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**Influencing sustainable food-related behaviour changes:
a case study in Sydney, Australia**

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“You never know what you can accomplish until you try.”

Michael Jordan

Research problem:

Eating too much meat is bad for planetary health; how can we convince people to change?

Chapter overview:

Personal eating habits are deeply ingrained in people’s consciousness and challenging to change. This exploratory longitudinal case study (2015 to 2020) in Sydney, Australia uses a sustainability social marketing intervention to influence more sustainable and healthier dietary choices through the intake of plant-based foods. A group of 30 adult participants was exposed to a range of social marketing techniques which included: (1) communication of scientific evidence; (2) demonstration sessions for preparation of plant-based dishes and (3) development of game-changing messages. In-depth interviews with the participants were carried out prior, during and at the end of the studied period to understand whether there has been any behavioural change and if yes, what were the influencing factors. The case study employs Sustainability Social Marketing Model (SSMM) and 4S mix (sustainability, strength, self-confidence and sharing). The analysis shows that dietary change is possible although there are many strong and counteracting forces within the Australian society which make such shifts difficult. Particular sustainability social marketing under messages, such as “No biodiversity destruction in my plate!”, “Is there a choice between a steak and a burning planet?” and “Red meat also can cause cancer and heart attack...” were applied and accessed as an approach that can have an impact on people’s food choices.

Keywords: Australia, diet, flexitarian, food, health, social marketing, sustainability

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Learning objectives:

- Understand the impacts of human diets as they relate to people’s health and the well-being of the planet’s ecological systems;
- Absorb the concept and benefits of flexitarianism, including the factors that contribute towards dietary shifts;
- Familiarise themselves with sustainability social marketing and its 4S (sustainability, strength, self-confidence and sharing) marketing mix;
- Being able to devise interventions that impact on dietary behaviour and food choices;
- Understand the pros and cons of longitudinal studies;
- Explore the benefits and challenges of qualitative research.

Themes and tools used:

Planetary health– tools for reducing the impacts of food and people’s dietary choices to achieve better planetary health (union of population and ecological health)

Flexitarianism – tools for sustainability social marketing to encourage reduction in meat consumption

Food – tools that educate people to make better dietary choices and prepare suitable meals

Sustainability social marketing – tools to encourage behaviour changes for broader social and environmental benefits

Longitudinal study – research design involving repeated observations of the study participants to test the effects of the intervention tools used to influence people’s dietary behaviour

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Theoretical framework: Sustainability Social Marketing

Social marketing is a way to influence behaviour towards the common good (Kotler & Lee, 2008; Rundle-Thiele et al., 2013), in other words to create a better world for better people. Its essence is in getting people to change their individual behaviour for the benefit of society as a whole and for the achievement of pro-social outcomes (French & Gordon, 2019). For social marketing to be successful, it needs to develop an appropriate marketing mix. The 4P (product, price, promotion, and place) marketing mix established since the 1950s and widely used nowadays is considered a powerful way to influence consumers (Twin, 2020). However, this marketing mix needs to be modified when transitioning towards sustainability. The 4S (sustainability, strength, self-confidence and sharing) has already been put forward as a most needed alternative (Bogueva et al., 2017). Social marketing goes beyond influencing individual behaviour. It draws attention to an existing social problem and through an ingenious campaign offers a simple and compelling solution for the target audience to be willing to change their behaviour and contribute to a sustained social transformation (Saunders et al., 2015). In addition, a systems approach is required if society is facing complex and dynamic social issues (Truong et al., 2019; Saunders et al., 2019) as is the case with climate change and other sustainability challenges, including food production and consumption.

What does it take for someone to stop eating meat? The vast majority of people are not aware that meat is an environmentally unsustainable food choice. Many are not informed that excessive meat consumption is detrimental to human health, leading to the spread of non-communicable diseases, such as colorectal cancer. In fact, the EAT Lancet Commission Report unequivocally states that “[u]nhealthy diets now pose a greater risk to morbidity and

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mortality than unsafe sex, alcohol, drug and tobacco use combined” (Willett et al., 2019, p.

5). People need to be educated in relation to their diets. Social marketing is a way to help people constructively and encouragingly, not through frightening messages, warning and scaring them. This experiment exploratory longitudinal case study with 30 Australians aimed at pursuing a dietary change without directing the participants what to do, but by using positive social marketing campaign interventions showing them how change can be done. Using real-life lessons, we aimed at encouraging dietary transitions and make something so difficult to shift as is Australians’ love for meat into a change that is fun, easy, attractive and accepted to do.

The original Sustainability Social Marketing Model (SSMM) is developed for assisting in wider campaigns (Bogueva et al., 2017), but in this longitudinal study it was applied to a smaller circle of participants and specifically for meat reduction (Figure 1). Given the extremely high environmental impacts of red meat in particular (e.g. Eshel et al., 2014) and the World Health Organisation’s warnings about overconsumption of these type of foods (WHO, 2015), we specifically targeted the intake of such products by replacing them with plant-based alternatives.

[INSERT FIGURE 1 AROUND HERE]

There are six stages in the SSMM aimed at producing effective social marketing campaigns and interventions. The stages are: define, scope, develop, implement, evaluate and finally adapt and improve, which are also iterative as a sequence (see Figure 1). In our case the duration of the process spanned across five years. Furthermore, there are also internal iterations between the stages of define and scope and implement and evaluate which allow for fine-tuning the interventions. The SSMM is tailored for influencing behaviour change. Its

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first stage is extremely important as it defines the targeted population section for which the

social marketing interventions are developed. For example, there are big differences if the target are young or older people compared to an intervention designed for the general public.

The social marketing interventions are then scoped to influence people in a dietary shift, particularly in relation to meat reduction. Designing and developing an intervention includes the creation of specific educational materials, planning of demonstration sessions, information about plant-based alternatives to meat consumption and de-marketing of animal-based foods. All these materials centre on the positives of increased intake of plant-based foods and the negatives of continued high meat intake. They blend health, environmental and ethical issues, ranging from human and planetary wellbeing to animal suffering (Singer, 2015), overuse of antibiotics and the threat from new emerging zoonotic diseases.

Implementing the intervention required active involvement of all participants over the entire five-year duration of the longitudinal study. Evaluating the outcomes was essential to have a good understanding of what works, what progress is made and whether there may be unexpected reactions, for example related to sensitive issues or previous experiences the participants may have had. It is also very important to adjust and refine the intervention based on people's reactions and their response to change. Adaptation and improvement are essential not only for the particular intervention but also for future social marketing sustainability-related campaigns (Bogueva et al., 2017).

The 4Ss marketing mix (Bogueva et al., 2017) supporting the SSMM illustrates the role of each S in the case of meat reduction:

- sustainability – meat production and consumption are contributing to global warming, climate instability, resources depletion and land degradation. Excessive red meat

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consumption is also associated with health problems linked to non-communicable

diseases, such as cancers, diabetes type 2 and obesity;

- strength – by reducing meat consumption, individual people, policy actors and influencers have the power to stop the destruction caused by livestock, improve human health and reverse negative ecological impacts; the positive impacts of such a change would be immediate;
- self-confidence – each person has the power to make the choice to change their diet by reducing meat intake; anybody can do it and by taking such actions we can all participate and contribute towards transitioning to a better and more sustainable society; taking pride in doing less harm;
- sharing – the planet is there to be shared and no one has the right to compromise the global commons on which all life depends.

More information about the methodology and the results from the SSMM longitudinal study are presented below. We are drawing on the experience of 30 participants and use their words to support our findings and recommendations.

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People are used to their eating habits and in everyday life, they rarely question or pay

attention to their existence. This is very much the case in relation to meat consumption.

Western society culturally embraces carnivory and meat meals have a regular presence on the dinner table. Meatless options are considered a deviation from the common practice and often frowned upon. This is in stark contrast with what science says about the need to transition to more plant-based options to maintain planetary health, including the wellbeing of the bio-physical systems and the human population (Willett et al., 2019). The text to follow presents the results from a 2010–2020) longitudinal study in Sydney, Australia which used sustainability social marketing to influence people’s dietary choices towards more plant-based options.

1. Introduction

In recent years, meat production and consumption have been identified to be among the biggest threats to sustainability with abundant research evidence suggesting the need for behavioural changes away from livestock-based products (e.g. Greenpeace, 2018; Willett et al., 2019). Choosing more moral, flexitarian options (Raphaely & Marinova, 2014; Berley & Singer, 2014; de Bakker & Dagevos, 2011) and eating less meat can slow climate change, improve biodiversity, reduce water pollution, prevent exhaustion and misuse of arable land as well as diminish humans’ negative impacts on planetary health (Willett et al., 2019).

Adopting a socially responsible plant-rich diet can help reconcile moral obligations to future generations and other non-human species.

However, such a transition is not a simple task given the meat’s special status in human diet.

In the West, society seems to have instituted the structure of meals as comprising of one

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piece of meat and two vegetables (Lupton, 1996; Schösler et al., 2012). There are many

factors that shape people's food choices and their behaviour as consumers, including health,

psychological, sensory and environmental considerations as well as marketing influence

(Marinova & Bogueva, 2019). Eating is also considered a matter of individual choice for

adults, particularly when and where there is ample availability of food. This assumption

however is increasingly being challenged.

As with the right to clean air and a healthy natural environment, it is time to ask the question

whether food should also be part of humanity's responsibility for the planet and its current

and future inhabitants. The use of the available arable land on this planet and the conversion

of vast areas of native vegetation for agricultural purposes are prime examples of the "tragedy

of the commons" (Hardin, 1968; Gusmai, 2018) which continue to be exploited by a selected

few to the detriment of the global public good. Australia and its livestock are major

contributors to climate change and the deterioration of the natural environment by

overexploiting the global commons. Ironically, Hardin's original paper described cattle

herders left unregulated whose behaviour could lead to overgrazing the common land. This is

exactly what is happening with the livestock sector whose selfish behaviour and self-interest

are destroying the common resources on which we all depend. The global cattle and sheep

herds have been consistently on the rise with Australia being a significant player contributing

respectively 3% and 7% of the global production of beef and sheep meat in 2017 (MLA,

2019). Australians also continue to be some of the highest consumers of meat in the world,

respectively three and five times higher than the global averages in the case of beef and sheep

meat (MLA 2019).

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These statistics are not surprising given the fact that the government is yet to limit the behaviour of the livestock industry which means animal husbandry continues to exploit the country's and global commons. The sector is a large contributor to global warming, soil and water depletion as well as adding towards the spread of non-communicable diseases, such as cancer, diabetes and obesity. It is also the biggest factor for the clearing of Australian native vegetation. In 2019, the EAT Lancet Commission proposed a universal planetary health diet, focussed on human dietary and planetary health and encouraging the intake of a vast variety of plant-based options and low amount of animal-based food products (Willett et al., 2019). This planetary diet calls for reorienting priorities from producing large quantities towards feeding humanity with quality, nutritious and healthy food on the existing agricultural land putting in place strong governance restricting the expansion of the livestock sector (Willett et al., 2019).

While policy actors in Australia are yet to respond to the scientific evidence and calls by the research community to stop the expansion of the livestock sector, the alternative to prevent further destruction is to influence consumer habits. This is not an easy task as dietary habits are deep-rooted in social norms and determined by individual behaviour. Sustainability and social marketing offers tools which, if deployed properly, can influence consumption habits with lasting implications. Insights can be drawn from anti-smoking and sun protection campaigns which have been very successful in Australia. With the right approach and using sustainability social marketing interventions (Bogueva et al., 2017), individual consumers can develop new attitudes and willingness to change their dietary habits. Various strategies to encourage dietary changes have already been used by different researchers and non-government organisations (NGOs) through marketing campaigns which encourage meatless

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days (de Boer et al., 2014), “meatless Mondays” (Euromonitor International, 2011; Parker, 2011) or “Green Mondays” in France (Bègue & Treich, 2019), meat portion size reduction, e.g. “less but better” (Laestadius et al., 2013, de Boer et al., 2014) or choosing “prime cuts” (Sutton & Dibb, 2013). Further efforts have emerged in advocating for meat substitutes (Schösler et al., 2012; Bogueva et al., 2019) and calling consumers to become agents of change (de Bakker & Dagevos, 2011).

Asking consumers to eat less animal products may trigger not only resistance to change and in some cases confusion regarding amounts and sources of protein, but also challenges the widely perceived link between meat and masculinity, manliness traits of power, virility and hegemony (Fessler & Navarrete, 2003; Ruby & Heine, 2011; Adams, 2010; Bogueva & Marinova, 2018;). Finding a solution and promoting pro-environmental, sustainable consumption behaviour is a complex and tough task, especially as it also requires the discrediting of habits and debunking of many myths. A broad societal change can only take place if individual consumers respond by shifting their dietary preferences.

This study portrays the efforts to trigger individual change through a longitudinal study based on sustainability social marketing. We first provide the methodology of the longitudinal qualitative study conducted in Sydney, Australia. This is followed by a discussion of the study’s results using quotes from the 30 participants. We also identify the marketing messages (or catchphrases) which can trigger dietary change and can potentially be used in wider campaigns aimed at improving human and ecological health.

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2. Method

This longitudinal case study used social marketing intervention to influence change by following up a group of 30 participants over five years. A longitudinal study is particularly useful for evaluating the relationship between predetermined factors and the development of change, when the outcomes need to demonstrate over a prolonged period of time (Caruana et al., 2015). At the outset, we made clear the logic of the intervention (Hill et al., 2016) by explaining its conceptual basis, components and emphasis on action through dietary behaviour changes. The study was qualitative and we used a combination of in-depth and group interviews to collect data to gauge behaviour changes in response to the social marketing intervention. In research, it is common to use control groups to assess whether any change resulted from the intervention. However, in our case we applied a single-group design which is common in longitudinal studies as they allow for before-after comparisons (Paulus et al., 2014). There was also an implicit comparison with the rest of the Australian population for which it is widely known that it maintains very high levels of meat consumption.

Instead of using a one-off intervention, we opted for regular exposure. The frequency of the intervention was decided to be three times over the five-year period to allow enough time for the participants to absorb the social marketing information and develop appropriate response. During the periods in between, we kept in touch with the “participants to assure their commitment to the project and to keep updated records of their contact information” (Hill et al., 2016, p. 812). The actual components of the intervention comprised:

- Component 1: Information session about the environmental drawbacks of meat consumption and the advantages of plant-based food options – conducted in second half of 2015;

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- Component 2: Cooking demonstration classes with plant-based alternatives to meat to develop skills and taste experiences – conducted at the start of 2017;
- Component 3: Information session about the health and performance benefits of plant-based foods – conducted in late 2018.

The three components of the intervention were applied approximately one and a half years apart during the study's period, with initial and final interviews held at the start of 2015 and 2020 respectively. Such frequency allowed time for learning and action as well as to maintain interaction with and between the participants in the study. The chosen period between interventions (of approximately one and a half years), the range of activities, interviews and observation measures were adequate to determine the presence of change over time (Ployhart & Vandenberg, 2010). This allowed to assess whether any change developed and if yes, whether there was formation of lasting habits.

The chosen group of participants satisfied the following conditions:

- (1) to consume meat at least 4 times per week – this puts the participants in a category aligned with the average Australian population whose red meat intake is 560 g per week plus 84 g per week of processed meat (National Cancer Control Indicators, 2020);
- (2) to belong to the same circle of friends for cross-monitoring of eating behaviour over the years – as eating is also a social activity, it was important to allow the participants opportunities to socialise with other members of the research group who were exposed to the same intervention; and

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(3) the participants being happy to be repeatedly involved in the intervention components and interviewed – as this was a longitudinal study, it was important to have access to the participants on a regular basis.

As advised by Hill et al. (2016), we treated the participants not like “research subjects” but as friends who had consented to the study and were also collaborating, sharing group activities and were part of a social network. Human research ethics permit was obtained from Curtin University. Each participant was informed about the nature and frequency of participation expected over the five-year period and they explicitly accepted these terms through a signed consent form prior to the study. The participants were also happy to share basic demographic information to provide additional context for the study. All participation was on a voluntary basis and no rewards were offered. The participants were free to withdraw from the study at any stage without the need to provide any justification for such a decision.

The empirical data collection occurred throughout the five-year period through:

- in-depth one-on-one semi-structured interviews with the 30 participants at the start of the study in early 2015;
- three small group discussions during each component of the intervention – the participants were divided in 12 groups comprising of 2-3 persons and were interviewed in a group setting; there were in total 36 such group interviews;
- final in-depth one-on-one semi-structured interviews at the completion of the study in early 2020. Because of unforeseen circumstances, we were not in a position to conduct final interviews with two of the participants – one passed away from a heart attack a

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couple of months before the interviews were scheduled and the other was hospitalised

with a mental health issue. In total, there were 28 individual interviews conducted.

Food is generally a personal choice. The questionnaire used for all individual and group interviews tried to capture personal opinions and behaviour. It contained five sets of questions:

- (1) basic demographic information, such as age, gender, education and income;
- (2) dietary habits, including frequency of meat consumption;
- (3) food preparation, including cooking skills and time dedicated to cooking;
- (4) opinion about meat, including pros and cons, and reasons for consuming meat;
- (5) factors that may impact their meat consumption, including barriers and incentives.

It was important to also capture catchwords, expressions and arguments that may sway the average Australian consumer away from high meat intake. Such clues could potentially be used as a dietary game changer in broader social marketing campaigns targeted at a wider population.

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3. Data collection and analysis

The period covered by this longitudinal study is from 2015 until 2020. All participants were initially contacted individually by telephone to inform them about the study, discuss their potential participation, obtain a participation agreement, and arrange the place for their involvement, including intervention and interviews. Using our social networks in Sydney, Australia we approached more than 60 people to recruit the 30 participants. Although many expressed interest in the study, the five-year commitment was a factor limiting their availability and desire to participate. The recruited participants found the study topic appealing and proved to be very reliable.

All interviews and group discussions were conducted creating and maintaining a natural conversation flow, passing from topic to topic while following the pre-determined schedule. This gave the participants space and time to describe freely their thoughts, feelings and opinion about food and meat consumption. The interviews and discussions lasted between one and two hours and were conducted at places where the participants felt safe, including their homes.

There were 94 interviews conducted in total, including 30 individual start-up, 28 individual final and 36 group (12 times three to coincide with each of the three intervention components) interviews. All interviews were digitally recorded and then transcribed verbatim with any identifying data removed. Handwritten notes were taken during the interviews to instantly record key points made by the research participants. All interviews were analysed by the researchers involved in this study. Participants' answers were transcribed and coded through assigning units of meaning including individual words, phrases, sentences or whole paragraphs. The transcripts and field notes were also entered

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into NVivo11 software for additional analysis to complement the researchers' discretion in the development of a thematic framework.

A condition for participation was frequency of meat consumption of no less than 4 times per week. All participants were then assigned to two groups, namely "heavy" meat eaters with intake of 6-7 times per week and "moderate" meat eaters with intake of 4-5 times per week.

The next section presents the results from this longitudinal study.

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4. Results from the start-up interviews

Four core themes and several supporting subthemes emerged from the initial in-depth interviews identified as: (1) personal context factors; (2) behaviour influencing factors; (3) barriers factors and (4) game changing factors. These themes were reviewed to detect key food consumption drivers and formed the thematic framework for the identification of social marketing messages which can influence behaviour change. They are described in turn below using information collected through the interviews, including word-for-word quotes from the participants (presented verbatim in italics).

4.1. Personal context factors

All participants differed vastly according to the personal context related to food choices. They came from different cultural backgrounds with some being born in Australia, Europe, Asia and America, their ages spanned from 18 to 72 at the start of the study (23 to 77 respectively at its end) and they have had diverse life experiences as represented by education, marital status, income and food preparation skills. Men and women were almost equally represented with 14 (47%) male and 16 (53%) female participants. At the end of the study the gender breakdown became equal (14 men and 14 women) as both participants with whom we could not conduct the final individual interviews were female.

The difference in the participants' age indicated that different generations were represented and this influenced their food-related decisions and behaviour. While the younger and mid-age generations (18-40 years old) were more open to considering changing their current diet by adopting more plant-based options, the older generations (50-70+ years old) saw meat as a staple food, essential for a balanced nutrition and were not prepared to make a shift. Table 1 presents some basic characteristics of the sample. The majority of the participants were

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married (24 or 80%, including 11 men and 13 women). There was a gender difference with only one male participant being a moderate meat eater (the remaining being heavy meat eaters) while the respective number for the females was 4. Although there were further differences between the participating men and women in their levels of awareness about the negative impacts of meat, they were not as pronounced. The quote below summarises the way many of the participants felt in relation to eating meat:

“If it gets to food, I eat the meat first... And with the costs rising now, I'm certainly not extravagant with eating, meat is the first thing that I'll buy and put on my table”. (Female, 71 years old)

Socio-economic and income factors impact on people's food choices. The participant group is not representative of the general Australian population as it did not include any people who are unemployed. In fact, it was not our intention to seek a general representation as we specifically aimed at people who have high levels of meat consumption and are not economically constrained in their food choices. Such a starting point would exclude economic factors as barriers to making a behavioural dietary change in favour of plant-based foods which are widely available at reasonable prices in Sydney. The majority of the participants (n=22 or 73%, including 11 males and 11 females) were employed full time, with only a few (n=4 or 13%, including 2 males and 2 females) working part-time and the rest (n=4 or 13%, including 1 male and 3 females) were retired. Consequently, most participants had sufficient income to source food for themselves and their families with only 3 (or 10%, including 1 male and 2 females) having annual household income below A\$50,000.

[INSERT TABLE 1 AROUND HERE]

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Food preparation is an important consideration when it comes to dietary choices. It relates to being able to cook as well as to having the time to do so. It was interesting to observe a high percentage of people (17 or 57%, including 9 men and 8 women) not having enough time in their busy schedules to prepare food for themselves. Half of the participants also reported that their cooking skills were not very good. The combination between time unavailability and lack of good cooking skills made meals a lower priority in people's busy weekly schedules. Many of them resorted to quick solutions, such as putting sausages and steaks on the grill or making pasta dishes, such as spaghetti Bolognese, for their dinner menus. Meal preparation had to fit between busy routines of travel to and from work, picking up children and other social activities.

The educational level of the participants also was higher than that of the general Sydney population. This was an important consideration in the study as it potentially relates to improved environmental and health awareness. Only 3 participants (10%, including 2 men and 1 woman) had completed high school; the remainder had higher qualifications, including university degrees (23 or 77%, including 10 men and 13 women) or further technical education (4 or 13%, including 2 men and 2 women). These relatively high educational achievements for the group did not translate in a high level of awareness about the negative environmental and health impacts of excessive meat consumption. Only 12 (40%, including 5 men and 9 women) participants had some such awareness obtained mainly through general knowledge and word of mouth. At the start of the study, the majority was not aware of any negative consequences from consuming meat. This also meant that the current Australian Dietary Guidelines, limiting red meat intake to 455 g per week had not reached them; neither have other social marketing campaigns, such as "2 Fruit and 5 Veg" (Healthy WA, n.d.).

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4.2. Behaviour influencing factors

The analysis of the start-up interviews revealed five groups of factors which influenced people in their decisions to eat meat. They are related to culture, health, physiology, the natural environment and animal welfare.

Cultural factors

Many made the argument that besides liking its taste, eating meat is part of their “*heritage and background*”. It provides “*special cohesion*”, “*it is our Australian culture*”, “*makes people happy*”. Some admit that they have not given the thought about eating meat not a second of their time as it is such a normal thing to do. Furthermore, meat is “*readily available anywhere in Australia*”. According to the participants, preparing meat-based meals also means you are looking properly after your family and guests.

Some male participants stressed that meat is “*part of our manliness and masculine identity*”.

Others linked it to social status and were pride of being able to consume it in Australia:

“Australians eat bacon for breakfast and ham for lunch, and meat for dinner and two veggies (laughing). That’s the way we were all eating and continue eating” (Male, 51yrs old)

Health-related factors

The participants were asked their opinion about what amount of red meat is appropriate and healthy to eat. Almost all were not aware of the limit imposed in the Australian Dietary Guidelines and the recommendations of the World Health Organisation. The majority

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and twice per day, as healthy.

It was interesting to observe that the older participants in the age bracket of 60–73 years old, were convinced their food choices do no impact on their health. They claimed to be proud of their meat-rich diet which had secured them good health and overall wellbeing. Some credited meat for helping them to prevent putting on weight: “*I maintained my body weight all my life eating meat and I am continuing to do so without any regrets*”.

There were, however a few, mainly female voices which warned that as people get older meat-based products “*are not as good as they were before*”. Some were “*aware of health implications with bowel cancer*” and the use of “*some bad hormones*” and “*steroids*”. Nevertheless, the prevailing attitude was that Australian red meat is “*beautiful*” and any health-related concerns are “*a hoax*”.

Physiological factors

The physiological importance of meat was given as an argument for high consumption. Meat “*makes you strong, full of energy and stamina*” was an often-used justification. The human species being “*omnivores*” and meat’s importance for “*a balanced diet*” were similarly emphasised by the participants. Several female participants stressed the role of meat as a source of iron, particularly as some have heard “*about pregnancy resulting in anaemia*”.

Another aspect was the psychological and emotional attachment to meat. For example, “*I feel distressed if I am not able to eat meat*”, “*the absence of meat makes me moody*” and “*I*

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experience some sort of anxiety when not eating meat". On the other hand, thinking about

meat had a calming effect with the image of "*a cow eating grass*". These examples indicate a possible addiction to meat and expectations that it should form part of the participants' diet.

Environmental factors

All participants were asked to describe what amount of meat is environmentally sustainable for Australians to consume. The older participants (60-73 years of age) believed their food choices had no impact on the natural environment. Some blamed "*foreign land buyers*" who "*are buying more of the Australian land and meat products*". Others accused mining for using "*cattle production areas*".

By comparison, the younger participants were more aware of the negative environmental problems caused by cattle with close to half (n=13 or 43%, including 5 males and 8 females) acknowledging the issue. They admitted to be worried "*about environmental issues*" and "*land clearance*"; however, were quick to justify their behaviour with the love for meat:

"To be honest, probably no amount of red meat is environmentally sustainable..., but we are all still eating it. There are 7 billion people on the planet, and we can't all eat red meat. And if it is good enough for one person to eat red meat then, you know, it's not fair for a first world country to get too indulgent on expensive food, and people living in third world countries are starving to death. So, from the planetary point of view, I don't think is sustainable for anyone to eat red meat. This was my reason to cut some of the meat I ate, but I am in love with the taste of red meat, and I simply can't avoid it." (Female, 38yrs old)

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Animal welfare factors

Animal welfare-related issues, including cruelty, intensive factory farming techniques, mass use of feedlots and antibiotics, were mainly of concern to the female participants and to only one man in the study group. Many admitted to having “*mixed feelings*”, to being “*selfish*” and morally “*obliged to be vegetarian*”. Some opted for humanely raised meat and criticised farming practices assuming that “*some of those farms are foreign-owned*”. A male participant was particularly concerned about “*the way red meat is produced*” and the use in feedlots of corn – an “*unnatural ingredient*” for cows.

Overall there was substantial gap between the latest scientific evidence and the opinions of the study participants. Such a gap equally manifested itself in relation to the barriers which prevent the group from switching towards more plant-based options.

4.3. Barrier factors

Many of the barrier factors which inhibit the study participants from consuming less meat are in many ways similar to the factors which encourage Australia dependence on animal-based proteins. They relate to personal factors, such as beliefs, values and knowledge, but also to the social environment and the influence of the media. Economic considerations were further emphasised, particularly when it comes to changing people’s diet.

Personal attitudes

In the initial start-up interviews, there was a lot of reluctance to change the dietary habits as the participants held strong beliefs about the value of meat. For example, one of the male participants categorically stated: “*I know that [it] is the right food for us*”. Another echoed a

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similar belief: “*I believe this is the way things need to be*”. Such a firm logic indicated that it would be a strong social marketing contest to challenge these personal attitudes.

Social relationships

The social perception and reaction of relatives, friends and generally other people to a person’s food choice is another major inhibiting factor. How social connections would be impacted by changing someone’s diet appeared to have a strong influence on the study participants and their eating behaviour. People’s choices often are linked to their social circles, including what is seen as acceptable or strange. Those who do not share similar tastes can feel socially isolated and can even become a subject of mockery and ridicule. Food preferences which exclude meat are often met with surprise and questioned by others. Not everybody is prepared to face such situations. People generally prefer not to be judged and an easy way to avoid this is to blend with the dominant food tastes.

Explanations, such as: “*It’s a bit of difficult to look after only one person that is having a different diet. It’s kind of killing the conversation and the whole fun*”, are put forward. There was also explanation that many new migrants come from countries where they could not afford meat and “*immigrants are raising a lot of the demand for red and other meat*”.

A major aspect of factors preventing people from eating more plant-based options is that the prevalent social norms encourage high meat consumption. Ironically, vegetarians and vegans in many ways are treated as smokers whose behaviour and presence on the shared table is undesirable. The reason behind this is the lack of awareness about the many benefits and co-benefits from reducing high meat consumption.

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One of the participant men admitted that despite his positive attitude to meat, his son was vegetarian. Although couched along the terms of acceptance, his words sounded more like a criticism towards the younger generation:

“My attitude is that meat is good. We all want to have red meat, but for some reasons if someone happens to be a vegetarian, I also respect their point of view. For us is important to have meat daily, although my son is vegetarian”. (Male, 51yrs old)

The media and marketing

Barriers to changes in consumption behaviour were associated also with the media, advertising and marketing messages impacting people. In the absence of social marketing, the public space is taken up by private advertising aimed at promoting meat consumption. For example, people trust *“media sources for information regarding food and health. I think a good iron and zinc and B12 protein like meat is well advertised and the health benefits message of meat is very clear”*. The media have also created meat icons, such as *“Sam Kekovich ads. They are pure gold and funny”*. Commercial advertising is successfully manipulating the English language with phrases that encourage meat consumption and stick in people’s mind. A participant referred to: *“We will not lamb alone on Australia Day”*.

Sometimes, however, people find it difficult to follow the latest information presented in the media and are getting confused. One male participant explained that he was *“aware of the methane issue”* but has heard that things *“are good now”*. A female participant explained: *“These new modern, clean farms, not anymore dirty and gross are an improvement”*. It may

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also be the case that often by presenting both sides of the story the media do not actively pursue the latest scientific evidence.

Economic considerations

Economic security was a major barrier to the participants. Many see meat as a valuable food the supply of which should be protected and guaranteed for the Australian population.

Sentiments along the lines: “*we got enough meat as long as we are not giving it to others*” and “*the whole of Asia is going crazy on red meat, which is going to increase the prices*” were commonly expressed.

Some participants saw meat as “*still cheaper than most of the fruits and veggies*” while others lamented that they could not afford “*buying beautiful fillet steak*”. Overall, people were reluctant to make any changes in their diet as they have currently balanced their budgets and “*need to be careful about what type of food we spend it*” with meat being a priority for “*putting good protein food at the table*”.

The start-up interviews revealed a very complex landscape which did not match the facts about meat production, its environmental and human health impacts. This was not surprising given that the group of participants was deliberately selected to comprise regular meat-eaters. On the other hand, the majority of the Australian population are regular meat-eaters with some of the world’s highest per capita levels of consumption. It still made the task of any social marketing challenging. Before responding to the task by devising a long-term intervention, we also asked what would potentially make the participants change their diets. We refer to these factors as game changing.

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4.4 The game-changing factors

The participants recognised a number of factors that could change their dietary behaviour and motivate them towards making it more sustainable. They could be organised under three categories, namely environmental concerns, including climate change; health considerations, including cancers; and experience with meals without meat.

In relation to the environment, some of the participants explained “*global warming and if there is no food for the animals to eat, we have to eat less*” and “*[r]esources on our planet are limited and we don’t realise that we are cutting trees to have land to grow meat... We have to think and see far away from our plate*”. However, not many were aware about the scale of the problems and livestock’s contribution to environmental deterioration, overuse of natural resources and climate change.

Health was another big game changer, but there was also a lot of disbelief that overconsumption of meat could be harmful. As one of the participants explained:

“I think if the WHO claims happened to be true, especially if meat-eating can cause cancer or other illnesses. It’s scary to even think about. I am sure people will change everything, their lifestyle, eating ... everything to avoid this. (Female, 51yrs old)

Others thought about allergies and people getting sick as meat “*takes a long process to be digested in a body... and it stays in a colon*”. Again, there were wide-spread resentment and doubts that such negative health effects could be real given the popularity of meat as human food.

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With many of the participants not being very confident in their cooking skills, food

preparation also could become a game changing factor. Even those who have time to cook

and enjoy doing it, describe using vegetables “*in the simplest possible way steaming or*

boiling or baking them. I don't know any other way”. When plant-based meals are made, they

found them to be “*plain and tasteless*”. By comparison, “*meat dishes... are tastier and nice*”

and “*never end up in the bin*”. Many acknowledged that they “*don't have much experience*

with vegetarian dishes”. From all start-up interviews, it became clear that knowing how to

prepare tasty plant-based meals could also be a game changer.

These game-changing factors, namely environmental concerns, health considerations and

food preparation skills became the three components of the intervention applied in this

longitudinal study. They are described with further detail below.

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5. The sustainability social marketing intervention

The social marketing intervention used during the longitudinal case study was informed by all the identified themes during the start-up interviews, including the game-changing factors. Each of its three components was developed using the SSMM for the target population, namely the participants in the Sydney study, and lasted one and a half years. This allowed to adjust the scoping of the tasks according to the knowledge and skills of the participants, develop the actions they had to do, implement and evaluate the results from their activities leading towards adaptation and improvement for the next component and ultimately for the next social marketing campaign (see Figure 2). The three components were all carried out under a marketing catchphrase representing the particular emphasis at that stage of the intervention, namely: “No biodiversity destruction in my plate!” – for the environmental element; “Is there a choice between a steak and a burning planet?” for the food preparation part; and “Red meat can also cause cancer and heart attack...” for the health-related module.

5.1 “No biodiversity destruction in my plate!”

During the first component held in the second half of 2015 after the start-up interviews, the catchphrase “No biodiversity destruction in my plate!” was used. The participants were exposed to science-based evidence and educational materials related to the environmental impacts of livestock and meat production and consumption, including contributing to climate change and biodiversity loss. These materials included a summary of the findings of the UN Food and Agriculture Organisation (FAO)’s “Livestock's Long Shadow” report (Steinfeld et al., 2006) and Michael Pollan’s 2006 book “The Omnivore's Dilemma: A Natural History of Four Meals”. The aim was to explain why consuming more plant-based meals would make a positive impact on the natural environment. Participants were given further tasks which included watching four documentaries in their free time, namely: “Cowspiracy: The

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sustainability secret” (2014), “Meat the truth” (2007), “Before the flood” (2016) and “Food choices” (2016).

[INSERT FIGURE 2 AROUND HERE]

Group debriefs were held to discuss the educational materials and films during which the participants shared their thoughts, feelings, perceptions about food and personal experiences. The participants were also observed to develop an understanding about the degree of impact this first social marketing component had on them.

5.2 “Is there a choice between a steak and a burning planet?”

In early 2017, the second sustainability social marketing component used the question “Is there a choice between a steak and burning planet?” which aimed to introduce new experiences in preparing and eating plant-based foods. This involved a series of demonstration and cooking sessions with the participants to teach them how to cook a variety of delicious plant-based dishes and enjoy them with family and friends. During the food preparation sessions conversations were held about advantages of plant-based dishes, preparation time, accessibility and price of ingredients. Group debrief sessions and observations were also held. Interestingly, prompted by this component of the intervention, some of the participants started to recommend documentaries about meat consumption they have watched, including “The end of meat” (2017), “What the health” (2017), and “H.O.P.E.: What you eat matters” (2016 in German and 2018 in English).

5.3 “Red meat also can cause cancer and heart attack”

The third social marketing component used “Red meat also can cause cancer and heart attack...” as a phrase to prompt the participants to think about the health consequences from

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excessive meat consumption. It also aimed at showing that human performance can improve when people are adhering to plant-based diets. In addition to watching “The game changers” (2019) documentary, the participants were given information leaflets summarising the latest scientific evidence about the health benefits of plant-based foods. They were directed to watch the weekly videos produced by Dr Michael Greger at nutritionfacts.org.

Again, group debriefs and discussion sessions were held with observations as what impact this component had on the participants. The aim was not to convert them to become vegan or vegetarians, but to encourage flexitarianism (Raphaely & Marinova, 2014), that is a reduction in meat consumption to healthy levels and incorporate plant-based dishes in their diet on a regular basis.

Final one-on-one interviews were held with all participants at the start of 2020. The outcomes from the longitudinal study are reported below.

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6. Summary of the outcomes from the sustainability social marketing intervention

The findings reveal that the social marketing intervention played a role in shifting the meat consumption perceptions and attitudes for 14 (or 47%) of the original number of participants.

Table 2 shows the changes, if any, the participants experienced throughout the five-year period. The social marketing campaigns results exhibited a complex trajectory toward a different degree of meat consumption changes (see Figures 3 and 4). As explained earlier, with this single-cohort group we were looking for changes before and after the intervention.

Any such changes were happening within a sociocultural environment which strongly encourages meat consumption. Despite the increasing new evidence presented in documentaries and academic publications, the message about decreasing meat consumption had not penetrated the wider Australian community.

At the commencement of the study, there were 25 heavy meat-eaters; this number became 13 at the end of the longitudinal period, including counting the woman who was hospitalised with mental health problems. Hence, the success in reducing meat consumption was around 50%. We did not expect to be able to influence all participants, given the multitude and multifaceted factors that shaped their dietary behaviour. The achieved reduction in meat consumption can be considered reasonable and shows that with social marketing effort we can sway a major proportion of the Australian population.

Such a change however was much more difficult for the male participants where only 5 (or 36%) changed their dietary habits, compared to 9 (or 56%) among their female counterparts.

At the end of the study, there was only one vegetarian man who switched to only a plant-

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based diet following a serious heart problem, and four vegetarian women. Below is an

excerpt from the final interview with the vegetarian man:

“Since I become a vegetarian, I feel pretty good, very energetic. I completely submerged with my new dietary identity and even when my old friends are laughing at me when gathering and ordering a vegetarian meal, I don’t care. Being healthy and happy is much worth than pleasing friends. I want to be able to see my kids growing and be part of their and my wife’s lives. Now it’s hard to imagine I used to eat meat.” (Male, 44yrs)

Two female heavy meat-eaters also became vegetarian after the social marketing intervention and at the final interview stated that there was no way back for them. One (43 yrs old) was shocked by the cruelty associated with livestock production and appalled by its high environmental footprint. She explains:

“One morning two years ago (2018) I woke up and I couldn’t put meat in my mouth anymore. I am still very shaken from what I learned, and I am slowly sharing with my daughter, husband, and my friends my experience. I can’t believe it how I was totally strayed and it took me a whole 3 years since I started the research study to realise things” (Female, 43yrs)

[INSERT TABLE 2 AROUND HERE]

The second female (51yrs old) switched to vegetarianism after suddenly becoming allergic to meat. She explicated how difficult it was for her to not experience any bad reactions when tasting meat, and particularly red meat:

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“I believe my body just had enough of meat. It was screaming from inside stop poisoning me and I just decided to stop. I haven’t experienced any issues for 2.5 years. Back then I was thinking that this was a reaction provoked from the information I received from the study, but actually, the study helped me to realise that I wasn’t meant to eat that much meat. Something just clicked inside me and the next day I embraced vegetarianism. I feel strong and will never go back.” (Female, 51yrs)

Two female participants who were moderate meat-eaters similarly became vegetarians. One of them (18yrs old) shared that she was thinking of changing her diet prior to the intervention but she had been afraid that excluding meat from her meals would result in her putting on weight. The social marketing intervention was an “*eye-opener*” for her and she was reassured that plant-based dishes “*are protein competitive to meat, something I thought wasn’t the case before*”. The other (52 yrs old) commented: “*The more meat you eat, the more consequences you experience. This is the deal we are all signing in with red meat and other meat.*”

Around 50% of the participants were not affected by the social marketing intervention and their meat consumption remained unchanged. Some of them reported dissatisfaction with the experience and that they felt “*trapped and not engaged*” and “*sick of people telling me what to do, what to eat and what not to eat*”. Others continued to remain convinced that there were no health risks associated with high meat consumption: “*It’s healthy, nutritious, the best source of iron, zinc, you name it...*” and “*I am too young to think that a disease for elderly people like non-communicable are something like that should bother me*”.

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There is also the group of participants whose dietary choices continued to include meat but shifted towards more plant-based options. Health considerations were a major contributing factor. According to one of these participants:

“If we know that red meat, and meat, is not good for us, why we continue to love eating it? This question stood still for days in my mind. We all need a wakeup call and this study was my awakening. I am a slow acceptor of new things, so I am taking it slowly and steady. So far so good. I am eating less meat.” (Male, 51yrs old)

There were also reasons related to the protection of the natural environment and concerns about animal welfare:

“Growing beef and other animals is harming the environment in many ways. Not only because of the land and resources we use to grow these animals, but also we are just looking at beef sizing, how to make it grow quicker and fatter... and to do this we feed the animals with unnatural food adding lots of hormones and antibiotics to avoid making them sick. But all of these are going into our own bodies and into the land, the water and everything.” (Female, 51yrs)

One participant also shared that she and others from the group now live much better without “the huge burden being murderer” and “killing so many animals to satisfy our appetite”.

Being more confident about making plant-based dishes also played a role in these participants’ decision to lower their meat intake. Many commented that they continue to “enjoy some of the recipes we’ve learned at the demonstration sessions”.

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7. Discussion of the Sydney longitudinal study results

To the best of our knowledge, this is the first study to apply a prolonged intervention and follow up the participants over five years. This makes comparisons with other studies impossible. There are however useful lessons that could be learned from the Sydney longitudinal study.

First, it is challenging to maintain the interest and commitment of all participants.

Furthermore, the effects of many interventions tend to dissipate in the medium and longer-term, as experienced in studies related to smoking and alcohol consumption (Stead et al., 2006). We also witnessed such an effect with two men and one woman (or 10% of the sample) reducing their meat intake and then reverting to the original levels of consumption of animal proteins. This is a relatively small share of attrition. We also did not observe any change between the last component of the intervention and the final interview (see Figures 3 and 4) which indicated that the achieved results had stabilised.

[INSERT FIGURE 3 AROUND HERE]

Second, as this was a longitudinal study, each participant was observed on many occasions (Cook & Ware, 1983) and under different settings, namely individual and group-based. This allowed us to follow the individual responses throughout the different components of the sustainability social marketing intervention. As we were dealing with a small group of participants, it is difficult to draw generalisations. However, it became clear that women, and particularly younger women, are more likely to embrace such a dietary shift and were more open to change. This is a positive finding as women are also those who have a bigger impact on the dietary preferences of the future generations.

[INSERT FIGURE 4 AROUND HERE]

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Third, as in real life, it was very difficult in this longitudinal study to control for external influences and dependencies including cultural, religious, societal and family pressure. In total, we saw a drop in meat consumption for 5 men and 9 women (14 participants or around 50%) of the Sydney group. Given that we witnessed a high level of stability, it is highly likely that these people would also influence their friends and relatives making the impact of this study even more significant.

Irrespective as to what the future holds for this particular group of people, we were able to observe that sustainability social marketing worked, including the 4Ss. The messages about sustainability, strength, self-confidence and sharing were commonly used in the information materials and they were also reflected in the words of the participants during the final interviews. Below are three quotes that summarise the feelings of those who made the transition towards more sustainable and healthier food choices:

“I can say I consider myself confident enough to continue being a vegetarian despite the pressure I... experience from family and friends.” (Female, 52yrs old)

“You know, there are not many opportunities this planet can provide us and we have to learn how to keep it going and to learn how to share with others what is best for all of us. Eating less meat and enjoying healthy life is what little we can do to help the planet.” (Female, 18yrs old)

“I can call it strength to be a man and not be afraid to be judged by others because of your meatless meal.” (Male, 44yrs old)

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The longitudinal design of the study permitted the observation and recording of behaviour change over time and with multiple observations (Caruana et al., 2015). Although we could not isolate the participants from other factors affecting their food consumption, the three components of the intervention were uniquely suited to help us understand the dynamics of behavioural change and adjust the messages we were sending to them. Nevertheless, we also experienced some difficulties, particularly in maintaining the size of the original sample of 30 participants over the five-year period. Additionally, another challenge was the high demand on research time for the design and delivery of the components of the intervention and the large number of interviews conducted with the participants individually and in group settings.

This study also has some theoretical and practical implications. From a theoretical point of view, it was testing the sustainability social marketing model (SSMM) and it confirmed that such an approach is a useful way of dealing with behavioural change in complex and often sensitive circumstances, such as the ones related to personal food choices. The importance of sending the same message through an iterative process was demonstrated in the encouraging outcomes and particularly the fact that the achieved new food behaviour remained stable without relapsing. Furthermore, the study was using the 4S marketing mix in a real-life situation and it showed that it worked on a practical basis. The majority of the participants were able to embrace the sustainability social marketing messages which resonated with their improved knowledge, better awareness and newly developed values. Hence, this study opens up the perspective for larger-scale SSMM interventions which can lead to improved outcomes for the greater public good.

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8. Conclusion

Change is a multifaceted construct (Caspi & Roberts, 1999) and personality traits are indisputably consistent across time and age (Roberts & DelVecchio, 2000; Fraley & Roberts, 2005). People are frequently making choices reflecting their personal values but also the knowledge they have. The study provided understanding of the complex environment within which people consume food and the factors that conspire against them being able to pursue sustainable behaviours. Social marketing aims at awakening people's behaviour towards the common good by succinctly exposing them to the appropriate and relevant messages and triggering positive changes.

This was manifested in the Sydney exploratory longitudinal study where 30 participants were subjected to a five-year long intervention aimed at reducing the level of their meat consumption. The components of the intervention were oriented towards preventing further environmental deterioration – “No biodiversity destruction in my plate!”, improving food preparation skills – “Is there a choice between a steak and a burning planet?”, and improving personal health – “Red meat also can cause cancer and heart attack...”. The behavioural changes we witnessed affected close to half of the subjects who participated in the study. They were sustained over a prolonged period of time which indicates that these participants have started to see the world differently. Such a shift towards an increased intake of plant-based options was more pronounced amongst women, and particularly younger women.

The findings from this study as well as the marketing messages or the catchphrases can be used as a reflective tool for other investigations. They can also inform policy actors and influencers, particularly when governments are not yet acting in the best interest of their constituents. It is difficult to make generalisations from this exploratory study; however, it

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leaves us with a positive optimistic view of the world where gradual changes in people's diets

can contribute towards eliminating the tragedy not only of the commons, but also of all

species who inhabit this planet.

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Lessons Learned

- It is important to educate people about the impacts of their dietary choices and sustainability social marketing provides a useful platform to achieve this;
- People make food choices based on their personal values and preferences; however, knowledge and skills in food preparation of vegetarian meals are crucial contributing factors;
- Sustainability marketing catchphrases are a good way to convey important messages in a succinct way that engages with the general audience and can become behaviour triggers;
- Shifting people's diets towards making them more sustainable is a challenging but not impossible task with the first step to accomplish the change is to convince your friends to give it a try.

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Discussion Questions

1. Comment on the success of the sustainability marketing intervention related to reduction in meat consumption.
2. What are the main factors that are likely to impact people's food preferences and why?
3. What is the role of social networks in impacting people's food choices?
4. Can food be seen as masculine or feminine and why?
5. What are the challenges and benefits in longitudinal/qualitative studies?

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Suggested Activities:

1. Develop sustainability social marketing catchphrases to influence people's dietary choices.
2. Analyse your own diet from a planetary health perspective. Do you need to make any changes and why?
3. Watch a sustainability food-related movie, such as “Cowspiracy”, “Meat the truth”, “Before the flood”, “Food choices”, “Food Inc.”, “What the health”, “The game changers”, “The end of meat”, “What the health”, “H.O.P.E.: what you eat matters”, “The need to grow” etc., and discuss what are the main issues covered and what are the main messages that you would remember.
4. Organise a food session in class by bringing dishes to share that are more sustainable than what you would generally eat. Explain what makes your dish more sustainable.
5. Create a menu for a new restaurant; how would you advertise it for a clientele interested in sustainability?

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Interesting Facts

- In the case of beef, it takes 38 calories fed to the animal to produce 1 calorie for human consumption.
- The land mass used on this planet for livestock grazing and feed (27%) is bigger than the land occupied by forests (26%).
- According to Google trends, veganism is increasingly gaining popularity.

Key Definitions

- 4S marketing mix – a new way of marketing products which emphasises the following qualities: sustainability, strength, self-confidence and sharing
- Flexitarianism – a diet which aims at reducing the consumption of animal-based foods
- Longitudinal study – a research study which follows up the same participants over a prolonged period of time
- Sustainability social marketing – a subclass of social marketing that aims to trigger and encourage behavioural changes for the common good of the human and other species
- Tragedy of the commons – overexploitation of common resources in the pursuit of personal gains to the detriment of society

Authors Whose Work to Follow

In addition to the authors of this chapter, below are some writers whose work is worth reading:

Carol Adams

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Hans Dagevos

Jeff French

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Figure 1: Sustainability Social Marketing Model (SSMM) for reduction in meat intake

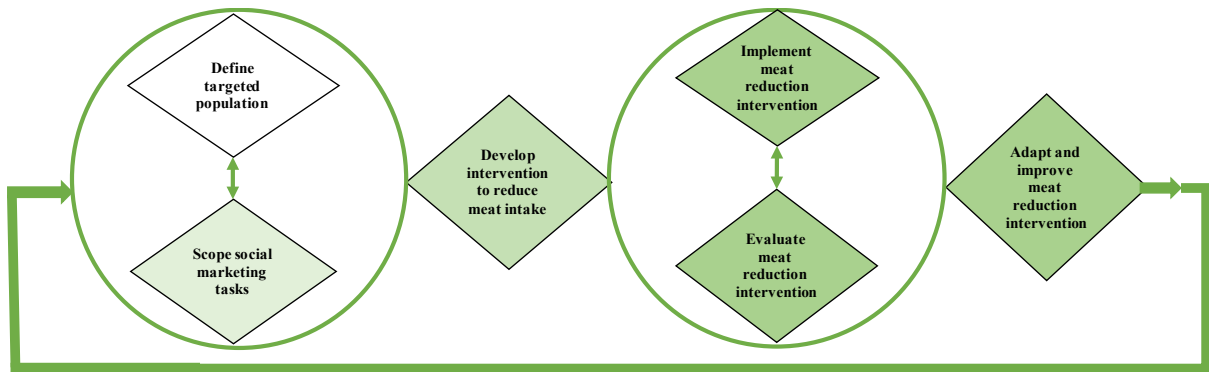
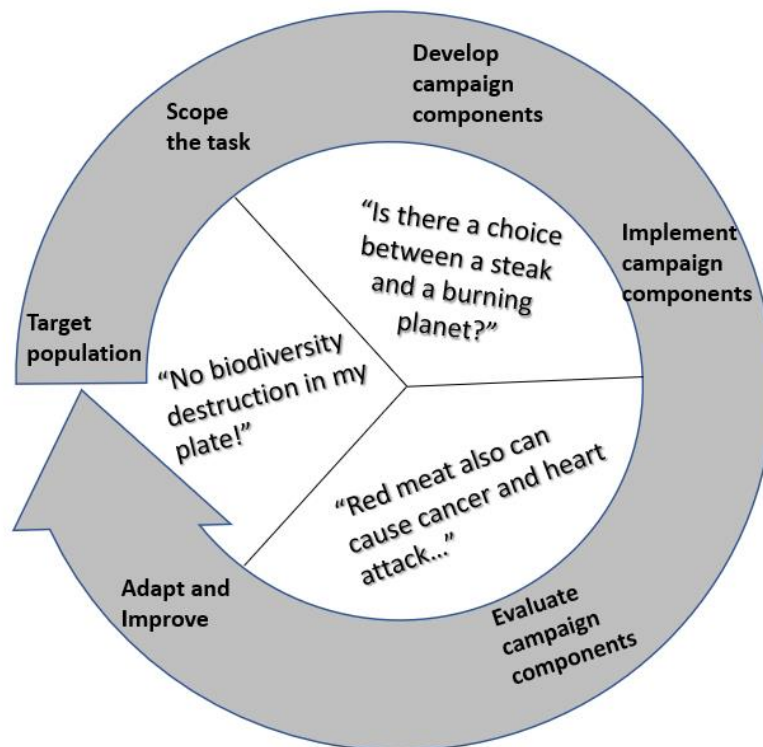
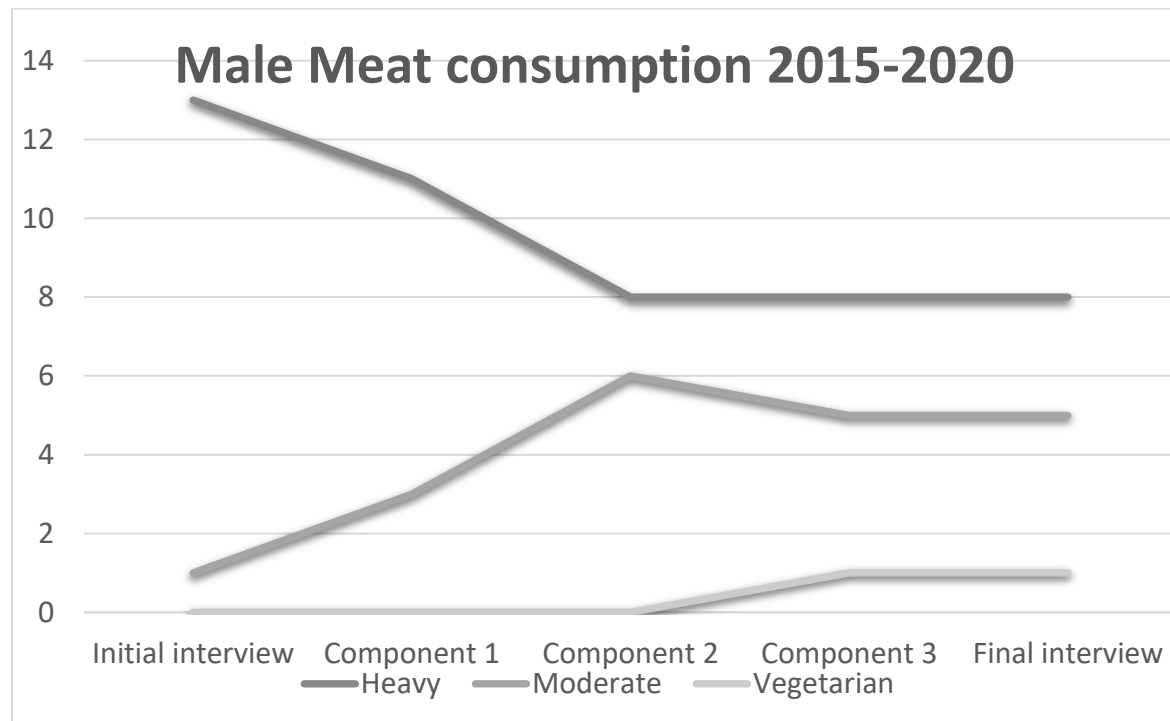


Figure 2: Sustainability social marketing intervention



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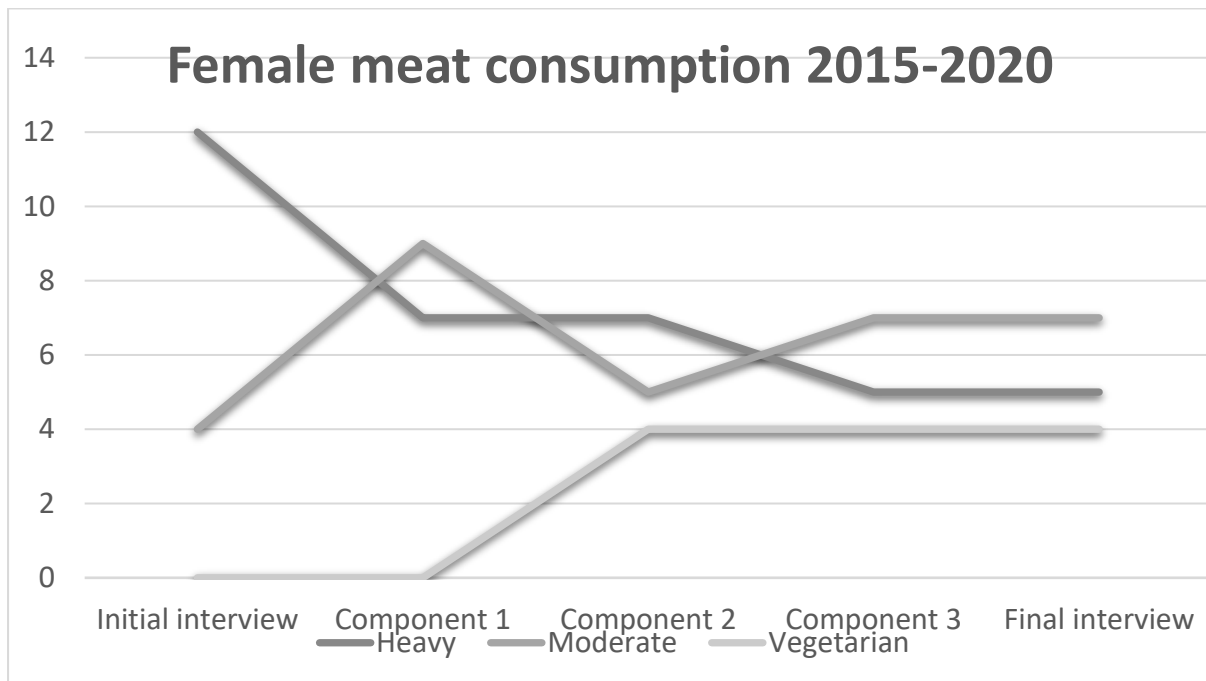
Figure 3. Men’s meat consumption behaviour change trajectory



	Heavy	Moderate	Vegetarian
Initial interview	13	1	0
Component 1	11	3	0
Component 2	8	6	0
Component 3	8	5	1
Final interview	8	5	1

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Figure 4. Women’s meat consumption behaviour change trajectory



	Heavy	Moderate	Vegetarian
Initial interview	12	4	0
Component 1	7	9	0
Component 2	7	5	4
Component 3	5	7	4
Final interview	5	7	4

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Table 1: Characteristics of the Sydney study sample

N	Gender	Age	Family status	Job status	Household income per annum	Education	Cooking skills and time for cooking	Dietary choice	Awareness about meat's impacts
14	Male	18-29yrs – 2	Single – 3	Full time – 11	<\$50K – 1 \$50K- \$99K – 2	University degree – 10 Technical and further education (TAFE)/ College – 2	Good cooking skills – 7 Not strong cooking skills – 7	Moderate meat eaters – 1 Heavy meat eaters – 13	Some awareness – 5 No awareness – 9

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		50-59yrs		Retired	\$150K-	High	Have time		
		- 3		- 1	200K - 2	school - 2	for cooking		
		60-69yrs			>\$200K - 1		- 5		
		- 1					Lack time		
		70-79yrs					for cooking		
		- 1					- 9		
16	Female	18-29yrs	Single -	Full	<\$50K - 2	University	Good	Moderate	Some
		- 2	3	time -	\$50K-	degree - 13	cooking	meat eaters	awareness - 7
		30-39yrs	Married	11	\$99K - 5	Technical	skills - 8	- 4	No awareness
		- 4	- 13	Part	\$100K-	and further	Not strong	Heavy	- 9
		40-49yrs		time -	\$149K - 7	education	cooking	meat eaters	
		- 3		2	\$150K-	(TAFE)/	skills - 8	- 12	
					200K - 1	College - 2			

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50-59yrs	Retired	>\$200K –	High	Have time
– 3	– 3	1	School - 1	for cooking
60-69yrs				– 8
– 2				Lacking
70-79yrs				time for
– 2				cooking –
				8

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Table 2: Summary of dietary outcomes in the Sydney longitudinal study

Subject		Meat consumption at the intervention's occasions				
N	Age at the start of the study/ Gender	Initial in-depth interview	Social marketing component 1	Social marketing component 2	Social marketing component 3	Final in-depth interview
		Early 2015	<i>"No biodiversity destruction in my plate!"</i>	<i>"Is there a choice between a steak or a burning planet?"</i>	<i>"Red meat also can cause cancer and heart attack..."</i>	Early 2020
			mid 2015-2016	2017-mid 2018	mid 2018-2019	
1	20yrs/Male	Heavy	Heavy	Heavy	Heavy	Heavy
2	23yrs/Male	Heavy	Heavy	Heavy	Heavy	Heavy
3	36yrs/Male	Heavy	Heavy	Heavy	Heavy	Heavy
4	62yrs/Male	Heavy	Heavy	Heavy	Heavy	Heavy
5	70yrs/Male	Heavy	Heavy	Heavy	Heavy	Heavy

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6	39yrs/Male	Heavy	Moderate	Heavy	Heavy	Heavy
7	47yrs/Male	Heavy	Moderate	Heavy	Heavy	Heavy
8	50yrs/Male	Heavy	Heavy	Moderate	Heavy	Heavy
9	38yrs/Male	Heavy	Heavy	Moderate	Moderate	Moderate
10	49yrs/Male	Heavy	Heavy	Heavy	Moderate	Moderate
11	53yrs/Male	Heavy	Heavy	Moderate	Moderate	Moderate
12	44yrs/Male	Heavy	Heavy	Moderate	Vegetarian	Vegetarian
13	51yrs/Male	Heavy	Heavy	Moderate	Moderate	Moderate
14	45yrs/Male	Moderate	Moderate	Moderate	Moderate	Moderate
15	37yrs/Female	Heavy	Heavy	Heavy	Heavy	Heavy
16	60yrs/Female	Heavy	Heavy	Heavy	Heavy	Heavy
17	71yrs/Female	Heavy	Heavy	Heavy	Heavy	Hospitalised
18	72yrs/Female	Heavy	Heavy	Heavy	Heavy	Heavy
19	46yrs/Female	Heavy	Moderate	Heavy	Heavy	Heavy
20	34yrs/Female	Heavy	Moderate	Heavy	Moderate	Moderate
21	50yrs/Female	Heavy	Moderate	Heavy	Moderate	Moderate
22	28yrs/Female	Heavy	Heavy	Moderate	Moderate	Moderate

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23	39yrs/Female	Heavy	Heavy	Moderate	Moderate	Moderate
24	44yrs/Female	Heavy	Heavy	Moderate	Moderate	Moderate
25	43yrs/Female	Heavy	Moderate	Vegetarian	Vegetarian	Vegetarian
26	51yrs/Female	Heavy	Moderate	Vegetarian	Vegetarian	Vegetarian
27	38yrs/Female	Moderate	Moderate	Moderate	Moderate	Moderate
28	65yrs/Female	Moderate	Moderate	Moderate	Moderate	Deceased
29	18yrs/Female	Moderate	Moderate	Vegetarian	Vegetarian	Vegetarian
30	52yrs/Female	Moderate	Moderate	Vegetarian	Vegetarian	Vegetarian
