Targeting the structural environment at multiple social levels for systemic change: The case of climate change and meat consumption

Abstract

Purpose – This paper aims to explore how the socio-ecological model can be expanded to address wicked problems that are perpetuated by marketing systems through examining the ways the external environment can be targeted.

Design/methodology/approach – We utilised an extended socio-ecological model to provide a framework for social marketers to combat climate change through the food system in the external environment.

Findings – The socio-ecological model is extended to examine how social marketers can influence the micro and macro environment through targeting the physical structure, economic, political and socio-cultural environment of desirable (sustainable) and undesirable (unsustainable) food products.

Practical implications – We highlight that social marketers should focus on the various ways the external environment at multiple levels can be targeted to produce systematic change.

Originality/value – This paper broadens current macro-social marketing knowledge by providing a framework to analyse where and how change can be affected at the various levels of society.

Keywords- Macro-social marketing, Systems social marketing, Social engineering, Policy change, Climate change, Sustainable food

Paper type- Research paper

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Targeting the structural environment at multiple social levels for systemic change: The case of climate change and meat consumption

With a rising population, feeding society is one of the major concerns of our time, especially when taking into account the changing global climate system. At the same time, while there are many causes of climate change, one large contributor is the food industry (Tilman and Clark, 2014). Agriculture alone is estimated to account for 30 percent of global greenhouse gas (GHG) emissions (Bellarby, Foereid and Hastings, 2008). Regional research has suggested that as much as a 70 percent reduction in the GHG emissions caused by food systems can be achieved by 2050 in the UK, but only with changes in both the supply chain and consumption levels (Audsley et al., 2009).

As such, a recent Lancet report (Willett et al., 2019) advises no or low quantities of red meat, processed meat, added sugar, refined grains, and starchy vegetables for a sustainable (and healthy) diet. Other studies also advocate for a reduction of red (rudiment) meat consumption, mainly due to methane emissions from enteric fermentation (Carlsson-Kanyama and Gonzalez, 2009; IPCC, 2019). However, social marketing campaigns rarely address food consumption in relation to its environmental impact (i.e., water, nitrogen, methane) (Laestadius, Neff, Barry and Frattaroli, 2014), instead focusing on other industries such as transport and electricity (Takahashi, 2009) which account for 14 and 25 percent of worldwide GHG emissions (IPCC, 2014). This may be due to the many institutional barriers, such as regulations, policy (i.e., subsidies), social norms and practices, that are in place preventing a shift in both food production and consumption for a more sustainable food system.

Shifting these institutional barriers in meat production is where social marketing can help. Macro-social marketing attempts to change institutional norms for systemic change (Kennedy and Parsons, 2012). Such change in social institutions is the process of

institutionalisation and is based on systems thinking to create change in the interconnected levels of society (Kennedy, 2016). Indeed, wicked problems such as sustainability and obesity need multi-level initiatives targeting 'people' and 'place,' or more specifically, individual as well as economic, social and structural barriers (Kennedy, Kapitan, Bajaj, Bakonyi and Sands, 2017; Parkinson et al., 2017).

One such theory and avenue to create change at all interconnected levels of society (Kennedy, 2016) is the socio-ecological model (Stokols, 1996). Many different types of socio-ecological models have been presented in the literature (Sallis, Owen and Fisher, 2015) to encourage a multi-level perspective approach to behaviour change targeting the micro (individual), meso (community) and macro (societal) levels of society. However, while socio-ecological models have been used in social marketing research and implementation (e.g., Brennan, Previte and Fry, 2016; Collins, Tapp and Pressley, 2010), there is a lack of focus about *how* to target each level or layer in the social system. Therefore, the objective of this paper is to adapt and extend the socio-ecological model to target the external environment at multiple levels in society.

We add to the literature by introducing a new mixed socio-ecological model (based on Cohen, Scribner and Farley (2000) and Swinburn, Egger and Raza (1999)) which can help evaluate where (i.e., physical, economic, political and socio-cultural) and how (i.e., policy, education, funding) to implement macro-social marketing initiatives. We make use of a case study of the food system, specifically red meat consumption, in relation to climate change mitigation and sustainability. Research in social marketing, climate change, food and public health supports and informs the use of policy, legislation, regulation and other initiatives we present.

The wicked problems of climate change, sustainability and the food system

Climate change is the most pressing issue of our time, and the food industry has a significant impact on carbon emissions (IPCC, 2019). The food system is a large and complex system and refers to the processing, packaging, delivery, consumption, and disposal (waste) of food. It is estimated that by 2050, an 80 percent increase in global GHG emissions from food production will be seen (Tilman and Clark, 2014). A focus on agriculture and its resource-intensive animal products show the greatest potential for a reduction in GHG emissions (Carlsson-Kanyama and Gonzalez, 2009; IPCC, 2019; Willett et al., 2019). Agriculture contributes to at least one-fifth of worldwide GHG emissions (Breda, 2012), or up to 50 percent when taking into account the full life cycle and supply chain (Goodland and Anhang, 2009). Consequently, a reduction in animal-based products to achieve a reduction in GHG emissions is now promulgated by national and international bodies (IPCC, 2019; Milman and Leavenworth, 2016; UNEP, 2010).

In the past, social marketing research aimed at addressing climate change through environmental behaviour change has focused primarily on programmes/campaigns related to: energy (20%), recycling (15%), transportation (13%), pollution (12%), and water (8%) (Takahashi, 2009). While these campaigns have shown some effectiveness, the complexity of climate change proves difficult for social marketing beyond the tight boundaries of energy, recycling, and transportation, as they have yet to include food (with some notable exceptions for food waste e.g., Pearson and Perera, 2018). This may be because organisations and NGOs are reluctant to tell people what to eat (Laestadius et al., 2014), especially as most cultures are accustomed to a red-meat based diet. However, considering obesity programmes have been telling individuals what to eat for decades (Carins and Rundle-Thiele, 2014), there is hope that the changing and urgent nature of climate change (IPCC, 2018; 2019) will allow social marketers to address the issue of a sustainable diet.

Addressing the food system requires a recognition of the interconnection between food supply and food demand (Lawrence, Friel, Wingrove, James, and Candy, 2015). While there

is no consensus about what a sustainable (and healthy) diet contains, research has offered some suggestions. Many have suggested a plant-based diet with reduced meat consumption provides both numerous health benefits and reduces carbon emissions (e.g., Carlsson-Kanyama and Gonzalez, 2009; Hallström, Carlsson-Kanyama and Börjesson, 2015; Macdiarmid et al., 2012). For example, research has shown that emissions can be reduced by 20 to 35 percent per individual if switching from a meat-based to a plant-based diet (Hallström et al., 2015).

Consequently, while a purely plant-based diet is the most sustainable (Fraser, 2009) and contributes the least to carbon emissions (Carlsson-Kanyama and Gonzalez, 2009), institutionalising such a diet to current heavy meat and dairy eaters is difficult (de Boer, Schösler, and Aiking, 2014; Macdiarmid et al., 2012). Given meat is considered a status symbol in many cultures (Chan and Zlatevska, 2019), and that there is a rising middle class in developing nations (Cavusgil, Deligonul, Kardes and Cavusgil, 2018), cultural and social norms present powerful barriers towards change. As such, changing informal and formal institutions to promote a sustainable diet is not an easy task.

In the examples that follow, we focus on reducing red meat consumption in response to climate change mitigation options for individuals. We recognise a holistic approach requires addressing more than just one product but research has suggested that a reduction in red meat, at least initially, offers the best means for environmental and health effects (Clonan, Wilson, Swift, Leibovici and Holdsworth, 2015). In the next sections, we discuss the socio-ecological model and our adapted multi-level structural framework to affect systemic change.

The socio-ecological model

The socio-ecological model is a broad-reaching, cross-disciplinary, overarching paradigm which posits that social, institutional, and cultural contexts affect human behaviour and well-being (Stokols, 1996). Individuals are seen to be influenced by personal attributes,

such as genetics, psychological dispositions, and behavioural patterns, as well as the social, cultural and physical environment (Stokols, 1996). Originally orientated in human development, Bronfenbrenner (1979) discussed the interaction of the individual and levels of society (nested layers of society, like a Russian Doll). Using a socio-ecological model also allows for the cross-level analyses of problems and related intervention strategies (Stokols, 1996). Many different types of socio-ecological models have been presented in the literature (see Table 1 for examples) (Sallis et al., 2015). Overall, in social marketing research and implementation there is a lack of clear focus about *how* to target each level or layer in the social system (see Table 2 for examples).

< Insert Table 1 about here>

Targeting the individual, micro, meso, exco, and macro levels is an essential part of systems level and macro-social marketing (Domegan et al., 2016; French and Gordon, 2015). Previous social marketing studies have used the socio-ecological model in various ways and define the layers of society in slight variations (i.e., difference in number of levels with either four or five levels, variations of what is presented in each level). For example, previous research has focused on utilising the model to provide coherent social marketing messages (Dresler-Hawke and Veer, 2006), communications (Lindridge, MacAskill, Gnich, Eadie and Holme, 2013), and initiatives (Evans, Christoffel, Necheles and Becker, 2010) directed towards each level of society. In addition, research has utilised the socio-ecological model to evaluate (Gordon, Butler, Cooper, Waitt and Magee, 2018; Gregson et al., 2001) and develop social marketing programmes (Collins et al., 2010).

< Insert table 2 about here>

Even though much social marketing research has focused on the levels of society, we suggest that there also needs to be a focus on the various external environmental factors which can be manipulated to create systemic change in *each social level*. Specifically, while Kemper and Ballantine (2017) identified the need to effect both informal and formal institutional change, they failed to clearly distinguish and discuss exactly *where* such change could be implemented beyond acknowledging the need to target micro, meso and macro social levels.

Thus, it is the combination of socio-ecological models focusing on the external environment (Cohen et al., 2000; Swinburn et al., 1999) with the societal layers (e.g., Bronfenbrenner, 1979; Collins et al., 2010; McLeroy et al., 1988) which can provide a holistic framework to provide interventions at multiple levels in society. While we acknowledge that ecological models are most useful to guide interventions when they are targeted to specific health behaviours, which is why we use red meat reduction as an example, lessons can be learned and be applied to other contexts (Sallis et al., 2015).

Targeting the external environment

Cohen et al. (2000) and Swinburn et al. (1999) provide categories of external factors (or domains) of the environment which can be manipulated by interventions to affect the population as a whole, rather than specific individuals. Cohen et al.'s (2000) interventions target availability (accessibility of products), physical structures (characteristics of products or services), social structures (laws and policies which encourage or prohibit behaviour), and cultural and media messages. Similarly, Swinburn et al. (1999) splits the environment into four areas: physical, policy, socio-cultural, and economic. The physical environment includes infrastructure, amenities and facilities, while the economic environment involves monetary and non-monetary (i.e., social, time) cost of factors, influences and consequences, and may include price incentives (savings, subsides) and disincentives (taxes). The political environment

includes laws, regulations and political messages about conduct and acceptable behaviours. Lastly, the socio-cultural environment involves both micro and macro attitudes, beliefs, perceptions, values and norms.

These two models were chosen for several reasons. Both the Cohen et al. (2000) and Swinburn et al. (1999) models are widely cited for targeting the external environment for obesity and break down the environmental factors (or domains) in similar ways, focusing on economic incentives/disincentives, regulations, physical structures and cultural norms. Cohen et al.'s (2000) model was chosen for its articulation of cultural and media messages, expanding beyond socio-cultural factors and highlighting the need to examine and influence media messages as a key means to affect societal discourse, norms and attitudes (Kemper & Ballantine, 2019; Wallack, 2002). The value of Swinburn et al.'s (1999) ANGELO (analysis grid for environments linked to obesity) framework is that it differentiates between the micro and macro environment, and thus clarifies multi-level interactions between individuals and their homes, schools, workplaces and neighbourhoods with macro-level impacts of health, media, industry practices and government policy (Kremers et al., 2006; Swinburn et al., 1999). However, Swinburn et al.'s (1999) model does not differentiate more finely between individual, micro, meso, macro and exco (e.g., Bronfenbrenner, 1979; Collins et al., 2010). While both models have only been applied to obesity, we see much potential for the model to extend to other issues such as sustainable consumption. Thus, this adapted multi-level structural framework outlines structural environmental factors which can be manipulated to address the wicked problem of climate change. Furthermore, we discuss how the different levels of influence (i.e., individual, micro, meso, exco and macro level) and the structural environment factors interact (which both Cohen et al. (2000) and Swinburn et al. (1999) do not expand upon).

Physical

The physical environment includes the characteristics of products and structures that promote the desirable (eating sustainably) or undesirable behaviour (eating unsustainably), such as infrastructure (i.e., services, facilities), consumer products, training and information (Cohen et al., 2000; Swinburn et al., 1999). The physical environment can be located and controlled at the level of homes (individual/micro), schools (meso), community/local (meso) and national (exco). The product itself can include such things as the availability of carbon emission or nutrition labels (i.e., traffic light labelling), GHG emission warnings, product demonstrations and certifications, and the manufacturers ability to leverage technology (e.g., water and energy usage in meat substitutes) (Chopra and Darnton-Hill, 2004; Gortmaker et al., 2011; Hawkes et al., 2015; Swinburn et al., 1999).

To increase the adoption of a sustainable diet, desirable products must be made more available (i.e., fruit, vegetables, meat substitutes) and undesirable products (i.e., red meat) made less accessible. Therefore, the availability of food products at outlets (e.g., restaurants, supermarkets, workplaces, schools, vending machines, etc.) are important for the macro-social marketer to tackle (Swinburn et al., 1999). The physical environment has been identified as a key underlying factor in the rise of wicked issues, such as obesity (Swinburn et al., 1999). Policymakers should manage the density of local fresh food retailers through zoning and planning restrictions (Cismaru, 2008; Sacks, Swinburn, and Lawrence, 2008). Public policy can restrict the sale of undesirable products (Kennedy and Parsons 2012), such as bans or restrictions (i.e., number of vegetarian meals on offer) in school cafeterias. The effectiveness of the promotion of undesirable products can also be reduced through regulation (Kennedy and Parsons 2012), such as placing restrictions on food advertising to children and sports sponsorship (e.g., Beef + Lamb New Zealand currently utilises sports stars, specifically Olympians, to promote its food products).

There is also the need to create accessible products and services that provide support for adopting the desirable behaviour (Peattie and Peattie, 2003). These can include telephone helplines, nutrition classes, large food demonstration/preparation events, television programmes or segments on sustainable eating, and community gardens; all of which need to be easily accessible to the public (Hawkes, Jewell and Allen 2013; Lee, Popkin, and Kim 2002; Sacks et al., 2008). In addition, policymakers can monitor and enforce strict laws on sustainable claims on food products to ensure reliable information is presented (Cismaru, 2008; Sacks et al., 2008; Swinburn et al., 1999).

Economic

The economic environment involves the cost of the (un)desirable product or behaviour. The sectors involved in the economic environment include production, manufacturing, distribution and retailing. Two interventions which are embodied in the economic environment are monetary incentives and disincentives, and financial support for services, education and social marketing programmes (Swinburn et al., 1999). The application of taxes and subsidies are advocated by many scholars, such as the introduction of a sugar tax on sugar-sweetened beverages which has been shown to be effective (Cabrera, Veerman, Tollman, Bertram and Hofman, 2013). Conversely, subsidies can decrease the price of desirable products (Gortmaker et al., 2011; Moodie, Swinburn, Richardson and Somaini, 2006). Here, subsidies should also be removed on undesirable products, such as on agriculture (Chopra and Darnton-Hill, 2004; Lang and Rayner, 2007; Swinburn et al., 1999). Research has shown that a 20 percent subsidy on fruit and vegetables could prevent or postpone 560 deaths per year in New Zealand (population of just under 5 million) (Mhurchu et al., 2015). Similarly, a 20 percent tax on high GHG emission food groups (i.e., meat and dairy) could prevent 1200 deaths per year (Mhurchu et al., 2015). Moreover, research has shown that taxes on unhealthy food and drink are more

cost-saving and cost-effective than other initiatives such as weight reduction or education programmes (Gortmaker et al., 2011). As such, similar results might be achieved when directing the same approach to meat reduction initiatives which increase the cost of red meat. Additionally, an incentive system for welfare recipients to buy sustainable food can be implemented (Sacks et al., 2008). For example, the introduction of the use of food stamps at local farmers markets in the U.S. (Grace, Grace, Becker and Lyden, 2007).

Increasing the price of undesirable products and decreasing the price of desirable products involves not only monetary cost but also social/psychological costs (Lai 1995; Peattie and Peattie 2003). The social costs are particularly relevant to informal institutional norms, as the process of institutionalisation progresses the social costs of not performing the desired behaviour or buying the desired product (Kennedy 2015; Lach et al., 2004). As such, while most economic structure initiatives (i.e., taxes, subsidies) impact directly upon the exco level, the social and psychological costs of (not) buying or using desirable products and (not) partaking in desirable behaviour affects the micro (peer pressure), meso (social norms) and macro (culture) level. More discussion on informal institutional change is presented in the socio-cultural section.

Political

The political environment involves the laws, regulations or policies that stipulate specific behaviours, which can be either positive or negative (Cohen et al., 2000; Swinburn et al., 1999). Such initiatives are imposed to dissuade undesirable behaviours and encourage desirable ones. Initiatives can also be formal (imposed by law, legislation) or informal (school, organisational rules or policy). Part of this is the enforcing of rules and regulations (Cohen et al., 2000) and changing the political and legislative system (Cohen et al., 2000; Swinburn et al., 1999). Legislation can be controlled and applied at the national or local level, but in turn

this may affect the home (individual/micro), school (meso), retailer (meso/exco), and marketing activities (exco). For example, requiring parents to place vegetables and fruit in school lunches specifies a behaviour, is enforced by the school and its teachers, and in turn changes the social or cultural norms of the school. Similarly, standards for food served in workplaces and schools can influence the social norms of 'normal' lunches (Hawkes et al., 2013; Sacks et al., 2008). As such, enforcement can be formally imposed by government and local councils (i.e., fines), or informal, such as sanctions imposed by family and friends (Cohen et al., 2000).

Targeting the supply chain and banning or restricting imports of ingredients are other options that can be considered. In targeting the supply chain, governments can introduce strict food standards or requirements (e.g., vegetarian and/or vegan options compulsory in cafeterias in schools and/or organisations) (Sacks et al., 2008). Another option is to incentivise the development of entirely new products such as meat substitutes (Swinburn et al., 1999).

Socio-cultural

The socio-cultural environmental includes societal beliefs, attitudes, values and norms (Swinburn et al., 1999). The cultural environment can be more micro focused, such as the culture of a school or home, or macro focused, such as the culture of a nation, influenced in part by mass media (Swinburn et al., 1999). As such, cultural messages which target individual beliefs or knowledge are an individual approach, while media that influences norms are considered a structural intervention (Cohen et al., 2000). Cultural messages are exhibited by local and mass media outlets, as well as cultural practices.

At the macro level, the mass media is an influential source of socio-cultural aspects (Swinburn et al., 1999). Media can be unidirectional in the case of entertainment programmes, advertisements and public relations campaigns (Hovell, Wahlgren and Gehrman, 2002) which

provide a basis for some behaviours, norms and expectations. However, media can also be news media, journalism and reporting. Here, discourse and narrative, how language is used to convey a message (and what is and is not said) influences local and national discourse formally (politics) and informally (social media, conversation) (Kemper & Ballantine, 2019). In this case, media advocacy is most regularly used to influence media messaging (Abroms and Maibach, 2008).

Therefore, the framing of meat consumption provides one area of research which needs further attention. Here, previous research suggests that consumers defend their meat eating by arguing that it is natural (humans are carnivores), necessary (meat is needed for nutrition), normal (everyone eats it) and nice (meat tastes great and is filling) (Piazza et al., 2015). Thus, the inclusion of the idea of variety (in terms of diets), authenticity, and animal welfare have been suggested as other means to shift consumption away from meat (Clonan et al., 2015; de Boer et al., 2014; Dibb and Fitzpatrick, 2014).

New informal institutional norms are communicated through social marketing initiatives using a mix of mediums (e.g., online, mass media), through the multiple levels of influence, and are a structural intervention (Swinburn et al., 1999). Macro-social marketing needs to shift the institutional norms of eating non-meat dinner meals. Consumers see red meat consumption as ‘normal’ and included in family meals and get-togethers (Dibb and Fitzpatrick, 2014; Perks and Hogan, 2015; Piazza et al., 2015; Pohjolainen, Vinnari and Jokinen, 2015); therefore, this needs to shift to a norm where the family can enjoy a low red meat diet. The social marketing campaign must make clear this is not a ‘war’ on meat; there would be weak receptivity of this by both political and public groups (Dagevos and Voordouw, 2013). As such, social practices may also be targeted (i.e., family dinners, school lunches), rather than just the individual consumption of products (Spurling, McMeekin, Shove, Southerton, and Welch, 2013). However, knowledge and personal norms must also be addressed, due to the lack of

knowledge about the environmental impacts of food, especially agriculture (Hartikainen, Roininen, Katajajuuri, and Pulkkinen, 2014; Macdiarmid, Douglas, and Campbell, 2016).

Research has shown that meat eating is habitual (Dibb and Fitzpatrick, 2014; Perks and Hogan, 2015). Thus, any new knowledge or information presented to individuals may be harder to process. One of the challenges to reducing red meat intake is information about how to prepare or cook new meals without meat, and what products can be used as substitutes (Perks and Hogan, 2015; Zur and Klöckner, 2014). Overall, the main barriers to a more plant-based diet are a lack of knowledge and skills (Lea, Worsley, and Crawford, 2005; Pohjolainen et al., 2015), length of preparation time, and poor quality of plant foods (Lea et al., 2005).

The interrelationships between levels of society and the environment

The levels of societal influence and the external environment interact. While the levels of influence outline the different levels of society the initiative can target (and which influence behaviour), the structural factors provide the different types of environmental elements (physical, economic, political, and socio-cultural) that can be affected. The macro-social marketer diagnoses the social forces that aid or hinder adoption of the desired behaviour at each level (Collins et al., 2010).

Initiatives at each level are launched to move social forces towards the adoption of the desired behaviour (Lindridge et al., 2013). Table 3 displays an example of the initiatives (aimed at red meat reduction) which can be implemented for each structural factor at different societal levels. While Swinburn et al. (1999) does not separate between the micro, meso, macro and exco layers (instead using simply micro and macro), we advocate for such a distinction to be made as the macro level should be distinguished as encompassing belief systems, bodies of knowledge, lifestyles, customs, material resources (Bronfenbrenner, 1979; Collins et al., 2010; Lindridge et al., 2013), while exco involves national economic factors, government policy and

infrastructure (Collins et al., 2010). Such a distinction allows a differentiation between the targeting of informal (macro) and formal (exco) institutions at the societal level. In comparison, the meso level includes the influence of school, family, and church on both local laws (i.e., local bylaws) and norms (i.e., household norms for dinner) (Bronfenbrenner, 1979; Collins et al., 2010; McLeroy et al., 1988), while the micro level involves interpersonal relationships, social roles, and activities conducted by the individual and their unique characteristics and skills (Collins et al., 2010; Gregson et al., 2001; McLeroy et al., 1988).

For example, the mesosystem may be examined to see what fast food and fresh food outlets are within close proximity to a school, a school's current food, food marketing policies, and the costs associated with healthy food acquisition, while the macro system can be examined for societal attitudes and beliefs related to meat and vegetables/fruit and their impact on the environment. In turn, the micro system may be examined to understand the formal and informal institutions which prevent a shift to a sustainable diet. Such a focus on structure means it is possible to examine its influence on individual evaluations such as attitude, subjective norms and perceived behavioural control (Kremers et al., 2006). Poor accessibility of alternatives may reduce self-efficacy expectations, high prices of alternatives may have a negative impact on attitudes, while poor availability and visibility of alternatives may result in negative norms (Kremers et al., 2006). Each social level may also affect the other through carry over effects. For example, exco system changes, such as in the case of economic factors (i.e., taxation), influence and is also derived from macro and meso norms, from which the individual also adopts (and adapts) their beliefs and attitudes about behaviour (individual level) (Brennan et al., 2016).

< Insert Table 3 about here>

Implications and future research

While addressing the macro environment in social marketing is not new, this paper makes a critical contribution to knowledge by providing a framework to analyse *how* change can be affected at the various levels of society. This framework is helpful to both social marketers and researchers. We utilised the food production and consumption system to address climate change, which has yet to be addressed in such a way by social marketers through the food system, but where much potential exists. However, we believe the framework is also applicable to other societal issues, such as alcohol (i.e., binge drink, drink driving) and drug control.

Theoretically, we highlight the applicability for an adapted multi-level structural framework (Cohen et al. 2000; Swinburn et al. 1999) to targeting different areas of the environment. In addition, we discuss how the different levels of influence (individual, micro, meso, exco and macro level) and the structural environment factors (physical, economic, political, and socio-cultural) interact. This model provides academics and practitioners with a clearer perspective about how to effect societal change at *each* level of society.

Practically, we offer insight in how social marketing can be applied to target food production and consumption to mitigate climate change. Lea et al. (2005) showed that 58% of their study participants were in the pre-contemplation stage of change towards eating a plant-based diet which suggests there may be 'low-hanging fruit' in regard to targeting individuals who want to reduce their meat intake. Here, macro-social marketing can target and persuade these individuals through a combined effort of affecting multiple levels of society (individual, micro, meso, exco and macro level), and the environment (physical, economic, political and socio-cultural), and through various tools (e.g., regulation, social marketing, legislation). Through implementation, macro-social marketing can aim to shift previously habituated eating habits.

However, there are broader social, political and economic impacts which may occur

due to interventions in the external environment. For example, if red meat consumption decreases significantly it would affect large established industries and economies. As macro-social marketing addresses wicked issues which impact upon established industries (i.e., food, transportation systems), the consequence of any interventions across all stakeholders (i.e., beef farmers, car manufacturers) must also be examined. Future research would benefit from a complete stakeholder analysis (Domegan et al., 2016) to understand the impact and effect upon the whole system. Moreover, consequences for government and (re-)elections, especially in the case of short-term election cycles, may also impact upon political will to introduce potentially contentious new policies (Kemper & Ballantine, 2019).

We provide macro-social marketers in government agencies and not-for-profits tools to address the wicked problems of obesity and climate change. While we acknowledge that vested interests may oppose the implementation of policy interventions beyond social marketing, such as taxes and advertising regulations, we do not discuss how upstream macro-social marketing will need to occur for governments themselves to implement such policies. We present a similar case study as Kennedy and Parsons (2012), who like this article, do not discuss how public policy was implemented. However, recent research by Kennedy, Kemper, and Parsons (2018) helps address the knowledge gap by presenting how upstream actors may be targeted to create formal regulatory change. Nevertheless, empirical research is needed to address how those in government agencies, such as health departments or those who may be in charge of the implementation of social marketing, can promote policy change. Here, social marketers must engage and coordinate amongst various stakeholders to create co-creation and cross fertilisation opportunities (Parkinson et al., 2017).

While we believe this framework can be applied to other social issues, further research is needed to examine different contexts, such as alcohol and drug control. Future research could also expand on ways to combine climate change with other wicked issues, such as obesity,

which also includes the food system as well as the transportation sector. In this way, combining the issues of obesity and climate change allows macro-social marketers to target food systems across public and political processes. Working across issues and policy regimes, such as combining climate change and obesity, "restrict policy monopoly and allow for several entrances into the policy arena" (Huang et al., 2015, p. 2427). Thus, there is a future research opportunity to explore and combine wicked issues across systems and policy divides.

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