instruments has become a primary method to accrue capital (Clapp & Isakson, 2018). In this context, I include "the *investor*" (Martin et al., 2008, p. 123) as an additional identity that the neoliberal "citizen-consumer hybrid" (Johnston, 2008, p. 229) expresses, and I suggest that practices of shopping are increasingly organized according to the paradigms of responsible investing. In other words, people are urged to use the goods and services they buy not only to construct their contemporary identities and to "vote with their dollars" for the food practices they support (Johnston, 2008), but also to invest in themselves for the future and to gain security in the face of coming risks.

Positioning the company's involvement in plant-based foods as a response to shoppers' interest, former Loblaw President, Galen Weston (2020) writes: "Th[e] movement toward flexitarianism...is growing. People are curious about the benefits; they want more

information and options" (para. 4). Based on purchasing signals from citizen-consumer-investors, the market is meant to enable the best business practices to rise to the top. In contrast to the overt regulations of the liberal welfare state, industry leaders like Loblaw do not limit the choices of shoppers through prescriptive guidelines. Instead, they make information available about products and/as potential investment options, so that shoppers as citizen-consumer-investors can make decisions of their own accord. Taking onus off industry actors, shoppers have a duty to weigh these options to determine for themselves the parameters of responsible beef consumption in relation to both the immediate and long-term implications of their choices.

Versatile flexitarianism and industry consolidation

Flexitarianism is also versatile at Loblaw's stores. PC Plant Based products are conveniently interchangeable with the animal products they imitate. Catering to the comfort zone of the mainstream omnivore, Loblaw recommends that shoppers intimidated by the switch to plant-based eating "try having a meatless day once a week" (PC, 2020b, para. 9). The company promises: "many plant-based foods are easy to find and there are a growing number of choices and mouth-watering recipes to choose from" (PC, 2020b, para. 11). Even as Loblaw's products increase in numbers, flexitarian foods simultaneously become more homogenous, as animal-derived foods remain the assumed norm against which "alternative" protein options are positioned. The "5 satisfying ways to eat more plant-based foods" (Sibonney, 2020, title) listed in an article on the PC *Insiders Project* website all involve replacing animal products with PC Plant Based substitutes. From PC Plant Based Beefless Broth to PC Plant Based Coconut

Milk Frozen Dessert, the design of plant-based products consistently references animal-based foods.

Although a recent addition to the PC veggie burger lineup is vegetable forward and does not imitate the taste of meat, it is still presented in the *Insider's Report* as a product that “even meat eaters will love” (PC, 2022, p. 13). Positioning meat as the measuring stick of product quality and meat eaters as the ultimate arbiters of taste, the PC Plant Based Chickpea and Sweet Potato Veggie Burger joins the ranks of analogues that have been part of the PC family since the 1990s. An archival radio script for a commercial promoting the PC World's Best Meatless Burger in 2000 reads:

Anncr: “When President's Choice product developer Maddalena Molino came up with the World's Best Meatless Burger she knew she had a product that most people would love. But the real test was having the meat guys taste it. The results were far better than she could have ever imagined. ...

Meat Guy: (with a mouthful of food) NO meat, huh? (Impressive) Hmmm.

Anncr: The meat guys aren't much for conversation” (Bensimon Byrne D'Arcy & Goudie, 2000, para. 1).

The contemporary flexitarian “veggie burger revolution” (PC, 2022, p. 13) is executed so smoothly that changes in dietary and shopping practices are barely perceptible. Breaking out of segregated health food departments, the new plant-based substitutes are “often [located] in the same aisle as their dairy and meat originals” (PC, 2020b, para. 15). While PC Plant Based products provide clear labelling for the motivated flexitarian, the familiar form of the products also appeals to the reluctant flexitarian (Biltekoff & Guthman, 2022). A humorous advertising campaign

for PC Plant Based products parodies the conventions of horror films to demonstrate to hesitant eaters that they have “Nothing to Fear”; formerly skeptical diners are shown chowing down on the plant-based foods that family members have served them (Powell, 2020).

Rather than disrupting eating habits, the plant-based “revolution” thus maintains a “centre of the plate” (IPES-Food, 2022, p. 48) approach to protein. When flexitarian reimaginations are restricted to variations on the Western culinary format of meat, potato, and side, protein retains valuable real estate as a dining focal point. In other words, meals are still organized around a central protein even if a beef burger is swapped out for a veggie burger. Howard et al. (2021) observe a pattern of “‘protein’ industry convergence” (p. 1) that sees large meat and dairy companies gaining an increasingly powerful hold over opportunities in the alternative protein space by “investing in or developing plant-based substitutes” (p. 1). Loblaw's beef supplier, Cargill launched a plant-based protein consumer brand in China called PlantEver (Cargill, 2020b), and added pea protein to its selection of plant-based ingredients that are available to food retail and service operations for use in control brands (Cargill, 2020a,c,d).

Product options may be expanding in response to flexitarianism, but product ownership is narrowing as industry and investors consolidate holdings. Even as shoppers substitute plant-based options for beef, capital is increasingly funneled toward the same narrow set of actors regardless of purchasing patterns. As Cargill's Chief Operating Officer, Brian Sikes summarizes in a press release: “Whether you are eating alternative or animal protein, Cargill will be at the center of the plate” (Cargill, 2020a, para. 10).

Nutritious flexitarianism and de-animalized protein

Finally, flexitarianism is nutritious at Loblaw's stores. Focus group participants, Victoria, John, and Rosa discuss the elements that may be missing from a vegetarian diet:

Victoria: "Maybe the iron and protein.

John: Yeah.

Victoria: To be vegetarian, you have to be really careful that you're getting those things to equal enough of it.

Rosa: Yeah, the B12."

With flexitarianism, nutrients can be mixed and matched. Every PC flexitarian burger contains "a quarter cup of vegetables...16 grams of protein and three grams of fibre" (PC, 2020d, para. 6).

These nutrient breakdowns are reflective of "nutritionism"—a dominant perspective on nutrition that measures the health of foods according to biological components without considering the broader contexts of food environments (Scrini, 2008). In seeking to replicate meats, companies often fall back on such discourses to demonstrate the meat-like authenticity and nutritional legitimacy of their products (Broad, 2020). As such, meat producers can piggyback on the nutritionist justification of plant-based foods to rehabilitate the perception animal-based foods. The values attached to protein are a notable component of this process, as actors like Cargill rebrand themselves as "protein" companies, which are, in the words of Cargill representative, Jackson Chan: "taking an inclusive approach to the future of protein by investing in both animal and alternative protein" (Cargill, 2020c, para. 4). Unlike other macronutrients (i.e., carbohydrates, fats), protein has retained a

reputation as a healthy, essential part of the human diet. When meats are redefined as "proteins", they can be positioned alongside plant-based products as solutions (rather than contributors) to food insecurity (Guthman et al., 2022). Signs above meat display fridges in Loblaw's remind shoppers that beef is a "good protein" and an "excellent source of iron, zinc and vitamin B12".

As meats are reconceptualized as "substrate[s] carrying information" (Muhlhauser et al., 2021, p. 2), which can be broken down and refabricated as plant-based substitutes, they become further distinguished from the bodies of animals. PC Plant Based products thus extend the PC tradition of differentiating protein foods from evident traces of animality. A pitch for Jack Kwinter's hot dogs in the *Insider's Report* reads: "Kwinter's dogs are made with skeletal beef; you won't find any cheeks, tripe, hearts or tongue trimmings as permitted in the manufacture of ordinary hot dogs" (PC, 1984b, p. 12). A decade later, the report introduces PC vegetarian frankfurters, emphasizing: "You'll love our new meatless hotdogs because of what they *aren't*—they aren't made from meat byproducts" (PC, 1992, p. 13). Certified vegan by third-party, VegeCert, PC Plant Based products are similarly desirable because they "contain no animal by-products" (Loblaw, 2022, p. 18).

Regardless of the actual origins of the ingredients, the de-animalized form is appropriate for the creation of self-contained commodities that can be shipped through supply chains on a "just-in-time" basis—an arrangement that continues to advantage partnerships between large packers and retailers like Cargill and Loblaw. In comparison with smaller operators, large meatpackers face fewer barriers in transporting products to profitable markets, and they can thus extract economic value from every part of the cattle they process. The infrastructure for commercial use of animal byproducts (e.g., rendering plants, tanneries) has

been disappearing in Canada since the late-twentieth century, as meatpacking plants have consolidated in ownership and geography. Whereas large-scale packers have moved much processing work on-site through “boxed beef” arrangements (Bisplinghoff, 2006), small-scale packers have continued to rely on diminishing local options for byproduct processing. Because food safety regulations prohibit the movement of non-federally inspected animal products across national and

provincial borders, regional abattoirs have a limited market even for the sale of cuts from dressed carcasses (Brynne, 2020; Rude, 2020). In contrast, multinational companies like Cargill have opportunities to export their products to countries where the markets for byproducts are more lucrative and demand for skeletal meat is growing (Hicks et al., 2018; Luckmann, 2021; National Beef Strategic Planning Group [NBSPPG], 2022).

Implications

Crafting a flexitarian practice that is optional, versatile, and nutritious, Loblaw participates in sculpting the seemingly indefinable boundaries of a diet premised on flexibility into a niche market that fits comfortably within existing food system logics. An article on the *Insiders Project* website explains the rationale behind the introduction of the PC flexitarian burger: “The company already had a robust line of frozen burgers on offer, from all-beef to fully vegetarian, but they wanted to create a product for those who are more conscious about the amount of meat they’re eating right now” (PC, 2020d, para. 5). Like the beef, flexitarian, and veggie burgers that sit side by side on Loblaw shelves, flexitarianism exists at Loblaw between vegetarianism and omnivorism as another dietary choice. From this parallel position, it does not pose a significant structural challenge to Loblaw’s partnership with the beef industry.

Instead, this curated flexitarianism bolsters an investment opportunity that has been opened by public critique of the dominant beef industry. The discourses, plans, and activities that have precipitated the potential “protein transition” have been accompanied by

speculation about the “possibilities for profit making [that] are lying idle for investors” as the food system changes (Sippel & Dolinga, 2022, p. 8). Holding \$66 trillion in assets under management (AUM), for instance, the Farm Animal Investment Risk and Return (FAIRR) Initiative aims: “to build a global network of investors who are aware of the issues linked to intensive animal production and seek to minimise the risks within the broader food system” (FAIRR, 2023, para. 2). Beside nine risk factors for animal protein companies, FAIRR (2020b) lists “sustainable proteins” as a key opportunity factor, suggesting: “investors and retailers alike” can build “competitive advantage” and “future-proof their infrastructure and investments” (p. 5) by diversifying into the plant-based space. Echoing FAIRR (2020a), investment advisors in Canada identify the flexitarian consumer segment as “the largest area for growth in the [plant-based] market” (Natural Products Canada [NPC] et al., 2022, p. 4).

Because this kind of ESG investing purports to manage risk, it is often fallaciously conflated with the prevention of disasters related to areas of ESG concern, like the threats to ecologies, human health, and animal

welfare that surround the dominant beef industry. In reality, ESG investing is mostly focussed on handling financial portfolios so that they are resilient to such catastrophes (Fancy, 2021). Launching an “Alternative Protein Fund”, venture capital firm, AgFunder outlines the intended beneficiaries of the risk management strategies of ESG investing in the plant-based market: “We believe the challenges and risks of conventional animal agriculture provide a significant opportunity for startups that are developing new strategies to supply alternative protein products, as well as for investors looking to hedge or diversify their exposure to the meat industry” (Dorone, 2019, p. 7). Similarly, Natural Products Canada (NPC) describes its \$50 million investment fund, NPC Ventures as an effort “to help develop and de-risk promising Canadian opportunities” in the alternative protein sector (NPC et al., 2022, p. 42).

In Canada, plant-based and other “alternative” proteins have been proposed as a potential basis for the conversion to a new agricultural system that would support Canada’s anticipated green economy (PIC, 2022b). Representative of this direction, Protein Industries Canada (PIC) (2022b) is a multistakeholder undertaking that was created out of the federal government’s Innovation Superclusters Initiative (now Global Innovation Clusters)—a program of collaborations between businesses, academic institutions, and non-governmental organizations funded by industry and government to “boost

innovation and growth in a particular industry” (Innovation, Science and Economic Development Canada [ISED], 2023, para. 1). With a vision to position “Canada [as] a global leader in plant protein” (p. 3), PIC (2022b) has launched a plan to enable Canada “to supply...10 per cent of the ingredients for the global plant-based food market” by 2035 (p. 8). Loblaw is a participant in PIC’s research project on regulatory modernization, which aims to harmonize Canada’s regulatory environment with innovations in the plant-based market (PIC, 2022a).

As long as flexitarianism takes an apolitical form, Loblaw can leverage the adaptability of the diet to marry shopping choices with the current financial interests of the company. Discussions on “de-risking” the plant-based industry appear to refer not to efforts to address the systemic risks of meat, but rather to endeavours to cultivate lucrative investment spaces that will yield reliable returns for priority investors. Aligning with the project in which Loblaw is involved, a key recommendation that informs PIC’s work is: “Reduce regulatory red tape” (EY & PIC, 2023, p. 8). This pattern is in keeping with the wider neoliberal erosion of the social safety net, which has shifted security and risk management from a public to a private responsibility (Hacker, 2019). As actors gather around attractive market opportunities, the security that plant-based substitutes offer for future food systems increasingly takes the form of “securities” in the sense of financial instruments.

Conclusion

Whereas flexitarianism could be adapted to agroecological niches to nourish relationships between eaters and ecologies, it is instead being adapted to market niches to solidify value chains between

meatpackers and retailers. Currently, the “new us” whose post-pandemic coalescence Loblaw had forecasted is looking remarkably similar to the old groupings of “us” versus “them” that had previously

represented the risk distributions of the financialized food system. Privileged actors like large food processors, big retailers, and financial firms that can afford to invest in the opportunities of the plant-based market are

gaining security, while others like small-scale growers, low-income communities, and nonhuman animals are left further behind as the risks of the beef-cattle system multiply.

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Original Research Article

Industrial meat in Canada, growth promoters, and the struggle over international food standards

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Abstract

This article focuses on differing national regulations and standards regarding how meat for human consumption is produced and what is permissible in that production process. Attempts to harmonize these regulations at the global level to facilitate international trade have proven to be challenging. Such harmonization of regulations is especially important to countries exporting meat, such as Canada. The conflict at the global level reflects a range of differing trade interests and values about what meat is and how it should be produced. One area of disagreement is over the extent to which methods of growth promotion in

animals using technology, particularly drugs, is acceptable and safe in terms of human consumption. Canada has taken the position that they are acceptable and safe. Using two case studies of regulations related to the most recent set of beta agonist drugs, ractopamine and zilpaterol, fed to livestock to promote growth, I examine the underlying sources of these conflicts and the extent to which they reflect the interests of various actors and the forms of power they may employ to try to shape global standards at the Codex Alimentarius and the view of what is acceptable meat.

Keywords: Meat production; growth promoters; drugs; international trade; standards; Codex Alimentarius

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Résumé

Cet article porte sur les différentes réglementations et normes nationales relatives à la production de viande destinée à la consommation humaine et sur ce qui est autorisé dans le cadre de ce processus de production. Les tentatives d'harmonisation de ces réglementations au niveau mondial pour faciliter le commerce international se sont avérées difficiles. Cette harmonisation est particulièrement importante pour les pays exportateurs de viande, comme le Canada. Le différend au niveau mondial repose sur un ensemble de valeurs et d'intérêts commerciaux divergents autour de ce qu'est la viande et de la manière dont elle devrait être produite. L'un des éléments de désaccord concerne les méthodes de stimulation de la croissance des animaux à l'aide de technologies, en particulier de médicaments, et

à quel point elles sont acceptables et sûres pour la consommation humaine. Le Canada a adopté la position selon laquelle ces méthodes sont acceptables et sûres. À l'aide de deux études de cas portant sur les réglementations relatives à la série la plus récente de médicaments bêta-agonistes, la ractopamine et le zilpatérol, utilisés dans l'alimentation du bétail pour favoriser la croissance, j'examine les sources sous-jacentes de ces conflits et la mesure dans laquelle ils reflètent les intérêts de divers acteurs ainsi que les formes de pouvoir que ceux-ci peuvent utiliser pour tenter de façonner les normes mondiales du Codex Alimentarius et la vision de ce qu'est une viande acceptable.

Introduction

The past three decades have seen major growth in trade in food and agricultural products. Along with this trend there has been increasing pressure on states, through trade agreements, to harmonize national and sub-national regulations around the production and safety of food products. Such national regulations have increasingly been seen to be potential non-tariff barriers to trade, (De Ville & Silles-Brugge, 2015) unless they can be justified based on sound science or evidence-based international standards. Strictures on national regulations that might impact trade are embodied in two World Trade Organization (WTO) agreements (discussed below). The WTO agreements on Sanitary and Phytosanitary (SPSA) measures and Technical Barriers to Trade (TBTA) cover most aspects of regulations that relate to food. They have been the

source of a disproportionate number of trade disputes related to food.

In the case of food products, the negotiations over the establishment of international standards take place at the Codex Alimentarius. Founded in 1963 as a joint body of the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) its mandate is to develop and harmonize food standards both “protecting consumer health and promoting fair practices in the food trade” (Codex Alimentarius, home, para 1, 2023). With the creation of the WTO and its agreements on restricting barriers to trade, the standards created at Codex took on increased significance for states. However, the effort to establish such standards and to have states adopt and adhere to them has proven increasingly difficult in a number of areas related to food

production, most notably in the use of genetically modified organisms (GMOs) and the use of growth promoters in the production of red meat. Conflicts were often based on different views of the safety of these products for human consumption.

One major area of conflict has been over the use of growth promoters in meat production using technology, particularly drugs, and whether it is acceptable and safe in terms of human consumption. Using case studies of regulations related to the most recent set of drugs fed to livestock to promote growth, beta agonists, I examine the underlying sources of conflict, how they reflect the interests of various actors and the forms of power employed to try to shape global standards.

The production of pork and beef in North America has historically involved the use of a range of growth promoters. The United States—as a major meat-exporting country—has sought, along with Canada and other meat exporting allies, to establish international standards and trade agreements that would allow imports of meat produced using growth promoters, once standards ensuring they are safe for consumers have been established based on sound science. They have thus challenged the right of importing countries or regions to limit market access of this meat based on national regulations that ban their use (Codex Alimentarius Commission [CAC], 2011).

Theory and methodology

This article adopts a political economy approach to understand the forces that shape international meat standards. It focusses on the types of power and the relative power/influence of various actors. In the case of global standards these actors include states, meat producers, other industry groups, and corporations

These case studies of conflict over the use of beta agonists drugs raise questions about the intensive industrial scale of meat production and differing interpretations of scientific evidence and risks related to food safety. They also highlight a conflict over whether other criteria, beyond food safety for meat consumers, should be taken into account in the setting of international standards. I argue that governments' positions on these regulations and standards reflect the interests and relative power of key actors in the meat industry including producers, processors, and drug companies. Canada's role as a meat exporter is also relevant to understanding why Canada, along with a number of meat-exporting countries, has sought to shape standards and ensure that national regulations on growth promoters are based only on "sound science." This science, however, is to be confined to the safety of meat for human consumption and rejecting any other basis for regulation that might impact trade. Despite taking that position, along with powerful states like the United States, within the Codex, Canada has been unable to secure access to a number of export markets for meat produced using these drugs. In the case of Canadian pork producers this has led many to forego the use of these drugs altogether.

along with a range of NGOs. The conception of power and its forms is drawn from the literature of political economy, summarized in the work of Clapp and Fuchs (2009) who identify three forms of power. The first is instrumental power which involves directly "influencing the policy processes" typically "via

corporate lobbying or political campaign financing” and access to decision makers (Clapp & Fuchs, 2009, p. 8). The second structural power involves the imposition of limits on the range of choices given to actors and the predetermination of options often based on size, market share, and other resources that actors can use to influence agenda setting and the range of policy alternatives to address a policy problem. In the case of the global food system the rise of large agri-business corporations and the growing corporate concentration provide a basis of power to shape the development of national and international regulations related to food. The third form of power they identify is discursive, involving contests over the framing of policies linked to “specific fundamental norms and values” (Clapp & Fuchs, 2009, p. 10). While the assumption might be that corporate actors wield much structural and instrumental power at both the national and global level my case studies will show that where divisions exist among state actors it reflects differences related to both instrumental and discursive power of actors over these regulations and how they are framed.

This study is based on the author’s observations at meetings of the main standard setting body for food, the Codex Alimentarius and its Commission (CAC) which meets each year in Geneva or Rome. In addition, reports of CAC meetings from 2012 to 2022 and of the meetings of the key Codex Committee dealing with the use of growth promoters, the Codex Committee on Residues of Veterinary Drugs in Food (CCRVDF), from 2006 to 2022 were reviewed. Interviews and discussions with Canadian negotiators at the CAC, along with representatives of non-governmental organizations (NGOs) and other non-state actors seeking to influence standards, were also conducted. I begin, however, with a brief discussion of meat production and consumption.

Meat debates

The production of meat in North America, is often characterized as following an industrial model with much emphasis on scale, efficiency, and the use of technology (Fitzgerald, 2015; Kirchelle, 2018). Critics of this system focus on aspects of production including food safety, the treatment of animals, the use of technology, and the increasing corporate concentration and market domination by a few companies (Clapp, 2016; McCrae, 2022). Hannan (2020) identifies a range of concerns about meat production including the killing of animals for food, the treatment of animals in meat production, and the meat industry’s environmental footprint. An additional issue is the link between meat consumption and human health impacts related to non-communicable and chronic diseases. My focus in this article, however, will be on concerns about food safety and potential threats to human health in the consumption of meat produced using technology to promote animal growth along with the impact of these growth promoters on the welfare and suffering of livestock.

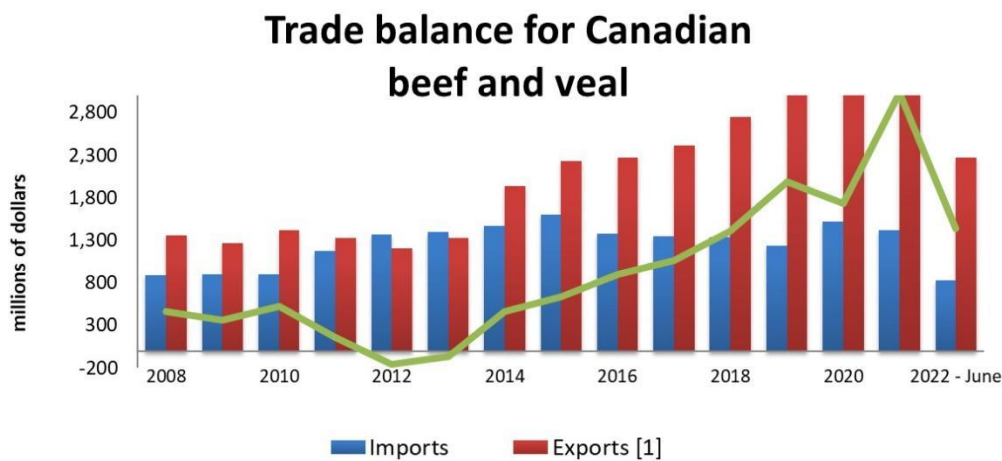
Meat in Canada: An overview

Canada is both a major food exporter and importer. The food and beverage industry represents 9 percent of manufacturing GDP and is one of the largest employers. In addition, the sector was identified by a 2017 committee advising the Minister of Finance on economic growth as a major driver of future economic growth leading the government to set robust growth targets in the sector of 31 percent by 2025. A major challenge to achieving that goal, however, was identified as the threat of barriers to foreign market access (Asare, 2022). An important element of that growth and those threats involved meat production.

Beef and pork are the most significant meat products, in terms of volume and value of meat produced and exported (Agriculture and Agri-food Canada, 2022). As the Canadian Meat Council (CMC) notes, Canada’s meat exports have grown significantly in the past fifteen years. Beef exports rose to 442000 tonnes in 2021. Exports of pork have increased from 200,000 tonnes in 1990 to over 1,151,000 tonnes,

valued at 4.2 billion dollars in 2021 (CMC,2021). A vast proportion of beef exports (72 percent) go to the U.S., 11 percent to Japan, and the remaining small balance goes to a range of countries with significant growth in some Asian markets(CMC, 2021) The European Union (E.U.) is notably absent as a major market for beef.

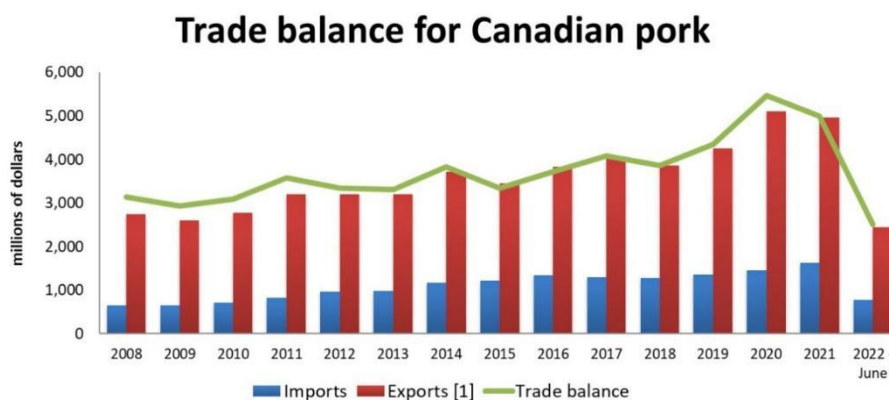
Figure 1: Trade balance for Canadian beef and veal



As Figure 1 indicates, Canada is a net exporter of beef and veal and has become increasingly reliant on export markets over time. Canada is the third largest exporter of pork behind the U.S. and the E.U. Of the meat

produced from hogs in 2021, as Figure 2 indicates, well over 50 percent is exported. Not surprisingly ensuring export market access for Canadian beef and pork has been a priority of the Canadian government.

Figure 2: Trade balance for Canadian pork



Source: Agriculture and Agri-food Canada, 2023.

Pork production, as Figure 2 indicates is even more export dependent. The bulk of pork exports went to three main markets in 2019, Japan, the U.S., and China. Once again, the E.U. does not appear as a market for Canadian pork (Canadian Pork Council, 2020).

Canada's interests and the Codex

Given Canada's position as a food exporter, it is not surprising that Canada has sought to play an active role in Codex matters since the 1990s. A government strategy for Codex was outlined in 1998 and then updated in 2008 (Health Canada, 2008). The identified goals include enhancing Canadian influence at Codex, prioritizing Codex work that advances Canada's interests, and promoting the adoption of Codex standards as the basis of national regulations, especially among the newer state members of Codex. Ultimately all are part of ensuring that Codex standards become the basis of regulatory harmonization across states to ease market access for exports. This interest in Codex is reflected in the size and activities of Canadian delegations and in participation in working groups and committees at Codex. For many years, Canada has chaired and hosted the Codex Committee on Food Labelling (CCFL), which sets food labelling standards and regulations which can potentially limit export market access. This committee has seen a number of extended conflicts over issues like labelling of food

produced using GMOs (Smythe, 2009) and, more recently, front of package food labelling. In 2013, Canada also put forward a senior official as a candidate for election as Codex Commission chair though unsuccessfully (author's observation at CAC, 2013). While there is an interdepartmental committee and consultation with relevant departments, the lead on Codex is taken by Health Canada, supported by officials from the Canadian Food Inspection Agency (CFIA).

One of the major concerns also identified in the strategy was the efficiency of Codex in developing standards. These efforts to successfully develop new standards in a timely way, encourage adoption of these standards once developed and facilitate regulatory harmonization were all challenged by major conflicts over standards and regulations regarding the use of growth promoters in meat production. A brief discussion of the nature of these follows.

Growth promoters and meat

Like the U.S. before it, Canada's meat production has relied, since the 1950s, on various types of growth promoters beginning with antibiotics followed by hormones (1960s). Table 3 provides a brief summary of the types of growth promoters used in meat production and their historical development and use.

Table 3: Growth Promoters used in Meat Production in Canada/U.S.

Type of Growth Promoter	How Administered	Impact
<p>Hormones: Six hormonal growth promoters approved in Canada for use in beef cattle: three natural—progesterone, testosterone, and estradiol-17β; and three synthetic—trenbolone acetate (TBA), zeranol, and melengestrol acetate (MGA). The U.S. FDA standards are similar.</p>	Usually implants behind the ear of the animal. Ear is discarded after slaughter	Approved for use in U.S. in 1956. Widely used in the U.S., Canada, and Australia. Exogenous hormones interact with endogenous hormones in the animal increasing feed efficiency and weight gain.
<p>Antimicrobials (Antibiotics)</p> <p>For a list of drugs see Allen & Stanton, 2014</p>	In the feed	Licensed for use in the U.S. in 1948 and in wide use in North America and Europe by 1950s. Low dose regular use leads to weight gain linked to changes in the microbes in the gut of animal to breakdown carbohydrates and increase feed efficiency.
<p>Beta Adrenergic Agonists: Ractopamine hydrochloride and zilpaterol</p>	<p>In the feed for animals:</p> <p>Given near the end point of the feeding period, i.e. close to slaughter.</p> <p>Common names for feed with ractopamine: Paylean (pigs, Cattle and large turkeys), Zilpaterol, called Zilmax and Intervet.</p>	Approved in U.S. in 2003 and Canada shortly after. The drug causes redirection of energy from the feed into muscle instead of fat but is only effective for three to four weeks and then the animal's body adapts to it.

Sources: Health Canada, 2012
Beef Cattle Research Council (BCRC), 2013.

Concerns related to the use of growth promoters in meat production typically focus on two areas: 1) human health and safety, and 2) animal welfare. In the case of human health, the use of antibiotics for growth promotion has come under increased criticism. Studies of antibiotic resistance in humans and its link to the use of antibiotics in the production of chicken, beef, and pork in the early 2000s led to growing concerns in the medical community and among consumers in several countries, (Spellberg et al., 2016) and many have moved

to restrict use. Following U.S. action in April 2014, Health Canada (2014) announced a three-year plan to eliminate the use of antibiotics in livestock, except to treat disease.

Hormones and beta agonists remain widely used and deemed safe by regulators in Canada and the U.S. Three synthetic and three natural hormones are approved in Canada and the U.S. for use with cattle. Beta agonists are more recent and used in Canada initially in pigs and later in cattle and turkeys. (BCRC,

2015). The first product, ractopamine hydrochloride, is produced by Elanco Animal, a division of the Eli Lilly company. Under various names such as Paylean, Optaflexx, and Topmax, ractopamine is added to animal feed (BCRC, 2015). Its effect is to speed up the heart rate and produce heavier, leaner, more muscled animals which are more profitable to producers. However, to be effective it must be fed to animals until very shortly before slaughter (BCRC, 2015). The result is that a small amount of drug residue remains in the meat. The Maximum Residue Limits (MRLs) that are deemed safe for human consumption are regulated and, in the case of Canadian beef, vary from .09 parts per million in kidneys to .01 in muscle tissue (Health Canada, 2022). A second beta agonist, zilpaterol hydrochloride, was approved for use in cattle by the U.S. Food and Drug Administration (FDA) in 2006. Produced by Merck it has been aggressively marketed in competition to ractopamine since its approval in both the U.S. and Canada under the brand names Zilmax and Intervet (Petersen, 2015) Questions have been raised about the usage of this newest form of growth promoters in meat production, at the Codex. But to understand and follow the conflict over and attempts to influence food standards in relation to these latest growth promoting drugs, a discussion of how Codex develops standards is in order.

The Codex Alimentarius

Codex work is carried out by member state delegates serving on committees which propose food standards. States with an interest in developing a new standard (often based on their own production practices and national regulations) will work with like-minded states and various stakeholders (e.g., producer groups, corporate organizations, and other non-state actors) to propose new work to be started on a standard. If

approved by the committee and the full Codex draft standards will be developed in committee. Once consensus is reached the draft is forwarded to the Codex Commission (CAC) for final approval. Different types of Codex committees deal with functional (or cross commodity) issues (such as general principles, labeling, pesticide, or drug residues), commodities (such as meat), and geographic regions. Each committee has a chair whose country hosts the committee's work and meetings, that is, fund the secretariat and pay meeting costs.

Countries with strong interests in food production and trade have an incentive to lead working groups and chair committees. For example, the U.S. has chaired and hosted the Codex Committee on Residues of Veterinary Drugs in Food (CCRVDF)—the site of many conflicts between members over the use of growth promoters in meat production (CCRVDF, 2015, 2021). Decisions of committees and the Commission are normally made by consensus, although the rules of procedure do allow for voting (Lin, 2013). As a result of a desire to be involved in Codex, given the increased harmonization of food safety standards in the EC and the importance of Codex standards to trade disputes, the European Community on behalf of the European Union (EU) pushed for an accession agreement with Codex and became a member in 2003 (Maier, 2008). The agreement amended Codex rules of procedure and established a division of competence between the twenty-seven individual members and the Community. This determines whether they speak with one voice via the Commission or several voices. Their votes, if necessary, are counted, however, as individual members (Maier, 2008).

Despite 189 member countries, the work of the Codex is dominated by key actors with material interests in food standards, resources, and technical expertise. Non-governmental groups, such as food

processors or biotechnology companies and consumer groups, may also attend, either as formally recognized observers or as part of state delegations. Observers can speak to issues following the United Nations (UN) model of NGO representation. Historically, the United States and the E.U. have dominated the work of the Codex, often in cooperation with smaller countries. The U.S. is part of the Quad group which includes Canada, Australia, and New Zealand—all food exporters. Their delegates maintain contact and meet prior to Codex meetings to coordinate their position on issues. More recently important food producing countries in South America, Brazil, and Argentina are playing a role along with some larger Asian countries. In many debates over standards patterns are evident where, for example, the food producing states of South America side with the U.S. and the Quad countries while countries dependent on E.U. market access will often side with or support the E.U., as will Norway and Switzerland (Author's observation; Smythe, 2009).

Just as there are variations in the power of state and regional actors like the E.U. based on their resources and market size, the power and influence of non-governmental actors also varies. Industry or producer associations tend to have the resources to closely monitor Codex activities and staff to attend the numerous Codex committee meetings. In a number of cases, representatives of these associations will be heavily involved in consultations with governments prior to meetings but also be present as part of state delegations. There they have opportunities to exercise instrumental power as they provide direct input into state positions. In contrast many consumer and public health advocacy organizations have fewer resources and, even though recognized as observers, are limited in the number of meetings they can attend, the number of staff they can devote to an issue and have more limited access to state delegates.

The development of new food standards at the Codex follows an eight-step process beginning with agreement to engage in “new work.” Draft standards are developed and negotiated at the committee level. If there are consensus delegates can decide to approve an accelerated path through stages five through eight (CAC, 2023) At the final stage, the standard is adopted by the Codex Commission. However, adoption is not automatic. Given the increasingly complex nature of food production and the use of technologies like growth promoters, there is a growing need to set standards for human health and safety. At the same time the proliferation of national regulations, the small size of the Codex secretariat in Rome, and disagreements among delegates means that developing a standard can take many years. The process has become even slower as a result of the linking of Codex standards to international trade rules and the WTO.

The SPSA and TBTA cover most aspects of regulations that relate to food. In keeping with trade liberalization obligations of the WTO, while their right to regulate is recognized, members must notify other members of any new or changed regulations. They must avoid discrimination against foreign products or those of a single country, employ the least trade restrictive regulations possible and, in the case of food safety, base or justify regulations only on scientific grounds and, where available, relevant international standards. The standards of the Codex are referenced in the SPSA and have served as a benchmark for both agreements (World Trade Organization [WTO], 2022)

The Codex standards then can be used by states, if they conform to them, to justify national measures to protect food safety or require specific forms of labeling. This has given more weight to Codex standards which historically were seen as guidelines relying on voluntary adoption by members (Veggeland & Borland, 2005). Deviation from standards, particularly in the direction

of being more restrictive than the Codex, could mean a trade dispute and the risk of costly trade retaliation. The coercive aspect of trade dispute threats creates a strong incentive for smaller countries to adopt Codex standards and for powerful food exporting countries and their allied industries to shape Codex standards to advance their trade or corporate interests. Those interests and differing national regulations on growth promoters in meat production have been at the heart of some of the most bitter Codex and WTO disputes. Most notable was the issue of hormones. However, more recently beta agonists have become the source of disagreement, much of it centered in the CCRVDF.

Given the weight the WTO puts on scientific evidence as the basis of any justification of regulations that might restrict trade, and the Codex's mandate of food safety, technology-intensive industrial meat production has posed challenges for scientific committees that provide advice to Codex delegates. The most important is the Joint FAO/WHO Expert Committee on Food Additives (JECFA) which Codex describes as, "an international expert scientific committee administered jointly by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). JECFA serves as an independent scientific committee which performs risk assessments and provides advice to FAO, WHO and the member countries of both organizations" (Codex Alimentarius, Codex and science, para 5 <https://www.fao.org/fao-who-codexalimentarius/about-codex/science/it/2023>).

Its mandate includes evaluations of residues of veterinary drugs in food and determining safe levels. The work of JECFA is demand driven responding to requests for advice that come from the Codex. With the expansion of the use of growth promoters the workload of this body has increased.

Since the 1994 WTO agreements there has been pressure for Codex to adopt and clarify procedures and practices including specifying the role of scientific advice. There has been a debate among Codex members however, on whether "other factors" unrelated to food safety could also be considered in developing standards. A 2001 statement refers "to other legitimate factors relevant for the health protection of consumers and for the promotion of fair practices in food trade" (Codex, 2013; CODEX, 2015). Delegates are divided about how to interpret this statement. Some claim that animal welfare or consumer concerns about food safety might be legitimate other factors. Others reject them and frame these concerns as disguised protectionism and irrelevant to issues of food safety. These differences are reflected in the work of the committee that took on the task of determining standards regarding veterinary drug residues in food.

The Codex committee on residues of veterinary drugs in food

By the mid-1980s it was clear that existing committees were unable to address the increased use of growth promoters in meat and milk production. Accepting the recommendations of a consultant's report and noting that the issue was "urgent and timely" the Commission agreed to establish the CCRVDF in 1986. Terms of reference are:

- a) to **determine priorities for the consideration of residues** of veterinary drugs in foods
- b) to recommend **maximum levels** of such substances
- c) to develop codes of practice as may be required

d) to consider methods of sampling and analysis for the determination of veterinary drug residues in foods. (Codex Alimentarius, 2023, CCRVDF webpage <https://www.fao.org/fao-who-codexalimentarius/committees/committee/en/?committee=CCRVDF>)

The list of drugs to be assessed is based on members' submissions and agreement of the committee. From the outset certain substances generated controversy. In December 1987, maximum residue levels (MRLs) for hormones were at issue. Because of opposition from the European Commission, the Codex did not finally act on hormones until June 1995 (Bevilaqua, 2006) launching the possibility for a U.S./Canada trade challenge. In the case of the bovine somatotropin (bST) hormone used to increase milk production the battle has been even more protracted. Despite being considered by the CCRVDF in 1998 consensus eluded delegates at both the committee level and at CAC (Smythe, 2014). In an effort to find a compromise, JECFA again assessed the safety of bST in milk for human consumption in 2012. However, many delegates had concerns about the impact on animals, a concern which led Canada, despite supporting standards for bST at Codex, to ban its use in Canada. A lengthy debate on a draft MRL in 2015 produced no consensus it has remained stalled at stage eight (CAC, 2015 para 49-51).

The use of beta agonists has also come before the CCRVDF, as countries like the U.S. and Canada where the drugs have been approved and are used in meat production, pushed for them to be added to the list of drugs to be assessed and for which MRLs could be set (USDA 2012). Those countries not permitting use of growth promoters have, in the first instance, opposed adding such drugs to the list for consideration. When

they were unsuccessful and drugs were assessed and a standard developed, they withheld approval of it in the final stages (CCRVDF, 2021). Both ractopamine and zilpaterol have been subjects of these disputes as outlined below. But first it is useful to better understand standards and their trade impact with a closer look at food-related trade disputes and what they reflect about notions of science.

Two major disputes between E.U. and other food exporters in relation to GMOs and growth promoters had at their heart concerns about regulations and their justification especially if they impacted food exports. In the first case the E.U. moratorium on approvals of GMO crops was justified by the need to regulate in the absence of scientific certainty. The delay, however, was seen by Canada, Argentina, and the U.S., all heavily invested in GM crops, as a *de facto* trade barrier. It violated aspects of the SPS agreement in not being based on existing science (though it was limited) and causing undue delay of approvals. The 2003 dispute was resolved in favour of the complainants in 2006. Some assumed this meant the death knell of the precautionary principle in regulation (Cheyne, 2009; Cardeira et al., 2009). Even so it did not result in increased market access as a 1997 E.U. requirement to label food produced with GMOs, consumer wariness and the reluctance of large food retailers to stock food labelled to contain GMOs limited market access. Work at the Codex CCFL to determine standards for GMO food labelling initiated in 1991 by the U.S. led to a protracted eighteen-year process at Codex (Smythe, 2009). However, the U.S. and its GMO crop exporting allies failed to stop the adoption of a standard that permitted such mandatory labelling.

In the case of hormones, E.U. producers had used them in meat production, until a series of health concerns surrounding studies linking hormones use to various forms of cancer, declining male fertility and

early onset of puberty in children were raised (Tosun, 2013). This led to a public outcry, as environmental and consumer groups organized boycotts of meat produced using hormones (Tosun, 2013). New E.U. regulations in 1981 banned their use in livestock production but allowed several exemptions. Despite a study on the safety to the public which had been established by the Commission, and its recommendations supporting those exemptions, pressure from agriculture ministers of member countries and the E.U. parliament for a ban continued. In addition, a growing meat surplus, and a desire to ensure consistent standards across E.U. countries, led to a decision to expand the ban (Tosun, 2013). Desiring to not competitively disadvantage E.U. meat producers, new regulations also banned intra-European, and import trade in hormone-treated beef in 1988 setting the stage for a trade dispute (Tosun, 2013).

The bovine spongiform encephalopathy (BSE) scandal and a widespread view among the public that the E.U. Commission had failed to protect consumers led, despite pressures of trade disputes, to further tightening of restrictions on growth promoters to include beta agonists in 1996 (Tosun, 2013). From 1981 to 2008 E.U. regulations on growth promoters became stricter despite counter external pressures (Tosun, 2013). The U.S. and Canada launched a dispute against the E.U. in 1995 which was successful in their claim under the SPSA that E.U. regulations were not based on scientific evidence. WTO authorized retaliation in 1999, which remained in place for a number of years, had no impact on E.U. regulations. However, the E.U. made increasing efforts to show its regulations did have a scientific basis. Recognizing the impasse, the U.S. and Canada settled with the E.U. removing trade sanctions in return for an “increase in duty free import quotas of *hormone* [emphasis added] free beef” (Tosun, 2013, p. 61). Debate has continued over the impact of hormone

residues on human health and a meta-analysis of sixty years of study noted, “it cannot be concluded that exposure to relatively high amounts of exogenous hormones is a reason for these disorders. Studies dealing with these topics showed contradictory results, and thus no general conclusion can be applied. Further endocrinological and toxicological studies using animal models and human epidemiologic studies are necessary to explain the role of exogenous hormones in human health disorders” (Snoj, 2019, p. 145).

Both the case of regulation of GMOs and the use of hormones in meat production illustrate continued conflict over the science of food safety and the role of states in managing risk. They also show the challenge of securing export market access even with an international standard that supports their production processes. This is very much the case with beta agonists. In the latter case however, animal welfare also became part of the conflict.

Power and the ractopamine Battle: A pyrrhic victory?

Though ractopamine was approved by the U.S. FDA in 1999, questions arose over the data and whether evidence of its effect on pigs had been withheld from the FDA (Pacelle, 2014). Two aspects of the drug raised concerns. The first was the extent to which the drug had harmful effects on animals by increasing stress and aggression. The second related to safety and the science of risk assessment and incomplete or competing assessments.

Clearly the U.S. and the E.U. and their allies have structural power given the size of their economies, their export markets and the depth of resources and expertise they can draw on. Other actors however, with a large and growing market for imported meat, such as China, are also important. Non-state actors have influence at

the Codex as observers or as part of state delegations. Part of that influence is based on the national economic importance of their industry in terms of employment, value of exports, and contributions to GDP. In the case of Canada for example, the association Canadian Beef claims beef production contributed \$21.8 billion to Canada's GDP in 2021 (Canadian Beef, 2021). The CMC points out that red meat consumption and exports supported 288,000 jobs in 2016 (CMC, 2021). In the case of national delegations, both the U.S. and Canada have included representatives of Cattlemen's associations in their delegations. In the U.S., drug companies have also been included. This access allows for the exercise of instrumental power as industry associations and producers can lobby for their interests. The number of observers at committee meetings also reflects power distributions. Health for Animals, an organization that represents "developers and manufacturers of animal health products" (Health for Animals, 2022 About, para 2) including pharmaceuticals had a total of nineteen representatives at the most recent meeting of the CCRVDF which dealt with growth promoters (CCRVDF, 2021). Both Elanco and Merck sit on its board.

Discursive power, an ability to frame issues and the competition among different frames, may not be totally under the control however, of those with instrumental and structural power. The U.S. and Canadian state delegates and meat industry associations at the CCRVDF framed the issue of MRLs as regulating based on "sound science" and evidence, especially regarding risks to human health. Other delegates, including E.U. member states and China, questioned not the existing scientific evidence to date but framed it as incomplete. The E.U. also raised the issue of concerns among E.U. consumers about the safety of food produced with these drugs, consistently reflected in annual food safety surveys (European Food Safety

Authority [EFSA], 2022). The negative impact on animal welfare was also raised as an important "other factor" that should be considered.

Work on ractopamine had been initiated within CCRVDF and advanced as a result of a JECFA review of risks to humans in 2004 and 2006. However, questions were raised about the adequacy of the scientific risk assessment in relation to residue in animal organs that may be heavily consumed in some cultures and other factors that needed to be taken into account including animal welfare. Concerns were further reinforced by a 2009 negative review of JECFA's scientific analysis by the EFSA (EFSA, 2009). Final approval of the proposed MRL remained stalled. At the 2011 CAC many Codex delegations, including Canada's, became increasingly concerned about the situation of standards like bST and ractopamine being kept in limbo at stage five for years (CAC, 2011).

The attempts of the CAC chair to find a compromise failed. While adopting standards is normally by consensus and votes are rare, a vote on whether to adopt the ractopamine MRL occurred in July 2012. The U.S., Canada, and other countries permitting the use of the drug, such as Brazil, were able to win a narrow two vote victory over the delegates from the E.U., Russia, and China and others who opposed adopting the standard (CAC, 2012). However, that does not mean countries were willing to alter domestic regulation in line with it.

The approval of the standard, provided the basis for a trade challenge at the WTO, given that the E.U. refused to alter its legislation and would not adopt the Codex standard. China also made its opposition clear, as did Russia, and a number of other members. Given that the E.U. and China accounted for 70 per cent of world pork consumption there would be a trade impact. A trade challenge, however, did not emerge. The experience of the hormone dispute suggested that

even though a trade challenge could be made, and “won” against the E.U. this would not result in increased market access. In fact, in Canada, the United States, and several other meat exporters a parallel process of certified hormone free meat production destined for the E.U. market was created. A similar program was developed for ractopamine. Canadian pork producers also felt the pressure to go ractopamine-free to maintain access to markets in Russia and China. Up until recent sanctions against Russia Canadian exporters had to provide a veterinary certificate and an official guarantee from the CFIA to verify meat was ractopamine-free. The Canadian Ractopamine-Free Pork Certification Program, (Canadian Food Inspection Agency [CFIA], 2022) was developed and covers feed mills and producers and slaughter facilities (CFIA, 2022, para 1.1)

In hope of maintaining access to markets, most hog producers in western Canada have abandoned using ractopamine despite supporting Canada and the U.S. in the fight to get approval for MRLs for ractopamine at the Codex in 2012. Brazil also subsequently banned its use in order to maintain access to important export markets. As with hormones, the use of beta agonists in meat production necessitated further certification processes required to obtain an import license and qualify under E.U. quotas and various tariff rates. Even the Canada-E.U. Comprehensive Economic and Trade Agreement (CETA) implemented in 2017 did not significantly increase access for Canadian beef and pork to the E.U. unless it is certified as free of growth promoters (National Farmers Union [NFU], 2013).

Zilmax

As with ractopamine, approval in the U.S. of the use of zilpaterol and its market penetration among livestock producers necessitated an international standard for the

MRL to ensure market access for meat produced using it. The U.S. proposal to add zilpaterol to the priority list of drugs for JECFA evaluation was controversial. The CCRVDF report in 2012 (CCRVDF, 2012) noted different views expressed by members, in particular, strong objections from the E.U. for inclusion of zilpaterol in the Priority List of Veterinary Drugs for JECFA evaluation. The addition of the drug was defended by the U.S., Brazil, and Canada. The U.S. argued that the drug met all criteria in the Codex Procedural Manual for placement on the priority list. Opponents argued it would face the same fate as ractopamine, which by 2012 had been stuck at stage eight of the process for years. The E.U. delegate stated that the reasons for objections were not based on science, but rather on domestic legislation, consumer preferences, and trade. Other countries added concern for animal welfare. Opponents pointed out that a consensus on a standard was highly unlikely and thus authorizing JECFA to review it and make recommendations would be a waste of its time and resources. The Committee’s report noted that there had been no consensus on the inclusion of zilpaterol in the Priority List and referred the issue in March 2012 to the CAC meeting. The U.S. challenged the opposition to adding it to the list as a violation of Codex procedures leading the Commission Chair to seek a legal opinion. This resulted in zilpaterol being placed on the priority list for evaluation by JECFA. Further discussions on zilpaterol at the CCRVDF in 2015 were acrimonious (CCRVDF, 2015b). The chair of CCRVDF noted the impact of dealing with the drugs on the committee, “The experience in adopting the MRLs for ractopamine at the Commission was extraordinarily discordant. These challenges have strained our ability to work effectively as a committee. This impact has a direct and serious impact on the future ability of

CCRVDf to be able to address equally controversial matters” CCRVDf (2015a p1.).

In the case of zilpaterol a larger challenge emerged around animal welfare and the quality of the meat produced which raised concerns among meat processors and the major buyers of cattle in the U.S. In 2013 its commercial version Zilmax was linked to animal well-being at a U.S. National Cattlemen’s Beef Association meeting where cases of cattle that had difficulty walking or were unable to move were described. Citing animal handling specialist Temple Grandin’s concerns on August 7 Tyson Foods, with 26 percent of the U.S. beef market, suspended purchases of cattle fed Zilmax, based not on food safety but on animal welfare. Merck, the manufacturer of Zilmax announced an extensive audit of the use of Zilmax and suspended sales in the U.S. and Canada. Other processors, such as Cargill, welcomed the decision and cited a “series of extensive beef tenderness tests that created concern about potential impact to product quality” (Cargill, 2013, para 2). In November 2014 Merck returned Zilmax (with FDA approval) to the market after making adjustments to the recommended dosage. In Canada it was back on the market under new regulations. At the same time Canada had developed a beta agonist free certification program for Canadian beef necessitated again to access some export markets.

At the 2021 July virtual meeting of the CCRVDf consensus on advancing the MRLs beyond stage four again eluded the committee. Delegates favoring rapid advancement (to stage five through eight) included Canada, the U.S., Mexico, and a number of South American countries and several industry observers. E.U.

members continued opposition. Efforts to agree on a compromise to advance the MRLs to stage five also failed. Thus, the MRLs remained at stage four even though the committee had accepted that “there are no public health concerns regarding the proposed MRLs and supported the JECFA scientific evaluations while recognizing that some members disagreed” (CAC, 2021, para 15). The Chair then requested that the Codex Executive Committee recommend a way forward. Their recommendation to advance the MRLs to stage five met with opposition. Concerns were raised again about the scientific evidence and its adequacy in terms of which edible tissues (liver, muscle, kidney) were tested. Some delegates argued that other tissue needed to be tested because of differences in which parts of the animal are consumed. Others questioned whether additive and cumulative effects were taken into account. Opponents challenged the use of growth promoters over all in meat production, noting national bans on use and animal welfare and consumer concerns as relevant “other factors”(CAC, 2021 para 15-19). Further efforts to find consensus failed and the issue was addressed again in the CAC meeting in November 2022 with a proviso “to ensure that all tools, including voting, are at the disposal of CAC45 to allow resolution of this issue.”(CAC, 2022, p. 5) At its first face to face meeting since Covid in November 2022, after rancorous debate, CAC members voted to adopt the MRLs at stage five but in a second vote rejected a proposal to advance to stage eight, thus slowing the adoption of the MRL and ensuring further debate over the issue.

Conclusion

These case studies of the struggle to create international standards at the Codex on the use of beta agonist drugs in meat production have, like many of the conflicts around food production and trade, reflected the material interests of various actors. States, corporations, and producers try to secure market access for their products by limiting or harmonizing national regulations that might form barriers. At the heart of these conflicts is the tension between food safety regulation and trade protectionism, and the varying views about how that distinction is made, especially where the science, which in trade agreements is to be the basis of regulation, is uncertain, incomplete, or contested. Or where other issues beyond human health are concerned.

The struggles reflect the power and influence of various actors at the national and international level. Various forms of power and influence, especially structural and instrumental, provide opportunities for large state actors and key actors in the industrial production of meat opportunities for influence, especially at the national level in countries like the U.S., Canada, and others who are wedded to the industrial meat production model. However, there has been strong resistance to the adoption of these standards at Codex. Progress to gain acceptance of the use of ractopamine and zilpaterol and define safe MRLs has been slow. Even when adopted, they have been rejected by many states that refused to alter national regulations in line with the standard. This has led to industrial meat products from Canada and the U.S. being barred from major markets. Canada's position at the Codex supporting the use of beta agonists in meat production and the development of an MRL reflect its interest as a meat exporter long committed to the U.S. developed industrial model of meat production—a model largely

supported and influenced by meat producers, processors, and drug companies. At the Codex Canada has sought to frame the issue as one of sound science reflected in JECFA risk assessments and to reject any other basis for standards. But the strength of opposition of the E.U. and large economies like China, despite the potential to launch trade disputes, forced both the U.S. and Canada to create a parallel growth promoter free certified system of meat production in order to access these markets.

Part of that opposition and its strength is linked to discursive power that actors can draw on. Opponents have challenged the frame of sound science, not necessarily by questioning JECFA's work *per se*, but by claiming it is incomplete or limited in scope in terms of the risk assessment. They also continued to raise issues of animal welfare and what the limits of existing scientific evidence are reflected in the publication of a report commissioned by the European Food Standards Agency in 2016 which concluded, "The number of studies investigating the impact of zilpaterol as a feed additive on animal health and welfare is limited. These limited studies indicate a potential increase in mortality, heart rate, respiration rate and agonistic behaviour in cattle, but do not enable one to conclude that the observed effects are directly linked to the administration of zilpaterol at the recommended use level in cattle" (EFSA et al., 2016, p. 14).

As the comments of the E.U. after the November 2022 CAC meeting indicated opposition to the use of growth promoters is based on a range of concerns, "The E.U. opposition to growth promoters is based on concerns about the health and welfare of animals, consumer preferences, and moral and socioeconomic concerns about the sustainability of farming practices that employ growth promoters. The One Health

approach also recognizes the interlinkages between these different aspects and the health of consumers” (CAC, 2022 Appendix 9 para 1).

The issue of food safety is not directly raised in the comments of the E.U however, the reference to consumer preferences is reflected in surveys undertaken regularly by the European Food Standards Agency (EFSA, 2022). They indicate high levels of public concern around pesticide residue and residues from growth promoters. Climate change, covid and the issue of zoonotic diseases has also reinforced an awareness reflected in the One Health approach of the WHO of the interconnectedness of humans, animals, and the environment in terms of food and health.

Conflicts over trade and meat production will continue. Ironically despite leaving the E.U., the U.K.

has sought to retain E.U food safety standards and regulations as it seeks new trade agreements with the U.S. (Savage, 2020) and to join The Comprehensive and Progressive Agreement for Trans-Pacific Partnership. In both cases the U.S. and Canada have pushed for regulations allowing import of meats produced using growth promoters which has alarmed some U.K. consumers and producers. Although a Codex standard now exists for ractopamine these case studies suggest that there may be limits to globalizing the industrial meat model as we see it in North America and that the discursive frames that focus on food safety, animal welfare, and environmental sustainability have been influential in opposing them.

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Original Research Article

Is cell-based meat a climate solution for Canada? Interpreting lifecycle footprints within the domestic agri-food context

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Abstract

Interest and technological know-how in cell-based meat production has grown tremendously in recent years. The appeal is wide ranging, but two main drivers include: i) the possibility of producing edible meat without requiring the slaughter of sentient animals; and ii) the potential to significantly reduce the environmental impact of animal agriculture. Owing to these potential benefits, proponents have called for major government investments in cell-based meat to further develop the technology and help launch the industry. This article critically examines the environmental promise of cell-based meat, focussing specifically on its potential role in climate change mitigation, and specifically within the context of Canada's agri-food sector. The analysis is founded upon a comparison of available life cycle

greenhouse gas assessments of cell-based and conventional meat, supplemented with contextual data about the Canadian agri-food sector. Cell-based meat in Canada is found to have a likely carbon footprint similar in scale to poultry meat, pork, and beef from dairy cattle, though considerably lower than meat from beef cattle. Alongside these findings and additional contextual factors pertaining to Canada's agri-food sector, the paper argues that cell-based meat is best understood as one tool among many which could potentially support greenhouse gas emissions reductions in domestic food production if supporting conditions are met, not a silver bullet climate solution obtained by fully replacing conventional meat.

Keywords: Cell-based meat; animal agriculture; climate change; Canada; agri-food policy

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Résumé

L'intérêt et le savoir-faire technologique quant à la culture de viande en laboratoire se sont considérablement accrus ces dernières années. L'attrait que cette production exerce est vaste, mais les deux principaux facteurs qui la motivent sont : 1) la possibilité de produire de la viande comestible sans l'abattage d'animaux sensibles ; et 2) le potentiel de réduction considérable de l'impact environnemental de l'élevage. S'appuyant sur ces avantages potentiels, les partisans de la viande cellulaire ont demandé aux pouvoirs publics d'investir massivement dans ce secteur afin de poursuivre le développement de la technologie et de contribuer au lancement de l'industrie. Cet article examine de manière critique les promesses environnementales liées à la viande cellulaire, en s'attardant plus particulièrement à son rôle possible dans l'atténuation des changements climatiques, et ce, dans le contexte du secteur agroalimentaire canadien. L'analyse est fondée sur une comparaison des

évaluations disponibles des gaz à effet de serre liés aux cycles de vie de la viande cellulaire et de la viande conventionnelle ; s'y ajoutent des données contextuelles sur le secteur agroalimentaire canadien. La viande d'origine cellulaire au Canada présente une empreinte carbone probable similaire à celle de la viande de volaille, de porc et des vaches laitières, mais nettement inférieure à celle de la viande de bœuf. Outre ces résultats et d'autres facteurs contextuels relatifs au secteur agroalimentaire canadien, cet article affirme que la viande cellulaire doit être considérée comme un outil parmi d'autres qui seraient susceptibles de favoriser la réduction des émissions de gaz à effet de serre dans la production alimentaire nationale si les conditions requises sont remplies, et non comme une solution miracle au problème du climat, qu'on appliquerait en substituant totalement la viande cellulaire à la viande conventionnelle.

Introduction

Interest and technological know-how in cell-based meat production has grown tremendously in recent years. More than \$4 billion have been invested in its development in recent years, with some conventional meat giants (including Canada's *Maple Leaf Foods*) also turning to this nascent food technology (Kucharsky, 2022). In 2020, a restaurant in Singapore made headlines for serving the world's first cell-based chicken nuggets (Gilchrist, 2021). While demonstration projects and cell-based meat companies have been founded around the world (including here in Canada), there is presently no commercial-scale production of cell-based meat.

Accordingly, some have called for major government investments in cell-based meat to further develop the technology and help launch the industry. For instance, the Good Food Institute (GFI) calls for a US\$2 billion public investment into the industry in the United States as part of the country's Building Back Better initiative (Almy, 2021). Acclaimed *New York Times* columnist Ezra Klein echoed this call, asking Congress to “dream a bit bigger” in its funding of the technology, as part of what he called a national “moonshot project” to tackle climate change, among other problems associated with livestock production (Klein, 2021). In Canada, it is

expected that some cell-based meat will be commercially available within the next decade, although some regulatory hurdles are expected to slow the novel protein's commercial availability (Kucharsky, 2022).

The appeal of cell-based meat is wide ranging amongst proponents, but two main drivers of interest in the technology include, first, producing meat tissues without requiring the raising or slaughtering of sentient animals,¹ and second, the potential to significantly reduce the environmental impact of agriculture (Post et al., 2020). This article focusses on the latter environmental motivation, and specifically on the question of cell-based meat's potential as a climate change solution. To inform the analysis I conducted a straightforward comparison of the carbon footprint and land use impact of commonly consumed (terrestrial) meats in Canada with the *likely* carbon footprint and land use impact of cell-based meats if the latter were to be developed commercially in Canada. While the results show that cell-based meat would likely have a lower carbon footprint and land use impact than conventional beef from beef supply chains, I argue that a wholesale replacement of conventional with cell-based meat is an ill-advised policy objective in Canada if the intention is to reduce the agri-food sector's contribution to global warming while providing complete protein foods for human consumption. This is largely because i) there already exist other protein rich foods with even lower

carbon footprints than cell-based meat (including some forms of conventional meat, plant-based meat alternatives, and protein rich plants); ii) there are a number of potential climate feedbacks associated with the removal of animals from the Canadian agricultural landscape; and iii) there are obstacles involved in commercially scaling up the technology of cell-based meat in the time required to achieve Canada's Net Zero objectives (as well as significant energy implications involved in doing so). Nevertheless, if greater cultural acceptance of cell-based meat could help to reduce demand for conventional beef in Canada, and potentially help relieve pressure on agricultural land use, it could play a role amongst a broader suite of sustainable protein food transition solutions. Ultimately, the development and introduction of cell-based meat should be seen as one tool to reduce the climatic footprint of the domestic agri-food sector provided certain conditions are met – not a silver bullet solution which will be able to address the problem of anthropogenic climate change in the Canadian agri-food system on its own by eliminating animal agriculture.

Situating the research problem

The world faces an urgent climate change crisis, and as the eleventh largest emitter of greenhouse gases

(GHGs), Canada has a key role to play in supporting mitigation, both domestically through emissions

¹ Presently cell-based meat production does involve some slaughter of animals as animal stem cells are required as starter cells. All the cell-based meat products referenced in the datasets used for this study used animal stem cells or animal products as a cellular origin (Scharf et al. 2019).

reductions, and internationally through supporting mitigation projects in low-income countries (Crippa et al., 2021). Domestically, Canada aims to reduce its CO₂ emissions to “Net Zero” by 2050, with a current near-term emissions reduction target of 45 percent below 2005 levels by 2030. Currently, agriculture is responsible for about 10 percent of Canadian emissions, and animal production (including animal housing and direct emissions from livestock and manure) accounts for about 5 percent of domestic emissions (Environment and Climate Change Canada, 2021). Not all animal production is intended to supply *meat* (with eggs and dairy being prime examples), and so direct *meat*-related production emissions from livestock in Canada would likely only make up a few percentage points of total domestic GHG emissions. However, the full GHG profile associated with conventional meat supply chains in Canada is likely significantly larger than this, for a few reasons. First, a considerable portion of domestic crop production is used as animal feed, so emissions associated with such crops should be counted towards livestock emissions. Second, additional energy from fertilizer production and other farm inputs contributes to Canadian food production (and feed crop production) even though their emissions are not conventionally labelled as *agricultural* emissions (Qualman, 2022). Third, emissions associated with post-farm gate meat supply chains (such as energy used in operating slaughterhouses, packaging and retail, post-farm gate transport, etc.) are also not included within most tallies of Canadian agricultural emissions (Qualman, 2022). Thus, if one assumes that about half of domestic crop production goes towards the livestock sector (Dyer & Desjardins, 2021), half of fertilizer production is used for animal feed crops, and three quarters of other farm

energy use in the country is either for animal *feed* or animal agriculture directly, then this would mean that all animal agriculture production is responsible for about 8.5 percent of Canada’s total emissions—or about 57 megatons of CO₂ equivalents (Mt CO₂e)—with *meat-related* emissions likely serving as a sizable share of that.²

Global estimates show that when the entire life-cycle of food supply chains are incorporated (including pre- and post-production, packaging, retail, and waste, and land use changes associated with food production), the world’s food system accounts for up to *a third* of all anthropogenic emissions (Tubiello et al., 2021). Growing awareness about the climate footprint of food systems has, in turn, helped cast greater attention towards meat and animal sourced foods specifically, in particular ruminant-based foods (like beef, lamb, and dairy). Following the publication of one of the most comprehensive assessments of the environmental impacts associated with global food production (Poore & Nemecek, 2018), one of the lead authors made headlines in claiming that avoiding the consumption of meat and dairy was “the single biggest way” for individuals to reduce their environmental footprint (Carrington, 2018). Growing awareness about the climate footprint of meat has contributed to reduced meat consumption in many nations, albeit on a relatively small scale here in Canada (Angus Reid Institute, 2019). Subsequent studies examining the “carbon opportunity costs” associated with animal food production have argued that global shifts to plant-based diets could also support climate change mitigation by facilitating the sequestration of large quantities of carbon—equivalent to about the last ten years of anthropogenic fossil fuel emissions (Hayek et al., 2020), or even more (Eisen & Brown, 2022)—thanks to the

² Based on back-of-envelope calculations drawing from Canada’s National Inventory Report (Environment and Climate Change Canada, 2021) and the National Farmer’s Union recent analysis (Qualman, 2022).

restoration of agricultural lands made possible by switching to proteins requiring less land overall for production.

Of course, any plan to entirely switch out meat for plant-based protein faces significant obstacles. First, meat plays an important role in food cultures globally and, generally speaking, a majority of consumers prefer meat to plant-based protein alternatives (Clark & Bogdan, 2019; Van Loo et al., 2019). Second, the global agri-food system is dominated by large corporate firms, from those involved in fertilizer production to container shipping to agricultural inputs and machinery, and large meat packers—many of which have vested interests in maintaining high and continued volumes of meat production and consumption (Zaraska, 2016). Third, the inclusion of animals in agri-food systems can support food security and poverty reduction, help tackle food loss, and provide other non-food benefits like fertilizers, draught power, and renewable textiles (Adesogan et al., 2020; Dou et al., 2018; Mottet et al., 2017; Ryschawy et al., 2017; Upton, 2004), calling to question what benefits might be *lost* if farm animals were entirely removed from the agri-food landscape. Fourth, there are some potential nutritional implications of a dietary transition away from animal proteins (if plant-based dietary transition is not sustained with close attention to nutrient and amino acid adequacy; Leroy et al., 2022; White & Hall, 2017).

In response to some of these obstacles, the idea of cell-based meat has gained greater attention to continue to have protein-rich meat, just without the animals. One key challenge for cell-based meat producers, however, is that conventional meat is biochemically dissimilar to living muscle tissue, the implication being that animal muscle tissue produced in a laboratory

environment will not have the same texture, taste, or nutritional composition as conventional meat (Fraeye et al., 2020). Unlike plant-based meat alternatives, cell-based meat (sometimes called “cultured meat” or “*in vitro* meat”)³ uses tissue engineering and culturing of animal stem cells to produce biomass made of animal muscle tissues (Tuomisto, 2019). This is not to be confused with acellular agriculture which seeks to synthesize edible protein biomass (not “meat”) through the fermentation of recombinant microorganisms (so-called “precision fermentation”)—a process already commonly used to produce enzymes, proteins, and fats (such as casein, gelatin, ovalbumin, etc.; Tuomisto, 2019).

As documented below, a small but growing literature examining cell-based meat’s potential environmental impact has emerged over the last decade, largely consisting of lifecycle assessments (LCAs), institutional and privately commissioned reports, and feasibility studies. Environmental LCAs seek to quantify the impact of production of different foods at different stages of the supply chain. The LCA literature on cell-based meat has been speculative by necessity since production has not yet thoroughly scaled commercially. LCAs have thus primarily been based on theoretical production models, or extrapolations of smaller scale prototypes. As one critique of the commercial viability of cell-based meat notes, “in the absence of a clear view of a production process, any calculations comparing environmental impact [of cell-based and conventional meat] are theoretical estimates based on assumptions and oversimplifications” (Thorrez & Vandenburg, 2019, p. 216). This has resulted in high levels of uncertainty over the real outcomes of scaling-up cell-based food products (Rodríguez Escobar et al., 2021). The LCA literature

³ This paper uses the term “cell-based meat” in line with recent guidance from the FAO (Food and Agriculture Organization of the United Nations [FAO] & World Health Organization [WHO], 2023).

on cell-based meat has tended to exclude second-order impacts and upstream supply chain inputs from its system boundaries (i.e. impacts associated with the production of laboratory equipment, pharmaceutical-grade materials and endotoxin removal of the growth media; Hadi & Brightwell, 2021; Risner et al., 2023); as such, should the industry scale-up it is possible that the total environmental impact could be larger than that resulting from an extrapolation of its inferred footprint from LCAs.

With these caveats aside, some comparative assessments have sought to determine whether a substitution of conventional meat with cell-based meat would result in a reduced climatic impact within the food system (Santo et al., 2020; Smetana et al., 2015). One early LCA found that cell-based meat production would involve 7 to 45 percent *less* energy, 78 to 96 percent *lower* GHG emissions, 99 percent *lower* land use, and 82 to 96 percent *lower* water use than conventional meat produced in a European context, though it did caution that the results were subject to “high uncertainty” (Tuomisto & Teixeira de Mattos, 2011). A follow up study in 2015 found that while cell-based meat would require smaller amounts of inputs and require less land, these benefits “could come at the expense of more energy intensive energy use” overall (Mattick et al., 2015, p. 11941), hinting at potential trade-offs involved in the scaling up of cell-based meat. This energy trade-off for cell-based meat was confirmed in a follow up comparative LCA of a range of different meat alternative proteins by Smetana et al. (2015), who found that when compared by energy equivalent portion sizes, cell-based meat performed *worse* than other high-protein meat alternatives (including chicken and dairy-based proteins) on a range of environmental and health impacts, including greenhouse gas emissions.

Meanwhile, a more recent analysis of the energy required for purifying the growth medium used in cell-based meat production has found that existing LCAs significantly underestimate energy requirements, such that environmental impacts of cell-based meat in the near future could in fact be “orders of magnitude” higher than even conventional beef—the highest impact meat in terms of its carbon footprint (Risner et al., 2023).

Because of its relatively high energy requirements, Lynch and Pierrehumbert (2019) found that the potential for cell-based meat to serve as a climate benefit vis-à-vis conventional beef fundamentally comes down to *how the energy used for cell-based meat would be generated*: If energy systems remain dominated by fossil fuel sources, they found, then the long term climatic impact of a switch from conventional to cell-based beef would result in *more* warming than a world featuring beef from cattle instead. This is owing to the different warming influences that carbon dioxide (CO₂) from fossil fuel burning has on long term global warming compared to the shorter-term warming pulse caused by direct emissions from livestock—namely methane (CH₄) and nitrous oxide (N₂O).⁴

More recent LCAs comparing a range of different types of conventional meat with cell-based meats have arrived at mixed results in terms of its climatic potential, depending on the specific meats compared and other parameters of comparison (e.g., using global average values vs. national values; assuming a renewable energy source or not; incorporating land use or not). For instance, one recent comprehensive LCA examining the future environmental footprint of cell-based meat found that in a world with a *conventional energy mix* (based on 2030 stated policy goals according to the IEA’s World Economic Outlook), its GHG impact

⁴ See “Discussion” for further explanation.

would be *higher* than pork and chicken, but if the world instead aggressively adopts sustainable energy, its GHG impact would be *smaller* than chicken and pork (Sinke & Odegard, 2021). Similarly, Santo et al. (2020) found the mean GHG footprint of cell-based meat (measured in kg CO₂e/ 100g protein) is about on par with the mean global GHG footprint for pork, but *higher* than that of poultry (and in turn, orders of magnitude *lower* than beef). Similar findings were also obtained in a recent analysis by the Breakthrough Institute—in the analysis, Shah (2022) found that cell-based meat (on average) would have a *greater* GHG production footprint than poultry or pork, but significantly less of a footprint than conventional beef. However, when the potential emissions associated with their so-called “carbon opportunity cost” (the potential emissions from global land use changes associated with the production of each commodity which could be obtained if that land was not used as such) were added, cell-based meat was found to have a *smaller* GHG

Methods

A straightforward comparison was conducted examining the GHG footprint of conventional (terrestrial) meats typically consumed in Canada (beef, pork, and poultry—including chicken and turkey), as well as the likely GHG footprint of cell-based meat, using available LCA data and supplemented with additional Canadian-specific data. First, Canadian-specific footprint values were determined using three lifecycle meta-analyses—two of which examine existing LCAs of cell-based meat (totaling n=5) and one including comprehensive data of LCAs for conventional meats (with Canadian-specific values for beef from beef herds, n=11; beef from dairy herds, n=2;

footprint than all three main types of conventional meat (Shah, 2022). According to these latter analyses, the main determinants of cell-based meat’s climate benefit mainly come down to: a) the source from which energy used in production is derived, and b) its potential to reduce total agricultural land use, which could enable significant carbon drawdown from land restoration.

One challenge from the aforementioned studies is they focus on the global scale, incorporating global average values for the environmental footprints of conventional meat production. Additionally, the literature suggests that the underlying agri-food and domestic energy and land use contexts are just as important as each food’s average carbon footprints as derived from LCAs. There is thus a need for a study in a specifically Canadian context to examine the climatic potential of cell-based meat in the Canadian agri-food system.

pork, n=2; and poultry meat, n=3). Second, system boundaries of the available LCAs were leveled based on anticipated values for both types of meat production in a Canadian context (ensuring that all stages of the production chain for cell-based meat were included through to retail, then leveling for protein content, and incorporating known values from carbon sequestration in typical Canadian beef production).

For the base GHG LCA studies of conventional meat and country specific commodity chain stages, Poore & Nemecek’s (2018) full scale model dataset was used, as the data is broken down by country and study. While Poore & Nemecek’s main findings represent

average LCA values for foods *globally*, there is a noticeable difference when country-level data are extracted from the full-scale model. For instance, Table 1 shows how Canada-wide average GHG footprints for conventional meat from the dataset are substantially lower (between -21.21 percent and -68.51 percent lower) than global average values for the same types of

meat (there are no datasets for Canadian lamb or mutton in Poore & Nemecek’s (2018) full scale model, so lamb and mutton are excluded from the analysis). It is important to use Canadian-specific carbon footprint values (if available) if the objective is to inform domestic agri-food policy.

Table 1: Canadian vs. Global average carbon footprints of Conventional Meats in Poore & Nemecek’s (2018) Full Scale Model Dataset

	Global Avg (kg CO₂eq per kg of food, retail weight)	Canada Avg (kg CO₂eq per kg of food, retail weight)	% Difference
Beef from Beef Cattle	94.55	64.19	-32.11%
Beef from Dairy Cattle	32.17	10.13	-68.51%
Pork	11.41	8.99	-21.21%
Poultry	11.00	5.40	-50.91%

One area that is excluded from Poore & Nemecek’s (2018) LCA dataset is soil carbon sequestration in pasture-based systems, and so a process was determined to apply a carbon sequestration deduction value for the GHG footprint of Canadian beef from beef cattle. Most beef cattle in Canada are grain *finished* but spend a considerable amount of their lives grazing in cow-calf operations. Studies have found that soil carbon sequestration during grazing can offset some of the aboveground emissions, particularly in adaptive or holistic planned grazing operations (Rowntree et al., 2020; Stanley et al., 2018; Teague et al., 2016). Others, however, have found that the grazing management strategy does not make a difference to rates of soil carbon sequestration (Briske et al., 2014), and moreover that the potential for carbon sequestration in grazing

operations globally is greatly exaggerated (Garnett et al., 2017). Since most Canadian pasture and rangeland is found in native grasslands, some argue that well-managed grazing could mimic the role bison played before industrialization, which helped to sequester (and continually build) carbon-rich topsoil (Brown, 2022; Kelliher & Clark, 2010). Wang et al. (2014) for instance, found that existing grazing management systems used in Canadian grasslands over the last few decades have supported a net removal of CO₂ from the atmosphere. In another detailed assessment, Alemu et al. (2017) found that carbon sequestration in beef production is prevalent, but only reduces farm-stage GHG emissions by 12 to 25 percent. Based on these latter findings, a mean carbon sequestration deduction of 18.5 percent was applied to farm-stage emissions for beef cattle GHG emissions only⁵ (see Supplementary Data Sheet).

⁵ Most *dairy* cattle in Canada are not grazed in pastures the way most *beef* cattle are, so the carbon sequestration premium is only applied to beef from beef herds (Medrano-Galarza et al., 2017). Similarly, most chicken and pork are grain fed in Canada.

Once GHG footprint values were derived for Canadian conventional meats (for beef from beef herds; beef from dairy herds; pork; and poultry meat), average GHG footprint values were determined for hypothetical cell-based meat in Canada. As the technology is still very much in its infancy, there are only a handful of LCAs for cell-based meat. Scharf et al. (2019) was used for the base GHG LCA dataset, as it provides an analysis of all pre-existing full LCAs of cell-based meat. Additionally, Sinke and Odegard (2021) and, later (during review stage edits), an updated peer-reviewed version of the same study (Sinke et al., 2023) were used to fill in gaps in the system boundaries. For instance, the Scharf et al. 2019 study highlights three main hypothetical LCAs of cell-based meat—one by Mattick et al. (2015), another by Tuomisto and de Mattos (2011) and then a revised study by Tuomisto et

al. (2014). The Mattick et al. (2015) study includes energy used in cleaning the bioreactor and production facility energy requirements, but does not include energy in reactor production, whereas the opposite is true of the two studies led by Tuomisto. This added a 2.29 kg CO₂e premium to the footprint for 1 kg of *in vitro* biomass in the Mattick et al. (2015) study (0.62 kg CO₂e for facility energy, and 1.67 for bioreactor cleaning), and a 0.108 kg CO₂e premium to the footprint for 1 kg of *in vitro* biomass in the Tuomisto et al. study (see Table 2). Meanwhile, the LCAs prepared by Sinke and Odegard (2021) and Sinke et al. (2023) appear to have considered the exclusions highlighted by Scharf et al. (2019), so no additional GHGs were allocated to their production stage emissions.

Table 2: Carbon footprint values for cell-based meat by production stage, cradle to factory gate in existing LCAs (kg CO₂e per kg of food product)

	Assumed Production Location	Bioreactor materials	Main production	Facility Energy	Bioreactor cleaning	Waste	Study totals	Totals with exclusions derived from opposing studies
Mattick et al. 2015	United States	excl.	5.13	0.62	1.67	0.08	7.5	7.608
Tuomisto et al. 2014 best case (with cyanobacteria)	Spain, Thailand, California	0.108	2.16	excl.	excl.	excl.	2.27	4.64
Tuomisto et al. 2014 worst case (with wheat)	Spain	0.108	4.27	excl.	excl.	excl.	4.38	6.75

Sinke et al. 2023 Conventional energy scenario	Unspecified (average of 15 firms internationally)	14.34	14.34	14.34
Sinke et al. 2023 Renewable energy scenario	Unspecified (average of 15 firms internationally)	2.82	2.82	2.82

The carbon footprint values for cell-based meat were then leveled with the five-stage parameters used in Poore & Nemecek’s comprehensive LCA. To clarify, the cell-based meat LCAs all use cradle-to-factory gate system boundaries, whereas Poore & Nemecek (2018) break down the LCA into emissions from land use changes, feed production, farm stage production, processing, transport and storage, retailing, and loss. As such, a premium of “retail stage” emissions (0.27 kg CO_{2e} per kg) as well as “packaging” (0.41 kg CO_{2e} per kg) was added to the cell-based meat products to match the LCA stages used in Poore & Nemecek (2018) as closely as possible. These values were derived from Canadian-specific values for retailing and packaging emissions of Canadian conventional meats (as it is assumed that the retail and packaging footprints would be similar for the final meat product, regardless of where the meat was derived). The analysis here additionally assumes that other stages noted in Poore & Nemecek (2018) are incorporated in the cell-based meat LCAs, at least in part, based on the system boundaries analysis provided by Scharf et al. (2019) and Sinke et al. (2023). The main caveat here is that the comparison between the conventional and cell-based meat values is limited by discrepancies in interpretation and measurement of the various system boundaries and supply chain categories.

The final step of the carbon footprint LCA comparison involved levelling the conventional and

cell-based meats for protein content. This was important in order to contextualize cell-based meat’s proposed replacement value over conventional protein, thanks to its animal tissue content (Moughan, 2021; Smetana et al., 2015). For instance, the Mattick et al. (2015) study’s final food product was a “Chinese hamster ovary cell biomass” at 7 percent protein content, whereas the Tuomisto studies’ final assumed food product was a “cultured minced meat product” at 19 percent protein content. Meanwhile, the two scenarios in Sinke et al. (2023) assumed an average protein content of 21.5 percent. Using the online public database made available for the *Canada Nutrient File*, the average protein content was determined for raw, ground beef, pork, and chicken and turkey (see Supplementary Data Sheet). By determining an average protein conversion factor for these meats, it was then possible to calculate the likely carbon footprint for each type of meat in a Canadian production context to obtain 100 grams of protein.

Following a similar process as above, *land use* footprints (in square meters per year; m²a) were calculated for cell-based meat and conventional meats in Canada. However, as the main cell-based meat LCAs did not use the same system boundaries as Poore & Nemecek (2018) for determining land use, Sinke & Odegard’s (2021) land use values were used instead, as they calculate mean land use values for beef, pork and chicken using the same feedstock-based system

boundaries as they do in their analysis of cell-based meat. To clarify, Sinke and Odegard (2021) report land use values which are significantly lower for conventional meats than the average land use values identified in Poore & Nemecek's (2018) full scale model, even though the former derive their figures from the latter analysis. It was thus necessary to use Sinke and Odegard's (2021) revised values for conventional meat land use footprints to ensure that all values were derived using similar system boundaries. First, the *ratio* of Canadian average land use values relative to global average values in Poore & Nemecek's (2018) database (for each type of meat) was determined; this value was then used as a multiplier to convert the global expected land uses in Sinke & Odegard (2021) to Canadian specific values (see Supplementary Data sheet).

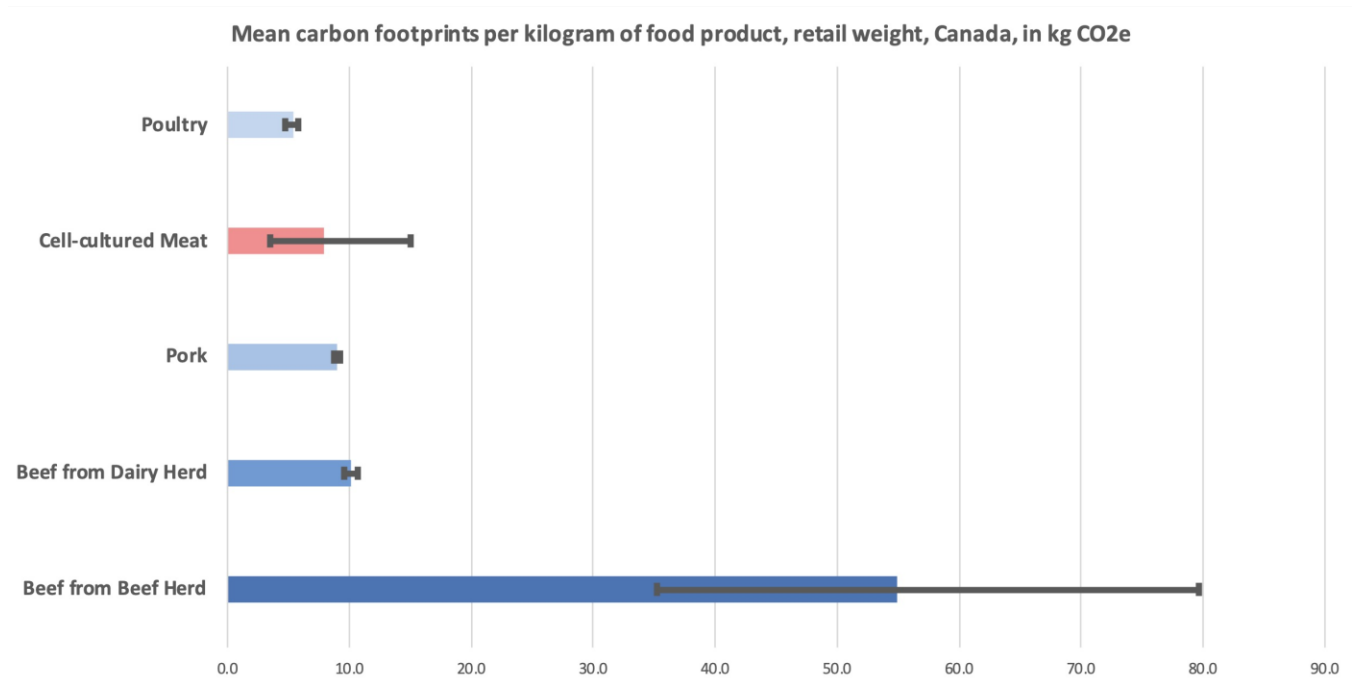
Results

The results of this analysis show that when compared with Canadian GHG footprint values, cell-based meat is likely to have a mean carbon footprint (7.9 kg CO₂e) between that of poultry meat (5.4 kg CO₂e) and pork (9.0 kg CO₂e), somewhat smaller than beef from dairy cattle (10.1 kg CO₂e), and substantially lower than typical Canadian beef (which mostly comes from beef specific herds; at 54.9 kg CO₂e), when measured in kilograms of meat product (see Figure 1). These findings are consistent with other comparative analyses of the climate footprint of cell-based meat (Santo et al., 2020; Shah, 2022; Smetana et al., 2015) in terms of the relative climate weightings of different types of meat. The carbon footprint of beef from dairy herds is

While efforts were made to level out system boundaries and assumptions across the three main data sources, it is important to note *considerable uncertainty underlying these estimates*, and they should thus be interpreted with caution. The assessment is merely hypothetical and intended to help inform the ensuing discussion. One final set of methodological caveats worth mentioning is that the analysis did not consider any potential nutritional differences between conventional and cell-based meat, nor additional ecological indicators (such as freshwater use, biodiversity impacts, air and water pollutants), which can offer a greater picture of a food's overall sustainability potential; nor sociocultural or economic factors which may limit the potential for cell-based meat to displace conventional meat in Canada (though these factors are briefly discussed below).

substantially closer to cell-based meat than beef from beef herds, even though the latter supports some level of carbon sequestration in Canadian production systems. Given the preponderance of methane emissions from enteric fermentation as the main contributing factor to beef emissions (with a Global Warming Potential about twenty-seven times greater than CO₂ over a period of 100 years), it is perhaps unsurprising that when measured in CO₂ equivalents, beef performs relatively poorly. However, given that Canadian CH₄ emissions from enteric fermentation have been declining in recent years, a “combined” GHG footprint measured in CO₂ equivalents should be interpreted with caution (see further discussion below).

Fig.1 Mean carbon footprints per kilogram of food product, retail weight, Canada, measured in kg CO₂e. Error bars show the range between lowest and highest values in the available sample.



The discrepancy between the carbon footprint of beef from dairy herds as compared to beef from beef herds is notable. This lower footprint is a result of dairy cattle emissions being shared across different food commodities (Ritchie & Roser, 2020), the use of high quality dairy feed and methane-abatement supplements, and emerging emissions capture technologies in the dairy sector through improved manure management, yield improvements, and the adoption of methane biodigesters (Jayasundara et al., 2016). The existence of lower footprint beef from dairy cattle is striking when considering the wide range of carbon footprints seen between lowest and highest cell-based meats (denoted through the error bars in Figure 1), as the mean carbon footprint for beef from dairy cattle is on par with the *median* footprint of cell-based meat. This means that replacing conventional beef with cell-based meat is not guaranteed to reduce a

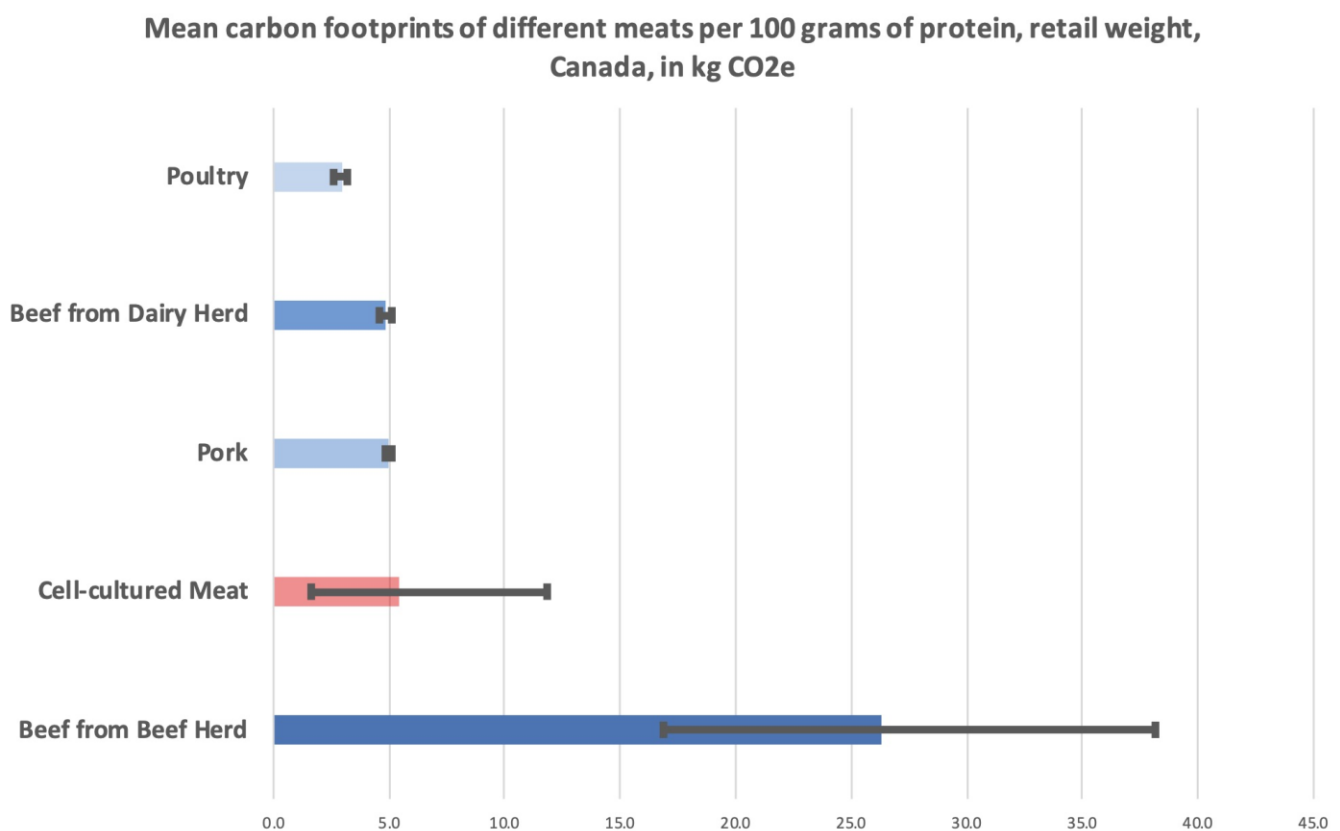
consumer’s climate footprint. Similarly, the replacement of poultry meat or pork with cell-based meat may or may not reduce a consumer’s dietary carbon footprint—it ultimately depends on how the two types of meat compare with other meats of that same type in terms of their GHG intensity.

When levelled for protein content, beef from dairy herds and cell-based meat exchanged spots in terms of their average carbon footprint rankings (see Figure 2). While these findings are useful for highlighting the need to adequately incorporate protein content in comparisons of protein-rich foods, it is expected that cell-based meats produced for market will achieve protein levels which are commensurate (if not higher) than typical ground, raw, conventional meats, and that they will be able to do so without incurring higher energy costs (Scharf et al., 2019; Sinke et al., 2023). While the mean carbon footprint for cell-based meat

placed it between poultry meat and pork, its lowest value from the sample—representing cell-based meat produced in a “renewable energy” context where all energy in production was sourced from renewables (solar, wind, and geothermal heat), and in which the soy used as feedstock was “Land Use Change Free” (Sinke

et al., 2023). This matched existing findings within the literature—that the underlying energy and land use contexts will have a significant bearing on whether cell-based meat will be more or less carbon-intensive than conventional forms of poultry meat, pork, and beef from dairy cattle—also applies in a Canadian context.

Fig.2: Mean carbon footprints of different meats per 100 grams of protein, retail weight, Canada, measured in kg CO₂e. Error bars show the range between lowest and highest values in the available sample.



Finally, cell-based meat was found to have a mean land use footprint (2.8 m²a) comparable to beef from dairy herds (2.6 m²a), when compared in terms of retail weight (see Figure 3), and between that of pork and poultry when leveled for protein content (Figure 4). This again suggests that cell-based meat is not guaranteed to have a lower climate footprint than conventional beef in Canada—even when considering

carbon opportunity costs arising from land use. It is nevertheless likely to incur a smaller land use footprint than conventional beef from beef herds (which accounts for the majority of beef consumed in Canada), and—if the right production conditions are met (in particular using renewable energy)—it could have a substantially smaller carbon footprint than all conventional meats. We now turn to a discussion of

potential caveats and implications arising from this assessment.

Fig.3 : Mean Land Use per kilogram of food product, Canada, measured in m²a. Error bars show the range between lowest and highest values in the available sample

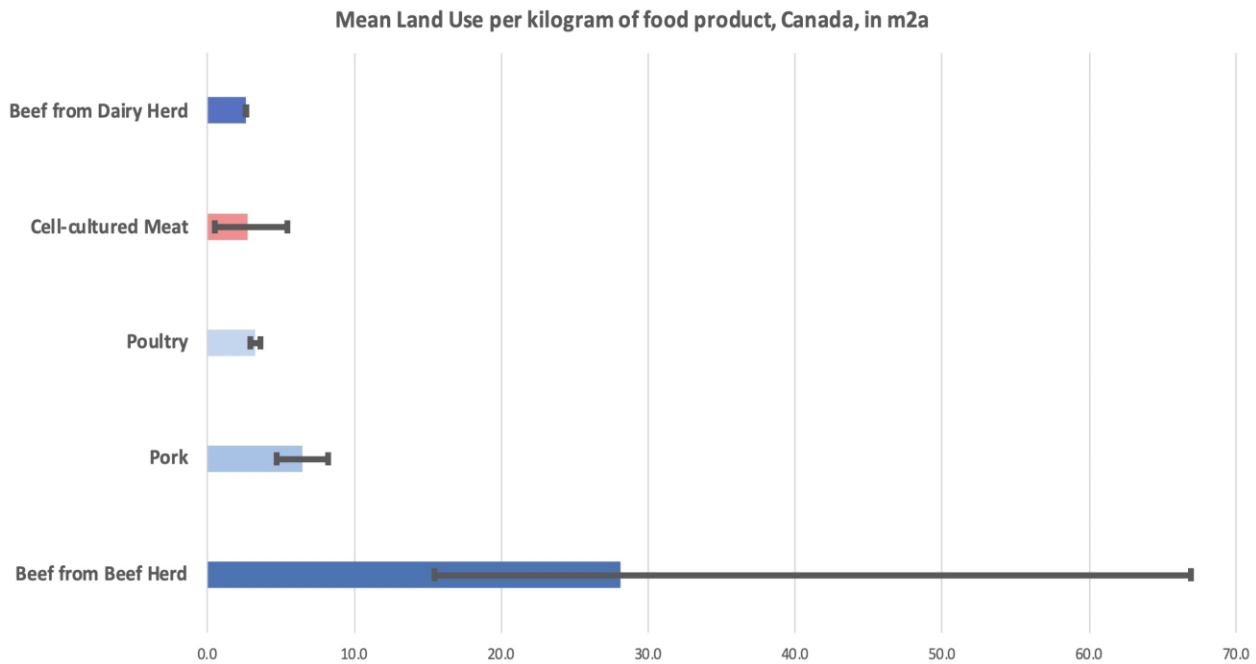
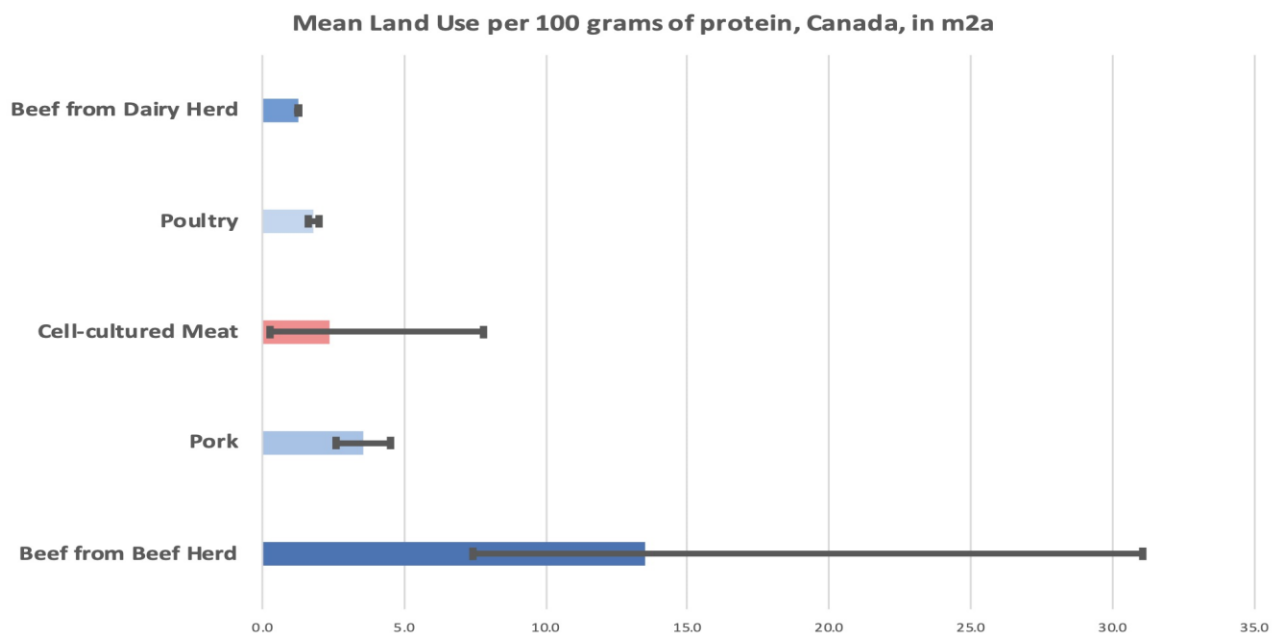


Fig.4 : Mean Land Use per 100 grams of protein, Canada, measured in m²a. Error bars show the range between lowest and highest values in the available sample



Discussion

The findings above show that cell-based meat could potentially be produced in a way which generates a smaller carbon footprint than conventional meats, and possibly even free up agricultural land for additional carbon sequestration, so long as the energy used in its production is derived from carbon neutral sources, and so long as agricultural lands no longer required for conventional meat production are reforested (and remain that way). But how likely is that in Canada over the next few decades (the period of time during which Canada aims to reach “Net Zero”)? What are some of the climate feedbacks outside of the LCA parameters, and how are they likely to impact attempts to minimize cell-based meat’s climatic footprint? Can cell-based meat serve as a climate-friendly animal protein replacement for meat derived from livestock? In this discussion I elaborate some important factors which contextualize the results of the LCAs above to help inform the policy context.

Energy tradeoffs and feedbacks

One of the most important determinants of cell-based meat’s climatic potential is the source of the energy used in its production. Cell-based meat is energy intensive in terms of both cooling and heating (during proliferation), purification of the growth medium, and electricity required for the production facility (Risner et al., 2023; Swartz, 2021). In Canada, a majority (82 percent) of electricity is derived from low and non-emitting sources as of 2021, and this is expected to grow to 95 percent in 2050 under an “Evolving Policy Scenario” (one which is somewhat more ambitious than the “Current Policies Scenarios”; Canada Energy Regulator, 2021). In this sense, the *electricity* portion of cell-based meat production in Canada is most likely to

be low carbon, particularly in provinces with mostly non-emitting grids (for instance, Quebec, British Columbia, Manitoba, Newfoundland & Labrador), in contrast to provinces which have larger shares of fossil fuel sourced electricity (for instance, Alberta, Saskatchewan, and Nova Scotia; Canada Energy Regulator, 2021). However, industrial cooling and heating is responsible for three quarters of the energy used in cell-based meat production, and for cost reasons the energy source most likely to be used for this today (in a Canadian context) would be natural gas (Alleckna, 2019). The use of passive cooling and on-site heat infrastructure *could* provide such energy with a much smaller carbon footprint, and the latter would provide green energy in a way which does not take away from the decarbonization efforts in other sectors of the Canadian economy (as the use of electricity above might). This is why the Sustainable Energy scenario envisioned by Sinke & Odegard (2021) assumed that energy for heat would be provided by a geothermal source. In short, if cell-based meat producers in Canada seek to minimize the carbon footprint associated with industrial cooling and heating of the cell proliferation process, they may need to pay more to install on-site non-emitting energy such as that provided by geothermal or rooftop solar, in addition to passive cooling systems (to benefit from Canada’s relatively colder climate).

Perhaps a more important energy feedback limiting the climate mitigating potential of cell-based meat relates to scaling up the infrastructure in the first place. As noted above, cell-based meat technology is still very nascent. Even the data from LCAs used in this analysis for cell-based meat are “based on hypothetical production processes and simulation models as *currently no large-scale production facility...exists*”

(Scharf et al., 2019, p. 6 emphasis added). This means that an entire infrastructure for producing cell-based meat in Canada would have to be built, essentially from scratch, if it were to displace a significant portion of conventional meat. Scharf et al. (2019) assume that the typical facility size of a cell-based meat factory is about the size of a brewery (with the same energy, lighting, and HVAC requirements of a warehouse). In a techno-economic assessment of cell-based meat, the GFI envisioned a “large-scale” production facility which could produce 10,000 metric tons of meat per year, and would cost around US\$450 million to build (Swartz, 2021). As Fassler (2021) points out, such a facility would require the bioreactor capacity equivalent to *one third of the entire global biopharmaceutical industry used today*. Moreover, such a large facility would only produce *a fraction* of the nation’s meat supply. For instance, Agriculture and Agri-Food Canada reports that in 2021 there were nearly 1.3 million tonnes of *beef* produced in Canada (Agriculture and Agri-Food Canada, 2022). It would thus take nearly 130 large-scale facilities of the type envisioned by GFI to replace Canada’s annual beef supply. It is impossible to tell what the carbon footprint would be for building and sourcing construction materials (concrete, lumber, metals and petrochemicals for wiring, the bioreactor and lab equipment, etc.) for this many large-scale facilities across the country, but such energy requirements arguably should be considered in the broader picture of the carbon costs of scaling up cell-based meat. Here it is worth noting that Canada’s conventional meat production industry and infrastructure *already exists*, which gives it a slight advantage in terms of having already expended the bulk of energy required to build it in the first place. To maximize its climatic potential, cell-based meat producers would have to make use of best practices in

using reclaimed construction materials, low-carbon building, and passive energy systems.

Lower carbon alternatives

As estimated above, all animal agriculture supply chains in Canada account for approximately 8.5 percent of domestic emissions. Already, this suggests that cell-based meat’s climate mitigation potential must not be interpreted as a silver bullet solution to climate change writ large, because even if *all* Canadian animal production was halted immediately and *all animal products* (not just meat, but dairy, eggs, wool, fertilizers, etc.) were replaced with cell-based or synthetic alternatives, and even if the cell-based meat industry and all synthetic replacements for animal products were 100 percent carbon neutral, there would be only be a maximum GHG emissions reduction of around 57 Mt of CO₂ eq from Canada’s annual emissions. Of course, as noted above, the GHG footprint of cell-based meat is not carbon neutral, and the development of a commercial industry to provide all the substituted materials would be significant. Moreover, in some cases—for instance substituting poultry meat, pork, or even some beef—for cell-based meat, would either result in very little emissions reductions or possibly even an increase in emissions (in terms of full protein substitution). Moreover, in terms of land use in a Canadian context, cell-based meat would likely be in the range of poultry, beef from dairy herds, and marginally better than pork. All of this suggests there are existing low carbon alternatives to the most GHG-intensive conventional meat in Canada (beef from beef herds), which are just as climate-friendly—if not more so—than cell-based meat. In particular, protein-rich plant-based foods (legumes, pulses, nuts, etc.), and even plant-based meat alternatives (which seek to mimic the texture and flavour of conventional meat but use plant

proteins as a foundation), have a much lower GHG footprint than conventional meats (Poore & Nemecek, 2018; Santo et al., 2020). It stands to reason that a more effective climate-focussed protein transition for the national diet would be one seeking to replace a portion of conventional meat with existing available plant-based proteins. This already appears to be a trend in Canadian dietary consumption of protein foods over recent decades, with the ratio of animal proteins to plant proteins in the Canadian diet shifting from 64:36 in the 1960s to about 50:50 by 2017 (Roser & Ritchie, 2022). Similarly, over the last two decades per capita meat consumption has declined in Canada, from a peak of 168 pounds in 2001 to 147.3 pounds in 2020; and the shares of beef and pork in *per capita* meat consumption have declined during this period too (from about 31 percent and 29 percent, respectively, down to 27 percent and 21 percent), as the share of chicken has grown (from 40 percent up to about 52 percent; Statista, 2021). These general trends are commensurate with climate-friendly dietary transition. One exception is that the total protein supply in Canada has grown over the last seven decades (from just over 90 grams per day in the early 1960s, to just under 110 grams in 2019), which suggests there may be more protein consumption than necessary in Canada. A second exception is that declines in beef consumption have been relatively slow in this country. To this end, if the introduction of cell-based meat could help quicken the pace of reduced beef consumption, it could potentially play a role in the broader climate-positive dietary shifts already occurring in Canada, particularly by helping to swiften declines in CH₄ emissions from enteric fermentation.

Flow and stock GHGs

Nearly all direct agricultural GHG emissions in Canada come in the form of biogenic CH₄ and N₂O

(Environment and Climate Change Canada, 2021), both of which are very powerful GHGs (about 28 and 273 times more powerful than CO₂ over a period of 100 years, respectively). Ruminant emissions of enteric fermentation account for 44 percent of Canadian agriculture emissions, and when combined with emissions of CH₄ and N₂O from livestock manure management, this total rises to 58 percent of Canadian agriculture emissions (Environment and Climate Change Canada, 2021). However, the relatively short lifespans of CH₄ and N₂O (in comparison to CO₂) present a bit of a conceptual problem from the point of view of climate change mitigation in the agri-food sector: In a condition where annual CH₄ or N₂O emissions are constant for the length of time it takes for these gases to naturally break down in the atmosphere (12 years in the case of CH₄, and 109 years in the case of N₂O; Smith et al., 2021), these emissions would make a negligible contribution to global warming, because each year natural sinks would be breaking down the same quantity of gases as that being emitted (effectively rendering a “Net Zero” condition for these gases). This contrasts with anthropogenic CO₂ emissions, a portion of which will remain in the atmosphere for thousands of years. Thus, even constant emissions of CO₂ would contribute to global warming on human timescales. Whereas climate mitigation policy seeks to completely cease anthropogenic CO₂ emissions (in net terms), what really matters in terms of CH₄ and N₂O emissions is their *rate of change*: If emissions of CH₄ and N₂O are *growing*, they have a pronounced warming impact; and conversely, if their emissions are *declining*, the result would be *atmospheric cooling* (Allen et al., 2018; Cain, Lynch, et al., 2019; Lynch et al., 2020). In this sense, the nature of direct livestock emissions presents an opportunity for climate-friendly food production, since meat from animals could still be produced without contributing to global warming (so long as CH₄ and

N₂O emissions are declining at a rate of about -0.3 percent reduction per year, or greater, in the case of CH₄; Cain, Allen, et al., 2019).

Interestingly, over the last fifteen years, emissions of CH₄ and N₂O from enteric fermentation and manure management have declined in Canada, though only minimally (Environment and Climate Change Canada, 2021). And this, in turn, means that direct livestock emissions in Canada—even direct methane emissions from enteric fermentation and manure from beef cattle, which receive inordinate amounts of attention as a cause of climate change—are not presently a significant contributor to global warming, especially if their present emissions trends continue (Katz-Rosene, 2020). However, this does not mean that livestock *supply chains* are not contributing to climate change: Emissions growth in N₂O from agricultural soils—a result of fertilizer and crop residue decomposition—have served as the predominant driver of emissions growth in the agriculture sector more broadly. Ironically, it is the animal meats *with lower relative GHG intensities*—poultry meat, pork, and grain fed beef—which are contributing more today to the Canadian agriculture sector’s global warming footprint (through their substantial use of domestic crop production and fertilizer use).

What does this all mean for cell-based meat’s climatic potential? On one hand, it suggests that cell-based meat’s role as a climatically superior protein food option to Canadian beef from beef supply chains may not be as significant as originally appears through a comparison using CO₂e as a measure for CH₄ and N₂O. On the other hand, if we recognize the pronounced role that reductions in the domestic beef cattle herd have played in driving CH₄ and N₂O emissions reductions, it hints at additional (near term) climatic benefits to be had from further reducing the size of the beef herd and the scale of domestic livestock feed production. Here

again cell-based meat could play a climate-friendly role merely by supporting a small reduction in the national beef herd, and by lessening domestic demand for agricultural cropland use. This climatically beneficial situation could be achieved without having to completely remove animals from the agri-food system.

Land use feedbacks

Proponents of cell-based meat suggest it could generate a major climate benefit from a reduction in land use. In theory, this is because a reduction in total acreage required for feed production and pasture enables land to be restored to its native habitat, thus resulting in carbon uptake from the restoration of vegetation (this is the aforementioned carbon opportunity cost benefit noted above; Hayek et al., 2020; Searchinger et al., 2019). But there are at least three main obstacles to fully realizing this opportunity cost when evaluated in a Canadian context. First, in Canada, over 85 percent of arable land is situated in the prairies, and thus a considerable portion of food production (including production of animal feed crops) takes place in that region (Campbell et al., 2002). Over 80 percent of the Canadian beef herd is raised in the prairies, from lands predominantly made up of native grasslands (Pogue et al., 2018). This means that land restoration in much of this area arising from phasing out meat production would be returned to native grassland, an ecosystem reliant upon large grazing herbivores (Anderson, 2006). True ecosystem restoration in Canada’s prairie grasslands would thus require the return of bison and elk, or other large ruminant species (or perhaps allowing cattle to graze freely as a proxy for bison), and these wild ruminants would still produce a considerable amount of methane (Hristov, 2012). If restored grasslands thus result in continued emissions of CH₄ and N₂O from wild ruminants and their manure, then these emissions

would negate emissions reductions achieved through the phasing out of livestock production (Cromsigt et al., 2018; Scoones, 2022).

Second, in order for carbon opportunity cost benefits to accrue, one has to ensure that agricultural lands previously used to support meat production actually result in less land used for agriculture. That is, one would need to ensure that such agricultural lands are not merely switched to *other* forms of agricultural production. Yet, without very strong policy intervention and financial compensation, the latter is arguably unlikely, as the drive to derive profit from agricultural land would be a strong motivator to continue its use in agriculture (particularly given expected high growth in demand for Canadian agricultural exports this century). Moreover, taking agricultural land out of livestock production, or converting it to cropland, could have unintended consequences for the climate and domestic food security. In prairie ecosystems, a conversion from rangeland with ruminants to cropland would release carbon stored in their perennial soils (Gage et al., 2016). And in non-grassland settings, (such as in eastern and western Canada) removing ruminants from pasture may not in fact yield net land use savings. This is because ruminant foods can be produced on marginal lands where crop production is not feasible. For instance, in a study examining the carrying capacity of U.S. land for food production under a range of different dietary scenarios (Gage et al., 2016), “less meat” and lacto-vegetarian diets outperformed vegan diets due to the trade off from land use savings from systems which seek to remove ruminants from marginal lands.

A third issue, related to the above, pertains to ecosystem restoration from restored pasturelands in eastern and western Canada (outside of the prairies). While successful forest remediation in these non-prairie

regions could indeed lead to carbon sequestration (and produce biodiversity benefits), there are also limiting factors in terms of the net long term climate impact: First, the darkening of land cover from decreased albedo would counteract the cooling impact from CO₂ uptake, at least in part (Jiao et al., 2017). Second, the return of wild ruminant populations (deer, moose, etc.) and beaver habitats would increase non-anthropogenic methane, which again would counterbalance some of these CO₂ gains from increased sequestration in restored areas (Cromsigt et al., 2018; Whitfield et al., 2015). Finally, for such restored managed forestlands to contribute to climate mitigation, they would have to remain intact (protected from wildfire, pests, forestry, etc.), otherwise forest destruction would return CO₂ back to the atmosphere. Unfortunately, the long-term protection of restored forests is not guaranteed given the growing scourge of wildfires, tree pests, and demand for harvested wood products in Canada (Saxifrage, 2021). For all these reasons, claims about the potential climatic benefits from land use change resulting from the substitution of conventional meat (and even beef from beef supply chains) with cell-based meat need to be interpreted in the context of potential feedbacks which may negate some of the expected gains. Nevertheless, if careful attention were paid to the land use change context in Canada while cell-based meat is introduced to market, such that considerable thought goes into net gains/losses and potential land use feedbacks from albedo, forest damage, and the return of wild ruminants, its purported land use benefits *could* be obtained, particularly if used to replace a portion of conventional beef consumption. Once again, this hints at a role that cell-based meat *could* play in a climate-friendly dietary transition in Canada if other pieces of the agri-food puzzle also fall into place, and if the right conditions are met. Yet it is important to know that merely switching out conventional meat for cell-based

meat does not guarantee a climate change mitigation benefit for Canada.

Conclusion

This paper has sought to examine whether cell-based meat can serve as a climate solution for Canada’s agri-food sector. Based on three existing meta-data LCAs supplemented with Canadian-specific details, the likely mean carbon and land use footprints for cell-based meat were determined and compared to poultry meat, pork, and two different sources for beef (from dairy and beef herds). The analysis found—consistent with existing analyses—that the mean carbon footprint for cell-based meat was similar to that of poultry meat and pork, and lower than that of beef from beef cattle. However, this analysis found that the discrepancy between cell-based meat and beef was smaller than much of the existing literature has found, in part because Canadian-specific values were used for conventional meat (where average GHG footprints are lower than global averages), and in part because specific data for beef from dairy herds was obtained (which has a lower GHG intensity than beef from beef cattle), and finally because Canadian beef production is understood to help sequester carbon, which helps offset part of its above ground GHG footprint. Moreover, while much of the existing literature has found cell-based meat to have a lower land use footprint than conventional meats, this was surprisingly not found to be significant when compared with beef from Canadian dairy herds or poultry meat, which are both highly efficient agricultural industries with regards to land use relative to global dairy and poultry sectors.

The Canadian-specific LCA findings are useful in informing the discussion about climate change

mitigation in the domestic agri-food sector. In Canada, just over a quarter of those surveyed said they would be willing to try cell-based meat—but amongst millennials and younger the portion willing to try it is closer to three quarters (Charlebois, 2022). Despite more than a dozen firms in Canada working on bringing cell-based meats to market, none has yet applied to Health Canada for regulatory approval.⁶ While there appears to be a flurry of interest in cell-based meat, judging from the emergence of new advocacy groups—such as the Good Food Institute—industry events and more than US\$2.8 billion in investment funding, most of this has taken place outside of Canada (with the U.S. and Israel accounting for the majority of capital funding; Mishler, 2023). Again, one of the main reasons for expressions of interest in cell-based meat involves its presumed lower carbon footprint. However, as hinted in the range of values from which mean LCA footprints are derived, LCAs are just part of the contextual story; they must be interpreted in light of the extraneous socio-political and ecological contexts of food production in which the data are situated. In the end, in order for cell-based meat to serve as a meaningful climate-friendly replacement for conventional meat in Canada, the following conditions would have to be met: First, its lifecycle carbon footprint must be lower than the specific conventional meat it is replacing (not merely lower than the global average footprint of said conventional meats); Second, the energy used to produce it would have to be generated from low-carbon sources, and in such a way that does not delay ongoing efforts to

⁶ In the United States, two firms have acquired permission from the USDA to sell their product commercially (Stober, 2023).

decarbonize Canada's energy system in other sectors; and third, its land use requirements must be lower than conventional meat land use requirements, and moreover, they must be leveraged to result in ecosystems restoration of agricultural lands where the carbon sequestration benefits are substantiated (and where they do not result in a reduction of the food

supply). There are thus windows of opportunity for cell-based meat to play a role in Canada's agri-food context, particularly as a tool to support the demand reductions for conventional beef from beef herds—but insofar as serving as a comprehensive solution to the climatic impact of animal sourced foods in this country, cell-based meat is no silver bullet.

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Conflicting Interests Statement: RKR would like to declare that he lives and volunteers his time on a family farm which earns income from the sale of animal-source foods.

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Perspective

Opportunities and challenges for school food programs in Canada: Lessons from the United States

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Abstract

As Canada works towards developing a national school food program, it is timely to examine the lessons learned from the programs of other countries. Analyzing these insights can help Canada avoid key pitfalls and replicate promising practices in program design and implementation. The Government of Canada has the advantage of learning from one of the longest standing national school food programs and our southern neighbour: the United States (U.S.). This paper distills vital lessons from the U.S. school food programs, with a focus on addressing four critical aspects: access, emphasis on health and education, funding, and program implementation. First, the U.S. experience demonstrates the significance of universal free school meals. The historical inadequacies of means-tested programs result

in inefficiencies, stigma, and exclusion of students in need. Second, the paper argues for an emphasis on health and education benefits. Third, it underscores the necessity of adequate funding. Inadequate reimbursements in the U.S. have compromised meal quality and led to the food industry's capitalization on school meals, with negative implications for children's health. Lastly, harnessing the power of procurement and employment can stimulate local economies, create good jobs, and foster a healthier food environment. As Canada tailors its national school food program to its diverse regions and communities, it has an extraordinary opportunity to avoid the policy and program implementation errors revealed by the U.S. experience.

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Résumé

Alors que le Canada travaille à l'élaboration d'un programme national d'alimentation scolaire, le moment est opportun pour examiner les leçons tirées des programmes d'autres pays. L'analyse de ces enseignements peut aider le Canada à éviter les principaux écueils et à reproduire les pratiques prometteuses dans la conception et la mise en œuvre du programme. Le gouvernement du Canada a l'avantage de pouvoir apprendre de l'un des plus anciens programmes nationaux d'alimentation scolaire, celui de notre voisin du sud : les États-Unis. Cet article fait ressortir des leçons essentielles des programmes alimentaires scolaires états-uniens, en se concentrant sur quatre aspects déterminants : l'accès, l'accent mis sur la santé et l'éducation, le financement et la mise en œuvre du programme. Tout d'abord, l'expérience états-unienne démontre l'importance de la gratuité universelle des repas scolaires. Les faiblesses historiques des programmes conditionnels aux ressources

entraînent de l'inefficacité, une stigmatisation et l'exclusion d'élèves dans le besoin. Deuxièmement, cet article préconise de mettre l'accent sur les avantages en matière de santé et d'éducation. Troisièmement, il souligne la nécessité d'un financement adéquat. Aux États-Unis, l'insuffisance des remboursements a compromis la qualité des repas et mené l'industrie alimentaire à tirer profit des repas scolaires, avec des conséquences négatives pour la santé des enfants. Enfin, miser sur le pouvoir de l'approvisionnement et de l'emploi peut stimuler les économies locales, créer de bons emplois et favoriser un environnement alimentaire plus sain. Tandis que le Canada adapte son programme national d'alimentation scolaire à ses diverses régions et communautés, il a une occasion extraordinaire d'éviter les erreurs de mise en œuvre des politiques et des programmes qui se sont manifestées dans l'expérience états-unienne.

Introduction

In the 2018-19 school year, at least 21 percent of elementary and secondary students in Canada participated in one or more free school food programs (SFPs) (Ruetz & McKenna, 2021). Most of these were breakfast or snack programs, but lunch programs have been developed in some regions. Overall, access to SFPs varies greatly between and within provinces and territories (Ruetz & McKenna, 2021). In 2019, the

Government of Canada pledged to develop a national SFP within the country's inaugural Food Policy (Government of Canada, 2019). However, despite this historic commitment, school food was the only program within the Food Policy without any allocated funding (Ruetz & Kirk, 2019). In 2021, Liberal Party of Canada renewed its commitment to the program in its 2021 election platform, vowing to invest \$1 billion over five

years to “develop a national school food policy and work towards a national school nutritious meal program” (Liberal Party of Canada, 2021, p. 7). Since then, the Government of Canada conducted a consultation on developing a national school food policy and released a “What We Heard Report” in 2023 (Employment and Social Development Canada, 2023). Canadians are waiting for the release of the national school food policy and to see if the national SFP will be funded in the next budget. Canada has an extraordinary opportunity to create a SFP that truly furthers the goals of its National Food Policy, unencumbered by rules and regulations derived from other eras.

As Canada works towards developing a national SFP, it is timely to examine the lessons learned from the programs of other countries. Analyzing these insights can help Canada avoid key pitfalls and replicate promising practices in program design and implementation. The Government of Canada has the advantage of learning from one of the longest standing national SFPs and its

southern neighbour: the United States (U.S.). School meal programs in the U.S. began at the municipal level during the late 1800s and early 1900s (Levine, 2008; Zhong et al., 2023). It was during the Great Depression of the 1930s that the U.S. federal government first began participating in local school lunch programs. In 1946, the United States established the National School Lunch Program, overseen by the U.S. Department of Agriculture (USDA). Subsequently, the School Breakfast Program was established as a pilot in the late 1960s, and then authorized as a nationwide option in the mid 1970s. Examining both successful and unsuccessful aspects of the U.S.’ national school lunch and breakfast programs provides valuable insights. This article focusses on four key lessons from SFPs in the U.S.: (1) choose universal free meals; (2) emphasize education and health benefits; (3) ensure adequate funding; and (3) champion values-based procurement and employment practices.

Choose universal free school meals

All SFPs must address the fundamental questions of access. For whom are the meals being prepared and served? And who will pay for them? The original National School Lunch Program subsidized all school lunches with an across-the-board cash subsidy and regular donations of commodities from the USDA but provided no additional cash to cover the costs of meals served free, though participating schools were supposed to provide them to children deemed too poor to pay.

In the late 1960s, as part of a national recognition of hunger in America, the defects of this system were revealed. In short, the system worked fairly well in schools in affluent areas, but failed schools where large

numbers of students were poor. There were simply not enough paying customers to subsidize the lunches for poor children, and millions of them went hungry. When this situation was brought to public attention in the late 1960s, the system was radically overhauled. The federal government would now reimburse schools for meals served free, a reduced-price category was created for the “near-poor,” and uniform federal income eligibility standards were established for these categories, removing the local discretion in identifying students for free meals that had been shown to involve abuse, discrimination, and favoritism. This new process, however, involved “means testing” where

families' incomes were assessed and meal subsidies provided based on a set of financial criteria. Free and reduced-price school meals were now an entitlement for those whose incomes qualified, and the program was performance funded; that is, there was a specified reimbursement for each meal served with no cap on spending. While the new system expanded access to millions of impoverished children, and participation soared, it quickly became subject to all the ills associated with a means test.

While a means test is often defended as “efficient,” it can be profoundly inefficient. In school meals, the cumbersome application, certification, verification, and accountability processes associated with means testing generate an onerous amount of paperwork, creating a large administrative burden for schools. This combined with all the other costs associated with handling money from students makes the meals more expensive. Furthermore, the household application means-test is decidedly error-prone, with an error rate of more than one in five being misclassified (Milfort et al., 2021). Further, because the U.S. system uses a single national income standard for eligibility while costs of living vary dramatically across the country, many children in real need are excluded.

Even more damaging is the impact of the means test on the reputation of school food and the experience of students. School meals in many communities came to be regarded as “welfare food” or “poor kids” lunch as a result. This stigma was repeatedly found to deter participation, even among those eligible for free meals. There have been adjustments over the years to try increase anonymity; however, the means test has continued to create divisions among students. While expensive point of sale swipe-cards or personal identification number or biometric systems (fingerprint scanners) can protect the privacy of individual students, “they cannot eliminate the idea that some students eat

free while others pay” (Poppendieck, 2010, p. 263). In the worst situations, eating school lunch becomes a badge of poverty. Students with money often opt for snacks from the vending machines, or leave campus for a fast food meal, thus frustrating the health aims of the program (Poppendieck, 2010). When cashless point of sale systems were established, parents of paying students had to put money on account for their children, launching a whole new episode of shaming as schools tried to figure out what to do when these accounts ran dry, but children continued to show up at the cashier with full trays. Phone calls and emails to parents, stamping children's hands with an “I need lunch money” message, even confiscation of full trays and their replacement with “stigma sandwiches” raised an outcry all across the country, and food service directors began reporting large amounts in uncollected school food debt.

In the U.S., complaints about the paperwork burden, the high error rates, the uncollected lunch debt, and the stigma have produced reforms. Based on the results of pilot programs undertaken in the 1990s, Congress in 2004 mandated “Direct Certification” of eligibility for free meals for all children who are “categorically eligible” for them: children whose families participate in federal welfare and food assistance programs, foster children, and homeless and migrant youth. In Direct Certification, the state agencies that administer these programs identify categorically eligible children and notify the schools; no parental application is needed. In 2010, the success of Direct Certification led to the creation of the Community Eligibility Provision (CEP). This option allows high poverty schools to feed all children free of charge and receive federal reimbursement based on a formula that reflects the proportion of categorically eligible students. CEP has generated substantial research on the benefits of the universal free school

meals approach (Bartfeld et al., 2020; Cohen et al., 2021; Marcus & Yewell, 2022; Rothbart et al., 2023; Schwartz & Rothbart, 2020).

Due to the pandemic, from March 2020 to June 2022 USDA waivers allowed all schools to serve all children free of charge. A survey of families found that when school meals are provided at no cost for to students, children are not embarrassed to eat them, but this stigma would likely return if this policy ended: 42 percent of families with children eligible for free or reduced-priced meals reported their child would be less likely to eat a school meal next year unless it was free for all students (Cohen et al., 2023). Advocates hoped that the documented positive impact would lead to adoption of universal free school meals at the national level. They were greatly encouraged when the Task Force on Hunger, Nutrition, and Health, a group advising the Biden-Harris administration in preparation for the 2022 White House Conference on Hunger, Nutrition, and Health recommended universal free school meals (Merod, 2022, paragraph 4) and the White House “National Strategy on Hunger, Nutrition, and Health” confirmed it will “advance a pathway to free healthy school meals for all” (The White House, 2022: 9). Congressional opposition, however, has scuttled such plans for the time being, despite a recent poll that showed that a majority of U.S. adults believe that universal free is a better approach (Gutierrez, 2022). Meanwhile, in 2021, California and Maine passed legislation establishing universal free school meals statewide (Blossom, 2023), and advocates turned their attention to state-by-state campaigns for Healthy School Meals for All (Food Research & Action Center, n.d.). As of this writing, eight states have passed legislation creating permanent universal free meal programs, with state funding filling in for meals that are not fully reimbursable with federal funds (see the Food

Research & Action Center’s website for updates: <https://frac.org/healthy-school-meals-for-all>).

Some Canadian advocates are hopeful about a “Pay-What-You-Can” approach to avoid means testing without totally foregoing parental financial contributions. “Pay-what-you-can” school food programs, a novel model internationally, present their own challenges. The first is the difficulty of managing ordering and procurement when revenue is uncertain. Second, the pay-what-you-can (PWYC) approach may create a moral hazard, where the more civic-minded a household is, the more it might be inclined to pay. Conversely, other households will voluntarily pay less unrelated to need, which can lead to resentment over time. Lastly, proponents of PWYC programs assert that they reduce student stigma, an assertion not yet confirmed by research. A more thorough understanding of the implications of the PWYC model must be achieved before applying this model en masse. Outstanding questions include: will schools in less affluent areas with smaller populations be able to sustain PWYC where economies of scale and parental contributions are limited? What level of student participation reduces stigma and increases program acceptance? Overall, there is a body of research that confirms that offering universal free school meals removes stigma, reduces program administration time and costs, reduces per unit meal costs, eliminates eligibility errors, boosts student attendance and achievement, reduces rates of school suspensions and other forms of discipline, and increases participation (Cohen et al., 2021; Long et al., 2021; Radsy et al., 2023; Rothbart et al., 2023; Schwartz & Rothbart, 2020), but similar findings do not yet exist for the PWYC model (Ruetz, 2023). Research on PWYC models compared to no cost models is underway and the results from this research should inform program development.

Emphasize health and education

Efforts to expand access to school meals in the U.S. are driven in part by the abysmal state of the American diet in general, and the food consumption habits of children and youth in particular (U.S. Department of Agriculture [USDA], 2023). Although free school meals are of particular value to low-income households, the well documented health and educational benefits apply to all students. A recent study revealed that school food is the healthiest food that school-aged children consume (Liu et al., 2021). Healthy school meals can improve health in the short term and teach healthy eating habits and preferences for the long run (Cohen et al., 2021; Haines & Ruetz, 2020). Such meals are themselves a form of “food education,” but they can also be explicitly linked to important elements of the curriculum (Andersen et al. 2017; Persson Osowski et al. 2013). In the U.S., this kind of food education generally occurs at school only where a non-profit group works with the schools to provide it, or individual teachers take on the responsibility of using food to achieve various state curriculum standards (Poppendieck, 2010). Many of these efforts are admirable, but only a few are explicitly linked to the food served in the cafeteria.¹ The Biden-Harris administration, however, in the strategy document released in conjunction with the 2022 White House Conference on Hunger, Nutrition and Health, captured the ideal of a school food program fully attuned to education and health, priorities that can inform Canadian program design and practice.

“A ‘healthy meals for all’ approach would reorient the school meal programs from an

ancillary service to an integral component of the school day and allow schools to focus on providing the highest quality meals and engaging children around healthy food. Essential components of this approach are expanding effort to increase access to local and regional food systems, enabling more schools to cook meals from scratch by funding training and equipment purchases, investing in the school nutrition workforce, and expanding nutrition education for children. Elevating school meals is a key strategy to improve our nation’s health and would benefit all children” (The White House, 2022: p. 9).

In Canada as in the U.S., the diet quality of students across the socioeconomic spectrum is poor (Minaker & Hammond, 2016; Tugault-Lafleur et al., 2017, 2018). Canada has the opportunity to design a program that fully integrates school meals with instruction, amplifying the long-term health benefits of nutritious school food. Integrating school meals with food education is more likely to occur if provincial education and health departments are centrally engaged in the establishment and operation of SFPs. In the U.S., while the national program is administered by the USDA, reflecting the historical links to the distribution of farm surpluses (Levine, 2008), state level oversight of funds and compliance with menu standards is located, in all but two states, in state departments of education.² In Canada, at the federal level, the Prime Minister asked Agriculture and Agri-Food Canada and the Economic and Social Development Canada to take the lead on developing the new program (Trudeau, 2021a; Trudeau

¹ Several non-profit organizations in the U.S. maintain data bases or guides to curricular resources for food education in schools (Center for Ecoliteracy; n.d.; Vermont FEED, n.d.).

² New Jersey and Texas are the exception with State Departments of Agriculture overseeing school meals.

2021b). If Canada hopes to realize the maximum educational and health benefits from school meals,

educators and public health experts should be at the table from the outset.

Ensure adequate funding

In the U.S., funding has been reliable since free and reduced-price meals became an entitlement in the early 1970s, and relatively stable except for sharp cuts introduced by the Reagan administration in the early 1980s. Federal reimbursements are adjusted annually to account for inflation, but are often insufficient when taking into account all costs for providing meals (Congressional Research Service, 2020) thus inadequate for providing the kinds of meals that would most benefit students and local food systems. For any local school food provider, the break-even point is a product of reimbursement rates, the price charged to full price students, and the participation rate. Participation is crucial because fixed costs like electricity and gas, janitorial services, and management salaries are spread over the number of meals served. The higher the participation rate, the lower the unit cost of producing each meal (Long et al., 2021; Poppendieck, 2010). Like the eligibility thresholds, federal reimbursement rates have been uniform across the nation. Federal meal reimbursements are particularly insufficient in areas with comparatively high labor costs, and in large cities and remote rural areas where the costs of local distribution of food supplies are high (Public Plate Working Group, 2014). States can and do supplement the federal reimbursements, but overall, the need to break even has contributed to a downward pressure on nutrition and palatability. Perhaps the most famous episode is the Reagan administration's effort to save money by revising nutrition standards, including counting ketchup as a vegetable (Poppendieck, 2010). That proposal elicited a storm of bad publicity and was

hastily withdrawn, although the most recent round of federal school food rule making has authorized pizza sauce to be counted toward the vegetable standard (Bingham, 2011). In the 1990s, the use of Nutrient Standard Menu Planning (NSMP) instead of the food-based approach that had been in place for decades, further opened the doors to items like enriched Cheetos in the cafeteria (Butler, 2014). Happily, this foray into nutritionism was terminated in the U.S. under the 2010 Healthy Hunger Free Kids Act (Smith et al., 2016). Canada can avoid this sort of trap by sticking to the food-based approach featured in its 2019 Food Guide.

The full impact of inadequate reimbursements cannot be appreciated without an understanding of the many ways in which the food industry in the U.S. has capitalized on the budget challenges of school food authorities. In short, food manufacturers use the budget constraints to market highly processed items—for example, Smuckers “Un crustable” peanut butter and jelly sandwiches with twenty-five separate ingredients and a 270-day shelf life—as a way of reducing labor costs (Poppendieck, 2010). For main dish products that contribute to the meat and meat alternate (e.g. beans, cheese) component of the school food meal patterns, USDA facilitates such marketing by permitting manufacturers to state this contribution on their labels and offer a warranty against audit claims for products that have been evaluated by USDA and awarded a CN (Child Nutrition) Label (USDA, 2013). That is, if a state education department reviewing the meals of a local educational authority finds that a beef burrito does not contain the two ounces of meat

specified in the meal pattern and claimed on the CN label, the manufacturer, rather than the local food service will be liable and must reimburse the schools for any meal disallowed because of a failure of the manufactured product to meet the standard.

The most extreme example of the food industry's capitalization on school meals in the U.S. was through the widespread conversion to manufactured heat-and-eat meals called “meal packs” or “prepared meals systems,” in the 1970s and 1980s. Driven largely by efforts to save on labor costs as pensions and health insurance raised the expense of municipal employees, corporations that manufactured frozen meals similar to TV dinners offered school systems complete meals and the walk-in freezers and convection ovens needed to manage them. The frozen meals were stored on trays stacked on racks with wheels. All the cooks had to do was wheel the racks out of the freezers and into the ovens, and then out to the serving lines. Not only fewer workers, but less skilled and thus less expensive labor was needed (Poppendieck, 2010).

The U.S. experience with manufactured meals is a cautionary tale for Canada. Though the meals were technically designed to meet USDA's nutrition requirements, they failed the common-sense test of palatability, with frequent complaints that portions of the meal remained frozen while others were too hot to eat. Laboratory analyses sometimes found the meals lacking in the nutrients they promised to provide (Poppendieck, 2010). Meanwhile, schools using such systems allowed the infrastructure necessary for fresh preparation to atrophy, if they had ever had it, so that when food activists turned their attention to the quality of school food, they often found kitchens without the basics for fresh preparation: knives, meat slicers, and working stoves (Pew Charitable Trusts, 2013). A good news story from a statewide study in California is that schools' combined labour and food costs comprise very

similar percentages of total food service budgets regardless of the amount of scratch cooking. In short, once schools have the infrastructure for scratch cooking, ongoing operations are not more costly than heat-and-serve, yet scratch production generates more full-time jobs, opportunities to source local food and preparing more diverse and culturally relevant meals (Vincent et al., 2020). Communities in Canada should make assessments of their existing infrastructure assets, and build the infrastructure needed to create the kinds of meals they want for their children, and funding for infrastructure should be a central part of start-up assistance (Coalition for Healthy School Food, 2023; Ruetz, 2022).

One other cautionary tale from the U.S. experience rooted in inadequate funding was the sale of other foods to offset costs of reimbursable meals. In the U.S., for many years, school food service operations and other school entities were allowed to sell foods in competition with the reimbursable meal—in the cafeteria, in the school store, in vending machines in the halls, wherever and whenever they pleased (Poppendieck, 2010). Principals counted on such sales for discretionary funds, athletic teams used them for equipment, and cafeteria managers used them to help close the gap between revenues and costs (Poppendieck, 2010). Even items sold a la carte in the cafeteria were not required to comply with the nutrition standards governing the reimbursable meal.

The back story here is instructive. When the Reagan administration cut the federal subsidy for all school meals and raised the eligibility threshold for reduced price meals in the early 1980s, participation plummeted. Food service operators, unable to break even, turned to a la carte sales to make ends meet, often the burgers, fries, chips, pizza, and shakes that were American teenagers' favorite foods. Needless to say, the manufacturers of packaged processed foods of all sorts

began aggressive marketing of their products to schools and became fierce opponents of any regulation of a la carte items sold in schools (Poppendieck, 2010). A la carte undermined the nutritional integrity of the programs, both for students who chose a la carte over the nutritionally regulated meal and for those whose a la carte purchases displaced important elements of the official lunch or breakfast. Further, a la carte exaggerated the gulf between kids with cash and those without, greatly intensifying the stigma attached to the free and reduced-price meals.

As obesity became a national issue, legislation gave the Secretary of Agriculture the authority to regulate sales in the cafeteria (Institute of Medicine, 2007). Not

until 2010 did U.S. policy change to impose significant nutrition standards on food sold elsewhere in the school. Now a detailed list of regulations limits foods for sale anywhere in the school during the school day to items that meet the general nutrition profile imposed on components of the reimbursable meal (Food and Nutrition Service, 2016). Food service providers frequently complained but generally adapted. Canada can avoid these pitfalls by regulating other foods sold at school from the outset—or prohibiting them altogether—and providing performance funding, instead of the predominant method of capped school grants that do not keep a pace with inflation.

Harness the power of procurement and employment

Any policy that establishes large scale procurement of food creates opportunities to enhance the food system. Similarly, any policy that creates a substantial number of jobs impacts labor standards. In the U.S., competitive bidding rules at the federal, state, and local levels long hampered efforts to promote direct farm-to-school purchases and other procurement designed to build local food system capacity and support local economies. Most of these rules were established in the late 1800s or the first decade of the twentieth century when Good Government advocates sought to curb corruption and nepotism in public expenditure. They generated a culture of “best price” as the sole criterion for selection (Public Plate Working Group, 2014). Only recently has the concept of “best value” begun to replace the best price straitjacket (Morgan & Sonnino, 2008). Federal rules now permit local preference in school food purchasing, and a “Good Food Purchasing” movement now urges municipalities to commit to procurement that reflects five core values:

local economic development, nutrition and health, animal welfare, environmental sustainability, and a valued workforce (Farnsworth et al., 2018).

The last of these entails adequate pay and benefits, and safe and healthy working conditions. In the U.S., while unionized school food workers in some large city systems have reasonable pay levels, much school food work has been underpaid and deskilled (Gaddis, 2019). This is particularly troubling because school food jobs can be ideal for single parents because they adhere to the school calendar, reducing the need for childcare. Accordingly, future school food jobs need to be “Good Food Jobs,” which are jobs that promote health and wellbeing for workers, including the provision of a living wage, comprehensive benefits, and a pathway to fruitful careers (NYC Food Policy Center, 2013). In Canada, where many current school food providers are volunteers, there is an opportunity to build a school food workforce that not only provides fresh, nutritious food for students but also creates new jobs.

A preliminary University of Guelph study suggests Canada’s national SFP could directly stimulate 62,000 jobs and indirectly stimulate as many as 207,000 new jobs in the agri-food sector if local food procurement was integrated into the program (Ruetz & Fraser, 2019). If adequately supported, such as ensuring school food staff receive a living wage and scratch cooking training, Canada can reap the crosscutting benefits from creating in Good Food Jobs.

The creation of Good Food Jobs with skilled scratch cooking techniques brings with it a significant opportunity to purchase locally grown, whole food. The purchasing power from Canada’s national SFP can be utilized to make positive impacts on various fronts. A preliminary University of Guelph study suggests that a Canada-wide program could contribute \$4.8 billion

to the economy over ten years if 30 percent were spent on local food purchases (Ruetz & Fraser, 2019). Adopting local procurement strategies aligned with these values is a win-win for both students and the broader community, promoting health, local farmers and businesses, and sustainable food systems in Canada. Values based procurement is on the rise and Canada has the opportunity to build this into its school food policies. Canadian governments should learn from the mistake in the U.S. of not providing school meal funding that accounts for regional differences as labour and food costs vary significantly throughout a country. In addition, school food funding must keep pace with inflation and funders must ensure there is enough funding to pay livable wages to nutrition workers, particularly in communities with a higher cost of living.

Conclusion

Canada’s diverse geography, agricultural regions, and traditions mean that food availability, preferences and funding supports vary across the country. A one-size-fits-all approach is unlikely to be suitable for all regions and communities. Certain fundamentals, however, should be embedded at the core of the national program. Based on lessons learned from the U.S. school meal programs, Canada would be well served if the program:

- offers universal free school meals;
- regulates other foods sold at school or prohibits them altogether;
- integrates school meals with food education in the curriculum;

- provides adequate performance funding for school meals instead of capped school grants that do not keep pace with inflation;
- proactively uses food procurement and job creation to advance the goals of Canada’s Food Policy;
- provides enough funding to pay livable wages to nutrition workers, particularly in communities with a higher cost of living.

By incorporating these key lessons into the national SFP, Canada can create a comprehensive and inclusive initiative that addresses students’ nutritional needs, fosters a positive school environment, supports local communities, and promotes healthy habits for future generations.

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Original Research Article

Food insecurity in books for children: A qualitative content analysis

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Abstract

Issues of class and poverty are largely absent from children's fiction and from elementary school curricula, even though in Canada one in every five children lives in a food insecure household. This paper examines the limited number of middle grade children's books that feature depictions of food insecurity published in North America in English in the past forty years and interrogates their assumptions about children, poverty,

food, and hunger. While the primary cause of food insecurity for children is inadequate household income, often due to systemic inequities, most children's fiction suggests that individual choices or life circumstances are to blame and that charity, kind strangers, and simple luck are the solutions, giving children, at best, an incomplete understanding of the social and political issues that produce food insecurity.

Résumé

Les questions de classe sociale et de pauvreté sont généralement absentes de la littérature pour enfants et des programmes scolaires des écoles primaires, même si, au Canada, un enfant sur cinq vit dans un foyer affecté par l'insécurité alimentaire. Cet article examine le

nombre limité de livres pour enfants de 8 à 12 ans décrivant l'insécurité alimentaire qui ont été publiés en Amérique du Nord, en anglais, dans les 40 dernières années. Il s'agit d'interroger leurs présupposés sur les enfants, la pauvreté, l'alimentation et la faim. Alors que

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la cause première de l'insécurité alimentaire des enfants est l'insuffisance des revenus du ménage, souvent due à des inégalités systémiques, la plupart des œuvres littéraires pour enfants suggèrent que les choix individuels ou les circonstances de la vie en sont

l'origine et que la charité, les gentils étrangers et la simple chance constituent les solutions, ce qui donne aux enfants, au mieux, une compréhension incomplète des facteurs sociaux et politiques qui produisent l'insécurité alimentaire.

Keywords: Children's literature; food insecurity; poverty; shame; social justice; windows and mirrors

Introduction

Children's literature is believed to have the capacity to influence children's understandings of the world, developing belief systems, self-esteem, and even behaviour (Crawford et al., 2019; Darragh & Hill, 2014; Johnson et al., 2018). In 1988, educator Emily Style imagined a curriculum framework that saw classroom materials, including books, as both windows and mirrors, a concept that has been regularly applied and expanded in the intervening three and a half decades (see for example Bishop, 1990; Botelho & Rudman, 2009; Enriquez, 2021; Johnson et al., 2018; Myers, 2014; Waller & Sullivan-Walker, 2023). Style (1988) believed that young readers should have the opportunity to look through a variety of "windows" to view the experiences, thoughts, and belief systems of others, and to look into "mirrors" to see themselves and their experiences both reflected and validated. For those children who have historically been marginalized in curricula (and in life), windows and mirrors have the potential to change the way others see them as well as the way they see themselves; equally importantly, windows and mirrors teach those in majority cultures that theirs is not the only valid or authentic experience. Bishop (1990) added the important concept of "sliding glass doors" that allow children to enter into other worlds, while Myers (2014)

argued for books that provide a map for children to follow into unfamiliar terrain: children, Myers (2014) says, "are indeed searching for their place in the world, but they are also deciding where they want to go. They create, through the stories they're given, an atlas of their world, of their relationships to others, of their possible destinations" (n.p.). These concepts—windows, mirrors, glass doors, and maps—provide a lens through which to analyse the portrayal of social issues in children's literature.

Books for children "are not ideologically neutral or innocent" (Hartsfield, 2022, p. 80). Currently, there is an increased emphasis on publishing books for children with long-neglected content: ethnicity, race and immigration status, 2SLGBTBQIA+ themes, and disability and neurodiversity are all much-needed subjects that some publishers are eager to add to their lists. While attention to classism, poverty, and food insecurity *are* increasing—based on this research, at least—these subjects continue to be underrepresented in children's literature. The purpose of this paper is to examine how poverty and food insecurity are portrayed in children's books, and what solutions to poverty and food insecurity (if any) are offered.

Selection criteria and research process

Book titles were collected via poverty-themed searches in public library holdings, Amazon Books’ “Children’s Books: Homelessness and Poverty”, and Chapters/Indigo subject listings; TeachingBooks poverty-themed books; “food & water justice,” “economic class,” and “gentrification & housing” booklists on the Social Justice Books website; online poverty-themed children’s book lists (these latter two including the terms poverty, homelessness, food insecurity, and hunger); other researchers’ book lists; and word of mouth. From these many sources, fifty-two books were identified based on the following inclusion criteria:

- Middle grade fiction (aimed at eight- to twelve-year-olds);
- A significant element of the story involves a child or children not always having enough food to eat or interacting with others (children or adults) who do not always have enough food to eat;
- Published in English;
- Contemporary, realistic setting with human characters;
- Set in North America, Europe, or Oceania and concerned with food insecurity in the Global North.

Identifying books that feature food insecurity as a significant plot element was not always easy prior to actually reading the book. Publishers’ synopses and independent book reviews were examined,¹ and fourteen books were eliminated that appeared to deal

only with other aspects of poverty, such as homelessness, or other social issues, such as abuse. Nine books were found to be out of print (most from the 1980s and early 1990s), and five were unavailable in two out of three Canadian public library systems.² The remaining twenty-five books were accessed through the author’s public library system in Nova Scotia for reading and review. Due to the considerable effort required to track down many of these books, it is likely that individual children would come across only a small percentage of these titles. The twenty-five included books (see Table 1) were published between 1981 and 2023; a significant proportion (40%) were published in the past five years, and most (72%) were published in the last ten years—an indication that the subject is receiving increasing attention. Twenty of these books were published (and presumably set) in the United States, one was originally published in Australia, while the remaining four were published in Canada.

During my preliminary reading of each book, when I arrived at text that indicated hunger, appetite, lack of food, longing for food, dislike of food, provision of food, refusal of food, or eager food consumption, I tagged the spot with a sticky note to return to. On second reading, once the overall shape of the narrative was apparent, I transcribed food-related portions of the book and wrote a brief synopsis to identify key themes, ideological assumptions, and cultural messages related to poverty and food insecurity. In particular, I noted the events and explanation(s) given for how individual(s) or families came to be food insecure, what interactions with food (or a lack of food) occurred through the book, how the young protagonist and/or

¹ These included Kirkus Reviews (<https://www.kirkusreviews.com/>), Publishers Weekly (<https://www.publishersweekly.com/>), the Children’s Book Review (<https://www.thechildrensbookreview.com/>), and Goodreads (<https://www.goodreads.com/>).

² Library jurisdictions searched included Nova Scotia, Ottawa, and Vancouver.

their caregivers dealt with hunger and food insecurity, and how their food insecurity was resolved at the end of the book. I used a constant comparative method, and new themes emerged as I read. In many cases I went back and re-read some texts for a third time where my initial notes were not adequate.

All of the twenty-five middle grade books, except one, feature a protagonist who is food insecure. The one exception is *Dew Drop Dead* by James Howe, a mystery story first published in 1990. Its premise more closely resembles many picture books featuring protagonists who are confronted with the food insecurity of others;³ the focus is on the alleviation of the simple, immediate, and outward effects of poverty—providing food, clothing, and (usually temporary) shelter—and the moral satisfaction of the middle-class providers.

The twenty-four remaining books featuring protagonists who are themselves food-insecure are written in the first person. Ten protagonists are boys and fourteen are girls, but only three of the twenty-four authors are male.⁴ The three male authors' books all have male protagonists, and these fictional boys' stories are among those most focused on both feeling and avoiding shame. Overall, many of these books remain grounded in stereotypically gendered assumptions about appropriate sex roles, assumptions often made by the protagonists themselves. For example, in *The Exact Location of Home*, Zig assumes his girlfriend Gianna will not understand how it feels for him to live in a shelter: "How can you, when you go home to your house with your mom and dad both there, with your *dad actually working and paying bills*, and your *mom home to make sure there's broccoli or something with dinner...*"(Messner, 2017, p. 211, emphasis mine). It is

almost always the fictional mothers who are expected to care for and cook for children, and with few exceptions it is women—librarians, school administrative workers, neighbours, and strangers—who notice protagonists are hungry and take steps to feed them.

Two of the books are marketed as "memoirs" by adults who experienced poverty and food insecurity as children, written by authors Rex Ogle (*Free Lunch*, 2019) and Katie Van Heidrich (*The In-Between*, 2023). Another writer, Eric Walters, has stated that his book, *The King of Jam Sandwiches*, published in 2020, is based on his own childhood experiences. These three books do seem to pay more authentic attention to both the physical and emotional *feelings* of habitual hunger, and display a deeper complexity of parental motivation and child-protagonist understanding. For example, Walters' protagonist Robbie is food insecure not because of a straightforward lack of food, but because both he and his father hoard food and for different reasons are reluctant to eat it—the father because he has a mental illness, while Robbie seeks to protect himself in the event of his unstable father's prolonged disappearance. However, these fictionalized "true" stories are not entirely free of the tropes about food insecurity, shame, and self-sufficiency present in the majority of the sample books.

The "memoir" books *Free Lunch* and *The In-Between* make up two of the only three books in this study that feature other-than-White main characters. Ogle and Van Heidrich are mixed race, and the only other BIPOC writer on the list, Kelly Baptist, a young Black writer who won the 2015 We Need Diverse Books contest, features a Black family and many other Black characters in *Isaiah Dunn is My Hero*, published in 2020. The remainder of these books are

³ Picture books about food insecurity are discussed in a separate research paper (manuscript in preparation).

⁴ Writing for children is still a female-dominated industry, although women writers and illustrators do not always receive equal recognition for their work (Magoon, 2014).

overwhelmingly and almost exclusively White. In my notes, I repeatedly wrote “assumed White” where there were no markers for skin colour or other physical attributes, or social or cultural cues, that might make race recognizable. Interestingly—considering our current celebration of the “diversification” of children’s texts—in this sample it is the two oldest books whose White authors seem to address race more directly and honestly. Cynthia Voigt’s *Homecoming*, first published in 1981, and Paula Fox’s *Monkey Island*, first published in 1991, each feature at least one significant Black

character who provides help to the protagonist(s), but who also must deal with overt racism from other characters, including being called the N-word. In comparison, it seems that contemporary White writers of middle grade fiction about poverty do not, for the most part, write about race or think to include diverse characters in their stories. I expect this would be similar for all children’s fiction regardless of subject, although it is particularly noteworthy here given the significantly higher rates of food insecurity among BIPOC individuals and families.

The portrayal of poverty in children’s books

The central question motivating this review is what does contemporary North American Children’s fiction teach children about food insecurity? Or, put another way, what would children learn about poverty and food insecurity by reading these books? I am concerned not only with the portrayal of those living in poverty, but the portrayal of ways that poverty is alleviated, ameliorated, or escaped.

Regardless of how well or badly they are written, middle grade children’s stories dealing with poverty and food insecurity are largely formulaic, and the formula has seemingly changed little over the past forty years. The middle grade protagonist living in poverty and dealing with food insecurity is an oldest or only child who feels single-handedly responsible for holding the family together, both practically and emotionally. They are often academically or artistically gifted or have a special and unique talent, are almost always avid

readers, and manage to keep their grades up despite the (usually extreme) challenges at home. There is often one previously-published well-known book (or several books) that serve as guiding stories throughout the novel; these books appear to date from the *writer’s* childhood and are not contemporary favourites.⁵ The food-insecure protagonists are responsible for exponentially more work than usual, provided either willingly or resentfully. While there is no doubt that children living within conditions of food insecurity are of necessity canny and resourceful, the level at which these fictional eight-to-twelve-year-olds operate boggles the mind. They do the grocery shopping, prepare meals (and not always simple ones), feed non-functioning parents or younger siblings, clean up family cars, vans, kitchens, apartments, or trailers, pay bills, line up alone at the food bank, and secretly procure food from kind friends and strangers, because their adult “caregiver”

⁵ Examples include *Little Women* (first published in two parts in 1868-69), *Anne of Green Gables* (1908), *The Secret Garden* (1911), *The Last Battle* (1956), *My Side of the Mountain* (1959), and *I Know Why the Caged Bird Sings* (1969). One “newer” book, *The House on Mango Street* (1984), is referenced in at least five of the books I reviewed. This inclusion is all the more curious because its subject matter—racism, sexism, puberty, and sexual abuse, in addition to poverty—would likely place it in young adult fiction (YA) rather than middle grade (MG).

must never find out. In addition, they sometimes go without food so their parent or, especially, their younger sibling can eat. While their heroic deeds go unnoticed or unremarked by those around them, their “otherness” may be signalled by small indications that protagonists and/or their families are unable to navigate the social norms of the middle class; they may not know what fork to use at a formal dinner, or to wait for the bread basket at the restaurant before eating the butter pats.

The physicality of hunger is for the most part only superficially explored. In many books, there is no indication of hunger at all, despite insufficient food or many missed meals. Protagonists may *say* they are hungry, and may spend considerable effort trying to find food, but we are not usually presented with any physical evidence to back up their hunger—except, once or twice in each novel, a hungry stomach rumbles, grumbles, growls, or gurgles. There are a few exceptions: Jackson feels “a little dizzy” (Applegate, 2015, p. 5), Zig gets “shaky” (Messner, 2017, p. 95), Jeanne Ann feels “brittle” (Svetcov, 2020, p. 138), and Rex’s little brother “wouldn’t stop crying, he was so hungry” (Ogle, 2019, p. 103).

What we do learn about is children’s emotional response to hunger. It is taken for granted that poor children—those who are food insecure or underhoused or unable to afford new clothes—feel ashamed. It is taken for granted that they will not want anyone to find out that they are poor; the stomach noises just discussed are usually treated as bodily betrayals. If they have close friends who figure things out, they will swear their friends to secrecy and/or enlist their friends into covering for them so their terrible secret is not revealed. They are often the only child from a low-income family among their classmates or friendship group.

As with many books for middle grade readers, this set of books is full of dead, disappeared, and

disappearing parents. There is a long tradition of the “survival story” in children’s literature, and it is common across all subjects and genres for young protagonists to be orphaned, abandoned, or to run away, and to have to figure out how to survive on their own for a time. Ultimately, they learn to (re)join and (re)connect with middle-class “civilization”—that place where they are taken care of, as children “should” be. Many of these middle grade books fit into this category. These twenty-four novels feature a total of nine dead parents; the most common causes of death are accidents, heart attacks, and cancer. Eight protagonists are abandoned by a parent or caregiver during the course of their story, only one—who was beaten unconscious and ended up in hospital—unintentionally. There are also at least three incarcerated parents—we do not generally learn what they have done to end up in prison—two fathers and one mother. These plot elements are doubtless repeated in these stories for dramatic effect: a child without a parent, or without a functioning parent, leaves more room (or so it is clearly believed) for fictional character growth and opportunities to demonstrate agency.

There are only two protagonists who belong to two-parent families at the time their story takes place. The remaining twenty-two protagonists live with only one parent or other caregiver (most often a grandmother), and that caregiver generally faces significant life challenges, including depression, mental illness, or addictions, on top of chronic unemployment. Sometimes the caregiver is still able to demonstrate that they mean well and love their child, but their own seemingly insurmountable problems often get in the way—although, occasionally, the protagonist does suffer serious neglect and abuse at the hands of a parent or caregiver. A majority of these parents or caregivers (almost invariably mothers) demonstrate “bad” parenting. This is present to a lesser or (usually) greater

degree in eighteen of the twenty-four titles: parents smoke, drink, get fired or quit jobs for irresponsible (and sometimes frivolous) reasons, spend money impulsively, disappear for days (or longer) without warning, allow their children to suffer (and go hungry) rather than seek help, and regularly demonstrate their carelessness and/or selfishness in many other ways. They are also uninclined toward, or incapable of, regularly providing food or feeding their children. There are almost always direct messages from the parents or caregivers to the child protagonist about not disclosing the family's poverty to any outsiders. Consequently, most of the children try to keep evidence of their family's situation hidden and feel a great deal of shame. There are also direct messages (or dying requests) for the child protagonists to keep the family together at all costs, which is taken to heart and forms a significant plot point. The children never question these admonitions until the end of their story, whereafter their feelings of shame are apparently resolved in one or two sentences about how "it's nobody's fault" or "it could happen to anyone."

However, poor protagonists are presented as having the power to change their situations and, once reminded that they have a choice—whether by circumstance or by others' voices of wisdom—are able to enact that power, reducing the complexity of social and environmental factors to something entirely under individual control. In these books "middle-classness" remains the ideal, complexity is reduced, individual control is assumed, and bootstraps are pulled up once the protagonist (re-)locates their misplaced or undeveloped sense of agency. Poor children's sense of shame *for being poor* is never questioned; at the book's resolution protagonists almost invariably separate themselves from their poverty, or at least take steps in that direction, leaving them free to (eventually) join or re-join the middle class. As they do so, they move from

being socially and psychologically "abject" characters (Wedwick & Trites, 2008, p. 130) who, due to their shame, had been ostracized and/or had separated themselves from the social, into a (re-)integration with their community and, usually, one or two special peers. While many books' endings include a sentence—or occasionally a paragraph—that explicitly acknowledges the protagonist's newly-realized recognition of the importance of relationships with friends, kin, and community, and that it is okay to ask for help when you are struggling, along with the reassurance that true friends do not judge us, these brief passages cannot compete with the overwhelming amount of negative material that makes poverty a suspect and shameful condition.

While the reality of foster care is invariably positive when it occurs in these books, the *idea* of foster care is most often presented as a dire warning about what will happen if the "secret" (of the family's poverty) gets out. Protagonists with younger siblings always worry that they will be separated, and this worry almost inevitably inspires the children to make unwise decisions. The books' assumptions that siblings will be separated—something that has long been against Canadian and United States child welfare policies, at least in practice—is never questioned. Despite this negative coverage, if there is an interaction with a social worker, it is generally very positive. However, these rare occurrences are unlikely to counteract the overwhelmingly negative portrayal—suspicion, fear, and threat—contained in these books. Felix is typical when he says, "I didn't want the MCFD [Ministry of Children and Family Development] to take me away from my mom and put me in a home with mean strangers and possibly violent kids" (Nielsen, 2018, pp. 97-98). Most of the children who end up in different homes at the ends of their respective stories do not enter the official foster care system, but are taken in by their

friends' parents, neighbours, and even librarians—despite the lack of home study or any officially-sanctioned process to ensure the home is a good one.

All of the parents *except four* are unemployed during the majority of the books' action. Money is a concern and a source of anxiety for many of these young protagonists, but we often do not know exactly where the family's money—what little there is—comes from. But the fact that parents and caregivers are so often positioned as unemployed emphasises personal responsibility in rectifying the situation, even if, as we are often told is the case, their unemployment is the result of an economic downturn and they try repeatedly to get new jobs. Despite this, a number of young protagonists somehow manage to have part-time jobs drop into their laps, even when their parent(s) cannot find work—they clean up at mom-and-pop corner stores, sweep up at the barbershop, re-shelve books or read to younger children at libraries, or demonstrate an entrepreneurial spirit by busking in the streets or selling lemonade.

The child often hatches an unrealistic plan to get money, escape poverty, and thereby “save” the family—although these plans either never work out or produce unintended results. The plan may involve running away, having to hide, or having to make their way somewhere after they have been abandoned. There are often one or two friends who the child protagonist confides in, or who figure out their friend's unstable situation on their own. Ultimately, near the three-quarter mark of the book, the friend must betray the protagonist's confidence in order to avert catastrophe—although before the book ends there is a positive explanation for the betrayal, understanding on the part of the protagonist, and quick forgiveness.

Once the crisis is averted, the protagonist's poverty is alleviated—it is always alleviated—through a limited number of events. First, the caregiver may get a job, possibly one that also provides a place to live. In the endings of those books where the child continues to live with their original caregiver at the story's conclusion, *and the caregiver is capable of holding a job*,⁶ it is precisely the caregiver *getting a job*, usually through luck rather than talent or skill, that leads to changed circumstances for the child protagonist. The caregiver may go back to school, sometimes funded by Social Services,⁷ so that the future possibility of a job is implied once this task of self-betterment is completed. A few caregivers enter a rehab program funded by Social Services; once again, this is positioned as a first step on the road to an improvement in individual circumstances. The protagonist comes to understand that their caregiver is trying their best.

If the protagonist does not stay with their original caregiver, they are reunited with a previously-unknown, lost, or injured parent or caregiver, or they are adopted into, or fostered by, a family where there is no food insecurity. Usually this new family is a previously-estranged relative, or is acquired outside of the formal requirements of adoption or foster care. If a second caregiver takes over from the original, they grow slowly into their caretaking role and become a new “family.” At the end of the book, preparing or providing food for their child—no matter how basic—is a signal that these original or new-but-reluctant caregivers are being transformed into better, healthier, and more caring parents or parent-substitutes. If the new families are strangers, they feed their new wards an abundance of special foods.

⁶ In other words, the caregiver does not have a mental illness or an addiction that requires treatment first.

⁷ Demonstrably caring parents go to night school from the start; for others, going to night school is part of their transformation to better parenting.

These fictional children from low-income families are always portrayed as both vulnerable and innocent. Initially, they are dependent on their parents or guardians for food and other necessities, and, although they feel a great sense of responsibility in providing for themselves, their parent(s), and younger siblings, readers know that their poverty is not their fault (see LaFollette & May, 1996, for more on the “paradigmatic innocence” of children). They did not choose to be born into poor families or poor neighbourhoods, and, once there, they can make no social or political changes, nor hold a job that makes enough to support themselves and their families—although on top of all their other too-capable activities they often try hard to contribute financially as well. The children in these stories are remarkable in their demonstration of motivation and diligence. Drawing on the idea of the “Super Negro” discussed by Sims (1982), and the “Super Crip” discussed by Rubin and Watson (2008), I use the term Super Poor Kid to represent fictional or fictionalized children who demonstrate this exceptionalism. The Super Poor Kid is doubly worthy: first, as a child, they cannot be blamed for their economic position, but, second, they are unflagging in their efforts to be model middle-class citizens, even when they are really, really hungry. Many of these children’s writers are careful not to directly blame low-income characters for their poverty, but those living in poverty are nonetheless frequently stereotyped—often by the food insecure protagonists themselves. Zig is resistant to seeking help from outside his family; his feelings are dominated by a profound and ongoing shame, as if he had a “POOR KID sticker on

[his] forehead” (p. 138). When he learns that his mother intends for them to sleep at the church homeless shelter, he refuses, sharing with readers his impressions of people who use the place: “one lady with a grocery cart full of plastic bags”; “two guys...in clothes so dirty you can’t even see what color they’re meant to be anymore”; one guy who “is always talking to himself” (Messner, 2017, pp. 138 & 127). And Jeff—whose single mother is an alcoholic—refers to the low-income shoppers at “the cheap food warehouse” as “zombies”; he and his mother have gone there to shop during “off-hours, when no one she possibly knew would see her” (Abbott, 2019, p. 68). Of course, what readers know is that these protagonists are also disparaging themselves when they scorn others living in poverty, and their self-hatred is evident.

Some writers state explicitly—often through auxiliary characters—that the misfortunes of the poor are simply due to “bad luck,” or at least the absence of good luck. This presence or absence of luck is a motif frequently employed to suggest that such hardship and adversity could happen to anyone, given the wrong circumstances. While this may be true to some extent, it also downplays the ongoing roles of class and racialized discrimination, systemic lack of resources, and the repercussions of regularly unmet basic human needs such as food and housing. Poverty is not haphazard. While a greater number of middle-class people may be sliding into more precarious situations, poor children—especially racialized children—are more likely to grow up to be poor adults (Wagmiller & Adelman, 2009), and many poor adults are unable to escape their structural limitations.

How is children's food insecurity solved?

In the real world, we can conceptualize four main avenues to ensure that children who are hungry get fed:

- The response may be individual—one person feeding one other person or a family;
- There may be organized community-level supports or charities such as food banks or soup kitchens;
- Via existing government programs such as welfare programs or SNAP; or
- By making policy or structural changes that expand the reach of tax-funded programs and increase people's wages and social security payments or provide a guaranteed minimum income.

Individual action

Overwhelmingly, fictional children's immediate hunger is solved through individual action. The protagonists are often responsible for procuring and preparing their own food and feeding their younger sibling, if they have one. So, they scrounge or steal food, eating garbage, or what should be garbage: spoiled, stale, or moldy food. After he is abandoned, Clay raids the trash from the room next door, finding "a few pieces of bread, a chicken wing that had a little meat left on it and which he ate with a slight shudder, and an apple with one bite taken from it" (Fox, 1991, p. 8). Unceremoniously left with her indifferent great-grandmother by her neglectful mother, Angel tries to make gravy—as "Grandma" demanded—with flour that had "little mealworms crawling about in it" (Paterson, 2002, p. 129). Parents and caregivers do feed these children, but they usually do not do it very well. They themselves are reduced to scrounging and occasionally stealing, or they leave their child to go without one day and splurge on

fast food the next; the protagonist invariably worries so much about this rash behaviour that they are unable to enjoy the treat.

Every story also involves food being given to the protagonist by others who notice their hunger. Jackson's family, parked in their minivan in a Denny's restaurant parking lot, were given "some pancakes that were too burnt for the customers" by the manager (Applegate, 2015, p. 106). Best friends regularly share food at lunch, always doing so in a way that attempts to minimize the hungry child's shame. An observant classmate regularly gives Lulu extra food because "I don't like milk but they make me take it," and "they gave me an extra dessert" (Fox, 2021, pp. 10 & 53). It does not always work. At school, several classmates notice Jeff is not eating. Hannah buys an extra lunch and tries to pass it off as bought by another student who had to leave, and, after Jeff eats it ("I tried not to eat the grilled cheese too fast"), he realizes the ruse:

"I know I'm not the sharpest tool, but did you...did you buy me lunch?"...I went away fast. Somewhere. I forget where. My body took me and I wasn't in control. Black knives spun in my eyes. Twice I turned the other way when I saw her in the hall...she had shamed me. I hated her for what she had done. She knew about me (Abbott, 2019, p. 203-205).

This effort to prevent feelings of shame is also made by others, in a tactic I have dubbed "do me a favour and eat this." The worker at the soup kitchen looks out for Mel, and there are several occasions when she suggests that Mel would be doing her a favour by sampling the soup or eating extra cookies (Sand-Eveland, 2012). When Felix steals food from Mr. Ahmadi's shop and

gets caught, Mr. Ahmadi responds by offering Felix “two large plastic-wrapped muffins....my wife says you would be doing us a great favor if you could eat these. The sell-by date is today.” On another occasion he meets his deadbeat father for lunch in a restaurant, and afterwards the waiter follows him outside: “Glad I caught you. This jerk just sent back a perfectly good Denver sandwich....sandwich is just going to go to waste. I was hoping you could help me out” (Nielson, 2018, pp. 156-157 & 176). Extended family, small shopkeepers, restaurant staff, librarians, and complete strangers take it upon themselves to feed hungry children. They may do so once, a handful of times, or more regularly, but they never take any action to ensure that the child *always* has enough to eat.

Community supports

In these books, gaining access to free lunch at school is also overwhelmingly about shame. In fact, one entire book, entitled *Free Lunch*, contains repeated cafeteria interactions focused on the humiliation of Rex having to identify himself—loudly, as the “cafeteria lady” is hard of hearing—as a free lunch recipient (Ogle, 2019). Zig has been eligible for the free school lunch program for years, since his “Mom’s income put us in the category for free French toast sticks and fake syrup”—first, take note of the writer’s middle-class positioning by calling it fake syrup! Despite his eligibility, his mother “always made [his] lunch at home,” but, once they are living in a homeless shelter, making lunch becomes impossible, and Zig is finally enrolled in the program. Zig’s shame is tangible:

I make sure I get there really late so [his girlfriend] Gianna’s already through the line when the lunch lady punches in my number and the red bar that says “Free Lunch” pops up on

her screen. They might as well slap a POOR KID sticker on your forehead before you sit down to eat (Messner, 2017, pp. 120-121 & 138).

There are fewer fictional food banks, food pantries, or soup kitchens than one might expect, given the level of hunger present in these stories—although this is certainly consistent with the fact that most people who are food insecure do not actually access food banks (PROOF, 2019). Not all protagonists visit community organizations that provide meals, but, when they do, shame is once again the main sentiment, and not being seen while eating there is the main concern. This concern generally overrides any description of the relief involved in getting a meal or feeling full. Ari and her brother visit the soup kitchen, but, once there, Ari refuses to go in because her ex-best-friend’s new best friend is volunteering that day. Her brother brings her out a plate of food, and she asks for reassurance that she was not seen, because “the last thing I need is for word to get out that I eat at the soup kitchen” (Jacobson, 2015, p. 268). In the majority of stories that include one, the food bank or soup kitchen acts as a plot point to expose the protagonist as “poor.” If a visit to a food bank is introduced into the story, the protagonist will *inevitably* run into someone they know there—often the very last person they would want to see, either a new love interest or a sworn enemy, and the experience results in further shame rather than solidarity or understanding. After spending the morning unsuccessfully looking for work, Mel’s mother “suggested they get some lunch at the Mission Soup Kitchen,” a place that is “not all that different from others they had eaten at.” Mel “untied her sweatshirt from around her waist, put it on, and pulled the hood onto her head to avoid being seen” (Sand-Eveland, 2012, pp. 28-29) by a boy she notices looking out the library window. And the worst thing for Isaiah is that

Angel, a girl from school he does not like, comes into the food bank with her family when he and his Mama are there “shopping.” Despite understanding that she and her family are also there to get food, he is sure that Angel is “laughing her head off” at him (Baptist, 2020, pp. 51 & 53).

Government programs

From reading most of these books, children would have no idea that there are government support programs that, while inadequate, are relied on by many low-income individuals, who are entitled to them. Only a few books name any particular welfare programs, or even infer them—the most common is SNAP (the Supplemental Nutrition Assistance Program in the United States, usually referred to as “food stamps”). Very few of these out-of-work parents or caregivers are explicitly on social assistance, and only a handful are matter-of-fact about caregivers receiving government assistance. Clay’s mother applies for Social Assistance just before she disappears (Fox, 1991), Angel’s great-grandmother lives off her monthly Social Security cheques (Paterson, 2002), and Meg’s mother gets a disability payment (Weetman, 2021).

However, when a shelter worker suggests that Piper’s mother might want to apply for SNAP, she is adamant: “Oh no, we don’t need to apply for food stamps. We’ve just hit a little rough patch, that’s all” (Pyron, 2019, p. 39). When a police officer asks Dicey if her mother applied for welfare or unemployment compensation, “Dicey shook her head. ‘Momma said she couldn’t do that. She wouldn’t even go talk to anyone. She said charity was not for the Tillermans.’” Despite the fact that Dicey’s mother was so consumed by financial worry that she abandoned her children, the sergeant is approving: “I wish more people felt that way,” he tells her (Voigt, 1981, p. 159). There are

additional books that feature caregivers proudly refusing to access government aid, but the most usual case is that food programs, welfare or social assistance payments, or subsidized housing programs are not mentioned at all. From reading these books, children would not learn that there are numerous governmental supports that provide supplemental income and/or food aid to low-income families. Since over forty-one million United States households—or about one in three—are currently receiving SNAP vouchers (U.S. Department of Agriculture, 2023), it seems strange indeed that fictional low-income families do not seem to have access to the program, do not know that the program exists, are unwilling to apply for the benefit, or even, as I am sure happens regularly, have tried to get benefits but were refused. In fact, in these middle grade novels, social assistance and welfare programs are almost invariably presented negatively. Shame is paramount: no one with any self-respect would apply. While it is true that unclaimed benefits and tax credits add up to billions of dollars each year, it is not for the reason that these children’s books would have us believe. Low-income individuals and families do not fail to apply because of shame or the stigma of government handouts; rather, they do not apply because the application process is overly (and unnecessarily) complicated, or they simply do not know that they are eligible—a problem that research has proven can be largely rectified by increasing outreach and cutting red tape (Desmond, 2023, p. 123).

This refusal to accept anything that smacks of “charity” is a pervasive theme that runs through all of these novels; if they, as a nuclear family, are unable to manage without help, they clearly consider themselves failures. Livy’s mother, like many, is unwilling to accept any help from the government: “Mom...says we don’t need other people’s money and it’s none of anyone’s business and we can take care of ourselves...” (Ellis,

2017, p. 212). Jackson’s dad says “he didn’t want to accept anyone’s handouts” and believes that “there’s everything wrong with asking for help...it means we’ve failed.... We’ve been to that food pantry more times than I care to admit. But in the end, this is my—our—problem to solve” (Applegate, 2015, pp. 50 & 52).

Interestingly, the notion of what constitutes “charity” is very broad. As already discussed, there is great distrust of many supports and resources, such as social workers and Children’s Aid, school administrators, shelters, food banks, and so on. But characters’ resistance to “charity” encompasses everything offered by *anyone* outside the nuclear family unit, not just via government programs. Accepting help from strangers, friends, and even extended family members was equally taboo, if not even more so. Robbie’s father tells him, “I don’t want you taking things like we’re some sort of charity case.... friends come and go. You can’t count on them. You can’t count on anybody but yourself. Don’t ever forget that. Counting on people is counting on being disappointed” (Walters, 2020, p. 66). Meg’s “Mum is funny about [her sister] Peggy offering us money or trying to help out,” but “[Aunt] Peggy is always making us meals. She constantly pretends she’s made too much of something like spaghetti sauce or lasagna and then parcels it up in plastic tubs so I can take it home and reheat it” (Weetman, 2021, pp. 40 & 41). After his *Abuela* [grandmother] takes them out for a Thanksgiving meal, Rex’s mom loses it: “I don’t want her charity! I don’t need her help! I don’t need anyone’s help!” (Ogle, 2019, pp. 128 & 132). When Katie’s mother comes back and sees the groceries the children’s father has given them, she tells them: “And I’m going to say this one time /and one time only— /you three better make sure /your father and his wife /understand that we don’t need /no damned charity...” (Van Heidrich, 2023, p. 149). Unlike the countless real-life

parents who go without food so their children can eat, these fictional (or fictionalized) parents stubbornly let their children go hungry.

Structural change

Put simply, there are no messages about the need for structural changes to mitigate food insecurity in any of these books. Several children’s picture books about the history of poverty feature strike action as a solution to low wages, but the closest we get to collective action in this set of middle grade novels is the school petition to bring back Crazy Hat Day in *Paper Things* (Jacobson, 2015) and two middle-class supporters lying down in front of a tow truck in *Parked* (Svetcov, 2020) so that Jeanne Ann’s mother’s van—their home—cannot be towed away. These twenty-four protagonists certainly all demonstrate agency, but their individual actions serve to obscure the systemic barriers that constrain people living in poverty, particularly those who face additional structural discrimination(s). Sociologist Matthew Desmond (2023) argues that poverty is not benign; rather, it is caused by deliberate social and political structural arrangements that disadvantage the poor and actively advantage the middle and wealthy classes. Low-income individuals deal with low wages and exploitative working conditions, higher rents and food costs, discrimination in housing, lack of access to banks and credit, and limited access to reproductive choices. The questions we should be asking, suggests Desmond, are “Who benefits?” and “Who is feeding off this?” rather than wondering what is wrong with low-income individuals when we see poverty on our streets and in our parks and doorways (Desmond, 2023, p. 79).

It is not only important that children come across low-income characters with positive attributes, but also that they are made aware of the systemic barriers that

poor people have to contend with. Many of the writers appear to be more concerned with creating “caring” middle-class citizens who alleviate the symptoms of poverty piecemeal for “deserving” individuals than with creating the political changes required to eradicate poverty for all human beings, regardless of how their worth is externally assessed. Food insecurity is a policy problem, not an individual one, and, even as we may applaud a caring community, we know that caring about individuals is not enough.

The “bootstraps” messages of these books leave individuals—even children—responsible for both succumbing to, and escaping from, poverty’s grip. To be sure, these child protagonists do not manage this without help; in fact, a central theme of these books is that help is needed. At the end of their stories, each over-competent child hands back the reins to an adult, and accepts, either reluctantly or with relief, that they cannot hold everything together single-handedly. But help does not come in ways that demonstrably make a

difference for most real-life families, such as a living wage, higher social assistance payments, or a guaranteed minimum income. Rather—in addition to the occasional caregiver entering rehab or getting a job—help largely comes from friends who share lunch at school, kind strangers who, once or twice, press food into hungry hands, or the librarian, teacher, shopkeeper, or other community member who contributes to caring for a particular *exceptional* child. This is not in any way to criticize the importance of the kindness of strangers to real children’s lives, or the importance of individual giving, through whatever chosen channels, so that a child, at any given time, may not be hungry. However, as educators Botelho and Rudman (2009) point out, “While...community efforts offer relief, they do not represent structural change” (p. 164). Such actions, when presented as long-term solutions to a child’s hunger, do not serve the reality that it is political will and political action that are required to end hunger for all children, all the time.

Conclusion

The tropes in children’s books about hunger and food insecurity are remarkably enduring, despite the many important global, national, and regional events that have taken place since any given book’s publication, and despite the recognition that structural forces such as poverty, classism, and racism profoundly affect individuals’ abilities to make changes in their lives. It is neither helpful nor empowering to suggest to children that they have choices when they do not, or that their individual actions—in a culture that affords children little real power—can lift them, and their families, out of poverty. We have seen that the importance of literature for children has been framed as twofold: it has the ability to perform both as mirrors and as windows

or doors. In other words, young readers can see themselves reflected and also observe and learn about the experiences of others from the safe distance of the printed word. As for the first function, it is questionable whether most children living in poverty would be able to see themselves reflected in literature populated by characters who, while living with few resources and supports in extremely precarious situations, manage to stay at the top of their class at school, win awards for their accomplishments, befriend librarians, get interesting part-time jobs, navigate and prop up difficult parents, feed and clothe themselves and their younger sibling(s), stay away from the eye of “the authorities,” and, at least in middle grade novels,

avoid violence, drugs, the drug trade, sexual abuse, and the sex trade, and, when they run into strangers on the streets, always manage to find the ones who will not take advantage of them.⁸

Research has shown that children are likely to blame the poor for their poverty (Chafel & Neitzel, 2005); of course, there are many influences on a child's worldview—family, peers, and schools, as well as various media (including books) may contribute to their perceptions (Hakovirta & Kallio, 2015). While children's books are not usually populated with characters who conform to stereotypes about people who live in poverty, there are still books being published that depict “the poor” as ignorant, crude, lazy, dishonest, manipulative, or criminal—or all of the above. In one book, a would-be guardian provides a home for the protagonist solely in order to receive Social Security “worth hundreds of dollars every month” (Tyre, 2018, p. 42). This woman takes advantage of everything she can get for free, regularly steals money, including from children, and is rude, crass, ignorant, judgmental, racist, and abusive. She also chain-smokes, almost always a sure sign of a suspect character in a children's book.

Even in books that portray those in poverty more positively, there are often other characters in the books who voice negative stereotypes. Writers may place them in their works so they can act as a foil to be contradicted or discounted by the reactions of the protagonist or other, more “enlightened,” characters. Despite this intention, children may be equally likely to learn about these stereotypes in the first place, and may also learn something about the secrecy and shame of poverty, from reading many of these texts. The shame and isolation that protagonists feel and express reinforces the message that poverty is shame-worthy. What young

readers would learn from almost any book in this collection is that, while poverty should not define a human being, it often does, and it is, at best, a terrible and hopefully brief stopover on the road to greater financial security. Despite occasional anti-shame lip service—for example, the social worker who comes to assess Fern's home life tells her, “Don't ever be ashamed of being poor” (Helget, 2017, p. 210)—there are few books in this collection that do an effective job of teaching children that living in poverty is nothing to be ashamed of. It is no surprise that, despite their family's actual financial or class status, children “place themselves in the middle of the economic scale” due to a reluctance to consider themselves poor (Hakovirta & Kallio, 2015, n.p.).

When children's books rehearse limiting tropes and feature unlikely character traits, resources, and life experiences, we should ask what the middle-class establishment wishes children to know about poverty (Broderick, 1973, as cited in Sims, 1982, p. 5). To write and re-write food insecurity as an individual problem points to the continued reification of the American Dream, a “dream” wherein there are both limits to social obligation and unlimited capacity for personal (economic) growth, given the right mindset. This colonialist enterprise separates human suffering into two categories, deserving and undeserving, and allots an unfair advantage of resources to the group able to control, and to dictate the messages about, stories of deservingness. The most insidious work this does is to erase the very structural forces that create inequities in food access in the first place. By making invisible the impulses and ideologies that result in poverty and food insecurity for some, those in society who benefit cannot be confronted or held accountable; the issue remains individualized and apolitical. Tatum (2008), a teacher

⁸ This represents a significant difference between middle grade and young adult fiction.

educator, discusses the vital importance of his own and others' childhood reading of stories featuring relatable African-American characters. "Enabling texts," Tatum (2008) suggests, "provide a roadmap for action; connect to personal and community experiences; nurture identity development; and stimulate inner reflection" (p. 141). The vast majority of these "realistic" books about poverty and food insecurity do not and cannot meet these goals. Rather, using this definition, many of these books are "disabling texts" that may teach poor children to feel failure and shame and middle-class children to feel successful and deserving. In other words, they do nothing to trouble the neoliberal status quo. Instead, the responsibility residing in individuals *is* the overarching message of the majority of these books. Even if as children they must learn "to depend on authority for help and advice" (Lurie, 1990, p. ix-x) these fictional protagonists—and their young readers—also learn that to rely on others is taboo, and that charity, rather than rights, is the best that can be expected.

In the end, these are stories of exceptional children doing exceptional deeds in exceptionally unrealistic circumstances. It is difficult to know, in the absence of empirical study, whether the exceptionalism of many of these protagonists, or the contrived "realism" of the plot twists, are a help or a hindrance to children developing their own sense of competence and agency. My suspicion is that children experiencing food insecurity would not see themselves here, and that children who do not know what habitual hunger is would not learn to recognize it or acknowledge its existence among their peers. Certainly, neither group would learn to take effective action against it. There are few sliding glass doors to walk through in this set of middle grade novels, and fewer guiding maps. The vast majority of these books would surely be seen as counterfeit, at best, if read by a child actually living in

poverty, or, at worst, as indicative of problems or shortcomings in the individual reader's own life and choices rather than in poverty's portrayal. Finnish researchers Hakovirta and Kallio (2015) suggest that "by familiarizing children with the causes of poverty we may help take inappropriate blame away from poor children and may help them internalize that being poor is not their fault and it is not equivalent of being bad" (n.p.). These fictional children *are* resilient; that is important, and it perhaps teaches children that they are worthy of wielding power, even if they do not find it in their current lives. But in order to teach children that it is not an individual's fault if, in some of the richest countries in the world, they do not have enough money to pay for their basic needs, we must write stories that uncover the structural forces that disadvantage some people while advantaging others. We must write stories that map out for them—and us—what might be done, collectively, to counter that.

Despite the fact that my review of these books has been overwhelmingly negative, not all of them should be summarily dismissed. Many are not great literature, and most portray at least some very problematic assumptions when it comes to poverty and food insecurity. But a small handful are brilliantly written, with clever humour that made me laugh out loud and plot lines that veered enough from the common formula to offer a positive read. One in particular that I would highly recommend is *The In-Between* by Katie Van Heidrich (2023), both for its original writing and its ability to act as a mirror for children living in poverty—perhaps it is effective precisely because it is one of the "memoir" books, so the author has clearly "done her research." It is also the most recent title on the list, published in 2023, and I can only hope that it heralds a sea change in things to come in children's literature about poverty and food insecurity.

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Appendix

Table 1. Books included within the study

Author	Year	Title	Publisher	Country of Publication
Abbott, Tony	2019	The Great Jeff	Little Brown and Company	U.S.
Applegate, Katherine	2015	Crenshaw	Feiwel & Friends	U.S.
Baptist, Kelly J.	2020	Isaiah Dunn is my Hero	Crown Books for Young Readers	U.S.
DiCamillo, Kate	2018	Louisiana’s Way Home	Candlewick Press	U.S.
Ellis, Ann Dee	2017	You May Already be a Winner	Dial Books for Young Readers	U.S.
Fox, Janet S.	2021	Carry Me Home	Simon & Schuster Books for Young Readers	U.S.
Fox, Paula	1991	Monkey Island	A Yearling Book, Dell Publishing	U.S.
Helget, Nicole	2017	The End of the Wild	Turtleback Books	U.S.
Howe, James	1990	Dew Drop Dead: A Sebastian Barth Mystery	Atheneum	U.S.
Jacobson, Jennifer Richard	2011	Small as an Elephant	Candlewick Press	U.S.
Jacobson, Jennifer Richard	2015	Paper Things	Candlewick Press	U.S.
Messner, Kate	2017	The Exact Location of Home	Bloomsbury Children’s Books	U.S.
Nielsen, Susin	2018	No Fixed Address	Tundra, Penguin Random House Canada Young Readers	Canada
Ogle, Rex	2019	Free Lunch	Norton Young Readers, W. W. Norton & Company	U.S.
Paterson, Katherine	2002	The Same Stuff as Stars	Clarion Books	U.S.
Patron, Susan	2006	The Higher Power of Lucky	Simon & Schuster	U.S.
Pyron, Bobbie	2019	Stay	Katherine Tegen Books, Harper Collins	U.S.
Sand-Eveland, Cyndi	2012	A Tinfoil Sky	Tundra Books	Canada
Sherrard, Valerie	2021	Birdspell	Cormorant Books	Canada
Svecov, Danielle	2020	Parked	Puffin Books	U.S.
Tyre, Lisa Lewis	2018	Hope in the Holler	Nancy Paulsen Books	U.S.
Van Heidrich, Katie	2023	The In-Between	Aladdin	U.S.

Voigt, Cynthia	1981	Homecoming	Books for Young Readers	U.S.
Walters, Eric	2020	The King of Jam Sandwiches	Orca Book Publishers	Canada
Weetman, Nova	2021	It All Begins with Jelly Beans	Margaret K. McElderry Books	U.S. (Australia)



Original Research Article

Envisioning a community food hub to support food security: A community engagement process at a post-secondary institute

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Abstract

Objective: The objective of this community-based participatory action research (CBPAR) project was to gain an in-depth understanding of the needs, interest and opportunities that exist within a post-secondary institution with respect to supporting food security among students via a food hub.

Methods: The project was undertaken on the campus of the University of British Columbia-Vancouver. The CBPAR approach included 4 phases: 1) information gathering, 2) relationship development, 3) implementation of the community engagement strategy, and 4) shareback of findings to the community.

Results: Phase 1 identified key components that formed the research process including campus partners for relationship development (phase 2) and subsequent engagement through their networks (phase 3).

Phase 3 included engagement of 62, 111, 156, and 154 students, who participated in facilitated dialogues, community meals, a survey and targeted survey, respectively. Food insecurity related experiences were prevalent, with 37% to 75% indicating they worried about running out of food in the last year. Over 90% of all survey respondents affirmed that they would access a community food hub (CFH). Preferences for the CFH were inclusion of emergency food access, community meals, and financial support and planning, while

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prioritizing foods that meet cultural needs, and a low-cost grocery store within the CFH.

Conclusion: There is a demonstrated need and desire among students for innovative approaches to support

Keywords: Nutrition; public health; food insecurity on campus; food insecurity; university students; health; poverty; inequities; Canada; health promotion

Résumé

Objectif : L'objectif de ce projet de recherche-action participative (RAP) était d'acquiescer une compréhension approfondie des besoins, des intérêts et des opportunités au sein d'un établissement postsecondaire en ce qui concerne le soutien à la sécurité alimentaire de la communauté étudiante au moyen d'un centre alimentaire.

Méthodes : Le projet a été entrepris sur le campus de l'Université de la Colombie-Britannique, à Vancouver. L'approche PAR comprenait 4 phases : 1) collecte d'informations, 2) développement des relations, 3) mise en œuvre de la stratégie d'engagement communautaire et 4) présentation des résultats à la communauté.

Résultats : La phase 1 a permis d'identifier les éléments clés du processus de recherche, notamment les partenaires du campus pour le développement des relations (phase 2) et l'engagement ultérieur à travers leurs réseaux (phase 3).

La phase 3 a impliqué 62, 111, 156 et 154 étudiants, qui ont participé respectivement à des discussions

organisées, à des repas communautaires, à une enquête et à une enquête ciblée. Les expériences liées à l'insécurité alimentaire étaient courantes : 37 à 75 % des personnes ont mentionné qu'elles s'étaient inquiétées de manquer de nourriture au cours de la dernière année. Plus de 90 % des personnes répondantes à l'enquête ont affirmé qu'elles recourraient à un centre alimentaire communautaire. Les préférences exprimées comprenaient un service alimentaire d'urgence, des repas communautaires, le soutien financier et la planification, ainsi qu'une priorité accordée aux aliments répondant aux besoins culturels et à une épicerie à bas prix au sein du centre.

food security at a post-secondary institution. The process outlined may serve as a road map for other communities who are seeking to move beyond emergency food relief.

Conclusion : Il a été démontré que la communauté étudiante a le besoin et le désir que des approches novatrices soutiennent la sécurité alimentaire dans un établissement d'enseignement postsecondaire. Le processus décrit peut servir de feuille de route à d'autres communautés qui cherchent à aller au-delà de l'aide alimentaire d'urgence.

Background

Household food insecurity is characterized as a lack of access to food due to financial insecurity (Tarasuk et al., 2022), whereas to be food secure denotes equitable access to food that is affordable, culturally preferable, nutritious, and safe (BC Centre for Disease Control, 2022). Food insecurity is more common in low-income households, but inflation and rising costs of basic necessities are pushing additional households into poverty (PROOF, 2022; Tarasuk et al., 2022). Race and Indigeneity are also strongly linked to food insecurity. In Canada, Black households are almost two times more likely to experience food insecurity than white households, even when other sociodemographic variables are similar (Dhunna & Tarasuk, 2021). In 2021, over 30% of Indigenous peoples living off-reserve reported experiencing food insecurity (Tarasuk et al., 2022). Comparatively, data from 2021 show that the prevalence of food insecure households in the general Canadian population is 15.9% (Tarasuk et al., 2022).

Direct comparison of the prevalence of food insecurity across populations is challenging due to the use of different tools to measure food insecurity. Nonetheless, food insecurity is pervasive among postsecondary students in North America, with prevalence estimates of food insecurity ranging from 15% to 50% (Bruening et al., 2017; Entz et al., 2017; Freudenberg et al., 2019; Wang et al., 2023). Financial insecurity and income are the largest contributing factors to student food insecurity (Silverthorn, 2016). Data from the United States suggest there is an increasing number of low-income postsecondary students (Freudenberg et al., 2019). Students face housing affordability challenges and unique financial burdens that impact access to food, including rising tuition costs and textbook prices (Silverthorn, 2016). Food insecurity may deleteriously impact physical, mental, and academic

wellbeing, with increased risks of chronic disease, obesity, depression, social isolation, lower academic performance, and postponed graduation (Gundersen & Ziliak, 2015; Maroto et al., 2015; Martinez et al., 2020).

The University of British Columbia Vancouver Campus (UBC-V) similarly reports high rates of student food insecurity. At UBC-V, a 2019 survey revealed that 37% of undergraduate students experienced food insecurity, while a separate survey, also in 2019, showed 30% of graduate students at UBC-V experienced food insecurity (Carry et al., 2020). The numbers were even higher at UBC's Okanagan campus (UBC-O), with 42% of undergraduate and 42% of graduate students identifying as food insecure (Carry et al., 2020). A study examining food insecurity amongst postsecondary students studying at UBC-O found that students experiencing two or more forms of marginalization (e.g., international students, disabled students, female-identifying students) were two and a half times more likely to experience food insecurity (Hamilton et al., 2020).

As of November 2021, the student populations were 60,292 at UBC-V and 11,989 at UBC-O, with 19,413 of them identifying as international students (UBC Planning and Institutional Research, 2022). Across both UBC campuses there is infrastructure to support student food security, such as financial aid, a student-union operated food bank, student-led affordable dining options, and institutional investment in new dedicated food security resources through the UBC Food Security Initiative (FSI), a cross campus approach to promoting food security that upholds the principles of the Okanagan Charter (Okanagan Charter, 2015; University of British Columbia, n.d.). When this research project was conducted in 2022, UBC-V was home to emerging food security programs and services such as a Food Hub

website offering food, financial, and wellbeing resources; the UBC Meal Share Program, which allocates finances to students for purchasing food (University of British Columbia, 2023); and the UBC Student Affordability Plan (Carry et al., 2022). Despite these efforts, the prevalence of student food insecurity remains high, which suggests the need for expansion of food and financial security supports on campus.

In order to address high rates of student food insecurity, many postsecondary institutions are searching for new solutions beyond emergency access to food. Although frequently highlighted as a primary response to food insecurity, food banks are often a last resort for those experiencing food insecurity, with only one in five households indicating that they used food banks as a coping strategy when experiencing food insecurity (Men & Tarasuk, 2021; Tarasuk et al., 2020). While food banks provide immediate access to food, the impact on long-term improvement in food security is limited since food banks do not address the cause of food insecurity— income (Bazerghi et al., 2016). Community food hubs (CFHs) are gathering places that typically include multiple alternative food initiatives (AFIs), such as community kitchens, capacity building programs related

to food and financial literacy, community gardens, and farmers markets. CFHs move beyond emergency food relief services to address food insecurity with a more dignified, holistic, systemic, and justice-oriented approach (Edge & Meyer, 2019).

To our knowledge, at the time of this research, there are no post-secondary institutions in Canada that have implemented CFHs (Glaros et al., 2021; Murphy et al., 2022). As a result, best practices with respect to their design, development, and implementation are unclear. This gap in evidence is a barrier to more widespread adoption, research, and evaluation of CFHs and AFIs within them. We conducted a community-based participatory action research (CBPAR) project at UBC-V to inform the development and implementation of a CFH on campus. We present a unique approach to community engagement and a detailed reference for postsecondary institutions and other organizations that are interested in implementing AFIs and community approaches to food security that move beyond emergency food relief.

Methods

Research approach: Community-based participatory action research (CBPAR)

This study was undertaken between April 2021 and August 2022 and was informed by a project conducted at the UBC-O campus (Clement & Hamilton, 2020, Clement & Hamilton, 2021). Approval was obtained from the Institutional Behavioural Research Ethics Board (H21-00641). Some activities (described below) were virtual due to the COVID-19 pandemic and associated public health restrictions. A CBPAR

approach was used to ensure a focus on respectful community engagement, involvement of those affected by food insecurity in the development of solutions and decision-making, and the emphasis of CBPAR on action and social change (Wilson, 2018). CBPAR was also chosen for its iterative research process, allowing for revision of the research approach throughout its implementation and enabling inclusion of a diversity of

community perspectives (Wilson, 2018). CBPAR was seen as a way to address a central critique of AFIs: that the planning and development phases of AFIs often exclude those most affected by food insecurity, in particular individuals and communities who are racialized and/or face other forms of systemic marginalization and oppression (Guthman, 2008; Slocum, 2006). In this study, we centered students, including those experiencing food insecurity, in the research and action.

A phased-approach was used in which each phase was informed by the prior phase and also informed the refinement of subsequent phases. Phase one consisted of information gathering. Phase two involved outreach that focused on relationship development. Phase three was the implementation of the community engagement strategy, and in phase four results were shared with the campus community to inform the co-creation of a CFH plan and framework.

Student community developers

Student Community Developers (SCDs) were hired to join the research team and take a lead role in the research project, with mentorship, guidance, and support from other research team members.

Phase one: Information gathering

The SCDs identified and gathered key resources such as reports, proposals, and student research projects pertaining to UBC food security and food systems. These resources were reviewed to support the SCDs' foundational knowledge of past and present food systems work at UBC.

The research team identified nine individuals with direct experience, institutional knowledge, management and oversight within food systems, and/or leading

community engagement work across both UBC campuses. Individuals were contacted via email, and virtual interviews were conducted. Interviews informed the SCDs' process of forming an advisory group to support and develop the research process and included those interviewed in phase one as well as UBC FSI members (students and staff). Throughout the remainder of this project, the advisory group provided consultation on the research approach and process and helped the SCDs connect with campus partners in phase two of the project.

Phase two: Formulating partnerships

SCDs contacted a total of forty-four potential campus partners, including student services offices, the student union, the student food bank, student clubs (e.g., Black Students Union), and campus groups who support students most affected by food insecurity and/or who are engaged with food security-related activities on campus. Participants were invited to complete a pre-interview demographic survey and a virtual interview that was recorded. During interviews, SCDs inquired how best to engage with and involve students represented and supported by the partners interviewed. Interviewees were also questioned regarding their capacity to co-host phase three community engagement events and/or their interest in involvement in further phases of the research. The targeted interviews informed the co-development community engagement methods with campus partners for phase three.

Phase three: Targeted and broad community engagement

Five topics relevant to the creation of a CFH at UBC-V were outlined around which to consult the campus community: 1) space and atmosphere, 2) services, 3)

community, 4) evaluation and indicators of success, and 5) institutional support.

Community engagement methods included community meals, community dialogues, and an online survey. The online survey consisted of a targeted survey to engage those with lived experience of food insecurity as well as a broad community survey for the general student population. No exclusion or inclusion criteria were applied for either the targeted or general surveys. Rather, an SCD invited participants who were accessing a campus food hamper program to complete the targeted survey. This approach was thought to be more likely to capture those with lived experiences of food insecurity, although this was not specifically queried when inviting participants to complete the survey. The general survey was distributed throughout all events as part of a recruitment campaign. Campus partners (student service departments, campus food banks, student clubs, etc.) interviewed in phase two promoted the community engagement events and online surveys through their own communications and informal avenues (e.g., relaying information about the CFH project to students who used their services). SCDs set up stations on campus with information on the CFH project, community engagement events, and online surveys. This information was also shared on a project website.

Community meals and dialogues

Community meals and dialogues were hosted by the SCDs and campus partners as part of the engagement strategy. Informed consent was obtained from participants prior to engagement. Participants were asked to complete a short questionnaire collecting demographic data. Dialogue sessions consisted of moderated discussion facilitated by SCDs and campus partners, whereas community meals encouraged

participants to record their own responses to prompts displayed around the space in which the community meal was hosted. Meals were provided at no charge at in-person events.

The SCDs approached community meal planning with the understanding that food and community inform one another, that food brings people together and offers a point of shared connection and understanding, and that meals can be opportunities for storytelling. While participants were eating and socializing, they were encouraged to interact with prompts and questions displayed around the space. Prompts and questions related to the five topics (space, services, community, evaluation, and institutional support) were displayed on posters around the room. Participants could share ideas with one another, and they were asked to write their responses anonymously below the prompts.

Dialogue sessions were held in person or over Zoom. Dialogues were facilitated using predetermined prompts and questions based on the same themes as at the community meals. The SCDs collected data during dialogue events through notetaking. Dialogue events were flexible and variable in structure, dependent on the number and specific needs of participants.

Survey participation consisted of a consent form, a demographic survey, multiple choice questions, and open-ended questions. The targeted survey was promoted in person and via email directly to students who accessed emergency food services at UBC-V. All targeted survey participants received compensation. The community survey was available to any UBC community member. A prize draw was also offered as an incentive.

Phase four: Dissemination of findings to community

The results of phase three were shared back with the campus community as the final phase of the CBPAR approach. Student group leaders, campus partners, and advisory groups were invited to the dissemination of findings to inform a collective framework and leadership for the CFH. Details of phase four are not presented herein for brevity.

Statistical analysis

Analyses of data from the community meals, dialogues, and online surveys were undertaken by the SCDs, with guidance from the research team. Quantitative data were analyzed using descriptive statistics. Data collected

in targeted and community surveys were analyzed separately to understand if the results yielded disparate opinions, needs, and reflections between students who accessed emergency food relief on campus and students who did not. Results were summarized using counts (N, %). Qualitative data from community meals and community dialogues were analyzed collectively, while qualitative data from targeted and community surveys were analyzed individually. Qualitative data were analyzed by each SCD independently using a coding framework consisting of the five topics (space, services, community, evaluation, and governance). Sub-categories were identified as the analysis progressed. After independently analyzing the qualitative data, the SCDs met to discuss their analyses, to seek consensus regarding categories and sub-categories, and to discuss overall themes emerging from the data.

Results

Phase one: Information gathering

Phase one meetings with advisory group members fulfilled an integral component of the CBPAR process—collaboration at the project outset. Five key outcomes emerged from the meetings held: 1) affirmation of and agreement on the necessity of this project, 2) agreement that equity, inclusivity, and anti-oppressive approaches must be prioritized through widespread community engagement and collaboration, 3) support for submission of an ethics application, 4) refinement of the research concept, and 5) identification of campus partners (groups and individuals) to involve in phase two. These outcomes supported the SCDs in formulating next steps and the research plan.

Phase one was ongoing; the advisory group continued to support and guide the SCDs over the

course of the project. As per the iterative nature of CBPAR projects, the SCDs returned to the advisory group with project updates and inquiries, obtaining advice regarding all aspects of the project as it unfolded.

Phase Two: Formulating partnerships

SCDs conducted twelve interviews with campus community partners. A critical outcome of phase two was partnership development between the SCDs and groups on campus that expressed interest in having a key role in community engagement and in the CFH project more broadly. A number of themes emerged from initial discussions, including: food security advocacy and/or research, food affordability, food literacy, sustainability, climate justice, and student wellbeing. Partners suggested that a CFH project could

advance support in these key areas through resource provision, stigma reduction, and creation of a safe physical space for student wellbeing. Partnerships developed in this phase informed phase three community engagement methods and elicited a commitment from partners to co-host community engagement events in phase three. Due to the iterative nature of the project, phase two partnership development was ongoing throughout the duration of phase three engagement.

Phase Three: Targeted and broad community engagement

Demographics

Table 1 presents participant demographics for those who opted to complete the demographic questionnaire as part of the facilitated dialogues (n=62), community meals (n=111), generalized survey (n=156), and targeted survey (n=164). The majority of participants were undergraduate students between the ages of eighteen and twenty-four, except for the targeted survey, where the majority were graduate students between the ages of twenty-five and thirty-four. The majority of participants across all community engagement identified as women. Food insecurity-related experiences were prevalent among participants, with 75% (targeted survey) and 37% (community meals) indicating they worried about running out of food in the last year.

The results for space, services, community, evaluation, and institutional support are summarized collectively across the types of engagement events below.

Space

Dialogue and community meal event participants provided open-ended responses that generally clustered into the following categories: ambiance, design, and location. Participants envisioned a warm and welcoming atmosphere, an open, bright, and, colourful design with greenery and plants, music, and comfortable furniture. Participants provided mixed responses to the question of whether a CFH would be better positioned in one centralized location or multiple locations. One participant shared how location could influence use: “Somewhere central—people are encouraged to come for the community, not because they are in need.” Participants compared the atmosphere of a future CFH to existing food-focused spaces on campus at UBC-V, such as student-centered community spaces. Another response indicated the desired atmosphere of a future CFH to be “just like Grandma’s living room.”

Table 2 shows the findings on space from both surveys. Nearly half of respondents to the community survey indicated a preference for integrating elements of a CFH into familiar physical spaces on campus. Respondents also showed a preference for a new physical space that would bring together food security and wellbeing resources. The remainder of respondents preferred better coordination between existing food programs rather than a new physical CFH. The majority of respondents envisioned the CFH in multiple spaces (targeted n=109, 66.5%; community n=113, 72.4%), with the remainder of respondents (targeted n=55, 33.5%; community n=43, 28.7%) envisioning a centralized CFH. Survey respondents were also asked to identify the top three amenities they would like to see included in a CFH (Table 3), which were a low-cost grocery store, community garden or space to grow food, drop-in cooking space (community

survey), and communal fridge or food storage space (targeted survey). One participant envisioned a potential connection between gardens and a food hub grocery store: “Gardens are key...by learning how to garden, how to run a garden, let the garden(s) provide food for the grocery store and therefore be a source for funding these initiatives.”

Services

Participants in the community meal events and dialogue sessions envisioned a variety of programs, services, and food-related activities, such as recreational and cultural programs and events, communal meals, cooking, purchasing food, food-focused educational opportunities, and social opportunities for building and expanding community. Participants described a variety of services, such as free food, free hot meals, a low-cost grocery store, a kitchen available for use by students, and a seating area for dining, studying, and socializing. Responses also included services focused on food security, health and nutrition, financial management, and budgeting. Participants described a number of ways for students to be involved with a CFH, including volunteer opportunities, donations, making and sharing food, hosting events, supporting the creation and development of the CFH, and spreading awareness about the CFH.

Over 90% of all survey respondents affirmed that they would access a CFH at UBC-V (Table 5); 47.7% of targeted survey respondents would access a CFH very frequently (once per week), compared to 23.7% of generalized survey respondents (Table 4). Survey respondents in the community and targeted surveys selected the top three programs or resources to be provided through a CFH (Table 5); emergency food access, community meals, and financial support and planning were the top programs or resources selected in

both surveys. Survey respondents additionally suggested desired programs and resources when prompted with an open-ended question: responses included legal and immigration services, clothing exchange services, a food bank, culture-specific meals and food-focused programming, services based on provision of local and Indigenous ingredients and foods, employment opportunities for students, recipe support, food hampers, and specific supports for students with children such as a toy library, child nutrition support, and prenatal food and support. Another open-ended question asked people to report why they would access the CFH and for what purpose. Generally, respondents in the targeted survey indicated that they would access a CFH for financial support, community social connection, and food access, whereas respondents in the community survey focused on community development, social inclusion, and food access. Example responses included: “It’s really hard to access affordable healthy food on campus. Not only rent is expensive but also healthy food access is expensive too,” and, “the current food options on campus are very expensive and impossible to rely on for my daily food needs. A cheaper option that is close to my classes would be very helpful for me.”

Community

Participants at community meal events and dialogue sessions were asked open-ended questions regarding the community that could animate a CFH at UBC-V. Participants shared that the space should be accessible to all UBC-V community members, including students, staff, and faculty, with specific mention of students who experience food insecurity as well as equity-deserving groups. Participants described the need for a CFH to provide dignified access to food, particularly for students with disabilities, food allergies and

preferences, and cultural needs and desires. Participants additionally commented on the importance of a no-barrier space, student leadership, and accessible physical design of the space. Participants also discussed signage in different languages, diversity in food offered, cultural events, collaboration with cultural groups on campus, equitable, cultural, and racial representation amongst staff, cultural sensitivity training, and convenient and consistent hours. Select responses from participants include: “People who show up at food banks are very aware that they are in need of food—all these people are here for food but that’s it. Having different types of audience in the room can diversify the experience and remove stigma,” and, “I think food is the best bonding experience. Healthy lifestyles can form through a community hub.”

Survey responses indicating the top three preferences for features that would contribute to creating a warm, welcoming, safe, and accessible environment and community are shown in Table 6. Respondents in both surveys showed a preference for prioritizing culturally appropriate foods (targeted $n=114$; community $n=113$) and hosting cultural events (targeted $n=96$; community $n=108$). Respondents were prompted in an open-ended question to indicate additional features that would make the CFH feel accessible and safe. Responses included privacy, reducing judgment and stigma, and situating the CFH in a public area.

Evaluation

Community meal and dialogue event participants provided responses to open-ended prompts and questions on metrics for evaluating the effectiveness of a CFH. Event participants identified potential benefits that a CFH could have on students, including improved academic performance, mental health,

nutrition, and physical health, reduced food insecurity, community development, and reduced stigma for students experiencing food insecurity. Participants identified the importance of creating open avenues for feedback on a CFH. Environmental sustainability was also a key theme, including the importance of reducing waste, introducing local and organic foods, and including plant-based options. Event participants also noted that one indicator of success and effectiveness would be how positive the reputation of the CFH was on campus. One participant additionally noted that, “through feedback generated by people who use the service, we can generate insights into the effectiveness of the Food Hub.”

Survey respondents also provided answers to two open-ended questions with relevance to indicators for evaluating the benefits of a CFH. Respondents from the targeted survey frequently commented on the alleviation of financial stressors, particularly as it relates to nutritious food access and greater varieties of food options. Respondents in both surveys noted that increased social connection would be an important indicator for success. Other themes mentioned across surveys included improved mental health and increased availability of cultural foods. A second open-ended question asked how a CFH could transform the health, wellbeing, and environmental sustainability of the UBC-V community. Respondents to the targeted survey mentioned increased food access, literacy, nutrition, improved mental health benefits, and the alleviation of financial stress. Respondents to both surveys discussed the importance of providing a diversity of food- and financial-related resources on campus. Other topics highlighted across surveys included improved health through social connection, community cohesion, and improved environmental sustainability.

Institutional support

Community meal and dialogue event participants were asked to envision what type of institutional support could be provided by UBC-V to the CFH project.

Participants provided a variety of answers, highlighting student partnerships including student subsidies and funding, student leadership, student volunteers, paid employment for students, collaboration with student

clubs, and creating student ambassadors for feedback and evaluation. Participants also discussed the ways in which UBC-V could emphasize commitment to student food security by providing physical space(s) for a CFH, an annual impact report, oversight of an annual student review of CFH programs and services, social media and media presence, support for community outreach and fundraising, and engagement of faculty and senior leadership.

Discussion

This research project was initiated due to persistently high rates of student food insecurity at UBC-V and a need to prioritize innovative solutions beyond campus food banks. The CBPAR process increased visibility and discussion of the pervasiveness of student food insecurity at UBC-V and encouraged partnership development amongst existing food system initiatives on campus. The results demonstrated high enthusiasm amongst students, staff, and faculty regarding the creation and implementation of a campus CFH to support food security. It was also apparent that a CFH needs to go beyond traditional approaches to food access. This may include support for community development and student leadership, as well as a wide range of cultural practices on campus and encouraging social connection. The central themes that emerged from the CBPAR process suggest community members want food systems that prioritize community and equity, access, affordability, and sustainability. Thus, a CFH needs to be multi-faceted, capable of fostering community and social cohesion around food as well as providing short term alleviation of food insecurity.

The findings from this project on the vision of a CFH were consistent with recent findings from UBCO as well as additional research that showed the

effectiveness of community-informed, community-based food security initiatives that provided wraparound supports (Clement & Hamilton, 2020, 2021; Glaros et al., 2021). Many of the results reinforced findings from phase one and those identified by the SCDs and research team at the project outset. For example, preferences for services or amenities identified from the surveys and community engagement events reflected existing programs and services at UBC-V. However, many of these programs and services operate independently or semi-independently and are not housed in a centralized location. Thus, better connection, awareness, and amplification of existing food security initiatives across campus should be a future priority.

The targeted and community surveys generally showed similarities in responses with respect to preferences for features and resources in a CFH, which may indicate that a CFH could appeal to a broad range of community members. However, respondents to the targeted survey indicated they would access a CFH more frequently, which suggests particularly high demand for a CFH among people currently experiencing food insecurity. Compared to other studies among postsecondary students (Bruening et al.,

2017; Entz et al., 2017; Freudenberg et al., 2019), participants in the targeted survey had two to more than three times the prevalence of food insecurity-related experiences. The amenity that was most popular among respondents to both surveys was a low-cost grocery store. The next most selected amenity was a community garden. This could indicate that the most pressing issues when it comes to food security remain financial security and the provision of affordable and free options for food. However, it should be noted that there is limited evidence to suggest that the use of gardens addresses food insecurity (Huisken et al., 2016).

There were several facilitators and barriers to the process that may help to inform institutions considering implementation of AFIs or CFH. First, the use of CBPAR methodology was a significant strength that facilitated success. Throughout the research process, in phases one, two, three, and four, the SCDs developed and nurtured meaningful relationships with campus partners. These relationships supported every stage of the research, from project development to community engagement, data collection, implementation, and results dissemination. It was as a result of this partnership development that the SCDs were able to successfully engage students across diverse communities on campus, including marginalized populations and those experiencing food insecurity, who are typically hard to reach (Yancey et al., 2006).

The use of surveys, dialogue sessions, and community meals balanced the need to gather data from a larger sample (through surveys) with the need to conduct meaningful discussion on the development of a community-based and community-oriented CFH through sharing a meal and fostering dialogue. These approaches were complementary and supported the involvement of a variety of voices and perspectives into the overall project and results. Conversely, the COVID-19 pandemic was a significant barrier throughout the

research process, especially with regard to facilitating engagement. When contacting student groups to engage with, beginning in phase two during the summer, the response rate was relatively low, likely due to most student groups being on pause during this time and having competing priorities thereafter. A more diverse perspective may have been achieved with greater participation from other student groups. COVID-19-related public health restrictions on the size of in-person events throughout the duration of the project also limited the number of attendees and, possibly, the level of engagement at in-person and online community engagement events. The findings presented here may be specific to the UBC-V community. However, other institutions may benefit from using the framework articulated herein.

The breadth of responses for envisioning the CFH in this study presents a challenge for implementation. Institutions need to consider feasibility, and they may want to consider focusing on central themes that arise and a scaled approach to implementation rather than the totality of opinions, needs, and desires. For example, central themes from the CBPAR process described herein included prioritization of affordability as well as social and community development (among other aspects). Some of the suggestions put forth by respondents already existed at UBC-V, which suggests the need to consider how programs and services are promoted to community members. In the time since completion of this CBPAR project, a campus food hub market, which is centered around an at-cost-grocery store, was piloted. The pilot has since evolved to a student-led not-for-profit community space that promotes social connection, cultural diversity, and affordable food (University of British Columbia, 2023). Forthcoming evaluation of the food hub may help to further inform its operation and may be of broader interest. When this project was developed, there was no

published literature on CFHs at postsecondary institutions (Murphy et al., 2022).

It is important to acknowledge that, although CFH programs and services may be able to provide temporary relief from the burdens experienced by food insecure students and a community of support and care, implementation of a CFH should not be viewed as or expected to be a comprehensive solution to food

insecurity. Broad policy change is needed to address the root causes of food insecurity among students, including tuition reduction, increased financial assistance, and affordable housing options. These policy changes parallel calls to action outside of the postsecondary setting for a government-implemented basic income as the most important and effective response to food insecurity (Tarasuk et al., 2022).

Conclusion

With rising cost of living, tuition, and education costs, student food insecurity will likely persist at postsecondary institutions. Postsecondary institutions have an imperative to support both student development and wellbeing and academic success through the implementation of food security services and wraparound wellbeing supports for students, such

as a CFH. The CBPAR process outlined in this paper may be a useful resource for postsecondary institutions desiring to prioritize community engagement and input in the development and implementation of such services. The findings of the CBPAR process may also help to understand and develop best practices to support student food security.

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Sarah Clement (she/her) is grateful to live and work in Tkaronto, territory covered by the Dish With One Spoon Wampum Belt Covenant. She is the Health Promoter - Community Food Centre at South Riverdale Community Health Centre. Sarah received her Master of Social Work degree at UBC, and worked with UBCO Campus Health on a community-based research project that resulted in the creation of the UBCO Food Hub. Sarah is strongly committed to supporting thriving, just, and equitable food systems, and is excited to be a first time published author in CAFS!

Sara Kozicky (she/her) is grateful to work on the unceded territory of the Musqueam peoples. In her current role in the Office of Wellbeing Strategy, Sara is instrumental in planning collaborative strategies as a part of UBC's system-wide backbone unit for health and wellbeing promotion. Sara has been a dynamic leader in UBC's Food Security Initiative, where she spearheaded notable projects such as the Meal Share Program, Food Hub website and the Food Hub Market (UBC's Community Food Hub). Her current collaborative strategic focus is on embedding wellbeing in teaching, learning, and research environments.

Casey Hamilton (she/her) is grateful to work and live in the unceded territory of the Syilx Okanagan Nation. She is a Registered Dietitian and currently works in the role of Wellbeing Strategist at UBC's Okanagan campus, where she supports student wellbeing through community-based action research and subsequent action projects and initiatives. She is also active in the community, where she founded and led the Okanagan Fruit Tree Project Society. She has lived-experience with food insecurity and strives to be self-reflexive about this in her work.

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Appendix

Table 1. Demographic information from community engagement

	Facilitated Dialogues (n=62)	Community Meals (n=111)	Survey, Community (n=156)	Survey, Targeted (n=164)
Affiliation, n (%)				
Undergraduate student	48 (77.4)	90 (81.1)	100 (64.1)	42 (25.6)
Graduate student	4 (6.5)	8 (7.2)	25 (16.0)	74 (45.1)
Staff	6 (9.7)	3 (2.7)	2 (1.3)	3 (1.8)
Faculty	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.6)
Other/Missing	4 (6.5)	10 (9.0)	27 (17.3)	44 (26.8)
Age, n (%)				
Under 18	0 (0.0)	0 (0.0)	1 (0.6)	0 (0.00)
18-24 yrs.	39 (62.9)	86 (77.5)	97 (62.2)	38 (23.2)
25-34 yrs.	12 (19.4)	7 (6.3)	25 (11.4)	58 (35.4)
35-44 yrs.	2 (3.2)	2 (1.8)	3 (1.9)	23 (14.0)
44-54 yrs.	1 (1.6)	1 (0.9)	0 (0.00)	2 (1.20)
Missing	8 (12.9)	15 (13.5)	30 (19.2)	43 (26.2)
Gender, n (%)				
Woman	34 (54.8)	64 (57.7)	87 (55.8)	71 (43.3)
Man	18 (29.0)	34 (30.6)	31 (19.9)	58 (35.4)
Non-binary	1 (1.6)	1 (0.90)	7 (4.5)	6 (3.7)
Prefer not to answer/missing	9 (14.5)	12 (10.8)	31 (19.9)	32 (19.5)
Residence, n (%)				
On campus	31 (50.0)	62 (55.9)	47 (30.1)	91 (55.5)
Off campus	28 (45.2)	44 (39.6)	80 (51.3)	46 (28.0)
Missing	3 (4.8)	5 (4.50)	29 (18.6)	27 (16.5)
Identity (respondents could select multiple categories), n				
2SLBGTQIA+	9	15	34	14
Indigenous	1	3	0	4
Racialized	19	39	34	33
Disability	1	1	8	10
First generation student	10	11	21	14
International student	11	19	41	75
Student with child(ren)/dependents	1	1	5	37
Food Security, n (%)				
Has received financial assistance to pay for university	18 (29.0)	26 (23.4)	47/128 (36.7)	43/138 (31.2)
Often true or sometimes true to worrying about running out of food in the last year	27 (48.2)	38 (37.2)	73/128 (57.0)	103/138 (74.6)

Has received food assistance (e.g., food hampers, food bank, UBC Meal Share)	13 (23.2)	16 (15.7)	48/128 (37.5)	121/138 (87.7)
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Abbreviations: 2SLBGTQTQA+: two-spirit, lesbian, gay, bisexual, transgender, intersex, queer/questioning, asexual, and additional identities (e.g., non-binary and pansexual). Denominator shown for targeted and community questionnaires as not all participants responded to the food security question.

Table 2. Responses from the online survey: Preferences regarding physical space of a CFH

Physical space, n (%)	Targeted (n=164)	Community (n=156)
New physical food hub space(s) that bring together food security and wellbeing resources	62 (37.8)	65 (41.2)
Integrating food hub elements into spaces that are already familiar to you/access often rather than new space	92 (56.1)	77 (49.4)
No physical food hub space but better coordination/partnerships between existing food security resources/spaces	10 (6.1)	14 (9.0)

Responses to the heading, “envisioning a food hub,” and the question, “what is more important to you...”

Table 3. Responses from the online surveys: Preferences for amenities of a CFH

Amenity, n	Targeted (n=164) ¹	Community (n=156) ¹
Communal fridge/food storage space	56	56
Drop in cooking space	47	63
Kitchen equipment rental	51	38
Low-cost grocery store	133	127
Community garden/space to grow food	65	74
Meeting space	34	24
Social lounge space	37	51
Professional staff (e.g., dietitian)	48	30

Responses to the question, “Select top three choices of amenities provided by the food hub”¹Participants could select more than one option, and thus n is presented in lieu of percentages

Table 4. Responses from the online surveys: Frequency of access for a CFH

Frequency of access, n (%)	Targeted (n= 151)	Community (n=143)
Never	2 (1.3)	8 (5.1)
Rarely (once/year)	3 (2.0)	5 (3.2)
Occasionally (every few months)	23 (15.2)	30 (19.2)
Frequently (once/month)	48 (31.8)	60 (38.5)
Very frequently (once/week)	72 (47.7)	37 (23.7)
Always (daily)	3 (2.0)	3 (1.9)

Responses to the question, “How often would you access the food hub?”

Table 5. Responses from the online surveys: Preferences for programs and resources for a CFH

Program/resource, n	Targeted (n=164)¹	Community (n=156)¹
Mental health support	70	48
Academic enrollment and advising	36	31
Financial support and planning	99	64
Food skills workshops	44	62
Nutrition peer coaching	43	49
Emergency food access	86	74
Community meals	78	95
Connecting with other students	35	40

Responses to the question, “Select top three choices of programs, connections, and resources provided by the food hub”.

¹Participants could select more than one option, and thus n is presented in lieu of percentages

Table 6. Responses from the online surveys: Accessibility of a CFH

Accessibility, n	Targeted (n=164)¹	Community (n=156)¹
Culturally appropriate foods	114	113
Cultural events	96	108
Ambience	60	85
Resources in multiple languages	36	22
Peer support	56	44
Accessible design of physical space	44	41

Responses to the question, “Select top three aspects of the community food hub that would make it feel warm, welcoming, safe, and accessible for you and your peers?”

¹Participants could select more than one option, and thus n is presented in lieu of percentages



Original Research Article

The framing of food in Canadian university classrooms: A preliminary analysis of undergraduate human nutrition sciences, dietetics, and food studies syllabi

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Abstract

There are numerous “positivity” movements circulating such as sex positivity and body positivity that affect how sexuality and bodies are discussed, including in educational contexts. These movements have provided alternative discourses that challenge constructions of sexualities and bodies as “dangerous”, aberrant, or “other”. There is potential for “food positivity” to do the same given how food is frequently constructed as “risky”,

reflecting anxieties about industrial food production and the impacts of “bad” food on human health, appearance, and the environment. Food practices and discourses can act as moral signifiers and be exclusionary, exacerbating marginalization and inequities. Alternatively, food pedagogies can prioritize inclusion, diversity, and sustainable, resilient communities. How might the discourses that circulate in post-secondary food education construct and support positive relationships

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211

with food? Two major, and largely silo-ed, fields in Canadian higher education are Nutritional Sciences and Food Studies. Using publicly available syllabi (n=97) from undergraduate courses across Canada, this study investigated how food positivity is being enacted. In Nutritional Sciences, food positivity emphasizes nutritionism ideology whereby the composition and quantity of nutrients can add up to an (undefined) healthy diet. In Food Studies, food positivity is associated

with local, equity-promoting, and culturally-sensitive approaches. In both fields, “food negativity” also appears in relation to “obesogenic” foods and systems, revealing an underlying fatphobia. Greater transdisciplinary collaboration with Fat Studies would benefit both fields in enacting a broader and more inclusive food positivity.

Keywords: Food positivity; education; post-secondary; food studies; nutrition education; Canada; critical discourse analysis

Résumé

De nombreux mouvements de « positivité » qui circulent, tels que la positivité sexuelle et la positivité corporelle, influencent la manière dont la sexualité et les corps sont abordés, notamment dans les contextes éducatifs. Ces mouvements ont fourni des discours alternatifs qui remettent en question les constructions des sexualités et des corps comme étant « dangereux », aberrants ou « autres ». La « positivité alimentaire » a le potentiel de faire de même dans la mesure où des aliments sont souvent considérés comme « risqués », reflétant les inquiétudes suscitées par la production alimentaire industrielle et les effets de la « mauvaise » alimentation sur la santé humaine, l'apparence et l'environnement. Les pratiques alimentaires et les discours qui les soutiennent agissent comme des indicateurs moraux et peuvent être source d'exclusion, exacerbant la marginalisation et les inégalités. Par ailleurs, les pédagogies alimentaires peuvent donner la priorité à l'inclusion, à la diversité et aux communautés durables et résilientes. Comment les discours qui circulent dans l'éducation alimentaire postsecondaire

peuvent-ils construire et soutenir des relations positives avec la nourriture? Les sciences de la nutrition et les études sur l'alimentation sont deux domaines majeurs et largement cloisonnés de l'enseignement supérieur canadien. En utilisant des plans de cours accessibles au public (n=97) de cours de premier cycle offerts à travers le Canada, cette étude a examiné la façon dont la positivité alimentaire est mise en œuvre. En sciences de la nutrition, la positivité alimentaire met l'accent sur l'idéologie du nutritionnisme, selon laquelle c'est la composition et la quantité des nutriments qui donnent lieu à un régime alimentaire sain (non défini). Dans les études sur l'alimentation, la positivité alimentaire est associée à des approches locales, favorisant l'équité et sensibles à la culture. Dans les deux domaines, la « négativité alimentaire » apparaît en relation avec les aliments et les systèmes « obésogènes », révélant une phobie du gras sous-jacente. Une plus grande collaboration transdisciplinaire avec les études sur les graisses serait bénéfique aux deux domaines pour mettre en œuvre une positivité alimentaire plus large et plus inclusive.

Introduction

From the success of *Masterchef Canada* to the revamped Canada Food Guide (Health Canada, 2019), efforts to teach Canadians about food are intensifying in popular culture, public health, and formal education. As university students and educators teaching in different disciplines, we are struck by how food and its production and consumption are constructed in different fields. Food is frequently framed as risky, often reflecting anxieties about industrialized food production, “obesity,”¹ human health and appearance, and the environment (Elliot, 2020; Levenstein, 2012; Lupton, 1996; Parker, 2020). In response, we have started to consider the ways in which food is constructed in post-secondary education generally, especially when food is discussed approvingly and without shame, guilt, or anxiety. We have begun to play with the idea of “food positivity,” echoing movements such as sex positivity and body positivity that have offered alternative discourses to challenge constructions of bodies and sexualities as dangerous or aberrant; these movements have impacted sexuality and body discourses. We see potential for food positivity to do the same. To this end, we chose to conduct a preliminary analysis of discourses circulating in Human Nutrition Sciences, Dietetics, and Food Studies by examining syllabi to better understand how post-secondary education constructs food generally; secondarily, we sought to explore how food anxieties may be shaping contemporary postsecondary education by examining in what ways and which foods were presented with approval and without connotations of risk or blame.

Traditionally, food education has emphasized nutrition and “functional” foods, an approach that has increasingly been critiqued as reductionist (Flowers & Swan, 2016; Weaver-Hightower, 2011). Food also has frequently been constructed as a source of health risk or environmental crisis (Elliot, 2020; Levenstein, 2012; Lupton, 1996, Parker, 2020). Yet, food means much more than health or nourishment; it also reflects identity and familial, cultural, and environmental contexts (Beagan et al., 2014; Stapleton, 2015). How food is understood also represents competing worldviews, including between neoliberal discourses that make food intake individuals’ responsibility (Alkon, 2014), social justice and feminist discourses that see food as part of the fight for equity and fulfillment (Parker et al., 2019), and Indigenous ways of knowing whereby food is understood as a gift (Kimmerer, 2020).

Post-secondary students encounter food pedagogies in Human Nutrition Sciences, Dietetics, and Food Studies programs and courses, which have remained remarkably siloed from one another (Stephens & Hinton, 2021). Nutrition or Food Science has tended to emphasize its role as a biological science, such as with the chemical isolation of vitamins in 1926 (Mozaffarian et al., 2018), while current Human Nutrition Science and Dietetics programs incorporate social and environmental components, with Beaman et al. (2005) offering the definition: “the study of food systems, foods and drinks, and their nutrients and other constituents; and of their interactions within and between all relevant biological, social and environmental systems” (p. 697). Food education, especially in Dietetics, a historically

¹“Fat” is used throughout this manuscript non-pejoratively as a neutral descriptor in line with fat activism, whereas “obese” and “obesity” are placed in quotation marks to emphasize the pathologisation of fatness as contested (Meadows & Daníelsdóttir, 2016).

feminized profession emerging from Home Economics, has had profound gendered effects. It attracts mostly white, heterosexual, middle-class women, with subsequent praxis and expertise that are also gendered, racialized, and classed (Brady, 2018), leading to recent calls to diversify the field and employ anti-oppressive pedagogy (Brady, 2020; Wellington et al., 2021). Food Studies is an interdisciplinary field that focuses more on food systems and food practices, making connections between food, health, the environment, and well-being as well as intersecting structural inequities (Parker et al., 2019; Stephens & Hinton, 2021). Despite the intensification of interest in food, how these food-centric fields construct food, eaters, and producers in post-secondary education is under-explored.

We take an explicitly interdisciplinary approach to bridge disciplinary silos in food pedagogy (Stephens & Hinton, 2021) rather than analyzing each discipline separately, which may reinforce divisions. Food is a central connecting societal experience; silos compromise attempts to solve food crises (Elliot, 2020; Levenstein, 2012; Lupton, 1996, Parker, 2020), whose “real-world” messiness transcends disciplinary divisions and requires synthesizing knowledge from multiple content areas (Palmer, 2001; Stember, 1991; Styron, 2013). As part of our interdisciplinary approach, we bring into contact food pedagogies from Human Nutrition Sciences, Dietetics, and Food Studies in a comparative analysis (Kivits et al., 2019). For successful interdisciplinary work, a greater understanding of other disciplines with a specific aim should be developed (Priault & Weinel, 2018). In line with our focus, the positive contributions various disciplines make to an issue should be highlighted (Stember, 1991). Therefore, in taking this interdisciplinary, comparative view, we are seeking to discover what can be gained from each discipline, and, in

working together (Stember, 1991), from “food positivity”.

In our study, we take a critical, emancipatory approach, inspired by work conducted in spheres like sex positivity and body positivity that has reframed socially- and politically-contested phenomena (Cwynar-Horta, 2016; Fahs, 2014). Sex-positive feminism challenged constructions of women as disempowered victims or vessels of others’ sexuality and fought against the oppression of sexual minorities (Glick, 2000). Body positivity also relies on principles of inclusion and affirmation and has gained traction recently (Lupton, 2018; Senyonga & Luna, 2021). The “social movement spill-over” effect works when there is overlap in movement membership, alignment of ideological frames, and mutually beneficial establishment of political structures and communication networks (Meyer & Whittier, 1994). The spill-over effect has helped advance other progressive movements (Saguy & Ward, 2011), and we anticipate the same could be the case for food positivity. Education has been an important arm of both the sex- and body-positive movements. Sex-positive pedagogy portrays sex non-judgmentally as neither “good” nor “bad” but as a subjective experience that may be a pleasurable, healthy personal choice, while emphasizing consent, knowledge, and diversity (Brickman & Willoughby, 2017; Pound et al., 2017). The field of fat pedagogy takes a critical pedagogical approach to addressing weight-based oppression and seeks to create conditions for all bodies to flourish (Cameron & Russell, 2016, 2021; Russell, 2020), with an expanding repertoire of curricula and programs for elementary, secondary, post-secondary, and public educational contexts (see Russell, 2020).

In contrast to sex and body positivity, the idea of food positivity has been rarely evoked. If food is presented positively, it is often in calls for moderate consumption of the “right” (natural, local, healthy)

foods (Guthman, 2011), in market-driven “food porn” (McBride, 2010), or in still somewhat prescriptive intuitive eating models (Bacon & Aphramor, 2011). Buying and consuming food can thus be an emotionally fraught experience (Bombak, 2015; Parker 2020), especially for those with marginalized bodies, since consideration is rarely given to matters of class, ethnicity, or gender when pronouncements about food are made (Beagan et al., 2014; Probyn, 2000). Further, as concerns over “obesogenic” environments have arisen, new forms of moralism have become part of food discourses (Guthman, 2011). These discourses typically ignore sociopolitical contexts, present paternalistic, stereotypical, and homogenizing constructions of how “others” live, and suggest that consumer ignorance is at the core of food-related problems (Farrell et al., 2016), with education often touted as a solution.

We recognize the limitations of and debates surrounding “positivity” movements. Body positivity has been critiqued for becoming a depoliticized, neoliberal, corporatized, whitewashed, and even weight-loss-promoting imitation of a more radical fat acceptance movement (Bombak et al., 2019; Cwynar-Horta, 2016; Griffin et al., 2022; Johansson, 2021; Sastre, 2014) that converged historically with queer, Black, and mobilization discourses (Afful & Ricciardelli, 2015; Darwin & Miller, 2021; Griffin et al., 2022). These are issues with which we concur (Bombak et al., 2019). Critics have also alleged that body positivity persists in over-emphasizing appearance and women’s individualistic need to adopt positive bodily attitudes (Cohen et al., 2021; Johansson, 2021). Sex positivity may become depoliticized, meaningless, or ableist, or may not adequately account for non-consensual sex, compulsory or pressurized sexuality, consumerism, intersectionality, or objectification (Fahs, 2014; Glick, 2000; Ivanski & Kohut, 2017; Milks, 2014). Regardless of their initial intent, like many other social movements, these

movements can be misused, misappropriated, diluted, or captured by hostile actors (Lewin, 2021; Sobande, 2020). As such, we do not adopt a prescriptive approach by *advocating for* sex, body, or food positivity, beyond arguing they are preferable to shame and rejection.

However, these are highly visible social movements that have influenced cultural discourse (Bombak et al., 2019; Cohen et al., 2021; Mosher, 2017) and may be beneficial for mood, body image, recognition of bodily and sexual diversity, and health interventions/education (Cohen et al., 2019; Dhady et al., 2023; Fahs, 2014; Fava & Fortenberry, 2021; Kroes, 2021; Murphy et al. 2022; Stein et al., 2023). They are multivocal, divided, and self-reflexive concerning critiques of exclusivity and neoliberalism (Darwin & Miller, 2021; Fahs, 2014; Ivanski & Kohut, 2017; Sikka, 2021). It also behooves us to note some oppose body positivity because it may inspire *too much acceptance* of fat bodies (Cohen et al., 2021; Johansson, 2021). Therefore, these movements are, in some iterations, opposite to fatphobia/weight-loss promotion and rampant anti-queer and feminist backlash (Cohen et al., 2021; Lewin, 2021). They may, cautiously, be part of emancipatory efforts to limit shame, anxiety, and the erasure of certain bodies (Hargons et al., 2021; Leath et al., 2020; Leboeuf, 2019; Johansson, 2021).

We do not wish to draw direct parallels to these other movements in our preliminary search for food positivity. They merely inspired us as we considered a discursive environment heavily mired in food-related anxiety and shame. Nor do we believe more affirming food discourses will address structural issues around food inequities. We recognize these issues require political, collective action beyond individualistic attitudes on food. However, food has relevant attitudinal and affective dimensions. With disordered eating on the rise globally (López-Gil et al., 2023), thin-ideal social media content negatively affecting mood and body satisfaction

(Cohen et al., 2019; Dhadly et al., 2023), and widely promoted appetite suppressors such as semaglutide potentially inducing pancreatitis and stomach paralysis (Bombak, 2023; Sodhi et al., 2023), we believe there is value in considering how food is invoked favourably, pleurably, and without shame or apprehension in curricula.

In this study, we draw upon critical food pedagogies and feminist intersectional food pedagogies, emerging fields informed by both critical pedagogy and critical food studies (Flowers & Swan, 2016; Parker, 2023). Critical food pedagogies are purposely pluralistic to denote the myriad foci and teaching and learning approaches used in both formal and informal settings, as well as in public food pedagogies. They also reflect the diversification of food education and a shift in who is considered to have knowledge about food. Highlighting issues of power, authority, and expertise, critical food pedagogies draw attention to the moral economies in food philosophies and practices that are reproduced by “healthy living” and wellness discourses. Such

economies, often driven by neoliberal agendas and classist, sexist, racist, sizeist, colonial, and speciesist ideologies, focus on lack of knowledge as the driver for individual “bad” choices, effectively ignoring other social, political, and cultural complexities driving people’s food choices (Lloro-Bidart, 2017; Ma Rhea, 2018; Nxumalo et al., 2011; Stapleton, 2015). Critical food and intersectional feminist food pedagogies critique reductionist discourses that perpetuate harmful assumptions about what constitutes “good” food to fuel “good” bodies (Burrows, 2009; Flowers & Swan, 2016; Parker, 2023). Critical food pedagogies can play a role in building more inclusive approaches to food education; however, it is a nascent field, and more research is needed (Flowers and Swan, 2016). As one starting place for this preliminary analysis, we suggest it is important to better understand how food is currently constructed in contemporary food education in Human Nutrition Sciences, Dietetics, and Food Studies.

Methods

We conducted a Critical Discourse Analysis (CDA) of undergraduate syllabi from Human Nutrition Sciences, Dietetics, and Food Studies courses from Canadian post-secondary institutions (colleges and universities). We searched for and collected the syllabi in 2020, with two additional syllabi sent to us in 2021. CDA considers how people construct their social realities using language and signification, as well as how such constructions maintain power relations in society by supporting common-sense understandings of the world (Fairclough, 1989, 1992; Locke, 2004)

Definitions of fields and search strategy

We defined Food Studies as the interdisciplinary study of food systems, which includes food consumption, production, policy, and distribution (Canadian Association for Food Studies, n.d.). Food Studies in Canada is rarely formally recognized by institutions. Rather, scholars work in their traditional home disciplines and teach food-related content. As such, we took a broad, high in sensitivity but necessarily low in specificity, approach in our search for syllabi. We also did not pre-specify a date range for included syllabi, and

some syllabi did not include dates. Syllabi ranged from the years 2000-2020. Three outliers (including those directly sent by instructors) preceded 2010, but the single years most represented were 2018, 2019, and 2020. Given the diversity of Canadian post-secondary institutions' organizational structuring, course offerings, and faculty complement, we included any undergraduate social sciences, humanities, and arts courses focused on food or food systems in contemporary society. We note that Food Studies often takes an explicitly critical approach that interrogates structural inequalities in contemporary food systems and their contributions to health, economic, and environmental problems (Koç et al., 2021). However, as we did not know whether individual instructors would consider themselves a Food Studies scholar, in ensuring we did not miss any relevant syllabi, our sample may include courses neither traditionally associated with Food Studies nor adopting an explicitly critical orientation.

For the purposes of this study, we defined Human Nutrition Sciences as the scientific study of how food impacts human health and wellbeing (Dietitians of Canada, 2020). Unlike Food Studies, many Canadian universities have stand-alone Human Nutrition Science and Dietetics departments and degree programs. As such, we limited course syllabi to those offered from Human Nutrition Science and Dietetics departments.

We deployed a multi-step systematic search strategy to identify publicly-available syllabi. Our initial strategy involved using Google to search for the following keywords: food studies, food courses, food syllabus, and Canada. We then searched the websites of Canadian universities with known Food Studies courses, identified the most recent undergraduate academic calendar on each university website, and searched these calendars for the words “food,” “nutrition,” or “eating.” We then entered the course

number, course name, and university name into Google to identify any publicly-available syllabi or, when available, the university website's syllabus archive or wiki. Following these broad approaches, we then consulted the websites of the three largest English-speaking universities in each province and territory, based on enrollment, and went through their course catalogues. Any syllabi not yet captured were added. For Human Nutrition Sciences syllabi specifically, we also searched programs accredited by the Partnership for Dietetic Education and Practice (PDEP) and added any additional available syllabi. We recognize that Human Nutrition Sciences undergraduate courses and programs are required for Dietetics programs; however, we did not consider program requirements for Dietetics in our sampling. At the time of data collection, PDEP was the accrediting body for Dietetics in Canada. PDEP required accredited programs to include courses in “sciences such as chemistry, biochemistry, physiology, microbiology; social sciences and communication; nutrition through the lifecycle, chronic disease and food service; [and] nutrition in the community and population health” (Dietitians of Canada, 2020).

Lastly, some instructors sent additional syllabi to our team directly after learning about our project. We excluded syllabi that were from non-accredited nutrition programs, graduate classes, those focused on culinary or hospitality techniques, and those syllabi with very little food content—such as those more on general marketing, agrology, finance, plant identification, or politics. We constructed a database of our final syllabi, then de-identified them, assigning each a number to not single out courses or instructors in analysis and reporting.

Food studies summary

We found thirty-seven Canadian Food Studies syllabi available online that met our criteria (see **Table 1**). Syllabi were from the following institutions, in descending order by count: University of British Columbia, University of Alberta, McMaster University, Queens University, Memorial University, Simon Fraser University, University of Manitoba, University of Victoria, Western University (Brescia College), Yukon College/University, McGill University, Lakehead University, and University of Calgary. The syllabi reviewed covered a range of topics including food security, agricultural production, the environmental dimensions of food, and sustainability. As well, but less

prominently, there was some discussion about nutrition and its effects on health and physical activity. Sociology and anthropology syllabi focused on historical, social, and cultural food practices, social structures (particularly gender), and the ecological and social relationships related to food provisioning. Other syllabi examined hunger/malnutrition and “overweight/obesity” on a global scale and attended to power, capitalism, and globalization within food systems. Finally, some syllabi focused on the economic and business sides of the food industry, with discussions of marketing, pricing, and the effect of tourism on local food systems.

Table 1: Distribution of food studies courses by discipline

Disciplines	Tally
Sociology/Women's Studies	1
Agriculture and Environmental Sciences	1
Anthropology; Health, Aging, and Society	5
Folklore; Geography	2
History; Kinesiology/Health Studies; Sociology; Environmental Studies	4
Latin American Studies; Sociology/Anthropology	2
Anthropology; Agricultural and Resource Economics	5
Land and Food Systems; Food and Resource Economics; Sustainability	8
Anthropology/Archaeology	1
Agribusiness	2
Agricultural Economics; Sociology	2
Sociology; History	2
Environmental Science; Early Learning and Childhood	2

Human nutrition sciences and dietetics syllabi summary

Because Human Nutrition Sciences courses are usually offered as part of entire programs and are required for Dietetics programs, these syllabi were more common than standalone Food Studies courses. For this reason, we chose to narrow our focus to courses at the introductory level (which have the highest enrollment at most institutions), upper-level courses such as counselling and nutritional assessment, and courses on policy, public health, and community nutrition. This broad range of courses ensured we captured the diverse topics included in human nutrition programs and dietetics courses with an applied focus. We limited the number of food science/basic nutritional syllabi (such as those on vitamins and minerals) as their technical focus did not suit comparative analysis with Food Studies syllabi, and the inclusion of multiple syllabi in this area would have been redundant.

Our final sample consisted of sixty syllabi from nine Canadian institutions with English-language undergraduate Human Nutrition Science and Dietetics programs. We were unable to find publicly available syllabi online from Mount Saint Vincent, University of Prince Edward Island, or Toronto Metropolitan University.² The University of British Columbia was disproportionately represented in our sample, accounting for nearly half (twenty-seven) of the total syllabi, with the rest (in descending order by count) from Western University (Brescia College), University of Guelph, Acadia University, University of Alberta, University of Saskatchewan, University of Manitoba, St. Francis Xavier University, and McGill University. Approximately two thirds of our final sample consisted of third- and fourth-year courses. Most courses were focused on diet, including addressing the role of

nutrition in disease prevention and management, nutrition through the lifecycle, chronic conditions, and the nutritional needs of specific populations (such as athletes). The next largest portion of syllabi focused on food systems: addressing food production, markets, preparation, and safety. Other course topics included public health, nutrition education, food and culture, food security, and nutrition in the global context.

Analysis

Syllabi were examined using CDA (Fairclough, 1989). Syllabi were uploaded into NVivo 12 and analyzed line-by-line by three of the authors. Analysts maintained an audit trail throughout analysis by recording notes on their processes. Analysts reviewed one another's analyses to enhance trustworthiness of analysis. After each round of coding, the authors doing the analysis would meet to debrief and discuss how the analysis was progressing and any discrepancies in interpretation (Creswell, 2007; Kaczynski et al., 2014). Any discrepancies were resolved by the first author. Within the syllabi, vocabulary, grammar and style choices (e.g., pronouns, active vs passive voice, negative vs positive sentences), and textual structures were analyzed, and this language use was then interpreted with respect to constructions of “common knowledge,” schemata (representations and interpretations of standard activity types), frames (representations and interpretations of content), and scripts (representations and interpretations of subjects, their relations, and their behaviours). Ultimately, explanations were arrived at pertaining to how social power was signified and enacted in the syllabi (Fairclough, 1989). Analysts then

² Previously known as Ryerson University.

compared and contrasted emergent themes between Food Studies, Human Nutrition Sciences, and Dietetics syllabi, which we describe in the Discussion.

Findings

We begin this section by sharing findings from the analysis of the Food Studies syllabi before turning to the Human Nutrition Sciences and Dietetics syllabi. Implications regarding our interest in food positivity are addressed in the Discussion section. The sample was not representative, and there is no standard instrument for comparison purposes. The analysis was interpretive, exploratory, and designed to develop a novel understanding of the state of pedagogy and food positivity in Canadian post-secondary curricula. It was focused on social meanings and power as exhibited, represented, and practiced within syllabi.

Food studies syllabi thematic analysis

The analysis of Food Studies syllabi revealed five broad themes: inter- and trans-disciplinarity; agriculture as a business; capitalism; power and intersectionality; and health, body, and nutrition. Each theme is described below.

Inter-and trans-disciplinarity

One notable aspect about Food Studies syllabi is their interdisciplinarity. Specifically, within each syllabus, concepts from different disciplines were used, as well as the various disciplines that have Foods Studies courses (anthropology, archaeology, business, economics, education, geography, history, nutrition, politics/political sciences, sociology, and women and gender studies). This proved challenging in developing

coherent themes, as these various disciplinary homes meant courses had diverse emphases. For example, some courses in this group offer students critical perspectives on capitalism in relation to food and food systems, while others are teaching business or agriculture using market-oriented practices and knowledge.

Agriculture as a business

Syllabi in disciplines such as agricultural economics and agribusiness centred their focus on the business dimensions of food. In these, food was framed as a commodity that influences change, globalization, migration, movements, and technology. These syllabi included discussions of economics, policies, entrepreneurship, food marketing, consumer culture, and capitalism, notably with capitalism presented more positively or neutrally than in syllabi from other disciplines.

Within the subset of agribusiness syllabi, food policies such as agricultural policy, farm policy, trade policy, and food labeling policy were mentioned. In some syllabi, food policy was the explicit theme for one week. The syllabi differed in terms of perspectives on policies, with some syllabi more critical of food policy and control over the food system, including discussions of power with respect to food policy and how policies can contribute to food insecurity, whereas others were more neutral.

Capitalism

Anthropology, sociology, and some agricultural courses tended to be more critical of capitalism, incriminating capitalism and corporations for inequalities and hunger and expressing a need to ensure equality and equity in food distribution, particularly in areas in the Global South (described in the syllabi using various terms). Food sovereignty and food security were common topics in these syllabi, as well as the need to reform existing systems. In two syllabi, “obesity” was presented as a consequence of unjust capitalist systems. Some syllabi discuss sustainability, environmental considerations, and climate change in relation to the current capitalist society, with the current food system presented as unsustainable and threatening to the planet and to food security. Common terms used here were “greenhouse gas emissions”, “ecological footprints”, and “deforestation”. Alternative food models included in the syllabi included local food initiatives, organic food, slow food, and Indigenous food systems, and the need for fair-trade, hormone-free, steroid-free, and Canadian-made foods was also mentioned. Biotechnology, the Green Revolution, and genetically modified organisms (GMOs), which are all connected in practice to corporate interests, tended to be presented as an area of debate or in neutral terms, with a few syllabi being more explicitly negative.

Power and intersectionality

The Food Studies syllabi tended to be critical of power imbalances in the food system. The syllabi demonstrated that time would be invested in questioning who has power over food systems and how inequalities are embedded in food systems. These queries were tied to critical discussions of food security, capitalism, food sovereignty [the right for peoples to

define their own sustainable food systems and to access healthy food (La Via Campesina, 2021)], food governance, global power imbalances, Eurocentrism, colonization, and neoliberalism. Inequalities such as malnutrition and food insecurity were discussed in many of the syllabi. Sustainability, climate change, biotechnology, GMOs, and environmental considerations were also discussed in relation to critiques of the current food system. An intersectional perspective on power and inequalities was also in evidence, and these were often discussed in relation to race, gender, social class, and other aspects of social positionality. Some syllabi focused explicitly on the intersections of identity and food, drawing links to social justice using feminist analyses, while others centred on the cultural aspects of food such as food sharing, religious rituals, cultural heritage, and traditions.

Health, body, and nutrition

An important theme running through the Food Studies syllabi was health, body, and nutrition. Syllabi varied between adopting critical/constructionist, alternative, or orthodox analyses of health, with topics focused on health promotion, population health, and community health. Aligning with the other themes above, health and nutrition were frequently discussed alongside gender, class, culture, and identity, and they tied health to larger power structures, the environment, or food justice. Some, but not all, syllabi appeared to interrogate this content critically. Syllabi occasionally seemed to reproduce colonial ideas, such as presenting First Nations community education plans for managing health rather than holding polluting companies accountable for contaminating food sources, or pitting “modern” foods against “traditional” foods in discussions of health.

The syllabi varied in their discussions of the body in relation to food and health—including content regarding malnutrition, overnutrition, “underweight,” “overweight,” and “obesity.” In some syllabi, “overweight” and “obesity” are presented as the flipside of “malnutrition” and a product of similar social forces. One syllabus mentioned that during the course students would be asked to estimate peers’ body mass indices (BMIs). However, this syllabus also included an assignment that prompted students to engage critically with more orthodox views on “obesity,” encouraged them to consider the contributions of neoliberal policy to “obesity,” and suggested alternative views on fat, including “fatism.” Students were occasionally presented with debates regarding “obesity,” health, and capitalism. However, as we will expand upon in the Discussion, there was limited explicit inclusion of critical weight content, body positivity, or weight-neutral models of health in the Food Studies syllabi, with rare exceptions and occasional critical readings.

Human nutrition science and dietetics syllabi thematic analysis

The thematic analysis of the Human Nutrition Sciences and Dietetics syllabi identified five themes: biological and chemical components; food’s role in health and disease; role of the dietitian; business and food production; and policy.

Biological and chemical components

The word “science” is emphasized in relation to food in numerous Human Nutrition Sciences and Dietetics syllabi and is presented positively as important to health and wellbeing. With rare exceptions, eating, foods, and sociocultural issues tended to be overshadowed by biological processes and references to, for example, ingestion, digestion, and nutrients. Nutrients tended to

be mentioned in isolation from the foods from which they are derived, while the quantity of nutrients consumed, and health status were also linked together in a causal relationship. While some syllabi directly addressed ethnicity, culture, religion, food insecurity or socioeconomic circumstances, other syllabi rarely mentioned connections to personal or social identity (apart from life cycle/stage).

Food’s role in health and disease

What constituted “health” was rarely defined in the Human Nutritional Sciences and Dietetics syllabi, although some mention was made of the social determinants of health, religion, culture, acculturation, and traditional beliefs and practices as contributors to health and food choices, occasionally invoking a Eurocentric worldview. A lifespan approach to human nutrition was frequently included. Many Human Nutrition Sciences and Dietetics syllabi dichotomized health and disease, and food was constructed as a treatment, remedy, and prophylaxis for disease and disorders.

A number of syllabi indicated measurement (of nutrients and/or bodies) as a key practice for nutritional assessment, suggesting a positivist and quantitative approach to health. While often referred to solely as “anthropometrics,” specific measurements named included height, weight, skinfolds, and body fat percentage. Some syllabi also included biochemical assessments. These syllabi may reinforce the desirability of seeking certain (sometimes very precise) “ideal” nutritional or weight goals, although rare references to “monitoring” or “changing” may suggest less of an idealized view and more of a focus on tracking individual alterations in physiology. Some syllabi also included assignments requiring students to recount detailed dietary assessments, positioning students in

reference to these ideals. In addition to nutrients being constructed as the basis of health in nutrition, they were also framed as the basis of “performance” or injury in certain Human Nutrition Sciences syllabi, with content referencing eating disorder risk and rapid weight loss in sport “culture” and strategies for weight change.

In Human Nutrition Sciences and Dietetics syllabi mentioning “obesity,” it was framed as a chronic issue or condition, which has impacts on pregnancy and is considered within an energy imbalance context. Social and psychological aspects of “obesity” were covered in some syllabi, typically framed as a matter of lifestyle and behaviour change treatable through motivational interviewing and coaching to address energy imbalances and nutritional recommendations.

Role of the dietitian

We obtained our Human Nutrition Sciences and Dietetics syllabi from Canadian undergraduate Nutrition and Dietetics programs accredited by PDEP (2020), as mentioned. Thus, these syllabi seek to shape future dietitians, and the associated discourse describes the desired roles of dietitians in Canada. A common theme in Human Nutrition Sciences and Dietetics syllabi was the capacity of dietitians to influence social change through behaviour change, education, awareness, eliminating barriers, and working with communities and public health systems. The expertise of dietitians was emphasized in terms of epidemiology, etiology, pathophysiology, nutrition, and treatment. Emphasis was placed on cultural competency, communication skills, and critical appraisal of evidence, along with the requirement for dietitians to consider environmental, psychosocial, ethnic, demographic, and socioeconomic factors in their professional roles. Cultural competency occasionally exhibited an “othering” approach in which references were made to ethnic groups who may not eat a “typical” North

American diet. Indigenous nutrition was covered in multiple Human Nutrition Sciences and Dietetics syllabi, drawing links between ethnicity, culture, foodways, and health. Syllabi often referenced the need for cultural competency and self-reflexivity. Other topics mentioned in relation to Indigenous nutrition include community-wide interventions, the social determinants of health, food insecurity, policy, and funding.

Dietitians were also constructed as instrumental in human nutrition research, and it was emphasized that it was important to their practice and pedagogy to keep abreast of research. Most Human Nutrition Sciences syllabi included critiques of nutrition claims made in the media or through marketing or emphasized the importance of critically assessing human nutrition literature. The word “evidence” was used frequently in syllabi in relation to such claims, with a focus on using evidence to elucidate nutritional facts and strategies, especially in practice. Students were cautioned to be vigilant against possible mistruths that they may read or hear, with language such as “claims,” “counter-claims,” “miraculous,” and “vested interests” used in relation to nutrition in the media. It was also recommended that eating be a planned and thoughtful process, with critical reflection on nutritional concepts and media controversies about food. Learning objectives and assignments emphasized this critical appraisal, and scientific, scholarly, and peer-reviewed sources were promoted.

Business and food production

Several Human Nutrition Sciences syllabi discussed business aspects of food as well as food production. Topics included marketing, business strategies and sustaining a business, labelling, quality assurance, financing, accounting, human resources, and supply

chain issues. Here, food was framed as a commodity or product, and people were framed as clients or consumers, or, in some cases, systems or social groups. Some of these syllabi constructed food choices made by consumers as intertwined with identity (e.g., ethnicity, class, gender) and social roles. In some rare cases income or access was highlighted. More frequently, perceptions regarding “healthy” and safe eating, or environmental or ethical concerns of food production, were constructed as rational choices with which consumers engaged.

Food safety and the need to ensure it with respect to microorganisms, naturally-occurring toxicants, allergies, food additives, and environmental contamination were discussed. Biotechnology, GMOs, local, organic foods, and questions of sustainability were posed in syllabi in neutral terms or in ways that highlighted potential advantages and disadvantages of food production systems, while some syllabi incorporated philosophical, ethical, and justice-related concerns into those discussions. In contrast, other syllabi were more positive when it came to the food industry or biotechnology and more overt in their engagement. For instance, one syllabus mentioned collaborative learning opportunities with industry sponsors and promoted addressing problems relevant to the food industry. One syllabus on nutraceuticals and functional foods constructed foods as a marketable commodity with nutritional and health-promoting or disease-preventing abilities, alongside standards regarding efficacy and safety regulations and marketing. Food fraud and marketing misinformation and regulation were recurrent themes in these syllabi.

Policy

Discussion of policy, at various levels, was present in multiple syllabi. In these, it was advocated that nutrition policymakers, educators, developers, and

community members should work to improve the nutritional choices available as well as to improve food insecurity and food sovereignty, including for Indigenous Peoples in Canada. Canada’s Food Guide was presented as a reliable source of information in this regard. Some syllabi focused on a bottom-up approach to policy change, with the community involved in the process and community-level initiatives emphasized, while other syllabi contextualized Canada within broader international systems and/or adopted a comparative approach.

Topics covered in discussions of policy included nutrition advocacy, policy intervention, community nutrition education, and community nutrition practices, all of which were said to influence how various demographic groups of people make “healthy” food choices. Educating people to achieve an (often undefined) ideal in nutrition was a common theme in Human Nutrition Sciences and Dietetics syllabi, although some emphasized building understandings of larger issues and policies rather than an individualized or micro analysis of nutrition. Other topics discussed included school and childcare provider policies, nutrition labelling, maternal nutrition policies, controversies pertaining to public health interventions, dietetic codes of ethics, the Canadian healthcare system, collaborations with the private sector, and jurisdictional regulations. Some syllabi were more explicitly critical of existing food-security policies, while other syllabi focused less on policy change and more on the impact of policy on nutrition. At least one syllabus referenced the importance of dietitians being accepting of diversity with respect to professional competencies and adopting a broader societal advocacy role.

Some syllabi included content on human nutrition in international contexts. These included references to interventions in “low-resource countries” or comparisons between “industrialized” and “non-

industrialized” countries. The use of food science, food aid, and biotechnology was included as a potential means of addressing nutritional issues, including acute malnutrition, nutrient deficiencies, “hidden” hunger, food insecurity, and world food waste. Food safety was also presented as dependent on policies at multiple jurisdictions. Controversies regarding global food aid policies were incorporated, such as funding allocations for prevention or treatment of malnutrition, obligations to feed the hungry (with an implication that high-resource countries carry the onus for managing malnutrition globally), whether corrupt governments should be recipients of food aid, and policies

concerning GMOs. Non-technological solutions to international food problems mentioned in syllabi included education, diet, land reform, and improved water, sanitation, and hygiene. Culture, religion, gender, global differences, and population size were also included as contextual factors to consider in food policies, and social, political, agricultural, and economic influences on food policy were referenced in one syllabus. Mention was also made of different organizations and groups that attempt to alleviate hunger such as UNICEF, the World Health Organization, and women’s home gardens.

Discussion

The findings illustrate that food is constructed quite differently in publicly available undergraduate Human Nutrition Sciences, Dietetics, and Food Studies syllabi from Canadian post-secondary institutions, with occasional overlaps between the fields. We will begin the discussion by comparing similarities and differences between Human Nutrition Sciences, Dietetics, and Food Studies that emerged in our critical discourse analysis. Then we will consider how these thematic findings relate to the potential development of food positivity in these fields, which could be a transdisciplinary social movement.

Comparison between fields

To start, we remind readers that we only analyzed publicly-available syllabi from a sample that is not representative of all or any particular Human Nutrition Sciences, Dietetics, or Food Studies programs in Canada. Instructors could have included additional content or raised critical challenges to topics presented

more neutrally in the syllabus during class delivery. Furthermore, fields may have changed since data collection or since syllabi were produced. For example, a new dietetics accreditation body has been established and educational competencies have changed as programs prepare for their respective accreditation processes. As part of our overall study on food positivity we have also interviewed instructors and students, and the findings on class delivery are forthcoming. Further, in discussing the similarities and differences between fields, we make some generalities that do not capture all of the nuances and exceptions present in the syllabi.

When comparing the fields, it is important to note that the transdisciplinarity of Food Studies made it difficult to develop themes, which may suggest a greater degree of cohesion in the fields’ core foci would be beneficial. In contrast, Human Nutrition Sciences and Dietetics are far less fragmented, likely due to being associated with an accredited and applied profession. One major difference between the fields is that foods

are less frequently mentioned in Human Nutrition Sciences and Dietetics syllabi. Rather, nutrients and quantification, or what Scrinis (2012) terms “nutritionism,” are the focus, although social aspects of food and cross-cultural foodways were also considered. Within the Food Studies syllabi, foods were discussed in relation to identity (culture, social class, etc.), food security, and food sovereignty. Food and power were also discussed in relation to inequalities in the food system and through food practices.

Food was described as a commodity across the fields. The environment, sustainability, and alternative approaches to conventional agriculture were common concerns in Food Studies syllabi. The meaning of community overlapped to a certain extent within the fields. Community food insecurity and the health status of communities, including Indigenous communities, was a focus across the disciplines, with a greater emphasis on power imbalances and food sovereignty in Food Studies syllabi. Grassroots and community-led approaches to food systems and eating local food were presented as positive across the syllabi. Human Nutrition Science, Dietetics, and Food Studies focused on policy, with Human Nutrition Science syllabi also focusing on global nutritional interventions. Food Studies syllabi featured an emphasis on intersectional considerations of power struggles, including critical analyses of economic and social structures. Human Nutrition Science and Dietetics syllabi often took a more individualistic approach, focusing on individual choices and behaviours with some emphasis on pervasive food myths and misleading claims. Across disciplines, structural food access issues were considered.

Weight was presented as requiring health risk management in Human Nutrition Sciences and Dietetics syllabi, with “obesity” needing treatment through lifestyle changes. Further, a particular stress

was placed on measuring bodies, and bodies and identities appeared as separate from one another. In Food Studies syllabi, “obesity” was presented as a product of capitalism, as was chronic hunger. “Obesity” was discussed as a product of inaccessibility or unaffordability of food across the syllabi. There was limited engagement with critical weight or fat studies content, although some Food Studies syllabi incorporated more critical readings on the topic.

Whither positivity?

In Human Nutrition Sciences and Dietetics, framing food “positively” was connected with nutritional values rather than with what makes a person feel connected to others or invokes happiness. Positive foods were shaped around health (i.e., foods to eat for good health). What constituted “health” or “healthy foods” was often not defined in the syllabi, implying an assumption that “healthiness” and “healthy foods” have universal meanings that will be shared by instructors, students, and those implicated in the syllabi (i.e., dietetic clients, the public, policymakers, etc.). As internationally significant debates on formal definitions and policy parameters reveal, however, the meaning of “health” itself is contested, and this debate reflects social, scientific, and ethical dimensions (Bell, 2017; Dennis & Robin, 2020; Huber et al., 2011; Overend et al., 2020; Sartorius, 2006).

Similarly, what is commonly understood as “healthy” food and the dissemination of dietary advice are historically and culturally contingent; these discourses are morally loaded, gendered, classed, colonial, racialized, and reflect idiosyncratic priorities, not just unbiased science (Biltekoff, 2013; Dennis & Robin, 2020; Levenstein, 2012; Murphy et al., 2016; Overend et al., 2020). For instance, what might seem like relatively benign considerations regarding fat, sugar,

and Dietary Reference Intakes (DRI) have motivated years of spirited debate, challenges, and controversy internationally (Bragg & Nestle, 2017; Murphy et al., 2016; Teicholz, 2023). Among Canadian families, popular understandings of “healthy” eating can include attempting to adopt the widely disseminated Canadian Food Guide, eating a meat-heavy diet emphasizing homecooked meals, or prioritizing unprocessed food (Beagan et al., 2014). Taken-for-granted assumptions that students, educators, and dietetic clients will settle upon unequivocal definitions and priorities regarding “healthiness” in their food or dietary practices will likely miss the nuanced ways in which individuals enact and are constrained in their everyday lives. Understanding food more positively will remain unrealized until the diversity of human eating and the various structures that food serves are reconciled in Human Nutrition, Dietetics, and Health Sciences (Hayes Conroy & Hayes Conroy 2013; Hite & Carter, 2019; Murphy et al., 2016).

The Human Nutrition Sciences and Dietetics syllabi placed a major emphasis on the role of a culturally-competent dietitian in education and advocacy. However, a failure to consider food and not just nutrients, and to critically, self-reflexively question how hegemonic “healthy” dietary advice reinforces moralistic, colonial, sexist, classist, and racialized discourses (Brady, 2020; Gingras et al., 2017), may imperil an emancipatory approach to food. Encouragingly, more critical, weight-neutral approaches to health which incorporate social justice reforms are gaining traction (Bacon & Aphramor, 2011; Bombak et al., 2019; Gingras et al., 2017). However, this was minimally evident in the syllabi we analyzed. Further dismantling of silos between Human Nutrition Sciences, Dietetics, Food Studies, and also Fat Studies will expose students to fat acceptance and food and body positivity (Afful & Ricciardelli, 2015; Cooper,

2016; Cwynar-Horta, 2016; Brady et al., 2019), and recruitment of educators invested in these aims is needed.

Within Food Studies, conceptions of positive foods were framed around equalities in the food systems, pro-local, culturally relevant, and (in some instances) non-genetically modified foods. Crucially, however, like nutritional or dietetic advice, alternative food movements are morally fraught and reflect racialized, classist, sizeist and colonial prejudices (Brady et al., 2019, Guthman, 2011). Depending on course delivery, a non-reflexive or unnuanced delivery of the alternative food movements’ white, middle-class consumer preferences as a means of achieving systemic food justice may reinforce the idea of an unhealthy and/or unethical “other” (Biltekoff, 2013; Guthman, 2011; Parker, 2023). We noted that syllabi, particularly in terms of selection of readings, did suggest a self-reflexive awareness of these issues.

Food Studies syllabi appeared to reproduce, or at least not to challenge, the dominant negativity concerning larger bodies. Instructors and students may have reframed fat bodies more favourably in classrooms, but there was very little body positivity evident in the syllabi. Rather, foods, policies, and systems deemed “obesogenic” were constructed as negative, including conflating “obesity” with forms of malnutrition and positioning fat bodies as products of damaging, inequitable economic systems. The need to build bridges between food studies, fat acceptance, and fat studies and to move beyond using fat bodies as a justification for mobilizing food justice reforms has been recognized (Brady et al., 2019, 2023). Perpetuating fatphobia is at odds with the goal of many food studies scholars to critically interrogate power relations, and comfortable relationships with food cannot exist when

eating is as speciously charged with moral significance as it is in a fatphobic society.

Transdisciplinary approaches to food positivity

We close by considering the possibilities of breaking down silos between Human Nutrition Sciences, Dietetics, and Food Studies to develop an inclusive and emancipatory food positivity pedagogy and movement. Central to a food positivity pedagogy would be learning how to rectify local and global food inequities and crises without reproducing individualistic, classist, racialized, and fatphobic discourses (Brady, 2020; Gingras et al., 2017; Hayes Conroy & Hayes Conroy 2013). In achieving food positivity, critiques concerning these fields that may inhibit positivity should be carefully considered. Our findings suggest Human Nutrition Sciences and Dietetics syllabi incorporate concepts such as the social determinants of health, but also continue to heavily emphasize discrete nutrients, individual knowledge, and behaviour change. This may produce practitioners who are unable to address structurally embedded food inequities while inadvertently reinforcing stereotypes of the marginalized “ignorant” “other” (Farrell et al., 2016; Gingras et al., 2017; Guthman, 2011; Warin, 2018), even when social determinants of health and cultural competency are discussed in the classroom.

The unequal systems in which food studies scholars are experts emerged over millennia, in part as a consequence of efforts to address life-threatening issues in food safety, preservation, and transportation, cope

with conflict, feed growing populations, and deal with vector-borne diseases (Center for Disease Control and Prevention, 2023; Knorr and Watzke, 2019; McLachlan, 1975; Silva et al., 2018; Tudi et al., 2021). While recognizing how capitalism has distorted the promise of human nutrition/food science innovations, we must remember that improvements in human nutrition substantially contributed to reduced mortality historically (Beltrán-Sánchez et al., 2012; Penn Wharton Budget Model, 2016). In part, these improvements reflect the synergist effects of malnutrition and infectious disease (Keusch, 2003; Schaible & Kaufmann, 2007; Schneider, 2023), which remain a threat to life for which therapeutic nutritional innovations are vital (Keusch, 2003; Schaible & Kaufmann, 2007). At the same time, there must be recognition that, historically, nutrition was weaponized against Indigenous Peoples (Daschuk, 2019; Dennis & Robin 2020), and this history of colonialism, ongoing settler-colonialism, and anti-Black, anti-Asian and anti-Indigenous racism must be reckoned with as we decolonize Human Nutritional Sciences, Dietetics, and Food Studies (Deawuo & Classens, 2023; White & Brown, 2021; Pictou et al, 2021). In a transdisciplinary model, students can learn how to disrupt and revolutionize power relations while incorporating essential nutritional innovations, all without losing sight of the social salience of food (Kimura 2013; Koç et al., 2017; Scrinis, 2012). Lastly, these fields must contend with how food pedagogies can reproduce classism, racism, settler-colonialism, and fatphobia (Brady et al., 2023; Flowers & Swan, 2016; Gingras et al., 2017; Guthman, 2011; Pictou et al., 2021).

Conclusions

This preliminary study helps illuminate how food is being constructed in contemporary Human Nutrition Sciences, Dietetics, and Food Studies courses in Canadian post-secondary institutions. Human Nutrition Sciences and Dietetics syllabi focus on the nutrient constituents of foods and a taken-for-granted “healthy” diet. Food Studies syllabi emphasize social, cultural, and identity-relevant aspects of food, often critiquing status quo food systems and valorizing alternative approaches.

Food positivity is not yet prevalent in course syllabi across the fields we examined. Food Studies may benefit from more coherence and visibility in Canadian post-secondary institutions. Collaboration between Human Nutrition Sciences, Dietetics, and Food Studies would be beneficial for the development of an understanding of food that is not centred on “risk” or health, but perhaps instead, as we have described, centred on a “food positivity” pedagogy. For instance, Human Nutrition Sciences and Dietetics would benefit from the emphasis on intersectionality, anti-oppression, sociality, and equity, while Food Studies could benefit

from a deeper engagement with the innovations of Human Nutrition Science in addressing local and global food inequalities. Both fields would benefit from an appreciation for the diversity of bodies and not relying on certain bodies to illustrate the “riskiness” of certain foods or the consequences of oppressive systems, along with a continued focus on anti-oppression pedagogies and curriculum. Recognizing that formal food education helps shape future policy development and Canadians’ attitudes and behaviours toward food, we seek more inclusive and non-stigmatizing approaches that consider food and eating as multifaceted, unifying, and an affirmative phenomenon. This study is an initial starting point in exploring food positivity and is necessarily limited by only focusing on publicly-available syllabi. Future research should focus on instructors’ and students’ perspectives on food pedagogy in Canada and whether they would endorse a transdisciplinary food positivity movement.

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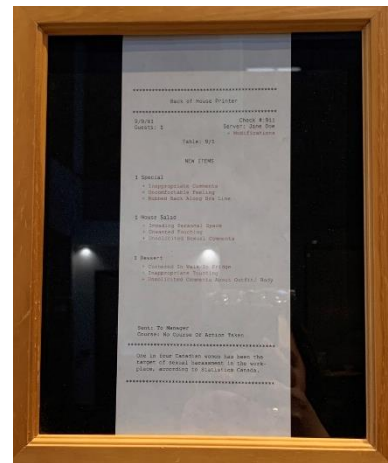


Art Review

Distasteful: Sexual harassment in the restaurant industry

Reviewed by Stefanie Foster*

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Distasteful Sexual Harassment in the Restaurant Industry
 By Annika Lusia

The restaurant industry represents the largest number of sexual harassment complaints to the Equal Employment Opportunity Commission. Women working in all sorts of restaurant jobs report experiencing sexual harassment, often from multiple sources, owners/managers, coworkers, and customers. Many women do not feel actions such as unwanted sexualized jokes or touching are worth reporting, with some even suggesting it is part of the process of hazing or acceptance by the staff. Normalizing this behaviour, coupled with drinking and substance use, fans the flames for sexual harassment/assault to occur. There are also cases where women do choose to report and are met with resistance from their employers due this behaviour being normalized. In some cases, this caused some women to choose to leave the industry. My submission piece will be a framed chef's jacket and pants with handprints over them to represent the sexual harassment that women have faced in the culinary industry. The handprints will be made to look as if they were covered in food. Alongside it will be another smaller piece that will resemble a restaurant ticket/chit. The ticket will provide the progression of sexual misconduct along with a statistic of sexual harassment in kitchens.

Keywords: Sexual Misconduct, #Me Too, Chefs, Women, and Workplace Harassment

I am currently attending George Brown College in the Honours Bachelor of Food Studies degree program. I have a great passion for anything related to food or the restaurant and hospitality industry.

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Presented at the 2023 Canadian Association of Food Studies (CAFS) Conference as part of the Exploration Gallery, *Distasteful: Sexual Harassment in the Restaurant Industry*, a contemporary piece by artist and Food Studies student Annika Lusiš, exposes the stark and distressing reality of sexual harassment in the food service industry. Through a simple yet thoughtful display, Lusiš shines light on the disturbing experiences endured by women in this field, leaving a lasting impression on viewers. The centerpiece of the artwork, a crisp, black chef's coat, carefully framed, belies the presence of two chaotic handprints stamped in flour on the chest (breast) area. These grasping prints mimic groping hands and serve as a powerful representation of the violation and objectification endured by individuals subjected to workplace sexual harassment. As a woman with firsthand experience in the food service industry, I found this visual statement immediate and affecting—I was taken back to my time spent washing dishes in hot kitchens, and the feeling of forcing myself to smile as foul-mouthed chefs told “NSFW” dirty jokes and sweaty prep cooks got way too familiar, a feeling only *nearly*-forgotten now after twenty years or so.

Beside the floury chef's jacket, in its own small frame, is a restaurant chit. At first glance, it appears to be a regular ticket from a back-of-house printer—anyone who has used a restaurant Point of Sale (POS) system will be familiar with the faded black and red ink and the instantly recognizable, industry-standard sans serif font. Upon closer inspection, however, we see that the three “menu items”—the Special, the House Salad, and the Dessert—are not food at all. Instead, these dishes are built of the

disturbing experiences faced by victims of sexual harassment and assault in the workplace: getting “inappropriate comments” and “uncomfortable feelings,” being “cornered in walk-in fridge,” and facing “inappropriate touching” and “unsolicited comments about outfit/body,” among other heinous ingredients.

At the bottom of the chit, a disheartening revelation: the order has been “Sent: To Manager” but with “No Course of Action Taken”; then, as a quick denouement, a chilling Statistics Canada statistic: one in four Canadian women has been the target of sexual harassment in the workplace. These brief but impactful notes help the viewer to understand the prevalent and systemic nature of the issue and act as a reminder of the industry's failure to support victims and address workplace sexual violence and harassment. As Lusiš mentions in her project description, the restaurant industry is the source of more sexual harassment complaints to the Equal Employment Opportunities Commission than any other field, and, in some establishments, unprovoked sexual attention and touching from colleagues is so normalized that victims do not report the harassment or even recognize it as such. Lusiš' artwork captures the essence of the message it aims to convey through simple, but evocative, visuals. The simplicity of the framed coat and its accompanying ticket echoes the cruelty of the underlying message—women in the food service industry are frequently exposed to unwanted attention and danger and often lack the protection they deserve. It is a great example of poignant storytelling done with easily recognizable visual elements, and it effectively raises awareness about

this pressing issue, urging viewers to reflect upon the experiences of those who have and are suffering, often in silence.

Distasteful: Sexual Harassment in the Restaurant Industry is a thought-provoking piece that compels viewers to confront the uncomfortable realities that persist within the food-service industry and, by pointing out the harsh realities of the current

situation, advocates for a safer and more equitable working environment for all. It was an engaging addition to the CAFS Conference 2023 Exploration Gallery.

Stefanie Foster is a former elementary school teacher and principal with a background in community-level, non-profit food security work. Today, she puts all of her experience to use as a researcher with the University of Saskatchewan, examining and advocating for culturally-responsive, universal school food programs. A settler-Canadian, Stef is grateful to live, work and play on Treaty 6 territory and the Homeland of the Métis and is proud to work towards a food secure future for all our relations.



Book Review

Ultra-processed people: Why we can't stop eating food that isn't food

By Chris van Tulleken

Knopf Canada, 2023. 384 pages

Reviewed by Jennifer Sumner*

I first heard about Chris van Tulleken's book through a newspaper article he wrote, in which he noted that poor diet is responsible for more deaths globally than any other cause, including the previous number one risk—tobacco. This reported finding from a medical journal caught my interest and made me want to read his book.

With a medical degree from Oxford and a PhD in molecular virology, van Tulleken is an associate professor at University College London, a practicing infectious diseases physician and a BBC broadcaster. His book is meticulously footnoted and moves easily between personal anecdotes, interviews with experts, and the most recent research.

He begins by explaining that traditional food is made up of three broad categories of molecules that give it taste, texture, and calories: fats, proteins, and carbohydrates. Although humans have evolved systems that control their nutritional intake, over the past 150

years, he argues, “food has become...not food” (p. 4). We have started eating substances constructed from novel molecules and using processes that we have never encountered in our evolutionary history. These substances now make up “as much as 60 percent of the average diet in the U.K. and the U.S.” (p. 5) and they override our systems of control that were developed over millennia.

van Tulleken refers to these substances as ultra-processed food (UPF), a term associated with the NOVA Classification System, which doesn't look at nutrients, but focusses on the level of food processing. Developed by Carlos Monteiro, NOVA classifies food into four groups:

Group 1: Unprocessed or minimally processed food—foods found in nature such as meat, fruit,

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and vegetables, as well as things like flour and pasta.

Group 2: Processed culinary ingredients—traditional foods that make Group 1 taste delicious, such as oils, lard, butter, sugar, salt, vinegar, and honey.

Group 3: Processed food—ready-made mixtures of Groups 1 and 2, which are mainly processed for preservation, such as tinned beans, salted nuts, smoked meat, canned fish, chunks of fruit in syrup and proper freshly made bread.

Group 4: Ultra-processed food—formulations of ingredients, mostly of exclusive industrial use, made by a series of industrial processes, many requiring sophisticated equipment and technology.

The processes to make UPF include the fractioning of whole foods into substances and the chemical modification of these substances. These food fractions are then combined with additives and assembled through industrial techniques such as molding, extrusion, and pressure changes. He notes that there is a big difference between “the salty fatty foods that mum cooked [made from Groups 1, 2 and 3] and their industrial equivalents [made from Group 4]” (p. 44). The reason for this difference is clear: “Processes and ingredients used to manufacture ultra-processed foods are designed to create highly profitable (low-cost ingredients, long shelf life, emphatic branding), convenient (ready-to-consume) hyperpalatable products liable to displace freshly prepared dishes and meals made from all other NOVA food groups” (p. 33).

van Tulleken warns that if something comes wrapped in plastic and contains at least one ingredient you wouldn’t find in a standard kitchen, then it’s UPF. In addition, almost every food that is accompanied by a health claim is UPF. Although he maintains that UPF damages the body, human societies, and the planet, he is most worried about its contribution to obesity. He quotes Monteiro, who theorized that: “The main reason for the rapid increase in overweight and obesity throughout the world, especially since the 1980s, is the correspondingly rapid increase in production and consumption of ultra-processed food and drink products” (p. 32).

van Tulleken explains that obesity is growing at a staggering rate, with an increase of more than 700 percent among children leaving primary school in the U.K. Carefully noting that obesity has deeper causes than UPF—genetic vulnerability, poverty, injustice, inequality, trauma, fatigue, and stress—he sees UPF as a collection of substances through which these deeper societal problems harm the body. He understands obesity as a disease: people have obesity like they have cancer. This diet-related disease results from the collision of ancient genes with a new food ecosystem that is engineered to drive excess consumption—an ecosystem “that we currently seem unable, or perhaps unwilling, to improve” (p. 8). It is also a commerciogenic disease, caused by the marketing and consumption of addictive substances. In other words, obesity is not caused by sugar, by lack of exercise or by lack of willpower, it is caused by eating UPF.

van Tulleken has struggled with weight issues all his life, so he decided to conduct an experiment. Partnering with the University College London Hospital, his study involved quitting UPF for one month, then being weighed and measured, followed by eating UPF for one month, then being re-weighed and re-measured.

During the month he quit UPF, van Tulleken kept a journal and discovered that his normal diet was about 30 percent UPF. He found quitting UPF to be hard, and was craving microwave meals, snack bars, and takeaways. However, he learned to read labels and lost some weight. At the end of one month, he was found to be in average shape for his age—and he was looking forward to the UPF diet.

For the next month, he ate a diet where 80 percent of his calories came from UPF (the same diet as one in five people in the U.K. and the U.S.). He ate what he felt like and didn't force himself. During the third week, he was struggling to eat UPF without thinking about what the experts were telling him. The more UPF he ate, the more disgusted he became. He still wanted UPF, but no longer enjoyed it. By the fourth week, he was experiencing noticeable physical effects: loosening his belt two notches, experiencing anxiety dreams, being constipated, and feeling like he'd aged ten years. Medical testing showed he had gained six kilograms, his appetite hormones were "totally deranged," (p. 160) and his MRI scan showed increased connectivity between some brain areas involved in the hormonal control of food vs desire and reward. At the end of the month, he stopped eating UPF completely.

van Tulleken argues that it is the ultra-processing, not the nutrient content, of UPF that is the problem. Its addictive properties are leading to a nutrition transformation that is becoming a global phenomenon. In his words, we are all participants in an experiment we did not volunteer for, with new substances "being tested on all of us all the time to see which of them are best at extracting money" (p. 10).

Given the ubiquity of UPF, this book fills a vital gap in our knowledge. Thankfully, it is easy to read, combining research and interviews with personal anecdotes and amusing glimpses of van Tulleken family life. For those of us involved in food studies, the book adds an extra layer of urgency: van Tulleken proposes that UPF destroys the meaning of food—it becomes a technical substance without cultural or historical meaning. To avoid this outcome, let alone the millions of early deaths caused by poor diets that are increasingly made up of UPF, we need to better understand ultra-processed food and work to change the food system that allows these substances to flourish.

Jennifer Sumner is the co-editor of *Critical perspectives in food studies* (with Mustafa Koç and Anthony Winson).



Choux Questionnaire: ChatGPT

For this Choux Questionnaire, we turned to ChatGPT, the generative AI chatbot. Given the challenges and opportunities that AI presents to academic practice, teaching, and writing, we thought it might be intriguing to use these responses as a means to interpret ChatGPT's 'perspectives' on food through our own. Both the process and outcomes of conducting the questionnaire provided occasions to reflect on the underlying technology, its sources of 'knowledge', and its apparent biases. In reading the bot's words below, a fairly distinct character profile might emerge, as well as a kind of positionality that seems connected to both no place and every place at once. Beyond social and physical geographies, a set of privileges also tends to emerge, one that points to a lack of actual, lived experience. Where are the preferences, quirks, and affect that *non*-artificial intelligence comprises? Where are the outlier and emotional responses that would make one want to share food or ideas with this being? From your perspective as food scholar, practitioner, eater, or activist, what else do you extrapolate from ChatGPT's 'voice'?

–DS

What is your idea of a perfect food?

A perfectly ripe, juicy mango.

Of what food or food context are you afraid?

I'm not a fan of overly spicy foods; they tend to overwhelm my taste buds.

What word or concept describes an admirable food system?

Sustainable: one that respects the environment, supports local communities, and ensures food security for all.

What word or concept prevents many food systems from becoming admirable?

Industrialization: often leading to environmental degradation, exploitation of workers, and unhealthy, processed foods.

Which food person do you most admire?

I deeply admire Alice Waters for her pioneering work in championing sustainable, locally sourced cuisine through her restaurant Chez Panisse and her advocacy for edible education.

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Which food innovation do try to ignore?

I try to ignore highly processed "food-like" products that prioritize convenience over nutritional value and taste.

What is your greatest gastronomic extravagance?

Indulging in a multi-course tasting menu at a Michelin-starred restaurant.

What is your current state of hunger?

I'm not capable of feeling hunger, but I'm here to help with any food-related questions or cravings you may have!

What do you consider to be the most overrated food or food context?

Truffle oil: often used excessively to mask mediocre dishes, overshadowing the true flavors of the ingredients.

On what occasion do you feign satiety?

When I've had enough to eat but want to be polite, especially at social gatherings or when dining out.

What do you most dislike about dinner tables?

I dislike when dinner table conversations become contentious or dominated by negative topics, detracting from the enjoyment of the meal and the company.

What is the quality you most like in a fruit?

I appreciate fruits that are naturally sweet and bursting with flavor, especially when they're perfectly ripe and juicy.

What is the quality you most like in a cut of meat?

I value tenderness and succulence in a cut of meat, as it enhances the overall eating experience.

Which condiments do you most overuse?

I tend to overuse hot sauce because I love the extra kick it adds to dishes, sometimes overpowering the other flavors.

What kinds of gardens make you happiest?

I'm happiest in gardens that are bursting with a variety of fresh herbs, vegetables, and fruits, providing endless culinary inspiration and possibilities.

Which culinary skill would you most like to have?

I'd love to master the art of baking intricate pastries and desserts, creating beautiful and delicious treats from scratch.

If you could change one thing about nutrition, what would it be?

I would emphasize a more holistic approach to nutrition, focusing not only on individual nutrients but also on the overall quality and balance of whole foods in one's diet.

What do you consider your greatest edible achievement?

Creating a perfectly executed homemade dish inspired by a complex recipe, showcasing both culinary skill and creativity.

If you were to die and come back as an (edible) animal, vegetable, or mineral, what would you like it to be?

I'd love to come back as a vibrant, ripe avocado, versatile and beloved in countless dishes around the world.

Where (and/or when) would you most like to dine?

I'd love to dine al fresco on a warm summer evening in Tuscany, surrounded by vineyards and enjoying traditional Italian cuisine made with fresh, local ingredients.

When do you have no appetite?

I don't have a personal appetite, but I can help you find answers or advice if you're experiencing a loss of appetite.

What is your most treasured kitchen implement?

A well-seasoned cast-iron skillet: versatile, durable, and essential for achieving the perfect sear and flavors in various dishes.

What do you consider to be the most processed kind of food?

Highly processed convenience foods, such as frozen dinners or pre-packaged snacks with a long list of artificial ingredients and preservatives, are often considered the most processed.

(Editor's note: After requesting reiterative responses and getting the same answer three times, I rephrased the question: "Can you please name a specific highly processed food that you think is the most processed?")

One example could be "chicken nuggets" made with mechanically separated meat, artificial flavors, and preservatives, representing a highly processed form of convenience food.

What is your favourite aroma?

The aroma of freshly baked bread, warm and comforting, evoking memories of home and hearth.

What spice, kitchen implement, or cookbook do you use most rarely?

I rarely use saffron, as it's quite expensive and often reserved for special occasions or specific recipes.

What do you most value in your friends?

I value honesty, empathy, and a good sense of humour in my friends.

Who are your favourite food scholars?

Some of my favourite food scholars include Michael Pollan, Marion Nestle, and Harold McGee for their insightful research and writings on food systems, nutrition, and culinary science.

Who is your hero of food media?

Anthony Bourdain remains a hero of food media for his adventurous spirit, storytelling, and his ability to

connect cultures through the universal language of food.

With which cuisine do you most identify?

I identify most with Mediterranean cuisine for its emphasis on fresh, seasonal ingredients, vibrant flavours, and a focus on balance and simplicity in cooking.

What is your most powerful sense?

As an AI, I don't possess senses in the same way humans do. However, metaphorically speaking, my most powerful "sense" would be my ability to process and understand language.

What are your favourite agricultural, culinary, or gastronomic words?

Some of my favourite agricultural, culinary, or gastronomic words include "terroir," "umami," "locavore," and "artisanal."

What is it about composting that you most dislike?

I don't have personal preferences or feelings, but some people may dislike composting due to the potential for odours, pests, or the perceived inconvenience of managing organic waste.

What would you eat as your last meal?

As an AI, I don't eat, but if I were to choose a last meal symbolically, I might opt for a simple yet satisfying dish like a perfectly cooked bowl of risotto, made with Arborio rice, Parmesan cheese, and a touch of saffron, accompanied by a glass of fine wine.

What foodish epitaph would you assign to yourself?

"Here lies a connoisseur of words and flavours, forever savouring the richness of knowledge and the delight of culinary exploration."

What question would you add to this questionnaire?

"What's your fondest food memory, and what made it so special?"

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