Faculty of Humanities

Influencing Reduction in Meat Consumption through Social Marketing

Diana Bogueva

This thesis is presented for the Degree of
Doctor of Philosophy
of
Curtin University

November 2017

Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made. This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

The research presented and reported in this thesis was conducted in accordance with the Ethic approval obtained from the Curtin University Human Research Ethics Committee (EC00262), Approval Number # RDHU-82-15.

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Diana Bogueva

Date 30 October 2017

Statement of Contribution of Others

All of the written materials submitted as part of this PhD by Publication were conceived and coordinated by Diana Bogueva. Diana also undertook the majority of the empirical data collection, analysis and writing for each publication.

Signed detailed statements from all co-authors relating to each publication are provided as appendices at the back of this volume (Appendix A).

Signed:
Diana Bogueva, PhD Candidate

Professor Dora Marinova, Supervisor

Date: October 2017

Abstract

This thesis by publication comprises seven articles which explore the issues of reducing meat consumption and the contribution of social marketing in influencing behavioural change. Given the unprecedented and pressing need for the western world to acknowledge meat consumption as a main contributor to climate change and environmental deterioration, the thesis presents results from surveys conducted in Sydney and develops a new sustainability social marketing mix and model for encouraging dietary shifts away from meat.

The scale of the problem of meat consumption requires urgent attention as well as focused methodologies and result-driven strategies for implementation. Social marketing interventions aimed at shifting consumer preferences for the common good need to be based on understanding current attitudes and perceptions about meat. To reduce the impact on climate change, achieve better public health, environmental benefits, and thus a more sustainable future for the planet, social marketing applications targeting meat consumption reduction should not be limited to delivering effective messages promoting behavioural change, but should also presents solutions to the challenges and opportunities to achieve this social transformation. This goes beyond the formula of avoiding red meat to re-conceptualising new meat alternatives.

Based on surveys, conducted in Sydney, Australia in 2016 and 2017, this thesis investigates the reasons behind Australian meat consumption, myths and marketing which influence people's perceptions and attitudes towards animal flesh as well as the degree of consumer awareness about the alarming environmental and climate change effects associated with livestock-based food. It further explores consumer openness for a change away from animal proteins towards embracing more sustainable plant-based diets. The findings from the exploratory work in Sydney are indicative of trends in the Western world.

Through a meat myths analysis, the first publication uncovers the role of the deeply entrenched beliefs and understandings in explaining the status of livestock-based products in relation to sustainable consumption. The second publication focuses on the social marketing methodology and its role in successfully solving health problems, presenting the new 4S (sustainability, strength, self-confidence and sharing) mix and sustainability social marketing model. Based on understanding of the attitudes and perceptions of Sydney residents, the third and fourth articles pre-test the idea of social marketing for meat reduction and adoption of more sustainable diets through exploratory research. The fifth article explores the meat as a luxury concept amongst three generations – Xers, GenY and GenZ, who represent vital present and future food consumers. Linking meat, men and masculinity is the focus of the sixth article which looks closely at one of the deeply embedded relationships with the aim to discover the possibilities for a shift toward a new modern evolutionary masculinity which reflects better sustainability values, such as environmental wellbeing, health and animal welfare. The seventh article examines reducing the consumption of livestock-based foods through substitution with new meat alternatives identified as healthier sources of protein offering ethical, environmental and health benefits and presenting directions for solving world hunger.

The publications forming this thesis develop a novel 4S sustainability social marketing model highlighting the two-fold role of social marketing in the process of meat reduction for human health and environmental sustainability and as positive influence for government and policy makers to encourage a dietary transformation which enables a smoother transition to sustainable consumption. The thesis also presents the concept of “new meat” as the future food alternatives without livestock.

Acknowledgements

I would like to acknowledge the contribution of an Australian Government Research Training Program Scholarship in supporting this research.

The number of people without whom this work may not have seen the light of day and deserving my big thanks is huge. First and foremost, are my supervisors from CUSP, Curtin University – Professor Dora Marinova and Dr Talia Raphaely, who have been invaluable in every aspect throughout my journey, enabling me not only to learn, but giving me inspiration for my work, encouragement to remain eager in the search for answers, go beyond any perceived limits and continue with perseverance, passion and commitment.

I also need to thank Professor Ian Phau and Dr Kurt Schmidinger with whom I have created wonderful co-authorships and friendship. Without their input, talent and valuable contribution, this work would have not been completed.

Finally, I wish to thank my dearest family – my husband, daughter and son, who willingly and patiently supported every single step of this journey. Thank you for always being behind me.

Publications included as part of this thesis

Publication 1:

Bogueva, D., Phau, I. (2016) Meat myths and marketing. In Raphaely, T., Marinova, D. (eds) *Impact of Meat Consumption on Health and Environmental Sustainability*, IGI Global, Hershey, PA, pp. 264-276

(The book was awarded World Best Book in the Sustainable Food category at the 22nd Gourmand Awards 2017, Yantai, China 26–29 May 2017)

Publication 2:

Bogueva, D., Marinova, D., Raphaely, T. (2017) Reducing meat consumption: the case for social marketing. *Asia Pacific Journal of Marketing and Logistics*, 29(3), 477–500

Publication 3:

Bogueva, D., Marinova, D. Raphaely, T. (2017) Red meat consumption and social marketing interventions promoting appetite for change. *International Journal of Food Engineering*, 3(2), 154-158

Publication 4:

Bogueva, D., Raphaely, T., Marinova, D., Marinova, M. (2017) Sustainability social marketing. In Hartz-Karp, J., Marinova, D. (eds) *Methods for Sustainability Research*, Edward Elgar, Cheltenham, UK, pp. 280-291

Publication 5:

Bogueva, D., Marinova, D. (2018) What is more important perception of masculinity or personal health and the environment? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 148-162

Publication 6:

Bogueva, D., Marinova, D., Phau, I. (2018) Is meat a luxury? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 172-186

Publication 7:

Schmidinger K., **Bogueva D.,** Marinova, D. (2018) New meat without livestock. In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 344-361

List of additional publications

The following list presents other publications and conference presentations relevant to this thesis but not forming part of it.

Other publications:

Bogueva, D., Marinova, D. (2017) Metamorphoses in the relations between man, food and masculinity. *Science*, 6, 16-23 (in Bulgarian, published by the Association of Bulgarian Scientists)

Bogueva, D., Marinova, D., Raphaely, T., Schmidinger K. (eds) (2019) *Environmental, Health, and Business Opportunities in the New Meat Alternatives Market*, IGI Global, Hershey, PA (forthcoming)

Tekiner, I.H., Al-Baarri, H. N., **Bogueva, D.** (2018) Genius, creativity and (not) eating meat. In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 187-203

Conference presentations:

Bogueva, D., Marinova, D**. (2017)** Red meat consumption and social marketing interventions promoting appetite for change. Presented in the 3rd International Conference on Food and Environmental Sciences (ICFES 2017) in Hanoi, Vietnam – 25-27 February 2017

(The presentation was awarded Best Paper at the above conference)

Bogueva, D. (2017) Changing attitude to meat consumption for waste reduction and sustainability. Presented in the 31st European Federation of Food Science and Technology (EFFoST) International Conference in Sitges, Barcelona, Spain – 13-16 November 2017

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CHAPTER 1: Introduction

Human appetite for meat and animal-based products has proliferated in recent years to unprecedented sizes. Australian consumers are the world's most voracious meat eaters (OECD, 2017; Ting, 2015). This increasing consumption of animal-based food however is causing severe negative impacts, including contribution to climate change and associated extreme weather events, environmental degradation, biodiversity loss, inefficient consumption of natural resources with warning consequences for human health. The need for more sustainable diets and a shift away from meat is clear and urgent than ever before not only for Australia, but also across the globe.

Most consumers in prosperous societies as well as people in other parts of the world who can afford consuming meat do not realise the serious negative ecological and health problems triggered by the bounteous consumption of animal-based products. This shortage of knowledge and lack of awareness that eating less meat is good for both – planetary and human health, is the motivation behind this PhD research. The papers included in the thesis together with many other credible sources (e.g. Cordts et al., 2014; Tobler et al., 2011; Whitmarsh et al., 2011) provide evidence that there is need for further work to be done in influencing people's dietary choices towards reduction in meat consumption. Such a change however is not an easy task and the approach I have taken is to develop the power of social marketing to influence a sustained behavioural change based on a goodwill and individual action.

Ignoring the issue of meat consumption is no longer an acceptable stance for any environmental or climate change related research. Similarly, this should not be a position in any policy negotiations. Given the magnitude of the problem, however, the most important changes that we need to witness are at the level of individual consumers. This is where social marketing can sway people's attitudes.

Changing the western type individual meat consumption patterns can contribute to better health, natural environment, mitigate further climate change as well as relieve any ethical concerns about animal exploitation. Such considerations should be playing a critical role in any decision making regarding food by consumers in affluent, high-income countries such as Australia, which are also heavy meat-eating nations.

The context behind individual meat consumption is very complex with layers of tradition and long-held beliefs. Using radical methods, such as for instance totally abandoning meat and becoming a vegetarian or vegan, is neither reasonable or feasible for most consumers. Flexitarianism as a dietary choice to reduce meat consumption with more emphasis on plant-based food (Bakker & Dagevos ,2012; Dagevos & Voordouw, 2013; Raphaely & Marinova, 2014; Bogueva et al., 2017) as well as lowering weekly meat intake and portion sizes (Dagevos & Voordouw, 2013; de Boer et al., 2014) are suggested as a moderate way to induce acceptable and attainable consumption behaviour change. Other approaches include promoting "less, but better (organic)" meat consumption (de Boer et al., 2014; Sutton & Dibb, 2013) and pro-environmental meatless day campaigns (Laestadius et al., 2013). All these suggestions are important in influencing the meat consumption debate towards cutting the intake of animal proteins. They are methods which rely on convincing vast population sections to embrace changes which will have social, individual and environmental benefits. This is the first time,

however, that the concept of social marketing is being developed to influence individual preferences and facilitate reduction in meat consumption.

Although this thesis refers mainly to meat, many of the arguments made implicitly apply to all animal-based food products. On the one hand, the increasing world population requires extra food and many (wrongly) argue that intensifying livestock production could be the answer. Furthermore, the availability of meat and its accessibility with expanding disposable incomes are considered core stimuli for the rising global meat consumption not only in affluent societies but also for the middle class in emerging economies (de Boer et al., 2014; Hallström et al., 2014; Edjabou & Smed, 2013; Bogueva et al., 2017). Unassumingly, the world is westernising its diets putting the planet on a trajectory of no return when it comes to climate change and biodiversity loss. It is time to wake up and re-assess what we are doing. However, a combination of very powerful factors, such as culturally and socially established values (e.g. see Santich in Ting, 2013 for Australia), rituals, traditions and social practices (Rozin et al., 2012; Beverland, 2014), combined with individual taste preferences and coupled with aggressive advertising by the livestock industry, have created myths about the value of meat (Bogueva & Phau, 2016) which require debunking. Setting straight the facts about the damage meat consumption causes, demystifying and discrediting vested interests and finding the best possible solutions to convey messages for the common public good are all factors that social marketing needs to address. Undoubtedly these solutions need to be around finding new communication strategies and concepts for reshaping and transforming the existing eating patterns, the use of innovative tools and practical approaches supported by government, policy and decision-making bodies in a dialogue how to best pitch the messages to the broader public. Social marketing requires a collaboration and joint efforts to break with the existing patterns of high meat consumption and generate benefits for human and planetary health.

Meat consumption and its devastating effects are yet to penetrate the wide public debate. The media are also ignoring essential links, such as between diet and climate change (Frielander et al., 2014). Whilst researchers across the globe are in consensus that global warming is human-caused (Cook at al., 2016), meat is left out of the discussion. The unsustainability of the present food systems and diets imposes enormous environmental and health costs, including compromising the future planetary food production capacity and food security (European Commission, 2011; Godfray & Garnett, 2014; IPCC, 2014) and reaching peak phosphorus (White & Cordell, 2015; Cordell et al., 2009; Cordell & White, 2011, 2015). Animal-based food also uses disproportionately more natural resources (European Commission, 2011; Smil, 2000) and contributes to water depletion, biodiversity loss (Raphaely & Marinova, 2016; Gerber et al., 2013), rise of anthropogenic greenhouse gas emission (Vermeulen et al., 2012) and has overall a large ecological footprint (Steinfeld et al., 2006; Springmann et al., 2016a; Whitmee et al., 2014; Tubiello et al., 2015). In contrast to the 795 million starving people across the globe (FAO, IFAD and WFP, 2015), 600 million are obese and 1.9 billion overweight (UNICEF, WHO and World Bank, 2016; GBD Risk Factors Collaborators, 2015), all causing major health risks (European Commission, 2011; GLOPAN, 2016; Aleksandrowicz et al., 2016; Pan et al., 2012). Against this context, reducing the consumption of meat and achieving substantial behavioural and social changes should be a central agenda.

The Paris Climate Agreement based on the commitment of the 197 parties to the United Nations Framework Convention on Climate Change (UNFCCC) to keep global temperature rise within safe limits below 2°C and 'pursue efforts' towards 1.5°C (UNFCCC, 2016) was the result

from lengthy and multifaceted diplomatic calls. If unchecked, the rise of meat production and consumption worldwide, including in Asia (Bogueva et al., 2017; GLOPAN, 2016), could be accountable for 80% of agriculture and food greenhouse gas emissions by 2050, making livestock responsible for half of all tolerable emissions for detaining the global increase in temperature below 2°C; (in UNSCN, 2017; Hedenus et al., 2014; Springmann et al., 2016b; Tilman and Clark, 2014; Popp et al., 2010). In fact, it is also predicted as possible for livestock alone to exceed total permissible emissions by 2070 (Hedenus et al., 2014; Springmann et al., 2016b).

Defined "with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations", sustainable diets are biodiversity and ecosystems protective and respectful, "culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, and safe and healthy, while optimizing natural and human resources" (FAO, 2010, n.p.; Burlingame & Dernini, 2012). Realistic sustainable diets containing scarce quantities of meat, plenty of fruits, vegetables and cereals can improve public health, while also helping to reduce greenhouse gas emissions (Friel et al., 2009; HLPE, 2012; Tilman and Clark, 2014; Green et al., 2015; Springmann et al., 2016b) and non-communicable diseases (Green et al., 2015, Milner et al., 2015); hence, minimising the social, economic and environmental repercussions of meat consumption. Transitioning to more plant-centred diets worldwide following the World Health Organisation's healthy eating recommendations (WHO, 2015) and human energy requirements guidelines (WHO, 2004) and the World Cancer Research Fund's goals (WCRF/AICR, 2007), could lower globally mortality by 6-10% and food-associated carbon emissions by 29-70% compared with the reference scenario for 2050 (Springmann et al., 2016b).

The current destructive levels of meat consumption could have been avoided had people followed more traditional plant-based diets. As this is not the case, we are faced with the prospects of a bleak future. This thesis argues that the now considered inevitable fate of the planet and its population can change and the irrevocable can be prevented. It offers a passionate stance against the current levels of meat consumption and that raising awareness about humanity's power to change future food demand through its dietary choices is not only important but possible. However, the message needs to be conveyed quickly and in a targeted manner. Using social marketing can be beneficial given the emerging consumer social consciousness with increased interest in sustainability, sustainable production and consumption, food safety and security (Grunert, 2005; Jensen & Sandoe, 2002; Verbeke, 2005). This new social consciousness is impacting people's behaviour, instigating and motivating them to be interested in the intangible attributes of the products they purchase and consume, including how they are produced and the surrounding socio-environmental, moral and ethical cost (Auger et al., 2010). For example, there is growing awareness about the environmental consequences behind meat production and consumption – emissions associated with livestock animals (methane and other greenhouse gases) and inefficient use of water. Being the primary beneficiary of the social marketing programs (Lee & Kotler, 2016), society is now ready to be influenced toward reduction of meat consumption (Bogueva et al., 2017).

Social marketing efforts are tailored around the idea of exchange meaning not to change people's existing values, but to offer something they already value in exchange for their changed behaviour (French & Gordon, 2015). People weigh the potential benefits and risks of the adoption of the new behaviour and to be successful they must perceive it as having higher

value for them than their current behaviour. Such behavioural changes will not only benefit individuals and society as a whole, but will also improve the planet's ecosystems and other inhabitants. Factors such as laws, government public policy, school curriculum, business practices, the media, even celebrities, can contribute for the achievement of the targeted behaviour change. In the case of meat consumption reduction, the targeted influence could be to accept a new behaviour (e.g. completely cut out meat intake), modify current behaviour (e.g. reduce the quantities of meat consumed), abandon an old undesirable behaviour (e.g. eating processed meat which is Category 1 carcinogenic) and continue desired behaviour (e.g. improve vegetables intake or become a flexitarian) (Lee & Kotler, 2016). Embracing a more sustainable plant-based dietary transition with the help of social marketing should be supported by governmental dietary guidelines and public policy, school education systems, small community initiatives, economic interventions and incentives (Garnett et al., 2015; Foresight, 2011), research programs (CGIAR, 2013), taxing (Marinova & Raphaely, 2018) and any efforts aimed at planetary resources preservation (Saxena, 2011, p.11; White & Cordell, 2015). Social marketing methodology can communicate the information and messages about the effectiveness of reducing global meat consumption in combatting climate change and preventing non-communicable diseases.

The first step in conquering the big difference for the good of humanity and the planet through better diets is always difficult. At present, only a limited number of countries including Brazil, Germany, Qatar and Sweden notably have encompassed sustainability criteria in their national dietary guidelines (Fischer & Garnett, 2016). Examples include reducing meat consumption, choosing seafood from non-threatened sources, eating more plants, seeds, nuts and plant-based products, reducing calorie intake and food waste and avoiding damage to traditional food cultures.

A major challenge for social marketing is to find ways to define and describe the new consumer intangible attributes that might influence reduction, avoidance or abstinence from meat consumption. They may relate to:

- health (Hoek et al., 2004; Stehfest, 2009; Hoek et al., 2011; Ruby, 2012);
- religion (Fraser, 2003; Fessler et al., 2003; McAfee et al., 2010);
- animal welfare (Fox & Ward, 2008; Rozin, 2004; Lea & Worsley, 2001; Ruby, 2012; Verbeke & Viaene, 1999);
- environmental consciousness (Gaard, 2002; Hoek et al., 2004; Hoek et al., 2011; Tobler et al., 2011) and resource depletion (White & Cordell, 2015);
- food safety (Verbeke et al., 2007; Loureiro & Umberger, 2007; Verbeke & Viaene, 1999; Vermeir & Verbeke, 2006);
- food security in respect to resource intensive and inefficient conversion of feed into meat by animals (FAO, 2006; Tilman et al., 2002; York & Gossard, 2004; Gerbens-Leenes & Nonhebel, 2002; Hoek et al., 2004; Ruby, 2012);
- ethical perspectives about raising and slaughtering animals (Neale et al., 1993; Santos & Booth, 1996; Fox & Ward, 2008; Hussar & Harris, 2009; Ruby, 2012, Aiking et al., 2006; Fiala, 2008; Hoek et al., 2004; Jongen & Meerdink, 2001; Smil, 2002);

• sensory factors as disgust (Rozin et al., 2008; Rozin et al., 1997; Ruby, 2012; Fessler et al., 2003; Graça et al., 2015)

• social conformity, peers' and friends' influence (Amato & Partridge, 1989; Santos & Booth, 1996);

• food's country of origin and local production (Grunnert, 2006; Hoffmann, 2000; Loureiro & Umberger, 2007);

• the inverted U-shape relationship between income and meat consumption where demand for meat starts to stagnate with improved quality of life (Vranken et al., 2014);

• spiritual connections to the land (Fairlie, 2010).

Without dietary change as a priority solution, avoiding dangerous climate change cannot be achieved. Livestock production has an enormous ecological footprint – land misuse and degradation, water depletion, pollution, deforestation, greenhouse gas emissions altering the composition of the global atmosphere. Notwithstanding this, meat remains a preferred food choice for many across the globe. This manifests in further negative impacts related to individual and public human health. The devastating effects of meat are the reason galvanising the research and publications included in this thesis. They are all inspired in search of the reasons behind meat consumption, the desire to propose proper game-changing actions and methodology allowing solutions and pathways to minimise the negative impacts. Social marketing has the potential to influence meat consumption and with this, climate change, human wellbeing and the health of the planet's ecosystems. There are better dietary options which are more sustainable as well as nutritionally beneficial. With the help of social marketing aimed at meat reduction and based on the interconnected personal, social and environmental benefits consumers will be in a much better position to embrace flexitarianism, a fully plant-based diet or switch to new meat alternatives. For me as a researcher who has closely explored all evidence surrounding meat consumption, it is no longer possible to have a value-free position. The publications included in this thesis offer some of the answers how to influence broader behavioural change.

1.1 The need for this research

Finding effective strategies and intervention models to foster widespread adoption of better diets constitutes the need for this research. Western countries' eating habits have been changing over time towards increasing quantities of one or another type of meat due to consumption styles, availability, affordability and consumer preferences. In recent years, meat consumption has surpassed healthy levels not only for consumers but also for environmental wellbeing. Global annual meat consumption per capita is expected to continue to rise by 2024 (OECD/FAO, 2015) and is vastly driven by the growing human appetite for more meat. Once embedded and established as a worldwide norm, high meat consumption is becoming a difficult to dislodge tenacious habit that requires special attention.

Consumers are unaware about the ecological footprint of their animal-based food. The need to understand the interconnection between people's food consumption choices and the

detrimental implications on animal welfare, human health and the natural environment is crucial. This can be seen as the base for social marketing and other interventions for adoption of less resource intense and more sustainable food systems. Indeed, reduction in the consumption of meat and other animal-based foods is regarded as the best opportunity for cutting down greenhouse gas emissions (Garnett, 2011; Garnett et al., 2015) and limiting the harmful effect on climate change as well as resource scarcity, land and water degradation. It will also benefit human health. Building awareness and knowledge about consequences from the consumption of animal-based foods is an important step for changing sticky eating habits and making the current mass western consumers' subconscious choices conscious.

Unravelling the reasons behind existing animal-based food consumption behaviours and understanding what are the change-provoking triggers for people to be willing to embrace more sustainable new consumption habits are justifying this research. Therefore, this thesis looks at social marketing as an intervention and policy mechanism designed to meet the needs of today and related ecological, social and economic requirements of the future.

1.2 Research question

The purpose of this research thesis is to draw attention to the issues of high meat consumption and its negative socio-environmental consequences and to contribute toward filling the gap of communicating the perilous link between meat consumption and climate change. It examines ways to encourage reduction in meat consumption and active consumer behaviour change. Its research question is:

How can a behavioural change towards reduction in meat consumption can be encouraged?

1.3. Research objectives

In order to answer the research question, the thesis includes the following research objectives:

• Conduct a literature review and analyse secondary data focusing on existing meat consumption behaviours in order to understand the underlying drivers and determine whether a change towards more sustainable food consumption is possible;

• Design and conduct three surveys in order to define the main factors influencing meat consumption, namely (1) an exploratory survey; (2) a statistically representative survey of randomly selected male participants on the link between meat and masculinity; and (3) a random statistically representative three-generation survey on perceptions about the link between meat and the concept of luxury.

• Develop a social marketing methodology, model and marketing mix to encourage reduction in meat consumption;

• Investigate possible alternatives to animal-based meat and the role of marketing in promoting them as dietary replacements.

CHAPTER 2: Research Methodology

"Not everything that can be counted counts, and not everything that counts can be counted "(Albert Einstein)

Fortunately, or not, Einstein is right. Furthermore, any research results irrespective of the methodology used to obtain them are subject to subjective interpretation. Hence, the entire responsibility rests with the researcher.

The methodology used for the purposes of this research thesis encompasses a literature review, an exploratory survey and two representative surveys covering questions of quantitative and qualitative nature aimed at identifying the problems and segmenting the target audience; and exploration of social marketing and its potential to contribute towards dietary shifts. All publications which form part of this thesis include different aspects of this methodology as well as present the specifics of the individual study reported. Each paper contains a literature review section which negates the need an expanded review of background information to be presented here.

Publication 1 is based entirely on a literature review (secondary data collection method) to establish the foundation of the thesis and identify the gaps in the existing research. It allowed researching the current status of knowledge development, including any substantial findings, theoretical and methodological contributions and critical analysis of published sources of the topic of interest, namely influencing reduction in meat consumption. The gap area which presented opportunities for further exploration was identified in relation to ways and mechanisms to target the general population about its meat choices.

Exploratory research (a primary data collection method) was chosen as the most appropriate for the next stage of my research thesis, as I needed to clarify and define the problem. This method was used in Publications 2 and 3. The small-scale investigative research study allowed to analyse existing trends and attitudes towards meat within Australia's Sydney population which was deemed representative of a western type dietary consumption. Such an exploratory research intended merely to discover and tackle new problems on which little or no previous research existed (Brown, 2006, p.43). The research also opened up the discussion for possible marketing interventions. Although exploratory research is not meant to provide final and conclusive answers and solutions to existing problems, it helped in determining the research design and further data-collection (Singh, 2007, p.64; Nargundkar, 2008, p.41). These specific features are both limitations and benefits of exploratory research which drew me to select it as a methodological approach. It generated the research directions adopted for the publications to follow, particularly Publications 5 and 6.

Publication 4 built on social marketing methodologies and the exploratory survey to develop a sustainability social marketing model and marketing mix which can be used for transitioning to more sustainable behaviours. Meat consumption was used as an example for the newly developed methodological model and marketing mix.

The two statistically representative surveys form the basis of Publications 5 and 6. They were similarly questionnaire-based and conducted in Sydney with different research themes and target audiences. Publication 5 focussed on the link between meat and masculinity and interrogated only male participants, while publication 6 analysed meat as luxury and involved three generations of respondents. This approach helped gather quantitative statistical data while capturing qualitative respondent opinions represented via the participants' own words.

All surveys were conducted online using electronic questionnaires with a combination of dichotomous, multiple choice and open-ended questions. The questionnaires used the positive aspects of both structured and unstructured questions allowing description of patterns and trends, measuring of prevalence of opinions as well as also collecting rich feedback with individual insights. Open-ended questions are also beneficial as they allow for the emergence of unforeseen issues and collection of information that respondents might be reluctant to share if asked directly. The questions forming the questionnaires were unambiguously formulated and s presented in a logical order.

The design of the questionnaires allowed for a speedy data collection, with low cost requirements, and higher levels of objectivity compared to many alternative methods of primary data collection, such as interviews and focus groups. Given the high response rate (in the 80-90%), it can be suggested that the surveys were effective in data collection. Although dichotomous and multiple-choice questions allow for misreporting by selecting random answers, it is highly unlikely for this to have been the case here. There was a consistency between the answers to the three surveys and most importantly, the insights gained from the first survey used in Publications 2 and 3 were tested again in the second survey used for Publications 5 and 6. There were no time limitations during the online surveys. The respondents were not pressured to provide answers within any given time and had enough opportunity to think and respond.

Publication 7 was based on a literature review of emerging new trends related to defining meat and meat alternatives. It developed a new conceptual framework for understanding meat in the current day and age.

CHAPTER 3: Summary of Publications

The following section provides a summary of each publication submitted as part of this thesis whilst the full texts are provided in Appendix 1. Each publication contributes to the cohesiveness of this thesis as outlined in table below.

Paper title	Publication and Status	Contribution
Publication 1: "Meat myths and marketing"	In Raphaely, T., Marinova, D. (eds) *Impact of Meat Consumption on Health and Environmental Sustainability*, IGI Global, Hershey, PA, pp. 264-276 Published 2016	Whether marketing has a role to play in decreasing rather than perpetuating meat-consumption
Publication 2: "Reducing meat consumption: the case for social marketing"	*Asia Pacific Journal of Marketing and Logistics*, 29(3), 2017, 477-500 Published 2017	The reasons behind meat consumption, what motivates meat consumers and explores the opportunities of social marketing to counteract negative environmental and health trends
Publication 3: "Red meat consumption and social marketing interventions promoting appetite for change"	*International Journal of Food Engineering*, 3(2), 154-158. Published 2017	
Publication 4: "Sustainability social marketing"	In Hartz-Karp, J., Marinova, D. (eds) *Methods for Sustainability Research*, Edward Elgar, Cheltenham, UK, pp. 280-291 Published 2017	Methodology for social marketing for sustainability, using the example of influencing people's behaviour towards reduction in meat consumption
Publication 5: "What is more important perception of masculinity or personal health and the environment?"	In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 148-162	Highlights trends in perceptions of masculinity and the link to personal health and the environment

	Published in 2018	
Publication 6: "Is meat a luxury?"	In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 172-186 Published in 2018	Identifies meat as luxury
Publication 7: "New meat without livestock"	In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 344-361 Published in 2018	Develops the concept of new meat with examples for replacement or supplementing animal-based food products

3.1. Publication 1: Meat myths and marketing

Published book chapter

Bogueva, D., Phau, I. (2016) Meat myths and marketing. In Raphaely, T., Marinova, D. (eds) *Impact of Meat Consumption on Health and Environmental Sustainability*, IGI Global, Hershey, PA, pp. 264-276

Publication abstract

This chapter explores how marketing uses the creation and perpetuation of myths to reinforce demand for meat amongst mainstream consumers. It explores advertising misinformation including with regards the place of meat in our culture, its nutritional value, its association with affluence, masculinity and the benefits of small-scale production. The power of marketing is within the context of whether marketing has a role to play in decreasing rather than perpetuating meat-consumption.

Approach

Carnism, or the consumption of animal flesh, is commonly justified and rationalised through statements, such as eating meat is normal, natural, necessary (Joy, 2011) and nice (Piazza et al., 2015). Such statements are used as a psychological excuse to reconcile people's love for animals and their feeling of guilt when they consume them. They are similarly exploited in marketing campaigns funded by the livestock and related industries which aim at promoting meat as an essential element of human diets.

This paper addresses the questions whether marketing has a role to play in decreasing rather than perpetuating meat-consumption. This paper dispels some of the myths about the benefits from meat consumption, vastly supported by marketing by the livestock industry, which are implicitly and unconditionally followed by consumers in Western countries. Six of the most popular, publicised and well-established in the mainstream consumer's mind meat related myths are: "we were meant to eat meat", "meat is good for you", "real men eat meat", "meat is part of our culture", "meat is affordable" and "organic meat is much better". Using literature-based evidence, the myths are debunked from a sustainability perspective. The literature review supports the need for demystifying meat myths and discusses the need for marketing strategies to decrease meat consumption.

Findings

The chapter affirms the urgent need of exploring the justification behind people's meat consumption choices, identifying and understanding meat consumers' psychology. Avoiding

further perpetuating of marketing messages used by consumers to justify their food choices is found to be a necessary direction for future research. Recommendations are made for different kind of marketing which promotes change, including campaigns recognized by medical doctors and environmentalists, such as Meat-free Mondays and Veggie Thursdays.

The chapter puts forward the concept of turning the same power of marketing that the consumers are trapped into, to play a role in decreasing rather than perpetuating meat-consumption. This leads towards the idea of researching and proposing marketing interventions and methods that could help influencing the consumption of animal-based foods.

Contribution

For the first time meat myths are addressed as a marketing problem from a sustainability perspective. The chapter identifies common myths perpetuated in the West and debunks them using the latest scientific evidence. It also outlines the need for future research in this area and paves the road for the other publications included in this thesis.

3.2. Publication 2: Reducing meat consumption: the case for social marketing

Published journal paper

Bogueva, D., Marinova, D., Raphaely, T. (2017) Reducing meat consumption: the case for social marketing. *Asia Pacific Journal of Marketing and Logistics*, 29(3), 477–500

Publication abstract

The purpose of this paper is to explore reasons behind meat consumption. It aims to find out what motivates meat consumers and explore the opportunities of social marketing to counteract negative environmental and health trends.

An exploratory Australian survey of Sydney consumer red meat choices is used covering dietary preferences, meat eating patterns, reasons and levels of concern for economic and environmental issues. Analysis of dietary guidelines and marketing campaigns in relation to the survey findings is conducted.

The survey highlights lack of awareness about the link between meat consumption and environmental well-being; widespread inaccuracy of health messages related to meat consumption; influence of the meat industry in promoting excessive meat consumption; pervasiveness of the link between red meat consumption and national identity, social status, prestige and masculinity; and urgent need for government-supported social marketing interventions and the demarketing of meat.

Approach

The reasons behind meat consumption, what motivates meat consumers and the opportunities of social marketing to counteract negative environmental and health trends are central questions for this paper. Using a quantitative pilot exploratory study of Sydney mainstream consumers, it focusses on identifying the reasons behind the current rapidly morphed affluent countries' excessive meat consumption and defining the ones supporting or preventing more sustainable plant-based diets. The survey sample includes 132 participants, 14% of whom abstain from eating meat. This is comparable with the results reported by Roy Morgan (2016), according to which 12.4% of the Australian adults living in New South Wales (NSW) consume predominantly vegetarian food. The slightly higher (1.6%) number of vegetarians in my sample can be explained by the fact that it comprises only people who are employed or studying (hence, not on social benefits and in a position to make informed food choices) and Sydney residents considered to be more progressive than the rest of the state's population.

By including popular meat consumption issues, such as masculinity, prestige, social status and luxury, nutritional values of meat as well as consumers' degree of worry about important contemporary issues including cost of living, climate change/global warming, actions to fight climate change and red meat's impact on the natural environment, this paper portrays the drawbacks and the advantages of meat consumption reduction and offers social marketing as a solution. This finding is important, especially as little previous research on linking meat consumption with social marketing has been done in Australia, except for few but significant related aspects, such as curbing meat consumptions to secure phosphorus (White & Cordell, 2015) and livestock industry specific reports around red meat in the environment and sustainability by Meat and Livestock Australia (MLA). There are however many previous publications which examine changes in the type of animal protein consumed and purchasing habits (Wong et al., 2013), nutritional composition of red meat (Williams, 2007) among others form a neutral or pro meat perspective.

Findings

After examining the reasons behind meat eating through a Sydney exploratory study this publication concludes that consumers in Australia are still vastly unaware of the detrimental environmental aspects of meat production and consumption. The collected research evidence shows that the main arguments justifying meat consumption, namely human health and social considerations, together with the global environment, are key drivers for government-supported social marketing interventions aiming to discourage deeply rooted consumption behaviours and achieve reduced meat consumption. Social marketing interventions, including a sustainability social marketing model and public information campaigns regarding the link between meat eating and human and environmental health, can be used for behaviour change motivation. The need for further research is also highlighted in this publication.

Contribution

This is the first study to analyse the reasons behind Australia's high dietary intake of red meat and people's perceptions about this food. It also puts forward for the first time the requirement for demarketing meat and proposes the use of government supported social marketing based on the health and environmental co-benefits of reduced red meat consumption. It also framed the need for future research and rationalised the other publications included in this thesis.

3.3. Publication 3: Red meat consumption and social marketing interventions promoting appetite for change

Published journal paper

Bogueva, D., Marinova, D. Raphaely, T. (2017) Red meat consumption and social marketing interventions promoting appetite for change. *International Journal of Food Engineering*, 3(2), 154-158

Publication abstract

Increasing red meat consumption is fast emerging as a problem requiring immediate attention because of its detrimental impacts on human health, climate change and environmental sustainability. Researchers around the globe are adamant that reducing red meat consumption, especially in the Western world, and relying on more sustainable ways for protein intake, namely through plant-based products, are a better alternative. The paper presents the results from an exploratory study conducted in Sydney, Australia in 2016 which investigates consumers' reasons for meat consumption. Social marketing through a sustainability social marketing model is proposed as an effective way to tackle excessive meat consumption and encourage voluntary behavioural changes towards limiting the intake of animal foods. Parallels are drawn with other successful social marketing interventions, such as in the case of tobacco, alcohol, drug use, obesity and sun protection. The proposed model similarly aims at promoting behavioural change recognising the complexity and urgency of the problem.

Approach

High red meat intake is a significant issue across the globe and particularly for developed economies, such as Australia, United States and the European Union countries. A trend of increased animal-based food product consumption is also evident among emerging economies, including China and Vietnam. Similar to Publication 2, this paper focusses on the meat consumption motivations and reasons and looks at the power of social marketing to oppose negative environmental and health trends. It uses the results from the Sydney exploratory survey to justify the need for social marketing.

Findings

The emerged ambiguity around meat, meat consumption, health and the environment amongst the Sydney consumers indicated in the research survey shows that there is an avenue for change which must be explored further. The social marketing for sustainable food consumption could target exactly these notions.

Contribution

The paper develops a new social marketing model, namely a sustainability social marketing model as the basis for interventions to respond to the overwhelming excessive meat consumption problem in western countries. Although parallels are drawn with other successful social marketing campaigns, such as in the case of tobacco, the research outlines the complexity of influencing dietary choices. It stresses the importance of understanding the full range of reasons behind people's consumption of meat in order to mount a successful targeted campaign.

3.4. Publication 4: Sustainability social marketing

Published book chapter

Bogueva, D., Raphaely, T., Marinova, D., Marinova, M. (2017) Sustainability social marketing. In Hartz-Karp, J., Marinova, D. (eds) *Methods for Sustainability Research*, Edward Elgar, Cheltenham, UK, pp. 280-291

Chapter Introduction

Despite conclusive scientific evidence, unsustainable practices contributing to ecological and social problems continue. Although sustainability is well defined both in the academic literature and in school syllabi (Australian Curriculum, 2014), it remains a complex and abstract concept people are still struggling to understand. In 1952, the psychologist Wiebe asked: 'Why can't you sell brotherhood and rational thinking like you sell soap?' (Wiebe, 1952, p. 679). His response was that 'the audience must be forcefully motivated and clearly directed to an adequate, appropriate, and accessible social mechanism' to achieve social goods (Wiebe, 1952, p. 679). The argument that traditional marketing principles could and should be employed for the benefit of all people clearly applies for sustainability. There is no greater challenge for humanity than finding means for transitioning to sustainability; in fact, its survival may depend on this. With sustainability being the most pressing imperative for the human race, every urgent priority requires behavioural change at the individual and policy levels. Social marketing can make a critical contribution to promoting behavioural changes in the transformation to sustainability. There needs to be a specific methodology to achieve this. The chapter uses the example of food, and in particular meat consumption, to propose and outline such a social marketing-based methodology, termed a sustainability social marketing model (SSMM). The seriousness of the health and environmental problems caused by meat consumption are described first. Typically, achievement of sustainability priorities has co-benefits, such as simultaneously improving human and ecological well-being. Reduction in meat consumption is no exception illustrating the need for behavioural change. Social marketing is outlined as an approach and methodology that is successful in changing people's behaviour. As sustainability priorities have unique characteristics, a tailored methodology – SSMM – is then outlined. Concluding comments are finally provided.

Approach

New methods are required in order to transition to a more sustainable way of living and doing business. They essentially aim at changing people's attitudes, behavioural patterns and decision-making processes. This paper is designed around a theoretical question whether a social marketing approach and methodology could be successful in changing people's behaviour towards sustainability using the example of meat consumption. Social marketing campaigns have successfully motivated people to change their habits in ways beneficial for

their health and the wellbeing of others around them. The publication presents a social marketing-based methodology, named a sustainability social marketing model (SSMM) and elaborates on the idea of the use of this methodology to pursuit meat consumption reduction for human health and environmental benefits.

Findings

The chapter concludes that as social marketing has been proven effective in fostering the adoption of environmentally-friendly behaviours, it should be also productive in influencing social acceptability of reduction in meat consumption (Dagevos & Voordouw, 2013; Raphaely & Marinova, 2014). Designed to provoke and achieve greater good in health and environmental benefits for all, the new SSMM model and the new 4S (sustainability, strength, self-confidence and sharing) marketing mix presented in the chapter provides opportunity for planned behavioural and attitudinal changes.

Contribution

A new methodology for social marketing for sustainability is developed, using the example of influencing people's behaviour towards reduction in meat consumption. The sustainability social marketing model and the 4S marketing mix could be also used for other related meat-consumption issues including waste reduction, use of antibiotics and animal welfare.

3.5. Publication 5: What is more important perception of masculinity or personal health and the environment?

Published book chapter

Bogueva, D., Marinova, D. (2018) What is more important perception of masculinity or personal health and the environment? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 148-162

Publication abstract

The unnecessary question what a man is without his masculinity, is deeply ingrained into the socially established norms of strength, power, virility and machoism. Although the traditional male masculinity stereotype and its association with meat consumption are still undisputable for many "real" men, there is indication about a shift toward a new modern evolutionary masculinity which reflects more sustainability values. The chapter explores this based on a survey of Sydney men. It reveals the influence of new factors, such as environmental, health and animal welfare concerns, which shape the concept of the masculine. Meat-eating men will experience increasing pressure to defend their traditional masculinity. The Sydney study also explores the factors likely to influence Australian men to replace a meat-centred diet with more plant-based alternatives.

Approach

The study by Vranken et al. (2014, p. 104) presented a well-developed analysis of cultural differences in meat consumption. It put forward the non-linear statistical relationship between meat consumption and quality of life according to which "[i]nitially meat consumption increases with income, but from a certain point onwards higher levels of income lead to lower levels of meat consumption". Australia, however, seems to be away from such a turning point despite of the relatively high per capita income of its population. As the findings from my earlier research (included in publications 2 and 3) indicate higher meat consumption by men in Australia, this publication specifically focusses on the country's male population. The paper is based on a statistically representative survey of male Sydney residents which is aimed at exploring the deeply rooted relationship between animal flesh and masculinity, how it could be changed and what are potential drivers for such a change.

Findings

Despite the existing favouritism towards meat among Sydney men at present, the study concludes that there is clear new evidence indicating a need for redefining masculinity in relation to sustainability, health and climate change imperatives and a possible shift towards healthier and more sustainable food choices. Identifying strategies for encouraging change in

Australian men's meat consumption dietary practices in favour of quantity reduction or adoption of plant-based alternatives for health and environmental advantages are urgently required.

Contribution

Masculinity traits evolve over time and apply to different aspects of male behaviour. This chapter highlights the emerging new trends in men's perceptions of masculinity and the link with meat consumption, personal health and the environment. A parallel is drawn for the first time between practices from the past no longer considered masculine and the need to reassess the current love of meat as old-fashioned and not appropriate for the 21st century which requires more sustainable food choices.

3.6. Publication 6: Is meat a luxury?

Published book chapter

Bogueva, D., Marinova, D., Phau, I. (2018) Is meat a luxury? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 172-186

Publication abstract

Once perceived as a nutritional and occasional bonus, meat has now daily presence in the affluent West, serving human appetite for food. Although meat is not a product typically associated with luxury, its large ecological footprint poses the question whether it is time to challenge consumers' perception about animal-based proteins. The purpose of this chapter is to gain a perspective on how consumers respond to the idea of meat being a luxury product. A 2017 Sydney study investigated the concept of luxury meat and meat consumption amongst three generations – Xers, GenY and GenZ. It shows the emerging meaning of luxury goods related to meat that is sustainable, healthy and socially responsible, in response to climate change and feeding the world's population. The Sydney evidence also suggests meat is no longer essential for human health. A shift towards plant-based and new meat alternatives can create more compassionate and environmentally responsible choices.

Approach

The decision whether to consume meat is multi-faceted with many intertwined environmental, ethical, social, cultural and economic issues (Fairlie, 2010). It is also linked to historical trends and perceptions as to what is fashionable and attractive. This paper explores the question whether the Australian consumers' perceptions can be challenged toward linking meat with luxury because of meat consumption's large ecological footprint. The approach used involves a statistically representative survey based on a questionnaire targeting consumers from three generations – Xers, GenY and GenZ, to understand their attitudes towards meat consumption and potential for changes.

Findings

The chapter suggests that consumers' motivation for eating less meat in the future is most likely to be encouraged predominantly by health and cost – including paying for organic, sustainably produced, expensive cuts and gourmet meats while environmental considerations are ranked lower. The study shows a lack of understanding among the Sydney survey participants about the environmental and health impacts of meat production and consumption. However, it also reveals that the younger generations are relatively more aware of the problems and open to accepting food products which reflect their values and beliefs.

The chapter also highlights the likeliness of future livestock meat replacement with non-animal based options reflecting the new health sustainability agenda. This will bring the new luxury consumption in line with the sustainability imperatives.

Contribution

For the first time meat is identified as luxury from a sustainability point of view. The recognition by the three generation of consumers of the relationship between the meat's high ecological cost on human health and the environment is an essential indicator for the importance of further research around this issue. This is particularly significant as the examined target groups in the study are representative of the present and future consumer buying power, leading the purchasing trends where sustainability and environmentally friendly options should be and will be preferred and consciously considered.

3.7. Publication 7: New meat without livestock

Published book chapter

Schmidinger K., **Bogueva D.,** Marinova, D. (2018) New meat without livestock. In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 344-361

Publication abstract

This chapter summarizes the global problems associated with livestock production and meat consumption and shows solution strategies through replacing animal products with plant-based alternatives. The positive effects of plant-based alternatives on human health and the environment are reviewed together with approaches for reducing world hunger. Psychological strategies for nutritional transitions towards more sustainable consumption patterns and criteria for market success of meat alternatives are presented. This is followed by an overview of meat alternatives – from soy, lupine or wheat based, to bleeding burgers and artificial intelligence concepts. Marketing strategies and best practice policy suggestions complete the chapter.

Approach

Our foods are constantly changing and our dietary choices are influenced not only by what is available in the shops but also by peer pressure and convenience. Some valuable plant-based foods are resurfacing as better dietary choices with a lower ecological footprint. The chapter offers redefining and reclaiming of the word "meat" looking at meat's etymology and proposes. It encouraging the concept of "*new meat*" which is healthier for consumers and the planet and represents animal-free food choices.

This chapter also looks into the future describing novelty ideas of new meat alternatives without livestock. It presents the Stability/Energy Minimum hypothesis reflecting the conformity of the people's dominant eating behaviour based on societal, family, friends' norms, less efforts and minimum energy as constituting factors. It discusses ideas for a more sustainable diet push through introduction of stable local energy minimum of individuals willing to practice such a diet. The sustainability social marketing model and the 4S marketing mix are seen as ways contributing to the establishment of such a minimum.

Findings

Given the seriousness of the health and environmental problems associated with the consumption of animal-based products, the chapter rationalises the need for a wide social

acceptance and smooth transition towards plant-based and other meat (cultured meat and etc.) alternatives. It concludes that the success/acceptance rate will be increased if the five criteria related to taste, cost, health, shelf life and marketing are satisfied and incorporated in meat alternative products and businesses marketing efforts to promote variety and make plant-based alternatives more appealing than ever.

The 'new meat" concept infers global food scale benefits related to easing waste due to the inefficient lengthened food chain – feeding livestock prior to feeding people, and allowing elimination of world hunger.

Contribution

This chapter for the first time develops the concept of *new meat*. It also presents examples for replacement or supplementing animal-based food products. The need for further imminent research around new meat alternatives is explained together with the opportunity they create for more sustainable and healthier future for humanity.

Conclusions and future research

This thesis set to explore the research question as to how a behavioural change towards reduction in meat consumption can be encouraged. The answer it provided is that social marketing can assist in this process. In doing so, the thesis develops new knowledge that sheds light how, and why, a reduction in meat consumption may occur. It highlights the problems associated with western diets and how social marketing can be used to influence behavioural changes for the greater good. This is an area that has not been explored previously in the academic literature.

The four research objectives were achieved with: (1) thorough literature reviews incorporated in each of the seven individual publications forming the body of this thesis; (2) three surveys – one exploratory and two statistically representative, of Sydney consumers which provided the basis for the findings described in four of the publications; (3) a sustainability social marketing model was developed with a new 4S marketing mix; and (4) alternatives to animal meat-based foods were investigated with the concept of new meat put forward in the last publication included in this study.

This thesis offers a framework for transitioning to sustainability through the help of social marketing and other marketing principles which allows the implementation of interventions targeting reduction in meat consumption. If this is implemented in practice, this research will not only make a theoretical contribution but would also have practical significance in encouraging better dietary choices.

The social marketing approach developed in this thesis, including the sustainability social marketing model (SSMM) and the 4S marketing mix, can be adjusted and adapted to many other challenges related to climate change, environmental wellbeing and human health. Further research will be required to design, apply and evaluate progress with specific social marketing interventions. It will also be of interest to analyse how the government sector would react to the proposition about its role in safeguarding human health and planetary wellbeing when faced with strong vested interests from existing industries, including the livestock and meat sector.

Progress in replacing livestock-based products, and related business opportunities, is also another area of potential future research. It can cover aspects, such as technical feasibility, lifecycle assessment, public acceptance and adoption trends.

The Anthropocene is the first time in the history of the planet that its human population is significantly impacting on the Earth's ecosystems through its activities. It is also the first time that human diets are ushering existential threats and irreversible tipping points. Through social marketing, this thesis proposes one way of changing the current warning trends for achieving global benefits. This and many other approaches and solutions will need action research implementation to create hope for current and future generations.

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Publications

PUBLICATION 1

Bogueva, D., Phau, I. (2016) Meat myths and marketing. In Raphaely, T., Marinova, D. (eds) *Impact of Meat Consumption on Health and Environmental Sustainability*, IGI Global, Hershey, PA, pp. 264-276

Impact of Meat Consumption on Health and Environmental Sustainability

Talia Raphaely
Curtin University, Australia

Dora Marinova
Curtin University, Australia

A volume in the Practice, Progress, and Proficiency in Sustainability (PPPS) Book Series

Information Science REFERENCE
An Imprint of IGI Global

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Library of Congress Cataloging-in-Publication Data

Names: Raphaely, Talia, 1966- | Marinova, Dora.
Title: Impact of meat consumption on health and environmental sustainability / Talia Raphaely and Dora Marinova, editor.
Description: Hershey, PA : Information Science Reference, [2016] | Includes bibliographical references and index.
Identifiers: LCCN 2015032770| ISBN 9781466695535 (hardcover) | ISBN 9781466695542 (ebook)
Subjects: LCSH: Meat industry and trade--Environmental aspects. | Meat industry and trade--Health aspects. | Food of animal origin--Health aspects.
Classification: LCC HD9410.5 .I47 2016 | DDC 333.95/414--dc23 LC record available at http://lccn.loc.gov/2015032770

This book is published in the IGI Global book series Practice, Progress, and Proficiency in Sustainability (PPPS) (ISSN: 2330-3271; eISSN: 2330-328X)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Chapter 15
Meat Myths and Marketing

Diana Bogueva
Curtin University, Australia

Ian Phau
Curtin University, Australia

ABSTRACT

This chapter explores how marketing uses the creation and perpetuation of myths to reinforce demand for meat amongst mainstream consumers. It explores advertising misinformation including with regards the place of meat in our culture, its nutritional value, its association with affluence, masculinity and the benefits of small-scale production. The power of marketing is within the context of whether marketing has a role to play in decreasing rather than perpetuating meat-consumption.

INTRODUCTION

Myths in society, whether related to food or any other aspects of everyday life, convey particular messages. Associated with notions of morality, heroes or natural phenomena, they are stories enlivened by people who accept them as valid and meaningful guides of behaviour. Myths can be used to justify and guide beliefs and cultural practices. This acceptance may be society-wide or limited to particular groups.

Consumer behaviour is as influenced by myths as any other aspects of life and this produces a variety of conscious or unconscious responses and decisions often expressing particular worldviews, values and lifestyles. According to Geertz (in Chernus, 2012, n.p.), a myth says: "because the world is the way it is, living as we do (or ought to) is uniquely satisfying and fulfilling".

Myths often contain elements that are both true and false blending fiction with empirical facts. The more truth they hold, the more convincing they are, the harder they are to contest, and therefore the more influence they have (Chernus, 2012). Marketing often contributes to both the establishing and reaffirming of myths and in so doing, encourage certain actions that become part of accepted normative thoughts and behaviours. Consumers may think that advertising is harmless and appealing only to some. However encouragement to perform certain actions, misinformation and myths repeated often enough become part of the accepted norm and steer certain behaviours.

DOI: 10.4018/978-1-4666-9553-5.ch015

This chapter looks at marketing myths related to meat consumption. Dispelling such messages is important not only for the benefit of the individual consumer but also for the collective good because of the heavy social and ecological footprint meat consumption and production have. Through consumer behaviour, marketing myths assume a physical reality that impacts human health, social wellbeing and the natural environment. This chapter analyses several popular meat myths created or exploited by the marketing industry, including: "We were meant to eat meat"; "Meat is good for you"; "Real men eat meat"; "Meat is part of our culture"; "Meat is affordable" and "Organic meat is much better".

MYTH 1: "WE WERE MEANT TO EAT MEAT"

Hunting, domestication, killing animals, socialising and eating meat in many forms have been important components of human progress (Smil, 2002; Pobiner cited in Kasper, 2013) including our intellectual and physical growth. Scientific evidence suggests that meat consumption may have contributed to our evolutionary heritage and is linked to key characteristics that have made us human mammals with larger brains, smaller guts and developed language (Smil, 2013b; Choi, 2012; Dominguez-Rodrigo et al., 2012). Smil (2013a, n.p.) explains: "Larger brains benefited from consuming high-quality proteins in meat-containing diets, and, in turn, hunting and killing of large animals, butchering of carcasses and sharing of meat have inevitably contributed to the evolution of human intelligence… and socializing". The ability to secure meat played a major role in human evolution. With the domestication of livestock, hunting was gradually replaced by the planned slaughter of livestock (Burket, 1983). Cooking allowed humans to develop more sophisticated tastes for meat. Nowadays 70 billion animals are slaughtered each year to be consumed by 7 billion humans.

In the contemporary industrialised world we have a very simple reason to eat meat – because this is what we've been taught to do. As Joy explains: "We do not need meat to survive or even to be healthy... We eat animals simply because it is what we have always done, and because we like the way they taste" (Joy, 2011, p. 29).

The large numbers of animals raised to support these dietary habits are putting enormous stress on the environmental limits of the planet and changing its ecological balance. Researchers are increasingly calling for reduction of meat consumption, promotion of more rational meat eating (Smil, 2013a, 2013b) and flexitarian diets (Raphaely & Marinova, 2014; Verain, Dagevos & Antonides, 2015). This is not a simple task as, in addition to habit and socialisation, marketers use the interrelatedness of human evolution with eating animals to further lure and guide consumers in the direction of high meat intake.

Meat-eating behaviour is a habit developed throughout the years passed to children not only by socialisation – including parents, friends and schooling - but also reinforced by advertising. Meat myths are prominent among the cluttered messages of contemporary food marketing whether it tries to build up, change or expand present or future habits and consumer preferences. It relies on our willingness to adopt, or reject, certain behaviours. Samuel Johnson is credited with the words: "The chains of habit are too weak to be felt until they are too strong to be broken" (Esar, 1968, p. 363). The historical truth that humans had to eat meat for their survival no longer applies but the message continues to be used in marketing and it will take tremendous effort for the chains of the habit to be broken.

MYTH 2: "MEAT IS GOOD FOR YOU"

For centuries meat was seen as essential for human health but recent scientific evidence shows that a plant-based diet is "good for us and for the planet" (Stanton, 2012, p. 5). Marketing meat is not necessarily health- or nutrition-driven but mainly oriented towards selling the products. Debunking the myth that an excessively meat-based diet is good for you is a challenge as shown in the highly disputed processes surrounding the development of dietary guidelines in the EU, US and Australia where such efforts were strongly contested by proponents of the livestock and related industries.

While the medical community seems to agree that reducing "meat consumption in the human diet dovetails with dietary guidelines for increased consumption of vegetables, legumes, fruits, nuts and wholegrain products" (Stanton, 2012, p. 5), the marketing of meat continues with advertising messages in the press, on TV, radio, billboards, Internet and elsewhere portraying it as essential to human health. Diets recommending high intake of animal-based proteins, such as the Atkins, Pier Dukan or the paleo diets, are being promoted by celebrities and movie stars without their legitimacy, safety or scientific nutritional validity confirmed.

Consumption of red meat however is credibly associated with increased risk of heart disease and stroke (HSPH, 2015). Amongst others, the World Health Organization (2003), the American Institute for Cancer Research and the World Cancer Research Fund support the evidence that high intakes of meat are associated with colorectal cancer. Excessive meat consumption has also been found to be a risk factor for developing type 2 diabetes (Barnard, Levin & Trapp, 2014). Campbell and Campbell (2006) disclose many health hazards associated with meat production and consumption including the dangers presented to humans by meat-borne pathogens, bacteria and use of hormones. According to the Pew Commission (2008), the meat industry itself increases the potential for pathogen and infectious disease transfer from animals to humans, raises the risk of food-borne infections and antimicrobial resistance, and exposes workers to a number of adverse health conditions, including bronchitis and asthma. To add to the growing list, excessive meat consumption is also associated with obesity (Wang & Beydoun, 2009).

Reputable health organisations recommend limiting the intake of red meat in the human diet – to a maximum of 500 g per week (WCRF & AICR, 2007) or a maximum of 65 g per day (NHMRC, 2013). These organisations send clear messages about restricting red meat consumption because of its negative health impacts and the recommended amounts are vastly different from the consumption quantities portrayed by the myth that copious quantities of meat is good for you.

The rising popularity of more ecological diets, such as flexitarian, vegetarian and vegan diets, is linked to perceptions of these as being a more moral, ethical option (Berley & Singer, 2007; de Bakker & Dagevos, 2012) with health benefits being an added bonus. Such ethical moral motivations for meat avoidance include environmental awareness, concern about use of resources and planetary health as well as sensitivity to the suffering of other sentient beings. Food choices are thus no longer value neutral or driven only by necessity and availability (in the developed world) but have a distinctive moral component (Rozin, Homes, Faith & Wansink, 2012).

MYTH 3: "REAL MEN EAT MEAT"

The high value placed on eating meat is related to its relevance in western society as a symbol of achievement, power and domination (Fiddles, 1991). According to Ruby and Heine (2011, p. 448), throughout much of European history meat was "a staple for gentry and a rare treat for the peasants". As the middle class emerged within society the impression of growing affluence was supported by eating of meat. According to Smil (2002), carnivorousness continues to evoke strong emotions, being a nearly universal symbol of affluence, wellbeing, satiety and contentment. Considered the tip of the food pyramid (Twigg, 1983), meat also defines social status. A study by Allen (2005) shows that people aspiring to improve their social position choose high-status foods such as meat and reject the low-status fruit and vegetables.

Along with social status, different foods are also linked to gender and sexuality. Medium-rare steak is the food most associated with men and maleness (Rozin et al., 2012). Historically meat, and especially red meat, is linked to masculinity (Fiddles, 1991). It carries the image of strength, force and aggression – qualities valued in a competitive world (Twigg, 1983). Men are able to show their dominance and virility by conquering beasts (Lupton, 1996); killing and butchering is associated with positively aggressive male behavior; meat production and consumption are positively depicted as human control over nature (Baker, Thompson & Palmer-Barnes, 2002), ''power-over'' (Warren, 2000) and the ''master identity'' (Plumwood, 1993; Rogers, 2008) whose self-centred biological drives require controlled rational expression (Kheel, 2008).

According to Kimmel (1996), eating meat is a vehicle of resurrecting manhood also when traditional gender roles are challenged, such as with the broader involvement of women in the workplace. The idea of manhood continues to be overemphasized by advertising and marketing campaigns in the fast-food culture. Domino's Pizza, Burger King, El Taco and McDonalds have produced TV and billboard advertisements repeatedly suggesting that real men eat more meat and that compromised masculinity can be regained through meat consumption (Rogers, 2008). Many advertisements present another macho idea – the bigger the meat, the better. In a Burger King advertisement, a man is served a small portion in a fancy restaurant after which he leaves his date singing "I am man..." conveying the message that a real man needs more meat. In recent years marketing is specifically targeting the Millennial Generation (or Generation Y), whose spending power is expected to soon overtake that of the Baby Boomers (Moss, 2014), attempting to reach them with advertisements such as "Beef. It's what's for dinner" and "Cool 2B Real". The image of the "real man" however is not always as attractive as the (marketing) myths suggest.

Some feminist scholars (e.g. Gruen, 2014) draw parallels between the oppressive structures and values in society that affect both animals and women. According to Adams (2010), the connection between meat and masculinity goes far beyond typical sexist advertising and legitimises violence and oppression on all levels.

In contrast to the dominant belief of power, meat also symbolises death, violence, cruelty and the denial of empathy (Twigg, 1983; Adams, 2010). A study of Allen, Wilson, Ng and Dunne (2000) shows that people who rate themselves as omnivores tend to be higher in authoritarianism, prefer hierarchical structures and place more importance on power. By comparison, people who identify as vegetarians tend to value more social justice, peace and equality (Allen et al., 2000). A preference for meat or vegetarian options seems to be dependent on whether the values symbolised by the food choice fit the individual's personal principles (Allen, Gupta & Monnier, 2008).

Alongside the masculinization of meat is the feminization of vegetarianism. Rogers (2008) however points out that vegetarianism is a threat to hegemonic masculinity from people who are motivated by

concerns about the environment and/or animal rights. Many vegetarians also identify themselves as feminists because they share a similar interest in rejecting patriarchal structures and hegemonic practices in society (Kwan & Roth, 2011). Positively for some, vegetarian men purposefully abstaining from meat are perceived by others as more principled and more virtuous (Ruby & Heine, 2011) for whom emotions are also more important (Allen et al., 2000). By refusing to eat meat such groups and individuals are participating in a physical resistance against institutional power and dominance (Kwan & Roth, 2011).

In particular, food consumption is a social marker for constructing social identities and lifestyles for both meat eaters and vegetarians.

MYTH 4: "MEAT IS PART OF OUR CULTURE"

Meat eating is part of Western culture with the typical family meal and social gatherings centred on it. Sausage sizzles and meat BBQs are the norm not only at home but also for parties, school fundraisings, sporting events, concerts, birthday celebrations, weddings, elections and others. On top of meat consumption being a deeply engraved social norm and habit, various marketing techniques are constantly used to reinforce these norms and to continue to make the customer want, need and buy it. The challenge for marketers is to make the public feel comfortable with what they are purchasing – pretty pictures of grazing happy cows and freely running chickens is one of the ways to convince the consumers.

In Australia the two main players contributing to the advertising of meat are Meat and Livestock Australia (MLA), which represents the beef and lamb industry, and Australian Pork Limited, the producers owned industry supporting the Australian pork sector. To attract viewers, entertained them and make them remember the messages, everyday situations, humour, irony, music, local jargon and parodies are used in the advertisements launched by these organisations. Examples include the MLA's Australia Day lamb commercials with a "lambassador" and "Put another steak on a barbie" as well as Australian Pork's "Get some pork on your fork". Lamb in particular is being targeted at young people and promoted as representing the Australian identity, lifestyle and way of socialising (see Figure 1 and Figure 2). Chicken is also marketed as a symbol of locally produced quality food (Figure 3).

Figure 1. Fueling Australia's love for lamb:Targeting the young generation
(Authors' Own Image).

Figure 2. Fueling Australia's love for lamb: Using lamb as equivalent to eat
(Authors' Own Image).

Figure 3. Using public transport for advertising meat: a public transport bus advertising chicken meat in Perth, Western Australia
(Authors' Own Image).

The same approach is used in the TV series "The Dinner Project" and Master Chef programs which aim to inspire consumers about cooking healthy meals using beef and lamb recipes. Hundreds of cooking websites, books, special TV shows, cooking competitions, advertisements on billboards, public transport, print and digital media are an unbreakable part of the big meat propaganda machine and its chains. They not only shape Australia's culture but also flawlessly serve the purpose to engage and create loyal consumers.

The presence of meat in the Western diet is taken as a given, whereas vegetarianism and veganism are treated as practices outside of the norm and requiring explanation (Wilson, Weatherall & Butler, 2004). These social expectations are one of the main barriers to adopting a meat-free diet (Taylor, 2012) or having a meat-free meal. As Kheel (2008, p. 236) states: "Despite some evidence of increasing tolerance for vegetarians today, the pressure to comply with the norm of meat eating still operates as a powerful cultural and economic force".

In reality, both omnivorism and vegetarianism represent particular dietary choices, and the preference to include meat in someone's diet should require as much explanation as the decision to exclude it (Fiddles, 1991). Both, meat eating and plant-based options are choices based on a set of assumptions about animals, humans and the world (Joy, 2011). It is a myth that because we have eaten meat in the past we have to continue to do so in the future. Health related and environmental concerns supported by scientific evidence are creating a new culture in which meat should have an increasingly modest place.

MYTH 5: "MEAT IS AFFORDABLE"

Throughout the years the meat industry transformed itself from small and medium scale livestock farms to big industrial production enterprises (PwC, 2011). According to the United Nations report (Steinfeld et al., 2006), approximately 80% of the meat sector growth in the world is occurring through industrial livestock production. One of the main results of this industrial livestock production is that meat has become readily available and inexpensive. With this availability of cheap meat demand has grown nationally and internationally. The global transition to industrialized production resulted in the growing power of the livestock industry with consolidation continuing to increase with the demand for more meat. A handful of large corporations dominate the meat industry (in Australia, United States, Europe) with enormous facilities, feedlots and slaughtering houses.

Beef industry is Australia's largest agricultural commercial activity and the country is the second largest exporter of beef (after Brazil) and the eighth largest producer of beef in the world. In 2011, there were about 26.6 million cattle in Australia, with 91% of the total herd used for beef production and the remaining 9% for milk (ABARES, 2011). Most consumers enjoying the "affordable" price of meat are unaware that the majority of animals slaughtered for food produced in the world are raised and fattened in feedlots and increasingly smaller spaces. Similar to the US, the use of feedlots in Australia has grown significantly since the 1980s and is expected to continue to increase in the future (PwC, 2011).

Popular works (e.g. Foer, 2009) and investigative journalism (e.g. Lynn White from Animals Australia) have lifted the veil on the meat industry's treatment of animals. Whether it be overcrowding, unnatural feed which promotes physical suffering, inhumane (and sometimes ineffective) slaughtering, or many other questionable practices, contemporary factory farming has been criticized on the grounds of animal cruelty. The denial of animal suffering (an attitude more common in men) and dissociating meat products with animals (more common among women) (Rothgerber, 2013) allows ongoing widespread

promotion of meat consumption. Numerous related strategies to justify eating meat are consistently used by advertisers; advertisements about beef, pork, lamb or chicken do not show the real picture about how the animals are raised but instead include happy pastoral scenes or mouth-watering images or ready to eat foods. Companies apportion vast budgets to promote meat – Cargill, JBS and McDonalds spent respectively $1,792 million, $1,594 million and $768 million in 2011. Much smaller amounts are available for advocacy for farm animals – the largest campaigner to date being the Humane Society of the United States with $126 million (Harish, 2012).

People are being spared the truth (or deceived) not only by the extensive marketing, through use of myths, of meat products but also through the price of meat which externalises the costs of animal suffering, public health, environmental deterioration and the health of the people working in factory farms and slaughterhouses. Ongoing perpetuation of common meat myths through marketing vehicles comes with a very high price tag attached.

MYTH 6: "ORGANIC MEAT IS MUCH BETTER"

Alternative small scale and organic livestock production systems, including their marketing, lie outside the conventional mainstream way of raising animals for food production and rely on local and niche markets. They produce meat by adopting ostensibly sustainable practices that allow production without polluting the environment or depleting the planet's resources including pasture-based organic farming with small flocks and herds, minimal antibiotic use and preserving the ecosystem. Irrespective of the better conditions for raising animals in these farms, many practices in the business, including breed selection, artificial insemination, weaning of calves and ultimately slaughter, remain the same. Although the small-scale farms provide better quality meat, they face fierce competition from the mega livestock industry with cheaper prices and abundant quantities (McWilliams, 2009). The ecological footprint of these small-scale producers is also larger. For example, grass-grazing cows emit considerably more methane than grain-fed and require more land converted to pasture (McWilliams, 2009).

Many of these livestock products started to carry labels identifying them as different from the mainstream. Marketing uses such sustainability, environmental and ethical labelling as an instrument to generate demand for "good" food products (Binnekamp & Ingenbleek, 2008). On the Australian market consumers witnessed a surge of "Free-range", "Hormone free", "Humane Certified", "Organic", "Grass-fed", "Local produce" and other "better" meat options offered generally at a higher price which conscious consumers are ready to accept.

Big meat producing corporations are also using compassionate and organic ideas about humanely produced meat and animal products deploying some of these methods and labels into components of their brand. This "sustainability" trend however does not reduce meat consumption - it just makes the consumer feel more peaceful with their choice and obfuscates them from having to take any other action in relation to meat choices. According to Boyle (2012), marketing should ask people to eat less and better quality, more sustainable meat. Organic meat and sustainability labels should not lure consumers to create another meat myth perpetuating excessive an justifiable meat consumption.

CONCLUSION

Meat consumption choices are very complex and influenced by an array of factors, including stage of life, friends, entertainment, perceptions, attitudes, beliefs, knowledge, norms and values. Marketing strategies identify and understand meat consumers' psychology. Marketing messages are targeted at providing exactly what is wanted – in quantity, place and time, in order to make a profit. For many consumers, marketing created or perpetuated myths allow them to justify or explain their own behaviours and offer an excuse not to change their consumption habits. If humans do care about health, morality, environmental sustainability and the welfare of animals, a change in excessive meat consumption as well as a change in the marketing, myths and practices that underpin such high intake (especially in the western world), is urgently needed.

The chapter examined myths and marketing around eating meat. Although meat consumption has been commonplace for millennia, the relatively new imperatives of climate change, environmental deterioration, resources limits, animal wellbeing, pollution from animal agriculture and importantly, issues related to human morality are making humans reassess their dietary habits. While the meat industry pushes for consumers all around the world to eat more of its products, change is slowly staring to appear. Meat-free Mondays and Veggie Thursday campaigns endorsed by doctors and environmentalists are active in 36 countries. Foer (2009, p. 24) writes: "We have the burden and the opportunity of living in the moment when the critique of factory farming broke into the popular consciousness. We are the ones of whom it will be fairly asked, 'What did you do when you learned the truth about eating animals?' A different kind of marketing that can help a transition away from meat is needed but ultimately it remains up to us to make the personal choice whether to stop accepting the myths promoted by the livestock industry and see the bigger truth about eating animals.

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KEY TERMS AND DEFINITIONS

Advertising: Communication promoting, encouraging or manipulating the use of particular products, services or particular behaviors.

Flexitarian: A person who consumes red meat in quantities less than 455 g per week and reduces other animal protein intakes.

Myth: A story or belief that guides behavior and cultural practices with or without factual basis.

Vegan: A person who abstains from eating any animal-based product.

Vegetarian: A person who eats mainly a plant-based diet and abstains from meat and fish consumption.

PUBLICATION 2

Bogueva, D., Marinova, D. Raphaely, T. (2017) Red meat consumption and social marketing interventions promoting appetite for change. *International Journal of Food Engineering*, 3(2), 154-158

Asia Pacific Journal of Marketing and Logistics

Reducing meat consumption: the case for social marketing

Diana Bogueva, Dora Marinova, Talia Raphaely,

Reducing meat consumption: the case for social marketing

Diana Bogueva
Curtin University, Perth, Australia
Dora Marinova
CUSP, Curtin University, Perth, Australia, and
Talia Raphaely
Curtin University, Perth, Australia

Received 1 August 2016
Revised 17 October 2016
Accepted 24 November 2016

Abstract

Purpose – The purpose of this paper is to explore reasons behind meat consumption. It aims to find out what motivates meat consumers and explore the opportunities of social marketing to counteract negative environmental and health trends.

Design/methodology/approach – An exploratory Australian survey of Sydney consumer red meat choices is used covering dietary preferences, meat eating patterns, reasons and levels of concern for economic and environmental issues. Analysis of dietary guidelines and marketing campaigns in relation to the survey findings is conducted.

Findings – The survey highlights: lack of awareness about the link between meat consumption and environmental well-being; widespread inaccuracy of health messages related to meat consumption; influence of the meat industry in promoting excessive meat consumption; pervasiveness of the link between red meat consumption and national identity, social status, prestige and masculinity; and urgent need for government-supported social marketing interventions and the demarketing of meat.

Originality/value – This is the first study to propose social marketing based on the health and environmental co-benefits of reduced red meat consumption.

Keywords Australia, Sustainability, Social marketing, Meat consumption

Paper type Research paper

1. Introduction

Consumption of food provides nutrition and energy for the human body. People's preferences for food, however, are much more complex than satisfying this basic function. For example, concerns about food quality, including organic and green, are attracting significant research attention in the marketing literature (e.g. Nasir and Karakaya, 2014; Perrea *et al.*, 2014; Tan and Cadeaux, 2012). Another aspect of food is its physical base – from plant or animal origin, with the last few decades witnessing increasing global per capita meat consumption (Raphaely and Marinova, 2016).

This trend contradicts the growing body of scientific evidence confirming that consumption of animal products, and red meat in particular, is a significant contributor to escalating environmental (e.g. Steinfeld *et al.*, 2006; Goodland and Anhang, 2009; Gerber *et al.*, 2013; Eshel *et al.*, 2014) and health (World Health Organisation (WHO), 2015; Springmann *et al.*, 2016) risks. Lowering meat consumption and relying on more sustainable ways of protein intake (de Bakker and Dagevos, 2012) seem necessary. However, despite this, little research exists on what drives consumer choices and why people opt to eat red meat. Consequently no previous studies have identified the need for social marketing to deal with these burgeoning problems. Social marketing has been successful in public health campaigns, such as against tobacco (Wakefield *et al.*, 2010; Australian Research Alliance for Children and Youth (ARACY), 2012) and for sun protection (Montague *et al.*, 2001), and can play a role in reducing meat consumption. To achieve this, it is important to understand what drives people's preferences for red meat.

The aim of this study is to explore reasons behind meat consumption in Sydney, Australia. A substantiated case made for the need for social marketing to promote reduction

Asia Pacific Journal of Marketing and Logistics
Vol. 29 No. 3, 2017
pp. 477-500

1355-5855
DOI 10.1108/APJML-08-2016-0139

in red meat intake in order to achieve environmental and public health benefits is the main contributions of this research. This is accompanied with a new approach to social marketing put forward. The structure of the paper is as follows. After reviewing evidence about the link between livestock and climate change, we further investigate environmental and health impacts of meat consumption (see Section 2). Section 3 explains the research methodology of the study, including the research tool, survey validation and sample. As an exploratory study, the aim was not to pursue statistical representation but to provide insights about the attitudes and behaviours associated with red meat consumption. The survey results are presented in Section 4 and this is followed by a discussion of the main themes emerging from the study (Section 5). Section 6 puts the survey findings into perspective using current national dietary guidelines and evidence about red meat marketing in Australia. This sets the scene for the need for social marketing outlined in Section 7. Research implications from the study and its limitations are outlined in Section 8 and concluding remarks are presented in the final section of the paper which emphasises the value of social marketing for reducing red meat consumption.

2. Literature review

2.1 Livestock and climate change

The 2015 Lancet Commission's Report describes climate change as the biggest global threat to human health (Watts *et al.*, 2015). Whilst there is widespread recognition of impact and action needed to replace fossil fuels to mitigate climate change drivers, the acceptance of the contribution made by meat consumption is ominously limited (Raphaely and Marinova, 2016). Climate change, caused by high levels of anthropogenic greenhouse gas (GHG) emissions, is expected to disrupt life on earth and requires urgent action and intervention to mitigate the predicted irreparable damage to human health.

In 2006, the UN Food and Agriculture Organisation estimated livestock's contribution to global GHG at 18 and 5 per cent higher than transport emissions (Steinfeld *et al.*, 2006). Whilst this figure was later revised down to 14.5 per cent (Gerber *et al.*, 2013), the accuracy is contested for not including all emissions connected with livestock. The 2009 calculation by Goodland and Anhang (2009), based on the most complete and comprehensive analysis of all factors associated with livestock products (including emissions from the animals themselves and lost carbon sequestration from land clearing for feed production) estimates the sector's contribution to be at least 51 per cent of total global GHG emissions.

All these estimates, however, are based on a 100-year horizon for determining livestock's input to anthropogenic GHG emissions and climate change. Although widely used, the results from such calculations fall worryingly short of reality. Methane – the main GHG associated with livestock products – is not only more powerful than carbon dioxide but its biggest impact occurs in the first 20-25 years following release in the atmosphere. Consequently, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (2015) provides an estimate of the global warming potential of methane at 84 times that of CO_2 over 20 years (compared to 28 times over 100 years). Hence, on a 20-year time horizon, agriculture, including livestock, becomes the economic sector with the highest contribution to GHG emissions at 22 per cent – higher than electricity and heat production (at 17 per cent), transport (at 10 per cent) and built environment (at 6 per cent) (IPCC, 2015).

2.2 Livestock and environmental impacts

Eating meat and animal-based products is an environmentally destructive practice and choice not only causing climate change but also significantly contributing to land and soil deterioration, biodiversity loss and water misappropriation (Raphaely and Marinova, 2014). Together with climate change, fresh water shortages, land degradation, desertification, deforestation, sea level rise and increasing global hunger will ensure a growing number of

environmental refugees (Knefel, 2015; Dundas *et al.*, 2016) and will "enhance the competition for resources – water, food, grazing lands" (National Geographic Society, 2016, n.p.).

Beef production is particularly damaging. It creates approximately 12, 6 and 50 times more GHG emissions than potatoes, rice and wheat, respectively (Eshel *et al.*, 2014). Beef also requires approximately 290, 295 and117 times more land and 8, 4 and 40 times more water than potatoes, rice and wheat, respectively (Eshel *et al.*, 2014). An Oxford University study suggests that halving personal meat intakes reduces individual carbon footprints by over 35 per cent (Scarborough *et al.*, 2014). Environmentally speaking, a compelling argument thus exists for intervention to reduce red meat consumption, particularly in places where the intake of animal proteins is high such as in Australia (see Table I). These countries also have the greatest opportunities for change in dietary choices.

Widespread awareness of the impact of petrochemicals is insufficient to avert the consequences of climate change. Other major sources of GHG emissions, such as those associated with livestock also need to be highlighted. Industry has been able to reduce its impact through the introduction of clean technologies (e.g. Kemp and Volpi, 2008) and a shift towards renewable energy (International Energy Agency, 2016). Is it possible that people are also able to shift towards reduced consumption of animal products and transition towards more sustainable choices and practices? Such a transition would mitigate climate change and other environmental impacts caused by meat consumption. In order to facilitate such a social evolution, understanding what drives consumer choices is necessary.

Country/region	Beef and veal	Pork	Sheep and lamb	Poultry	Meat	Red meat
Argentina	40.4	8.2	1.2	36.5	86.3	49.8
Australia	22.8	20.3	7.4	42	92.5	50.5
Bangladesh	0.9	0	1.2	1.2	3.3	2.1
Brazil	24.2	11.2	0.4	39.4	75.2	35.8
China	3.8	31.6	3	11.6	50	38.4
Colombia	12.1	5.1	0.2	26.4	43.8	17.4
Ethiopia	2.5	0	1.3	0.6	4.4	3.8
European Union	10.8	33	1.8	22.7	68.3	45.6
India	0.5	0.2	0.5	1.7	2.9	1.2
Iran	2.9	0	3.2	23.1	29.2	6.1
Japan	6.7	15	0.2	13.6	35.5	21.9
Kazakhstan	16.9	5	8.1	16.5	46.5	30
Korea	9.6	28.4	0.2	14.2	52.4	38.2
Malaysia	5.7	6.2	0.8	41.4	54.1	12.7
New Zealand	14.5	18.1	4.4	37.8	74.8	37
Nigeria	1.7	1.1	2.4	0.9	6.1	5.2
Pakistan	6.3	0	2.1	4.4	12.8	8.4
Peru	4.7	3.3	1.2	36.8	46	9.2
Philippines	3	14.2	0.5	11	28.7	17.7
Russia	12.1	18.3	1.1	26.4	57.9	31.5
South Africa	10.7	3.4	3.1	30.6	47.8	17.2
Tanzania	4.1	0.2	1.1	1.5	6.9	5.4
Thailand	1.8	10.9	0	9.7	22.4	12.7
Turkey	8.3	0	4.1	16.5	28.9	12.4
The USA	24.7	22.7	0.4	47.6	95.4	47.8
Uruguay	46.4	14.3	5.7	13.6	80	66.4
Viet Nam	8.7	29.1	0.1	14	51.9	37.9
World	6.4	12.5	1.7	13.5	34.1	20.6

Source: Organisation for Economic Cooperation and Development (2016)

Table I.
Meat consumption per capita (kg), 2015

2.3 Livestock and human health

Ongoing scientific evidence also shows that excessive meat consumption is detrimental to human health. The 2013 Australian dietary guidelines limit red meat intake to a maximum of 455 g of lean cooked red meat per week or 65 g per day (National Health and Medical Research Council (NHMRC), 2013). This is similar to recommendations by the World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) (2007) and Harvard School of Public Health (2011). Furthermore, in 2015 the International Agency for Research on Cancer, part of the World Health Organisation, classified consumption of red meat as a Group 2A carcinogen (together with substances such as the weed killer glyphosate) – or a substance considered highly probably carcinogenic to humans (WHO, 2015). Consumption of processed meat was classified in Group 1 (together with tobacco, arsenic and asbestos) – that is a substance or product known to be carcinogenic to humans.

2.4 Social marketing for environmental and health co-benefits

Reducing meat consumption has obvious co-benefits for both, environmental and human health. Despite this, there have been very limited efforts to include livestock products in climate or environment-related policies or interventions. One reason for this is that meat consumption is a deeply rooted social practice. According to Power (2010, p. 1), "[c]hanging behaviour is notoriously challenging, and changing food habits is particularly difficult, partly because food tends to be such an emotive issue, bound up with cultural and personal perceptions of what a 'normal' diet is".

Climate scientists are calling on social science disciplines, including the field of marketing and communication, to help understand and change human behaviour (Pidgeon and Fischhoff, 2011; Phillips, 2012). Social marketing is "an approach used to develop activities aimed at changing […] people's behaviour for the benefit of individuals and society as a whole" (National Social Marketing Centre, 2011, n.p.). The internationally adopted consensus definition and platform for its activities is: "Social Marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviours that benefit individuals and communities for the greater social good" (International Social Marketing Association, European Social Marketing Association, Australian Association of Social Marketing, 2013, p. 1). Science-backed social marketing campaigns have worked. "Slip, Slop, Slap" (Montague *et al.*, 2001) and numerous anti-tobacco messages (Wakefield *et al.*, 2010; ARACY, 2012), have successfully influenced people's choices and behaviour. Similar social marketing approaches, based on understanding red meat consumption choices, are required to reduce red meat intake for the benefit of individuals and society.

This 2016 study explores red meat consumption choices amongst Sydney residents. Being the largest, most liveable and most recognisable Australian city, Sydney is an icon of multiculturalism and diversity. It is a progressive city where culture plays a major part in people's lives. The findings from Sydney may be used to inform social marketing efforts across Australia and in other countries where meat consumption is high or on the rise.

3. Research methodology

This exploratory research applies a quantitative approach through a survey of a random sample of Sydney residents. Ethics permission was obtained from Curtin University in Perth, Western Australia. The survey sample comprising adults – employed or studying, allowed exploration of the issue of food choices within a population not strongly influenced by the price of meat (be it cheap or expensive). Exploratory surveys are used for issues that are relatively new and poorly understood both, by the researcher/s and the general population being investigated. Often the problem is not clearly defined and such exploratory research helps in gaining familiarity with the issue (Shields and Rangarjan, 2013). According to the FluidSurveys Team (2014a, n.p.) "[e]xploratory research is the researcher's

tool to understand an issue more thoroughly, before attempting to quantify mass responses into statistically inferable data". The focus is on discovering insights and exploratory surveys are typically used for their value in developing marketing strategies (FluidSurveys Team, 2014b). Essentially, social exploratory research seeks to find out what is going on, how people react to particular settings, what meaning they attach to their actions and what concerns they have (Schutt, 2012). Understanding the complex issue of meat consumption requires such an exploratory approach.

3.1 Research tool

The anonymous exploratory survey was conducted in 2016 using a questionnaire covering the following five areas: demographic characteristics, such as gender, age and employment status; dietary preferences, including for how long people have adhered to a particular diet; meat consumption patterns, including frequency and size of portions; reasons for adhering to a particular diet; and the level of concern participants had in relation to common issues, such as the cost of living, climate change/global warming, red meat's cost on the environment and actions to fight climate change.

3.2 Survey validation

The validation of the survey questions was based on preliminary evaluation and assessment for adequate coverage of each area of research interest related to meat consumption and other associated issues. All questions were tested during a pilot study for feasibility, readability, consistency and dependability – whether they effectively capture the topic under investigation, namely, reasons for meat consumption, as well as for clarity of the language used. The questionnaire was checked for common errors, such as double-barreled, confusing or leading questions. Randomly selected Sydney residents were used as respondents to answer the questions based on their subjective view, private ideas and beliefs about meat consumption as well as their degree of concern about other issues, including cost of living, global warming, red meat's cost on the environment and actions to fight climate change. The coverage of the issue about meat consumption was balanced in the questionnaire with each aspect having similar and adequate representation in all included questions.

The questions in the questionnaire cover the frequency and quantity/portion size of meat consumption, associations with the word "meat", reasons behind red meat eating/not eating and degree of worrying about environmental and selected social issues. The complete structure of the questionnaire is presented in Table II.

3.3 Research sample

The survey sample comprises 132 Sydney residents. Although we were not aiming at a representative sample, the margin of error for this exploratory survey is 8.53 per cent – just above the acceptable 8 per cent at the 95 per cent confidence level. The survey was carried out electronically as Australia has a very high internet penetration at 93 per cent (Internet World Stats, 2014) and Sydney is the most technologically advanced Australian city. Out of the 200 randomly selected Sydney residents who were invited to participate, 132 completed the online questionnaire generating a response rate of 66 per cent (Surveygizmo, 2016 estimates the average response rate at 10-15 per cent). This high response rate from a relatively small sample indicates the level of interest people have in the issues related to food and eliminates concerns about non-respondent bias.

The sample has an almost equal gender representation – 51 per cent males (67 men) and 49 per cent females (65 women). Adults of the age 18 and above were approached for the survey. The majority of the respondents (85 per cent) were between 21 and 50 years of age and the

No.	Question	Answer
1.	How long have you been living in Australia?	Free answer
2.	Gender	Male/female
3.	Do you eat red meat?	I do not eat red meat Less than twice a week Twice a week Three to five times per week Every day
4.	What associations do you make when you hear the word "meat"?	Free answer
5.	How worried are you personally about Global Warming?	(a) Very worried (b) Worried (c) Not worried (d) No opinion
6.	How worried are you personally about red meat's cost on the environment?	(a) Very worried (b) Worried (c) Not worried (d) No opinion
7.	How worried are you personally about the cost of living?	(a) Very worried (b) Worried (c) Not worried (d) No opinion
8.	How worried are you personally about action to fight climate change?	(a) Very worried (b) Worried (c) Not worried (d) No opinion
9.	What quantity of red meat do you eat?	(a) None (b) Eat up to 150 g red meat a day (c) Eat between 150 g and 300 g red meat a day (d) Eat more than 300 g red meat a day
10.	What are the reasons for you to eat or not to eat red meat?	Animal welfare Health (healthy and natural food) Religious/cultural reasons Environmental reasons Economic (availability and price) Social status Prestige food Symbol of masculinity Essential for weight loss diet Meat as cause for diseases Other: (free answer)
11.	Please elaborate on the reasons for you to eat or not to eat red meat	Free answer

Table II.
Questionnaire

achieved education with the exception of the three high school students was at least at vocational tertiary educational level (referred to in Australia as technical and further education or TAFE). Hence, the sample comprises educated people in a good position to inform the issue of meat consumption. Table III presents the general description of the sample.

4. Results

This exploratory survey did not pro-actively try to solicit participants who adhere to different diet styles. The sample was randomly selected from a large database of Sydney residents with the only eligibility criterion applied being to be employed (98 per cent of the sample) or engaged in full-time studies (2 per cent of the sample). The key survey results in relation to dietary preferences and the main reasons for consuming meat are discussed below.

Age group	Female	Male	Level of education achieved	Employment status	Total	Share of the sample (%)
18-20 yrs	3	3	High school	2 × students 4 × paid employment	6	5
21-30 yrs	15	23	High school, TAFE, university	37 × paid employment 1 × student	38	29
31-40 yrs	24	20	TAFE, university, post graduate	44 × paid employment	44	33
41-50 yrs	12	19	TAFE, university, post graduate	31 × paid employment	31	23
51-65 yrs	6	2	TAFE, university, post graduate	8 × paid employment	8	6

Table III. Description of the sample

4.1 Dietary preferences

Table IV summarises the eating habits of the survey sample as reported by the participants. Overall, 86 per cent (or 114 people) were consuming red meat while the other 14 per cent (or 18 people) were not.

The behaviour of the Sydney sample matches the meat consumption data (see Table I) which indicates high prevalence of red meat in the food choices of Australians. It also seems comparable to other western populations. Direct comparisons, however, are difficult because most other studies look at meat consumption overall, rather than just red meat. For example, a Dutch study (Dagevos, 2014) found a much higher prevalence of meat in people's dietary choices (only 5 per cent abstained from meat and 18 per cent consumed meat everyday) than in the Sydney sample but this also included chicken. Poultry is also very popular amongst Australian consumers ranking second after red meat (Australian Bureau of Statistics (ABS), 2016 and Table I) in the intake of foods from the dietary group described as "lean meat and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans" (NHMRC, 2013). As the environmental and health impacts of poultry are relatively smaller, this study focussed only on red meat.

4.2 Reasons for abstaining from meat

There were different reasons stated for avoiding red meat (see Table V), mainly concerns about animal welfare and personal health. Religious reasons were stated by two participants and economic unaffordability by one. Environmental concerns were not listed by any of the participants who abstained from red meat.

Red meat consumption frequency	Females	Males	Total	Sample (%)	Quantity per day
Every day	2	7	9	7	More than 300 g
Three to six times per week	17	34	51	39	29 participants (14 female and 15 male): more than 300 g 22 participants (3 female and 19 male): up to 150 g
Twice per week	30	16	46	35	7 participants (5 female and 2 male): more than 300 g 39 participants (25 female and 14 male): up to 150 g
Less than twice per week	8	0	8	6	8 participants (8 female): up to 150 g
Abstaining from meat	8	10	18	14	18 participants (8 female and 10 male): 0 g
Total	65	67	132	100	

Table IV. Red meat consumption frequencies

4.3 Reasons for meat consumption

Table VI presents the reasons stated by the participants for their current levels of red meat consumption. The two most popular reasons are: meat is good for your health, including for weight loss (47 per cent of all meat eating participants) and eating meat is an expression of strength, masculinity, social status, prosperity and prestige (30 per cent). Further reasons include animal welfare, family, religious and other beliefs (12 per cent) and economic affordability (6 per cent). There were four people (3 per cent of the sample and 4 per cent of the meat eating participants) who consider the negative health impacts of excessive meat consumption in their dietary preferences and only 1 person (0.76 per cent of the sample and 0.9 per cent of the meat eating participants) whose food choices are influenced by environmental concerns. This indicates that despite the clear scientific evidence, the messages about environmental and human health co-benefits of reduced red meat consumption are not having a big impact on the wider population or people's dietary choices.

4.4 Concerns about popular issues

In addition to dietary choices, the Sydney participants were asked about their concerns in relation to issues frequently discussed in the media such as the cost of living, climate change/global warming and actions to fight climate change. They were also asked whether they were worried about red meat's impact on the natural environment. The responses are summarised in Table VII.

The cost of living attracted the largest share of worried people – a total of 90 per cent of all respondents (see Table VII). By comparison climate change and actions to combat climate change drew 56 and 81 per cent of worried people, respectively. The share of people worried about red meat's impact on the natural environment was similarly high at 69 per cent (see Table VII). These figures indicate there seems to be some awareness of

Table V.
Reasons for not consuming red meat

Reason	Females	Males	Total
Animal welfare	5	5	10
Health concerns	2	3	5
Religious and cultural reasons	2	–	2
Economic affordability	1	–	1
Total	10	8	18
Sample (%)	8	6	14

Table VI.
Reasons for consuming red meat

Reason	Females	Males	Total	% of meat consumers
Meat is good for human health, including weight loss	32	22	54	47
Eating meat is a symbol of: strength, masculinity, status, prosperity and prestige	10	25	35	30
Religion, family and other	4	6	10	9
Animal welfare considerations	3	0	3	3
Economic affordability	3	4	7	6
Excessive consumption of red meat causes disease	3	1	4	4
Red meat consumption negatively affects the environment	0	1	1	1
Total	55	59	114	100
Sample (%)	85	88	86	–

Issue	Level of concern	Number of participants	Sample (%)
Cost of living	Very worried	75	57
	Worried	44	33
	Not concerned	12	9
	No opinion	1	1
Global warming/climate change	Very worried	20	15
	Worried	54	41
	Not concerned	41	31
	No opinion	17	13
Actions to fight climate change	Very worried	44	33
	Worried	64	48
	Not concerned	18	14
	No opinion	6	5
Red meat's impact on the environment	Very worried	32	24
	Worried	60	45
	Not concerned	33	25
	No opinion	7	5

Table VII. Concern about popular issues

environmental consequences from red meat consumption. However, as indicated by the preceding data, this is not reflected in people's dietary choices showing a gap between awareness and behaviour.

In order to quantify the participants' responses and compare them, we assigned a value to the levels of concerns, namely: 3 for "very worried", 2 for "worried" and 1 for "not concerned" (see Table VIII). With those who did not express an opinion eliminated from the sample and the weighted averages calculated, Table VIII represents the relative importance of the issues assigned by the participants in this study. Cost of living (at 2.5) is the issue attracting the highest levels of concerns; followed by concerns about the actions taken to fight climate change (at 2.2), the impact of red meat on the natural environment (at 2) and climate change/global warming (at 1.8). Hence, overall the Sydney participants were worried about red meat's impact on the environment but again, this did not reflect in their dietary choices. Other reasons prevailed. This is discussed below using excerpts from the Sydney questionnaires and previous research around red meat consumption.

5. Discussion

The survey asked participants to describe their associations with the word "meat". No negative associations were recorded by the meat-eaters. Taste and health associations feature very strongly (see the list below). Many participants indicate their love of the taste of meat and enjoyment of eating it with descriptions, such as "juicy", "delicious" "bloody steak", "mouth-watering" and "comfort". Health-related descriptions include references to: "iron", "protein", "staple dietary requirement", "energy" and "goodness". These associations are very powerful consumption motivators and are unlikely to change easily. Innovative social marketing approaches are required to reduce meat's appeal.

Issue	Importance	Number of participants with an opinion	Share of survey sample (%)
Cost of living	2.5	131	99
Actions to fight climate change	2.2	126	95
Red meat's impact on the environment	2.0	125	95
Global warming/climate change	1.8	115	87

Table VIII. Importance of the concern about popular issues

Associations with the word "meat" (as cited by participants):

(1) Health benefits

- protein, meal basis, staple dietary requirement;
- food, protein, nourishment, healthy;
- full with goodness;
- healthy food with iron in it;
- protein, food, sustenance, sustainability;
- beef, iron, steak, blood, energy; and
- hunger, comfort, iron.

(2) Taste preferences

- mouth-watering, sizzling, steak;
- delicious and expensive;
- I'm a carnivore. I love meat – chicken, lamb, beef, pork […] Meat is my life, seriously;
- soft, red, juicy bloody meat, bloody steak;
- family dinners, BBQs with friends, satisfying meals; and
- affordable, filling, treat, enjoyable, BBQ.

As indicated earlier, the two main reasons for meat consumption emerging from the survey are: meat is good for your health, including for weight loss, referred to henceforth as meat and well-being; and eating meat is an expression of strength, masculinity, social status, prosperity and prestige, referred to henceforth as meat and power. These are further explored below followed by a discussion of the co-benefits of red meat reduction.

5.1 Meat and well-being

The survey shows that Sydney residents overwhelmingly are convinced about the health benefits of consuming meat. No explicit recognition is evident about the role advertising and the media play in influencing perceptions.

Meat and well-being: reasons for eating meat (selected excerpts from the survey):

- meat is a great source of everything you need to be healthy;
- it gives me proteins, iron, all the goodness I need;
- meat is very nutritious and it is helping me balance my diet and lower my body weight;
- red meat gives lots of iron and good proteins;
- because my GP said I need to eat (meat) at least once a week for iron and B12 which I lack;
- for health reasons I eat lots of meat. It is healthy for the humans and for the environment;
- I eat because of iron deficiency, but in limited amounts, because I think it is contributing to carbon emissions;
- I am disgusted by the taste, but otherwise it is healthy and very popular;
- I believe I am more relaxed and concentrated because red meat is making humans more intelligent;

- I am really sorry for the animals we slaughter for our food, but at the same time I want to stay healthy; so this is why I have to eat meat and to be honest I enjoy it;
- helping me reduce my body mass because I have high blood pressure;
- it is healthy and natural. I do not believe the rubbish they say that red meat causes high cholesterol, high blood pressure, heart disease, and obesity. It is all propaganda;
- red meat is healthy and smells good. It is delicious to experience on your palate. Plus all the celebrities eat meat and salad to maintain their body shape;
- why should we need a reason to eat meat?! It is tasty and healthy and nutritionists and the media recommend it; and
- I feel satisfied and not hungry all day long when I eat meat.

Despite all research evidence regarding red meat's harmful effect on the human body and the environment, people still seem to believe it is essential for health and well-being. This is the overwhelming impression from the survey participants. Two major factors are influencing this: nutritional advice which wrongly or unnecessarily promotes red meat as a healthy choice (e.g. Russell, 2009), and aggressive marketing campaigns by the livestock sector and related industries which promote meat (Bogueva and Phau, 2016). It is thus not surprising that survey participants view meat as a valuable source of iron, vitamins, nutrients and minerals.

An important finding is that many participants say recommendations by health professionals influence their choice. This highlights a gap in professional knowledge despite strong scientific evidence about healthier ways of providing the nutrient intake necessary for the human body through a plant-based diet (e.g. Stanton, 2012; Doran-Browne *et al.*, 2015). The need for disseminating the latest research results through visible convincing communication at all levels and across society, including professional development and social marketing, is clear.

Another popular argument for meat consumption is that it facilitates weight loss. It builds on the fact that obesity has reached enormous proportions in the developed world, including Australia (Ng *et al.*, 2014). Diets, such as paleo, often endorsed by celebrities, propagate the belief that high consumption of red meat is the best way to achieve or maintain a healthy weight. Commercial marketing perpetuates such messages and hence, study participants refer to red meat helping them "maintain their body shape" or "lower […] body weight" (see Meat and well-being: reasons for eating meat (selected excerpts from the survey)). Such arguments ignore or misrepresent information available from prestigious longitudinal studies, such as the European Prospective Investigation into Cancer and Nutrition (Riboli and Lambert, 2002; Rohrmann *et al.*, 2013) and the Seventh Day Adventists Health Study (Orlich *et al.*, 2015) which confirm the benefits of plant-based diets.

Some participants exhibit cognitive dissonance in reasoning justifying meat eating practices with their answers. The following quotes are examples of such confusion: "I am really sorry for the animals […], but at the same time I want to stay healthy" and "I am disgusted by the taste, but otherwise it is healthy […]" (see Meat and well-being: reasons for eating meat (selected excerpts from the survey)).

The results from the survey show the impact of misrepresentation and marketing which conceal the true health-related and environmental costs of animal-based foods. Consumers' views reflect the marketing messages of the livestock industry and the global meat sector aggressively pursues its commercial interests by encouraging high consumption of animal-based products. According to the Pew Commission's inquiry into industrial farm animal production, there is "significant influence by the industry at every turn – in academic research, agriculture policy development, government regulation, and endorsement" (Pew Commission on Industrial Farm Animal Production, 2008, p. viii).

For example, Meat & Livestock Australia (MLA) regularly funds research which promotes the industry's image and encourages people to think positively about the meat they buy and eat. This includes research demonstrating "improvements" in the Australian beef industry's environmental performance based on increased productivity through intensive farming with feedlots and a grain diet (Wiedemann *et al.*, 2015). In a similar way, the American beef, pork and dairy industries sponsor research on the benefits of animal proteins for public health (e.g. Protein Summit 2.0, 2015). The animal products industry regularly contributes large amounts to political party candidates (Zaraska, 2016) to influence government policies.

Australians on average consume amounts of red meat much higher than the nutritional guidelines' limit (Australian Bureau of Statistics (ABS), 2014), yet the MLA continues to stress that "many women and girls are not eating enough red meat" (Meat & Livestock Australia, 2016b, n.p.). The survey shows that 75 per cent of the female participants and 81 per cent of all respondents consume red meat at least twice per week (see Table IV). Furthermore, science confirms humans do not need to consume meat at all. At the expense of public health and environmental well-being, the meat industry in Australia, the USA, other western countries and in fast developing nations like China, invests in advertising to promote and expand markets (Bogueva and Phau, 2016) encouraging consumers to eat more meat, not less.

5.2 Meat and power

Eating meat was described by Sydney survey participants as expression of strength, high social status, prosperity and prestige, with an emphasis on masculinity and social aspects (see the list below).

Meat and power: reasons for eating meat (selected excerpts from the survey):

(1) Masculinity (as cited by participants)

- it is a manly thing to eat meat;
- it is a masculine thing. Man eats meat because it shows you are the man;
- men eat meat, women eat veggies;
- red meat gives […] lots of strengths;
- meat is protein and protein is muscles;
- red meat is good for your body and for your stamina;
- eating meat is for men going out for chicks;
- all real men like me love eating meat, so do I. It is more than simple enjoyment. It is like orgasm;
- humans eat meat, because they dominate the planet;
- it gives me power and makes me an iron man; and
- it is natural for humans and men particularly to eat meat. It is what we are meant to eat.

(2) Social aspects (as cited by participants)

- eating meat is super when gathering with family and friends;
- I adore nice juicy steaks, especially when gathering with family and friends;
- BBQ with friends, socialising and having fun while eating freshly cooked meat;
- love eating and socialising. Everybody likes rich, mellow steak;

- it is common people you visit to serve meat and you have to eat not to be rude to them and respect their effort to cook for you;
- it is part of our Aussie culture;
- Take a meat on your fork is what a real Aussie does;
- (I) cannot afford buying good cuts (but) even I was raised with lots of BBQs and I am used to it;
- because it was so expensive to have meat in my country I really enjoy it here in Australia;
- meat is essential for me, because I can afford to buy it as much as I want;
- even I was vegetarian most of my life now I eat meat because it shows who you are amongst your friends and socially; and
- I buy expensive quality cuts and I really enjoy them.

Historically meat is associated with strength and power – two features attributed to males (Twigg, 1983; Adams, 2010; Potts and Parry, 2010). Only one female participant referred to meat eating as a symbol of strength. In total, 15 male participants directly linked meat consumption with manhood, power and virility, explicitly connecting it with attributes of the male sexuality and sex drive: "it is good for your stamina" and "eating meat is for men going out for chicks" (see Meat and power: reasons for eating meat (selected excerpts from the survey)).

An extension of the perception of strength is the popularly assumed link between muscles and meat: "meat is protein and protein is muscles" (see Meat and power: reasons for eating meat (selected excerpts from the survey)). Popular media, such as the *Men's Health Magazine*, promote muscle-building meat-based diets (Stibbe, 2004). This makes animal products similarly attractive to females who want to be fit and strong. Many marketing campaigns exploit the connection between meat and strength. Examples include Burger King's "I am man" advertisement and MLA's "You're better on beef".

Furthermore, not consuming meat is often perceived as compromising masculinity and male gender identity (Sobal, 2005; Gal and Wilkie, 2010). All male participants who embrace meat as a symbol of strength and masculinity report that they consume meat daily or at least three to five times a week. Given the link between meat consumption and cancer (confirmed by WHO, 2015), researchers are turning to psychology to understand why men would rather compromise their health than be associated with feminine attributes perceived to be manifested through a vegetarian diet (Rousseau, 2016). In the words of a Sydney participant: "Men eat meat, women eat veggies" (see Meat and power: reasons for eating meat (selected excerpts from the survey)). Women contribute to the reinforcing of this stereotype by favouring meat eating men (Ruby and Heine, 2011).

Advertisements currently used by companies such as Burger King, Del Taco, Jack in the Box, Quiznos and TGI Fridays, "articulate the oppositions of men's versus women's food" and also "oppose contemporary movements towards less meat-centred diets, diets motivated in part by concerns over animal rights and environmental sustainability" (Rogers, 2008, p. 282). Only one Sydney participant expressed the opinion: "We are eating far more meat in Australia that we need".

Meat consumption has central stage in the Australian culture. Many survey participants associate meat with social activities, such as BBQs, family gatherings and parties: "Eating meat is super when gathering with family and friends" and "Love eating and socialising. Everybody likes rich, mellow steak" (see Meat and power: reasons for eating meat (selected excerpts from the survey)). Australian identity is linked to eating red meat: "It's part

of our Aussie culture" or "Take a meat on your fork is what a real Aussie does. I love my meat!" (see Meat and power: reasons for eating meat (selected excerpts from the survey)). According to Twigg (1983, p. 22), in western societies meat "is the centre around which a meal is arranged. It stands in a sense of the very idea of food itself". Advertisements, such as MLA's 2016 Australia Day Lamb: Operation Boomerang, reinforce this meat-based culture concealing the widespread local and global population health and environmental consequences.

As a major part of social gatherings, meat is highly endorsed in the social "hierarchy" of foods (Allen and Ng, 2003), affecting the public image of the host. While in the past, consumption of meat was associated with human superiority over nature and with social status – commonly attributed to the leading males within society (Rozin, 2010), nowadays in Australia it signifies prosperity. Meat's prestige is linked with success: "Meat is essential for me, because I can afford to buy it as much as I want"; "Even I was vegetarian most of my life now I eat meat because it shows who you are amongst your friends and socially" (see Meat and power: reasons for eating meat (selected excerpts from the survey)).

The findings of the Sydney survey reveal reasons for meat consumption comparable to earlier studies. This includes: perceived healthiness (Van Wezemael *et al.*, 2010; de Bakker and Dagevos, 2012), enjoyment in consumption (Lea and Worsley, 2003) and perceived symbol of power, status and masculinity (Rozin, 2010; Ruby and Heine, 2011; Rozin *et al.*, 2012; Rothgerber, 2013). Deeply entrenched perceptions, beliefs and behaviours need to be changed. Social marketing can contribute towards dismantling the appeal of meat. "Demarketing" meat – namely, banning advertising in order to decrease meat's presence and profile (similarly to the demarketing of cigarettes in Australia) – is an important approach.

5.3 Co-benefits of meat reduction

A 2016 study by Oxford University (Springmann *et al.*, 2016) assessed the dual health and environmental benefits (or co-benefits) of reducing animal-based products in the human diet, examining vegan, vegetarian and healthy (with meat consumption within the dietary guidelines) dietary options. The authors conclude that Western high-income countries, including Australia, gain the most co-benefits on a per capita basis. Furthermore, a transition by 2050 to "more plant-based diets that are in line with standard dietary guidelines could reduce global mortality by 6-10% and food-related GHG emissions by 29-70%" compared with a non-changing scenario (Springmann *et al.*, 2016, p. 4146).

It appears that the 47 per cent of the Sydney participants whose meat consumption is motivated by health considerations (refer to Table VI) are not getting informed medical advice and instead are exposed to misleading messages. Similarly, the high number of participants concerned about climate change and actions to combat climate (see Table VII) are not focussing their attention to the full spectrum of causes. They ignore possibly the largest contributor to global warming, namely, meat consumption. Economic concerns represented as the cost of living are also extremely high on the agenda of Sydney participants (see Table VII). The same Oxford study identifies large economic benefits from improving people's diets "equivalent to 0.4-13% of global gross domestic product (GDP) in 2050" (Springmann *et al.*, 2016, p. 4146). Meat and animal products should be included in sustainability policy and dietary guidelines to pro-actively promote reduction and plant-based alternatives in order to achieve public health and environmental co-benefits.

6. Current dietary guidelines and red meat marketing in Australia

The latest Australian dietary guidelines (NHMRC, 2013) are unambiguous in limiting the consumption of red meat. This is in line with other prestigious health bodies, such as WHO (2015). Surprisingly, the meat industry itself purports to support these guidelines. The MLA's Guide to Healthy Meals suggests limiting red meat intake to "650 g/week, raw weight"

(Meat & Livestock Australia, 2015c, p. 6) which is approximately the equivalent to 455 g/week of cooked red meat (Glasser, 2015). MLA also states its commitment to nutrition by supporting "consumption of 455 g/week of cooked red meat in palm-sized portion sizes, three to four times a week, as part of a healthy, balanced diet consistent with the Australian Dietary Guidelines" (Meat & Livestock Australia, n.d., n.p.). It has even developed a Healthy Eating Guide for different age groups (Meat & Livestock Australia, 2015b) including the lower meat amounts required for children under nine and for older adults. However, this needs to be interpreted with a lot of scepticism because of MLA's extensive advertising and meat promotion which constantly bombard consumers and whose messages are inescapable through overt and subliminal aggressive marketing.

Moreover, the MLA's Fast Facts website claims that Australians consume "57 g/day of beef, lamb and pork […], defined as 'red meat' in the Australian Dietary Guidelines" (Meat & Livestock Australia, 2015a, n.p.) referring to the 2011-2012 Australian nutritional survey (ABS, 2014). This creates the impression that the intake is lower that the Australian Dietary Guidelines' limit of 65 g/day or 455 g/week. However, this is misleading because: the MLA mean red meat intake covers all Australians older than two years old but consumption by children in younger age groups (who eat much less meat) brings down the overall per capita average which misrepresents adult consumption; and in addition to the mean intake of 57 g/day of unprocessed red meat, Australians also eat 25 g/day of processed meat (sausages, ham, bacon, luncheon meats, salami and other fermented meats, frankfurts/saveloys, canned meat and nuggets). Despite WCRF/AICR (2007) and NHMRC (2013) warning against this and advising processed meat be avoided and limited, Australians are consuming large quantities of processed red meat making their total mean red meat consumption 82 g/day per person – higher than the caveat of the Australian Dietary Guidelines. Popular social and fundraising events such as sausage sizzles, Australia Day barbeques and meat-based picnics are continuingly entrenched in the Australian culture irrespective of their negative health impacts.

In response to the Australian Dietary Guidelines' "caveat around meat consumption […] due to the association of red meat to certain cancers when consumed in large amounts" (ABS, 2016, p. 34), the Australian Bureau of Statistics assessed Australians' 2011-2012 red meat intake and concluded (ABS, 2016, p. 34):

> Taking account of all red meat (including all non-discretionary, lean, discretionary, higher fat and processed varieties), the weekly consumption of red meat by Australians was estimated at an average 565 g – 24% higher on average than maximum suggested by the Guidelines. The age group with the highest total consumption of red meat was 14-18 year olds who averaged 625 g per week or 37 per cent higher than the maximum suggested by the guidelines.

Given these facts, one would expect interventions to protect public health by encouraging reduction in red meat consumption. This, however, has not been the case to date. On the contrary, the meat industry is left free and uncontrolled to promote its products. The MLA states on its website that it is "working in collaboration with the Australian Government and wider red meat industry […] to deliver value […]", including through marketing services, "to Australia's red meat industry" (Meat & Livestock Australia, 2016a, n.p.). As a result of this government–meat industry powerful alliance, marketing in Australia is bombarding consumers with pro-meat advertising.

An example, as mentioned, are the Australia Day advertising campaigns using media celebrities and the "Lambassador" and young generation values messages as diversity (MLA spring advertisement "We love our lamb") which aim to increase lamb consumption framing this as a way to conform with the national identity and support Australian economic growth. Another example is the MLA's "You're better on beef" campaign rolled out across all possible platforms, including national radio, TV, in-store advertising, social media, online and mobile digital, outdoor advertising, editorial, advertorial and podcast content. This marketing

is highly pervasive and its messages are spread not only in the media, but also through politics, government, educational and health institutions. The results of the Sydney exploratory survey confirm this perfidy – only 4 per cent of the participants were aware that excessive meat consumption impacts negatively on human health while 15 per cent indicated that they have even received medical advice to increase their red meat intake. The main reasons for meat consumption stated by the respondents, namely, health and social considerations, demonstrate that the aggressive pro-meat marketing is working.

Despite climate change being identified as the biggest threat to population health (Watts *et al.*, 2015), Australia's Dietary Guidelines do not make the connection between meat consumption and negative environmental impacts. In fact, attempts by Doctors for the Environment Australia and researchers to include this link in an appendix to the 2013 Guidelines were violently opposed and stopped. Unsurprisingly, the survey results show only 1 per cent of the Sydney respondents being concerned about the climate change – meat link.

The livestock industry subordinates its enormous contribution to pollution and other environmental degradation and instead exploits social symbolisms of strength and masculinity in its commercials. The majority of these campaigns explicitly link meat eating with stereotypical masculine realms. Roth (2016) describes this as toxic masculinity – a way patriarchy dominates over and hurts women, billions of sentient animals, the ecology of the planet as well as damages men. This is clearly visible in the 2016 MLA advertising campaign "Commence operation: Boomerang" – the mission to bring Australians from abroad for BBQ lamb on Australia Day. The advertisement targets male ex-patriates by reinforcing the stereotype for a new generation of machos meat-eaters and negating the right not to consume red meat. In the advertisement vegans are "rescued" and given the opportunity for national participation and redemption through eating lamb.

No scientific confirmation that the human body needs meat exists while there is ample evidence of the health and environmental benefits of plant-based diets. Community-based meat-free initiatives and academically supported flexitarianism (e.g. de Bakker and Dagevos, 2012; Dagevos and Voordouw, 2013; Raphaely *et al.*, 2013; Dagevos, 2014; Raphaely and Marinova, 2014; Verain *et al.*, 2015a) are building momentum around the globe. However, social marketing and the demarketing of meat can speed up the process. As the survey results confirm, this is particularly important given the narrow window of opportunity to deal with climate change and the ever-increasing global burden of non-communicable diseases, such as cancers, diabetes and obesity.

7. The case for social marketing

Given the pervasiveness of meat consumption within Western culture, and Australian society in particular, any changes in current attitudes and behaviours without strong social marketing interventions are unlikely to occur. The survey results show that the choice to eat meat is not entirely rational but caused by a mixture of emotional, social and nutritional messages. Although this may well be the case with the consumption of any other food, none is as devastating to the environment as meat is.

In addition to physical and physiological needs, humans satisfy a wider range of social, cultural, aesthetic, symbolic, moral, health-related, environmentally appropriate, religious and spiritual values through the food they eat. Irrespective of this, eating is in its essence a very basic activity which also expresses individual freedom of choice in places where such liberties are possible, including Australia. The complexity of contributing aspects makes changing red meat consumption behaviours, attitudes, values, habits and patterns extremely difficult. Understanding red meat consumption choices within a broad social-cultural frame opens possibilities of exploring and developing new potential pathways for social marketing interventions towards environmentally better diets. The health co-benefits increase the imperative of taking reduction of meat consumption into the public political and policy domain.

So far in Australia, there seems to be some understanding of the government's health-related responsibility as manifested through the red meat consumption caveat in the Australian Dietary Guidelines, but no acknowledgement of environmental impacts. Contrary to protecting the public good, the government is complicit in contributing to destruction of human and environmental health (Russell, 2009) by supporting the livestock industry. Rather than safeguarding public interests, the political and policy domain facilitates food choices shaped by alliances with commercial interests of health professionals and industry bodies, such as MLA, and uses the powers of marketing via the new emerging technological opportunities, information and networking channels including internet, Facebook and social media.

Whether marketing is viewed in "the old sense of 'pushing' products or in a new sense of 'customer satisfaction engineering' " (Kotler and Levy, 1999, p. 37), it remains a pervasive societal activity which affects everyday lives and especially consumer choices. This space is now colonised by messages that market meat, making the task of social marketing even more difficult. Such marketing for the social good will not only have to combat established consumer choices but also change learned behaviour and demarket meat. Government support is essential for success and this requires decoupling its shorter-term roles of promoting economic growth of the livestock industry from its wider responsibility of safeguarding public and environmental health.

This research also identifies the need for parallels with the role of government in relation to other originally sensitive and controversial issues, such as plain cigarette packaging (Australian Government, 2016), obesity control (New South Wales Government, 2015) and anti-drinking campaigns (Do not turn a night out into a Nightmare, Australian Government, 2008). These are all based on protecting public health and their success has affected the social and economic status quo of detrimental business activities.

Effective social marketing interventions need to be consumer-driven and constructed on an understanding of choices, experiences, values and needs (Andreasen, 2002) and the results from the Sydney survey provide important insights about these aspects. In the words of Zaraska (2016), "we should […] become aware of meat's many meanings – only then can the hooks be released one by one" (Morley, 2016, n.p.).

8. Research implications and limitations

8.1 Research implications

This exploratory study of consumer preferences for meat bridges the gap between theory and practice and has practical implications in offering avenues for exploring social marketing initiatives. A transition to more plant-based diets because of health and environmental reasons requires changes in public attitudes towards the place of meat in human diets. Social marketing interventions can be developed and implemented at a strategic – policy making, and operational – individuals, level (Hopwood and Merritt, 2011) in order to influence both public policy and consumers. A further programme of action would require building on the conventional commercial marketing tools in a way that benefits the greater social good (Dann, 2010). Consumers would need to be classified in different segments depending on their sustainable food behaviour (e.g. Verain *et al.*, 2015b) in order to develop the correct marketing messages. Also, instead of the 4Ps (product, promotion, place and price) product-based (Wood, 2008) and 4Cs (customer value, cost, communication and convenience) consumer-centric marketing mixes, a new approach focussing on sustainability would be needed. We describe this as the 4Ss (sustainability, strength, self-confidence and sharing) marketing mix which uses messages around (Bogueva *et al.*, 2017):

(1) sustainability – well-being of current and future generations;

(2) strength – people have the power and opportunity to arrest climate change and improve the ecological systems;

(3) self-confidence – each person's actions matter; and

(4) sharing – the planet and its resources need to be shared among all living creatures.

The findings from the Sydney study may be used as a basis for further research in Australia and internationally for understanding better consumer preferences as well as behavioural change. Reduction in meat consumption is an example of an important sustainability issue and social marketing can be applied for the greater good to influence a switch to more plant-based diets but also towards many more other sustainable individual and policy options reliant on voluntary behaviour.

8.2 Research limitations

Two limitations deserve to be mentioned. First, being an exploratory survey, one limitation of this study is that it is not representative. However, it allows for some light to be shed on a complex behavioural issue. Second, the Sydney sample results are indicative for a wealthy western society and should be used with care in other settings, particularly in places where population suffers from hunger and malnutrition.

9. Conclusions

This exploratory study examined the reasons behind meat intake of Sydney participants. Although these consumers may not be aware of the importance of this sustainability issue, "in scholarly thinking the ecological effects and energy-intensiveness of meat production and consumption have been acknowledged for more than 20 years" (Verain *et al.*, 2015a, p. 209). Similarly, evidence of the negative health impacts of excessive meat consumption has also been available for decades.

The survey findings, combined with the analysis of the marketing space in Australia occupied by the vested interests of meat producers and sellers, show how successful the meat industry has been in influencing the general public. Despite the fact that Australians are consuming more meat than the limit set by reputable national and international dietary guidelines, aggressive marketing promoting meat intake continues. The answers of the Sydney residents reveal that first, the misconception about the health benefits of meat is widespread and second, that the environmental aspects of meat production are not understood. Mixed messages from health practitioners make the issue even more complex for the general public. In light of the latest scientific evidence, the two main reasons driving meat consumption, namely, human well-being and social considerations, are both flawed and produce increasingly toxic results for public health as well as the global environment.

A strong case exists for government-supported social marketing interventions which can reclaim the public space and influence people's opinions, attitudes and behaviours to achieve reduced meat consumption. Discouraging behaviours which are deeply rooted in social norms and beliefs is a difficult but not impossible task as demonstrated with positive results in other health areas, such as smoking and sun protection. What is at stake with the high levels of meat consumption, however, goes beyond the realm of individual health and affects the global commons of clean air, water, biodiversity, reduced climate change impacts and land use. If a prosperous country like Australia does not act to cut meat consumption, the situation is likely to escalate even further with large populations in developing countries adopting western lifestyle and diets.

Social marketing "has been shown to make a useful contribution to tackle many of the big […] challenges faced by the communities and their governments" (French *et al.*, 2011, p. 2). Marketing interventions, such as public information campaigns about the link between eating meat and human and environmental health, can prompt Australians to act quickly. When

consumers have the will and motivation to alter their diet, they hold a lot of power and can make this change immediately – without the need for investment in infrastructure or delays while new technologies become available.

Designing social marketing interventions focussing on red meat consumers in Australia and around the world, needs to be based on understanding the motivation of the target population. Helping the public to cut its red meat consumption is crucial. Social marketers have to address the motivations specific to a particular audience which in the case of Sydney participants relate to health, weight loss, masculinity, social status and prosperity. Social marketing intervention strategies should focus on influencing voluntary behaviours by understanding the reasons why people might change rather than "providing the kind of information that frequently makes scant difference to people's actual choices" (Young and Caisey, 2015, p. 99) or sends alarming messages.

Further research can help in developing suitable interventions and assessing their impact on the greater Australian population. Reducing meat consumption and protecting public and environmental health is a long journey with every step marked by what food consumers are encouraged to choose to put on their plate.

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Corresponding author
Dora Marinova can be contacted at: D.Marinova@curtin.edu.au

PUBLICATION 3

Bogueva, D., Marinova, D. Raphaely, T. (2017) Red meat consumption and social marketing interventions promoting appetite for change. *International Journal of Food Engineering*, 3(2), 154-158

Red Meat Consumption and Social Marketing Interventions Promoting Appetite for Change

Diana Bogueva, Dora Marinova, and Talia Raphaely
Curtin University, Curtin University Sustainability Policy (CUSP) Institute, Perth, Australia
Email: diana.bogueva@postgrad.curtin.edu.au, {d.marinova, t.raphaely}@curtin.edu.au

***Abstract*—Increasing red meat consumption is fast emerging as a problem requiring immediate attention because of its detrimental impacts on human health, climate change and environmental sustainability. Researchers around the globe are adamant that reducing red meat consumption, especially in the Western world, and relying on more sustainable ways for protein intake, namely through plant-based products, are a better alternative. The paper presents the results from an exploratory study conducted in Sydney, Australia in 2016 which investigates consumers' reasons for meat consumption. Social marketing through a sustainability social marketing model is proposed as an effective way to tackle excessive meat consumption and encourage voluntary behavioural changes towards limiting the intake of animal foods. Parallels are drawn with other successful social marketing interventions, such as in the case of tobacco, alcohol, drug use, obesity and sun protection. The proposed model similarly aims at promoting behavioural change recognising the complexity and urgency of the problem.**

***Index Terms*—red meat consumption, social marketing, environmental sustainability, human health, behavioural change, Sydney**

I. Introduction

Global meat consumption nowadays is recognized as unsustainable, both in terms of the inevitable environmental costs (greenhouse gas emissions, deforestation, land use change, fresh water shortage and biodiversity loss) we generate to get what we want on our plates [1]–[4] and also in respect to socio-economic dimensions, such as global hunger and rising number of environmental refugees [5], [6]. Over the upcoming years humanity is likely to face significant pressure because income growth, urbanization and globalization across the developing world lead to shifts towards Western dietary patterns high in meat intake. These dietary shifts are already witnessed in China which is undergoing a rapid change in meat consumption. They are likely to be followed by other developing countries, including India and Vietnam unless measures are taken to increase the global awareness about the problem.

The love for eating meat is not only traditionally, but also socio-economically conditioned, with some exceptions still existing in the third world countries. Nowadays most people, especially in wealthy societies, such as in Australia, America and Europe, have access to and can afford diverse range of foods from both plant and animal origin. Recently however there is a growing acknowledgement worldwide that a shift towards more sustainable diets is an important approach to meet the needs of the constantly growing world population and its demand. Studies assessing the environmental impacts of diets find the lower the meat intake, the lower the negative health and environmental impact [7]–[12].

Sustainability transitioning towards reduction in meat consumption could be achieved through social marketing centred on voluntary behavioural changes – an approach which had been successful in other health and social related issues, including tobacco, alcohol, drug use, obesity and sun protection [13]–[19]. Other examples of voluntary behavioural changes encouraged by social marketing are campaigns related to cycling to work or using public transport, waste management, composting, recycling, reusing, use of solar panels, water saving etc. If people are aware of the issue a great majority of them are willing to adopt more sustainable practices.

Effective social marketing can help foster a shift towards diets which are healthier and respectful of the planet's environmental limits. When engaging social marketing models to promote a sustainability agenda, it is essential to take into account the specific characteristics of the issue and understand the drivers behind a particular behaviour.

The remainder of the paper is organized as follows. The Sydney exploratory survey is first presented, including its methodology and results. This is followed by a description of a new sustainability social marketing model which responds to the urgency, complexity and pervasiveness of the problems related to excessive meat consumption.

II. Sydney Exploratory Survey

Comprehending the compounded topic of meat consumption requires an exploratory approach which helps in gaining familiarity with the issue [20] and focuses on discovering insights for developing marketing strategies [21]. Social exploratory research hunts for people's reactions to certain things, issues, the meaning of their actions and the concerns they have [22]. Although statistically not representative, a quantitative exploratory survey allows for capturing the novelty of issues and sheds light on problems which are often not clearly defined.

Manuscript received March 20, 2017; revised August 2, 2017.

doi: 10.18178/ijfe.3.2.154-158

A. Research Methodology

An anonymous exploratory random sample survey was conducted in Sydney, Australia in 2016 with the aim to understand the reasons behind meat consumption prior to any further research on the problem or interventions. The ethics permit for the study was obtained from Curtin University in Perth, Western Australia.

Overall 132 participants (with almost equal gender representation) replied to the survey. The response rate of 66% to the originally 200 randomly approached Sydney residents demonstrates the interest in the topic. A condition for inclusion in the sample was for participants to be adults in employment or in full-time study, so that their food choices are not restricted because of economic considerations.

The questionnaire covered five areas: participants' associations with the word "meat"; dietary preferences and adherence to a particular diet; meat consumption patterns, including frequency and size of portions; reasons for following a particular diet; and level of concern for common issues, such as the cost of living, climate change/global warming, red meat's cost on the environment and actions to fight climate change.

B. Findings

In total 86% (or 114 people) reported red meat consumption of different frequency – from every day to less than twice per week. The remaining participants – 14% (or 18 people), abstained from red meat intake. The Sydney sample indicates red meat has a high popularity amongst Australians which is confirmed by data from the Organization for Economic Cooperation and Development (OECD) [23] (see Table I.) according to which Australia is one of the top red meat consuming nations. Among the stated reasons for abstaining from meat consumption were animal welfare and personal health; two participants referred to religious reasons and one stated economic unaffordability. None of the participants justified not consuming meat because of environmental concerns. This is surprising given the existence of convincing and conclusive evidence about meat's large negative environmental impacts [10].

For those Sydney respondents who consume red meat, it conveys different messages. Close to half of the survey respondents (47%) perceive meat as important for human health, weight loss and a dietary source of nutrients including iron, vitamin B12, zinc and others (see Table II.). Such a message is often supported by recommendations from doctors, GPs and nutritionists – a confusing and unjustified advice given the World Health Organization's 2015 categorization of processed red meat as carcinogenic and red meat as probably carcinogenic [24]. Another 30% of the sample, perceived red meat as an important source of protein which they also related to social status, prosperity, prestige, masculinity and strength. The respondents who consume red meat overwhelmingly do not see its impact on destroying the natural environment. Only four people (3% of the sample and 4% of the meat-eating participants) consider the negative health impacts of excessive meat consumption in their dietary preferences and only one person (0.76% of the sample and 0.9% of the meat-eating participants) stated that their food choices were influenced by environmental concerns.

TABLE I. ANNUAL MEAT CONSUMPTION PER CAPITA IN 2015. SELECTED COUNTRIES [KG]

Country/region	beef and veal	pork	sheep and lamb	**red meat**	poultry	total meat
Uruguay	46.4	14.3	5.7	**66.4**	13.6	80.0
Australia	22.8	20.3	7.4	**50.5**	42	92.5
Argentina	40.4	8.2	1.2	**49.8**	36.5	86.3
United States	24.7	22.7	0.4	**47.8**	47.6	95.4
European Union	10.8	33	1.8	**45.6**	22.7	68.3
China	3.8	31.6	3	**38.4**	11.6	50.0
South Korea	9.6	28.4	0.2	**38.2**	14.2	52.4
Viet Nam	8.7	29.1	0.1	**37.9**	14.0	51.9
New Zealand	14.5	18.1	4.4	**37.0**	37.8	74.8
Brazil	24.2	11.2	0.4	**35.8**	39.4	75.2
Russia	12.1	18.3	1.1	**31.5**	26.4	57.9
Kazakhstan	16.9	5	8.1	**30.0**	16.5	46.5
Japan	6.7	15	0.2	**21.9**	13.6	35.5
Philippines	3	14.2	0.5	**17.7**	11	28.7
Colombia	12.1	5.1	0.2	**17.4**	26.4	43.8
South Africa	10.7	3.4	3.1	**17.2**	30.6	47.8
Malaysia	5.7	6.2	0.8	**12.7**	41.4	54.1
Thailand	1.8	10.9	0	**12.7**	9.7	22.4
Turkey	8.3	0	4.1	**12.4**	16.5	28.9
Peru	4.7	3.3	1.2	**9.2**	36.8	46
Pakistan	6.3	0	2.1	**8.4**	4.4	12.8
Iran	2.9	0	3.2	**6.1**	23.1	29.2
Tanzania	4.1	0.2	1.1	**5.4**	1.5	6.9
Nigeria	1.7	1.1	2.4	**5.2**	0.9	6.1
Indonesia	1.9	2.3	0.4	**4.6**	6.6	11.2
Ethiopia	2.5	0	1.3	**3.8**	0.6	4.4
Bangladesh	0.9	0	1.2	**2.1**	1.2	3.3
India	0.5	0.2	0.5	**1.2**	1.7	2.9
World	*6.4*	*12.5*	*1.7*	***20.6***	*13.5*	*34.1*

Source: [23]

The Sydney survey participants reported red meat consumption from 150 g to more than 300 g per day. Although the latest research evidence suggests that processed and unprocessed red meat potentially increases the risk of heart disease, colorectal cancer and is associated with premature mortality [25], [26], consumers are either ignorant, mislead or not willing to give up their meat-based food choices. Given the scientific findings about the negative health impacts of red meat and processed meat, the World Cancer Research Fund advises that processed meat should be avoided and the public health goal for unprocessed red meat should be restricted to a maximum of 300 g per person per week [26]. Similar limits to red meat intake are suggested by Food Industry Asia – between 280 and 525 g of meat and poultry [27], the Australian dietary guidelines – 455 g per week per person [28] and the UK Standing Advisory Committee on Nutrition – 70 g cooked meat per day [29].

TABLE II. REASONS FOR CONSUMING RED MEAT IN SYDNEY, AUSTRALIA IN 2016

Reason	Total	% of meat consumers
Meat is good for human health, including weight loss	54	47%
Eating meat is a symbol of: strength, masculinity, status, prosperity and prestige	35	30%
Religion, family and other	10	9%
Animal welfare considerations	3	3%
Economic affordability	7	6%
Excessive consumption of red meat causes disease	4	4%
Red meat consumption negatively affects the environment	1	1%
Total	114	100%
Sample %	86%	–

Officially the meat industry in Australia appears to be also supporting limiting meat consumption and adhering to the dietary guidelines by suggesting an intake of up to "650 g/week, raw weight" [30]. However, in reality its representative body Meat and Livestock Australia (MLA) constantly bombards the public space with advertisements promoting meat and aimed at increasing the intake of animal-based products. This advertising helps shape and sustain a positive red meat attitude in consumers through aggressive and highly pervasive marketing campaigns and meat promotion [31]. Messages endorsing unsubstantiated health benefits and questionable national identification calls, e.g. lamb advertising with Lambasadors, are spread across the media and also through politics, government, educational and health institutions. The results from the Sydney exploratory survey confirm the lack of proper social advice – only 4% of the participants claimed to be aware that excessive meat consumption has negative impacts on human health and 15% indicated that they have even received medical guidance to increase their red meat intake. These results represent a picture which clearly shows widespread unawareness about the health, environmental and social price associated with excessive red meat consumption. The aggressive pro-meat marketing is contributing towards misleading the consumers towards the desired by the meat industry direction.

Several questions in the Sydney exploratory survey related to popular concerns debated in the media, including the cost of living, climate change/global warming, actions to fight climate change and red meat's impact on the natural environment. The results show 90% of all respondents were worried the most about the cost of living. Climate change and actions to combat climate change attracted respectively 56% and 81% of worried people. Although awareness about the environmental consequences from red meat consumption did not influence people's dietary choices as discussed above (with only 1% of the Sydney respondents concerned about the climate change–meat link), the share of people worried about its impact on the natural environment was similarly high at 69%. This indicates a gap between participants' concerns in theory and their actual real meat consumption behaviour. Social marketing interventions could be used to close this gap and create an appetite for change towards more environmentally friendly and more sustainable dietary choices.

III. SOCIAL MARKETING INTERVENTIONS PROMOTING APETITE FOR CHANGE

A sustainability social marketing model (SSMM) to encourage transitioning to sustainable development was put forward by Bogueva *et al*. [32]. The model (see Fig. 1) can be applied to help promote a change in consumer behaviour towards more sustainable dietary options.

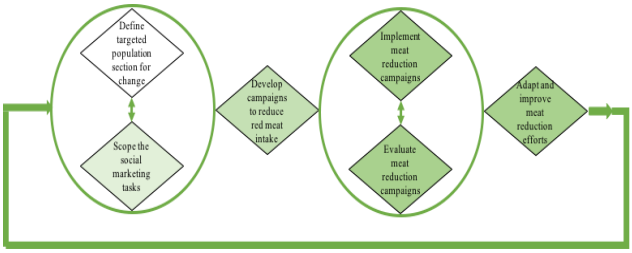

Figure 1. Sustainability social marketing model (SSMM) for reduction in meat consumption.

The sustainability social marketing model in the case of meat reduction incorporates a 4Ss marketing mix based around: sustainability – high red meat consumption destroys climate stability, damages human health and threatens present and future generations, strength – humans have the power and opportunity to reverse climate change caused by livestock and improve their health and ecological impact on the planet, self-confidence – the actions of each individual embracing reduction in personal meat consumption matter; and sharing –the planet and its resources are there to be shared and sustained for the present and future generations and no one has the right to compromise them.

IV. CONCLUSION

The SSMM is a necessary and vital intervention methodology that can contribute a lot to the pursuit of sustainable dietary choices. Global meat consumption requires urgent and immediate behavioural and attitudinal change for humanity to meet the climate change agenda by reducing greenhouse gases and cancer. Social marketing can be used to sow in the minds and hearts of people the message that returning to the predominantly plant-based dietary practices of their predecessors is easy, healthier and will make a difference to the environment for the benefits of the future generations to come.

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Diana Bogueva is a PhD candidate with more than 20 years of international media and communication experience as a professional radio journalist. She has worked with several worldwide recognized news media, including the Bulgarian National Radio, Bulgarian Section of BBC, London and Special Broadcasting Services (SBS), Sydney, Australia. She is currently working for SBS radio as a program producer and as a Director of Market Research with Sydney Focus Groups. Diana is also completing her PhD studies at Curtin University, Australia, focusing on meat consumption, social marketing and sustainability. She has a chapter (together with Prof. Ian Phau) on meat myths and marketing in the edited reference book Impact of Meat Consumption on health and Environmental Sustainability, published by IGI Global. Other recently accepted for publication articles include: Sustainability social marketing (with R. Raphaely, D, Marinova and M. Marinova, to appear in Methods for Sustainability, J. Hartz-Karp and D. Marinova, Eds, Cheltenham, UK: Edward Elgar) and Reducing meat consumption: the case for social marketing (with D. Marinova and T. Raphaely, to appear in Asia Pacific Journal of Marketing and Logistics). Diana is a member of the International Federations of Journalists and a Wood Badge member of the World Scout Organization.

Prof. Dora Marinova – originally from Bulgaria, Dora has been living and working in Perth, Western Australia since 1991. After being Head of School at the Institute for Sustainability and Technology Policy (ISTP) at Murdoch University, she is now Director of the Curtin University Sustainability Policy (CUSP) Institute. Dora has over 400 referred publications and has supervised 50 PhD students to successful completion. She served as a member of the Australian National Health and Medical Research Council's Panel on Centres of Research Excellence in Population Health. Her research interests cover innovation models, including the evolving global green system of innovation and the emerging area of sustainometrics. Dora recently edited the book Impact of Meat Consumption on health and Environmental Sustainability (with Dr.

Talia Raphaely, published by IGI Global) and Methods for Sustainability (with Janette Hartz-Karp, published by Edward Elgar). She is Editorial Board member of the International Journal of Education Economics and Development (published by Inderscience, Switzerland) and Transformation: An Interdisciplinary Journal (published by EBSCO, USA). Dora is also Elected Fellow of the prestigious Modelling and Simulation Society of Australia and New Zealand (MSSANZ), International Environmental Modelling and Software Society (IEMSS) and Elected Member of the Australian Institute of Aboriginal and Torres Strait Islander Studies.

Dr. Talia Raphaely – originally from Cape Town, South Africa, Talia has 30 years of international experience in behavioural and attitudinal change, communications and diverse media, sustainability awareness and conscientiousness and collaboration and partnership building for increasing sustainable outcomes. She has worked closely with multicultural and heterogeneous groups in a diverse array of organizational settings, including academia, media, research-based organizations, government bodies, industry, non-government organizations and community-based organizations. Talia works as an academic at the Curtin University Sustainability Policy (CUSP) Institute in Perth, Western Australia and continues to undertake consultancy research relating to sustainability. She edited the book Impact of Meat Consumption on Health and Environmental Sustainability (with. Dora Marinova, published by IGI Global). Talia is recognized for her work on flexitarianism (reducing meat consumption to within healthy levels as recommended by Australian national and international guidelines), collaboration, empowerment and sustainability humanistic education.

PUBLICATION 4

Bogueva, D., Raphaely, T., Marinova, D., Marinova, M. (2017) Sustainability social marketing. In Hartz-Karp, J., Marinova, D. (eds) *Methods for Sustainability Research*, Edward Elgar, Cheltenham, UK, pp. 280-291

18. Sustainability social marketing

Diana Bogueva, Talia Raphaely, Dora Marinova and Mira Marinova

INTRODUCTION

Despite conclusive scientific evidence, unsustainable practices contributing to ecological and social problems continue. Although sustainability is well defined both in the academic literature and in school syllabi (Australian Curriculum, 2014), it remains a complex and abstract concept people are still struggling to understand. In 1952, the psychologist Wiebe asked: 'Why can't you sell brotherhood and rational thinking like you sell soap?' (Wiebe, 1952, p. 679). His response was that 'the audience must be forcefully motivated and clearly directed to an adequate, appropriate, and accessible social mechanism' to achieve social goods (Wiebe, 1952, p. 679). The argument that traditional marketing principles could and should be employed for the benefit of all people clearly applies for sustainability. There is no greater challenge for humanity than finding means for transitioning to sustainability; in fact, its survival may depend on this.

With sustainability being the most pressing imperative for the human race, every urgent priority requires behavioural change at the individual and policy levels. Social marketing can make a critical contribution to promoting behavioural changes in the transformation to sustainability. There needs to be a specific methodology to achieve this. The chapter uses the example of food, and in particular meat consumption, to propose and outline such a social marketing-based methodology, termed a sustainability social marketing model (SSMM).

The seriousness of the health and environmental problems caused by meat consumption are described first. Typically, achievement of sustainability priorities has co-benefits, such as simultaneously improving human and ecological well-being. Reduction in meat consumption is no exception illustrating the need for behavioural change. Social marketing is outlined as an approach and methodology that is successful in changing people's behaviour. As sustainability priorities have unique characteristics, a tai-

lored methodology – SSMM – is then outlined. Concluding comments are finally provided.

THE MEAT CONSUMPTION PROBLEM

According to Springmann et al. (2016), human diets are influencing health and impacting on the environment with meat consumption detrimentally impacting both. Scientific analysis shows the 'dual health and environmental benefits of reducing the fraction of animal-sourced foods' (Springmann et al., 2016, p. 4146). Many studies demonstrate that excessive meat contributes to increased greenhouse gas emissions, land, air and soil degradation, biodiversity loss, deforestation, water use and pollution (e.g. Pimentel & Pimentel, 2003; Goodland & Anhang, 2009). Based on the analysis of 800 studies by health experts from ten countries, in 2015 the World Health Organization (WHO, 2015) categorized various red meats as carcinogenic and probably carcinogenic. Therefore dietary guidelines across the globe (WCRF/AICR, 2007, NHMRC, 2013; FIA Communications, 2016) limit the intake of red meat.[1] Yet, western diets, including American and Australian diets, rely heavily on meat intake and are increasingly being replicated across the globe. The environmental and health burden of such diets is very high (Raphaely & Marinova, 2016a).

All food provides energy and nutrition but is not equal as far as sustainability is concerned. Plant-based foods have a consistently lower environmental footprint and are healthier than animal-based counterparts. Per unit of nutrient (that is for the same nutritional value within the dietary recommended amounts of essential nutrients, including protein, fibre, vitamins A, C and E, calcium, iron, magnesium and potassium), beef generates 79 times more greenhouse gas (GHG) emissions than wheat (Doran-Browne et al., 2015).[2] Similarly, per unit of energy, beef generates 227 times higher GHG emissions than wheat (Doran-Browne et al., 2015).[3] Beef production requires 295 times more land and four times more water than rice (Eshel et al., 2014). Furthermore, feeding people with meat is an inefficient use of resources – beef requires 38 calories of animal feed to produce one calorie for human consumption (Eshel et al., 2014). Global population numbers are increasing, but the per capita meat consumption is growing much faster (Raphaely & Marinova, 2016b).

Meat is a major sustainability issue. In wealthy economies with an abundance of food choices, changing dietary preferences does not seem a big task – it does not require new infrastructure or technologies to disrupt existing trends. All that is required is a behavioural shift to generate immediate benefits. Such change however has proven very difficult. Multiple

factors, including misconceptions about the benefits of meat, mixed messages from health practitioners, perceptions about masculinity and strength (Bogueva et al., 2017), are used to justify human preference for meat. Social marketing offers the most accessible mechanism to influence people's behaviour.

SOCIAL MARKETING

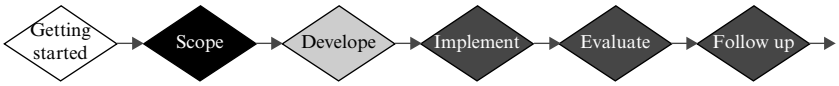
Building on traditional commercial marketing concepts, principles and frameworks, social marketing encourages consumers to contribute to the 'social good' (Dann, 2010) that benefits individuals, the community and the broader society (Rothschild, 1999). Its distinctive characteristic is that it uses marketing for the resolution of particular problems through influencing people's behaviour. Examples include addressing behavioural challenges such as AIDS/HIV, tobacco, alcohol, illicit drugs, traffic accidents, birth control and obesity.

Defining Social Marketing

Kotler and Zaltman (1971, p. 8) heralded social marketing as a process of 'design, implementation, and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research'. Subsequently, social marketing has been linked to ethical principles and collective well-being (ISMA/ESMA/AASM, 2013). The internationally accepted consensus definition is: 'Social Marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviours that benefit individuals and communities for the greater social good' (ISMA/ESMA/AASM, 2013, p. 1). According to Hopwood and Merritt (2011), there are three essential aspects of social marketing; it is:

1. a planned process involving systematic adherence to a set of steps (described in Figure 18.1);
2. for the benefit of larger sections of society; and
3. focused on behaviour and aims at changing, maintaining or achieving a particular behaviour.

Despite certain limitations (Peattie & Peattie, 2003, 2012; Wood, 2008; Gordon, 2011a, 2011b), effective social marketing generates beneficial public health and social outcomes (Rothschild, 1999). According to Dann (2010, p. 152), the benefits from social marketing have a dual focus: 'down-



Source: NSMC (2010)

Figure 18.1 National Social Marketing Centre (NSSM) social marketing model

stream benefit with an emphasis on the return to the adopter exceeding the total cost of adoption, and upstream benefit with the return to the society at large and partners exceeding the societal level investment in the social change activity'. The traditional business-focused 4Ps – product, promotion, place and price – continue to be a foundation of social marketing research and practice (Luca & Suggs, 2010; Thackeray & McCormack Brown, 2010). More recently a shift towards a customer-centric approach has been recognized, focusing on the 4Cs – customer value, cost, communication and convenience (Lauterborn, 1990).

Applying Social Marketing

Viewing consumers as active participants in a process of choice, social marketing concentrates on behavioural and attitudinal change. Although the benefits of attitudinal changes may only manifest over time (McDermott et al., 2005), behavioural shifts are more immediate. However, social marketing often works in a public space that is occupied by the advertising and promotion of behaviours antagonistic to the greater public good. Examples include tobacco (Lovato et al., 2003; Stead et al., 2016), alcohol (McGinnis et al., 2006) and poor nutritional and energy-dense food products causing obesity (Harker et al., 2007).

According to Hopwood and Merritt (2011, p. 10), social marketing can be used strategically 'to inform policy and strategy development' as well as operationally 'to address specific behavioural issues'. Supported by health departments and services, social marketing has proven successful in campaigns tackling tobacco, alcohol, drug use and obesity (Hastings & McDermott, 2006; Hastings et al., 2010; Carroll, 2012; Scollo & Winstanley, 2016). It is positioned at the centre of health improvement in numerous countries globally, including Australia, Canada, New Zealand, the UK and the US. Although few social marketing campaigns target the consumption of healthy foods, the 'Go for 2&5' promoting two fruits and five vegetables per day has been very active in Australia (Carter et al., 2011).

Social Marketing Model

The British National Social Marketing Centre (NSMC, 2010) uses six key steps based on successful social marketing projects (see Figure 18.1): getting started, scope, develop, implement, evaluate and follow up. The marketing mix recommended by the NSMC (in Hopwood & Merritt, 2011) builds on the 4Ps. Key features in the success of such social marketing interventions are: citizen orientation, clarity of purpose, coalition building, combination of approaches and continuation, learning and evaluation (French et al., 2011, p. 1).

SUSTAINABILITY SOCIAL MARKETING

In global and local transitions to sustainability almost every single outcome is dependent on successful behavioural changes that can be encouraged by social marketing, as the majority of concerns result from voluntary human activities. Examples include initiatives in renewable energy, food choices, waste management, use of public transport or cycling, housing and planning policies. Social marketing to date however has not been used for influencing more sustainable behaviour. Reduction in meat consumption highlights the potential of social marketing to support voluntary action for a greater good (Dagevos & Voordouw, 2013; Raphaely & Marinova, 2014).

By nature, the sustainability agenda has a specific set of characteristics to account for when employing social marketing models. They are:

- *Urgency* – tight action timeframes; climate experts estimate humanity has ten years to change behaviour before irreversible changes in the earth's atmosphere and ocean surfaces (IPCC, 2014).
- *Scale and complexity* –the sustainability challenge is vast, complex, pervasive, colonized by conflicting interests and requires fundamental global shifts engaging the world's population as reflected in the UN Sustainable Development Goals (UN, 2016).
- *Dynamism* – sustainability achievements, failures and much that is not yet understood will result in changing priorities.

Sustainability social marketing, that is social marketing specifically developed for transitioning to sustainability, thus requires adaptation of existing methodologies whilst allowing for flexibility and iterations as knowledge about climate change and other environmental and social issues advances and priorities shift.

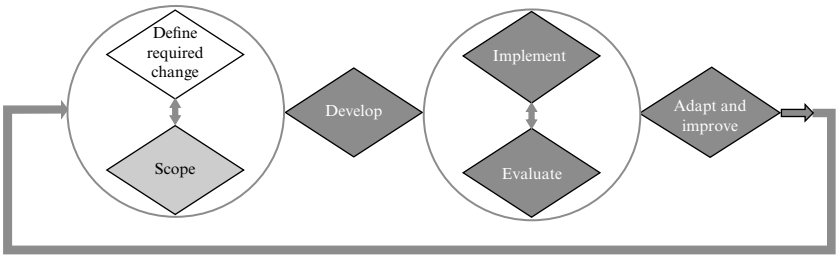


Figure 18.2 Sustainability social marketing model (SSMM)

Sustainability Social Marketing Model

Figure 18.2 illustrates the tailoring of the social marketing approach into a sustainability social marketing model (SSMM). Its stages are as follows (refer to Figure 18.2):

1. *Define required change* – identify the priority that needs to be addressed through specialist studies; include starting and destination points; carried-out in conjunction with, informing and informed by scoping, resources availability and mobilization, risks and timescales are identified at this step; identification and selection of alternatives to current options are also investigated; this step involves marketing and demarketing objectives.
2. *Scope* – check research evidence about the nature of the sustainability objective; decide whether the intervention is part of a broader strategy or is project based; assess wider ecological, economic, social, political, cultural, technological and governance implications of achieving the required change; identify, invite and engage interested and affected stakeholders; commission specialist studies to address key issues and concerns; form teams, coalitions, networks and partnerships for designing and resourcing the marketing intervention.
3. *Develop* – design a specific campaign, programme or intervention and its evaluation taking into account stakeholder engagement.
4. *Implement*.
5. *Evaluate* – simultaneous launch of the intervention and its evaluation process, this allows adjustment and refinement according to the reaction of the targeted segment, stakeholders and general society.
6. *Adapt and improve* – continue to engage with stakeholders, disseminate results, adjust, adapt and improve intervention if required; design follow-up actions.

Unlike social and other marketing models, SSMM should use a new marketing mix that is better suited for its purpose. In line with the common marketing practice of using alliterations (YourDictionary, 2016), a possible such marketing mix is around sustainability, strength, self-confidence and sharing – the 4Ss:

- *Sustainability* – this is the greater public good for current and future generations.
- *Strength* – this sends a positive message that humans have the power and opportunity to reverse climate change and improve the ecological health of the planet.
- *Self-confidence* – this should create individual empowerment for sustainability through the reassurance that the actions of each individual matter.
- *Sharing* – the planet and its resources are there to be shared not only among all living species today but also those of the future.

Applying SSMM

To date there have not been any social or other marketing campaigns despite evidence of the need to bridge the citizen-consumer gap (De Bekker & Dagevos, 2012), provide adequate information (Cordts et al., 2014) and dispel the myths around red meat (Bogueva & Phau, 2016). Sustainability social marketing can reclaim the greater good in spaces currently dominated by vested interests which discount or repudiate the health and environmental problems of meat consumption. Australians consume on average 24 percent more red meat than the 'caveat' stipulated by health authorities which recommends restriction to no more than 455 g per week (ABS, 2016, p. 34). Yet meat consumption continues to be promoted (Bogueva & Phau, 2016). In order to illustrate the application of SSMM, the case of reduction in red meat consumption is used:

1. *Define required change* – a 24 percent reduction in red meat consumption and replacement with plant-based alternatives; this could be project based or part of a broader strategic initiative to reduce GHG and cancer.
2. *Scope* – interested and affected by meat reduction, stakeholders have significant role and influence, all should be invited to participate and collaborate, including those likely to be negatively affected; commissioning of specialist studies related to the transition and alternatives are a likely outcome.

3. *Develop* – design a campaign for encouraging meat consumption within the dietary limits, including marketing alternatives and de-marketing of meat.
4. *Implement*.
5. *Evaluate* – unexpected reactions to such a sensitive issue are inevitable; adjust and refine the campaign according to the emerging reaction and evaluation.
6. *Adapt and improve* – plan future related sustainability campaigns while maintaining momentum in meat reduction and existing collaborations and partnerships.

The 4Ss marketing mix is illustrated in the case of meat reduction:

- *Sustainability* – by destroying climate stability, misusing resources and compromising health, excessive red meat consumption threatens present and future generations.
- *Strength* –individuals, policies and strategies have the power to stop destruction caused by meat, improve health and reverse negative ecological impacts.
- *Self-confidence* – through the choice and action of reducing personal meat consumption anyone is able to participate and contribute towards sustainability; any reduction in meat consumption has value; take pride in doing less harm.
- *Sharing* – no one has the right to compromise the global commons on which all life depends.

The SSMM is a needed and important methodology that has a lot to contribute to the pursuit of sustainability.

CONCLUSION

Marketing and social marketing have proven successful in promoting products and behaviours (MacFadyen et al., 1999). Sustainability social marketing is particularly relevant to transitioning to sustainability, as its main aim is to modify the behaviour and practices of society as a whole for the benefit of current and future generations of people, other species and the ecological environment of the planet. It should thus be able to influence the social acceptability of reduction in meat consumption (Dagevos & Voordouw, 2013; Raphaely & Marinova, 2014). The SSMM allows for planned behavioural changes benefiting the greater good.

Whilst this methodology is by no means the only way to approach the

behavioural and attitudinal change required for the transition to sustainability, this powerful tool offers a new opportunity. The 4Ss marketing mix is applicable to all sustainability concerns and considerations in the urgent imperative for change facing humanity. This is a very important marketing paradigm shift that in itself starts a new phase of interventions for the greater good of the planet and people of today and tomorrow.

NOTES

1. As a public health goal, a limit of 300 g per person of red meat per week (WCRF/AICR, 2007), 455 g per person of red meat per week (NHMRC, 2013), 280–525 g of meat and poultry (FIA Communications, 2016).
2. This estimate of CO_2e is based on a 100-year horizon; however, as methane remains in the earth's atmosphere for a shorter period of time (20–25 years), an estimate of CO_2e over a 20-year period produces a much higher GHG impact. Based on Australian data from Doran-Browne et al. (2015) and the Australian National Greenhouse Gas Inventory (Department of Energy and Environment, 2014), over 20 years beef produces 113 times more GHG than wheat per unit of nutrient.
3. The respective figure over 20 years is 326.

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PUBLICATION 5

Bogueva, D., Marinova, D. (2018) What is more important perception of masculinity or personal health and the environment? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 148-162

Chapter 10
What Is More Important: Perception of Masculinity or Personal Health and the Environment?

Diana Bogueva
Curtin University, Australia

Dora Marinova
Curtin University, Australia

ABSTRACT

The unnecessary question what a man is without his masculinity, is deeply ingrained into the socially established norms of strength, power, virility and machoism. Although the traditional male masculinity stereotype and its association with meat consumption are still undisputable for many "real" men, there is indication about a shift toward a new modern evolutionary masculinity which reflects more sustainability values. The chapter explores this based on a survey of Sydney men. It reveals the influence of new factors, such as environmental, health and animal welfare concerns, which shape the concept of the masculine. Meat-eating men will experience increasing pressure to defend their traditional masculinity. The Sydney study also explores the factors likely to influence Australian men to replace a meat-centred diet with more plant-based alternatives.

INTRODUCTION

Manliness (of old English origin) describes a set of traits, abilities, attributes and qualities which characterise the male human species, whilst masculinity (of Latin origin) is the property of manifesting these features (English Oxford Living Dictionaries, 2017). Although these two terms are intertwined, masculinity – that is, the manifestation of manliness, is much more affected by social factors and practices.

The relationship between man, meat and masculinity has manifold meanings and for centuries has represented a socially acceptable norm about male self-perception and identity. Currently, the list of prevailing hegemonic masculinity characteristics in western countries includes: heterosexuality, power, physical strength, toughness, aggression, decision-making, independence, dominance, authority, asser-

DOI: 10.4018/978-1-5225-4757-0.ch010

tiveness, courage, rationality, emotional stoicism, muscularity and prowess, adventurous spirit, initiative, self-confidence, work supremacy, financial independence, virility, playboy behaviours and violence (Fiddes, 1994; Austin, 2008; Van Hoven & Hopkins, 2009; Bogueva & Phau, 2016; Kahn, 2011; Reeser, 2010; Pease, 2010; Hearn et al., 2013).

Masculinity is also determined by biological and presentation factors. In the past male emperors, sages and leaders of yore had attributes like facial hair – a style also popular nowadays for many celebrities. Beards have been associated with high testosterone, virility, leadership and power (Schiebinger, 1993; Withey, 2015). The upper class male aristocracy in 16th-17th century Europe enjoyed the privilege of eating meat abundantly as well as "manly" attributes, including wearing high-heal shoes and wigs (Zevallos, 2014), which are no longer considered such. Socially-defined signs of power, rank and prestige change over time and, for example, high-heel shoes now symbolise femininity (Zevallos, 2014). What this chapter explores is whether the connection between meat and masculinity is also evolving.

MEAT AND MANLINESS

Meat, and especially red meat, is an archetypical masculine food (van den Wijngaard, 1997) embedded in the western construction of masculinity (De Boer, 2006; Rothgerber, 2012; Rozin et al., 2012). The contemporary male meat consumption behaviour is equated and effectively wrapped under the pretext of traditional masculinity traits aimed at positioning men at the top of the social and animal hierarchy. Historically a scarce resource attributable to the privileged rich as a means of demonstrating authority and wealth, meat has become a highly palatable food associated with strength, virility, blood, masculinity and tangibly represents human power over the rest of the natural world (Fiddes, 1991; Kubberød et al., 2002; Stibbe, 2004; Ruby & Heine, 2011). The deeply believed link between meat and masculinity is traced back to ancient times with Aristotle stating: "other animals exist for the sake of man" (in Fiddes, 1994, p. 276). In the 1840s meat gained a scientific status with the popularised 'protein myth' and the notion that animal food is more nutritious than plants as it can replenish muscular strength (Fiddes, 1994).

According to Lupton (1996), the type of food men prefer to eat is a central part of their subjective identity, sense of self and experience of macho embodiment. Attempts to usurp the western menu consisting of a piece of flesh from warm-blooded animal plus a piece of vegetable, usually potato or pumpkin, and gravy (Lupton, 1996; Murcott, 1982:203; Douglas and Gross, 1981, p. 6-8), could cause serious social disharmony and instability (Lupton, 1996). Manly foods are not a necessary part of the male nourishment and physiological need to eat, but a major aspect of the socio-cultural environment where they belong or with which they identify.

While there is a shared culture across the western world considering meat as normal, natural, necessary and nice – the 4Ns (Piazza et al, 2015), it is particularly perceived as a masculine food (Willard, 2006) and masculinity is performed through meat-eating (and macho behaviour) for the approval and recognition by other men. When men consume meat in public places, such as steak houses, strip clubs or around the BBQ, they validate their manhood and self-comfort about being a man (Rothgerber, 2012). "Meat eating is an act of a self-definition as a privileged (male-identified) human" gaining strength from consuming strong animals, such as bulls and cows, as vegetables represent passivity (Adams & Calarco, 2016, p. 34). Men often emphasise meat while women minimise meat, displaying gender individualities (van den Wijngaard, 1997).

Food marks boundaries not only between cultures, geographic regions, social classes, rituals, traditions, religious, life stages, but also in the perception of manliness. It is also gendered, that is masculine – men eat meat, and feminine – women eat vegetables (Adams & Calarco, 2016, p. 34). Vegetarians and other non-orthodox eaters are treated with disguised suspicion because they challenge the western "society's basic cosmology" where taste is culturally conditioned and governed by patterned rules (Fiddes, 1994).

In addition to the social framing of the link between meat and masculinity, other factors are shaping the consumption of animal-based foods in the 21st century. Being highly inefficient use of natural resources, including phosphorus (White & Cordell, 2015), current and future expansion of meat consumption is incompatible with the projected world population growth and the rocketing appetite for animal foods, especially in countries transitioning to more prosperous economies (Roberts, 2008; McMichael & Bambrick, 2005; York & Gossard, 2004; Bogueva et al., 2017). Considered a dietary norm for men across the globe, increasing and excessive meat consumption in response to hegemonic masculinity traits is contributing to detrimental ecological impacts directly linked with livestock, including climate change. Furthermore, meat's association with cancers and unnecessary use of antibiotics is causing public health concerns. The abundant scientific evidence is supported by strong arguments for reduction in the intake of animal-based products by researchers (Pimentel & Pimentel, 2003; Goodland & Anhang, 2009; Garnett, 2014; Raphaely & Marinova, 2016; Springmann et al., 2016) and prestigious international bodies (UN, 2015; WHO, 2015).

Against this up-to-date understanding of the pitfalls in linking masculinity with meat consumption, it is probably time to abandon this myth the way society ditched male high-heel shoes as impractical. The problem however is disproportionately more complex as not doing so challenges the health of any life on our planet the way we know it today. Interventions and methodologies for sustainability social marketing (Bogueva et al., 2017) are needed to create ways for overcoming people's, and specifically men's, addiction to meat or their ignorance about its destructive impacts.

This however is not an easy task. The remainder of the chapter examines men's attitudes about the importance of their perceptions about masculinity, and its social norms of machoism, bravery, virility and stamina, against environmental and health concerns. Understanding what drives men in their food choices can help target better any efforts to restrain the escalating problems associated with meat consumption.

SYDNEY SURVEY

An online survey was conducted in Sydney, Australia in 2017 with 545 male participants aged 18 to 57 years about the symbolism of meat, their perceptions about the link between meat and human health and any factors that could influence a change in consumption patterns. The survey was statistically representative of the total Sydney population at a 95% confidence level with a 4% error of margin (or confidence interval). Below are the description of the sample and discussion of the results.

Sample Description

Six hundred people –150 from four age groups (born 1960-1969, 1970-1979, 1980-1989 and 1990-1999), were invited to participate in the survey. The overall response rate was 91% with two age groups providing a complete 100% response (see Table 1). Although the overwhelming majority of the participants

Table 1. Sydney men's survey sample

Age Group by Year Born	Number of Respondents	Percentage
1960-1969	117	21%
1970-1979	150	28%
1980-1989	150	28%
1990-1999	128	23%
Total:	545	100%

– 512 (94%) are meat-eaters (seven or 1% of whom have chosen to eat only white meat), the sample also comprises 32 (6%) vegetarians and one (0.2%) vegan.

Results

The participants were asked what is their main association with meat (refer to Figure 1). As expected, the majority of them – 58% (317), linked meat to manliness, namely: symbol of strength and masculinity for 32% (175), human power over animals for 16% (88) and being the "real" food for 10% (54). Similar justification of meat consumption is reported by other researchers showing it is human fate to eat animals as they are lower in the food hierarchy chain (Rothgerber, 2012) and a meal is not considered real unless it contains meat (Sobal, 2005).

A second group of participants – 17% (93) associate meat with being an attractive dietary option, namely: prestigious and luxury food for 9% (49), nutritious healthy food for 5% (27), food rich in protein and iron for 3% (15) and food related to the Australian identity for 0.4% (2). They represent popular-held beliefs about the nutritional value of meat without explicit awareness of the health and environmental dangers triggered by excessive consumption.

The most interesting is the third group of participants – 25% (135), for whom meat is associated with negative impacts and who are aware of the need to limit its intake, namely negative environmental effects for 19% (103), animal suffering for 5% (25) and moderate consumption because of potential risks for 1% (7). This group manifests a change in the awareness pattern among the Sydney male population with a quarter of the participants associating meat with worrying concerns about human, animal and planetary wellbeing.

When asked directly about meat's effect on human health (see Table 2), the majority of the participating males – 52% (286), do not see any negative impacts. They take meat for granted without any concerns about impacts on men's masculinity or health. The remaining 48% (259), however, are of the opinion that meat should either be consumed in moderation or not at all, namely: 20% (109) believe that eating up to 100g per week is good for human health, 14% (74) believe that excessive consumption causes disease and another 14% (76) that meat is bad for human health. Combined these results illustrate clearly the fact that a large section of men worries about health implications associated with eating meat. This is a shift away from the traditional masculinity traits of strength, toughness and stoicism regarding men's own health towards more self-conscious awareness.

The research results suggest emerging understanding of masculinity which rejects the old social norms and establishes a pathway for changing meat consumption behaviours based on healthier and more sustainable food choices. Referring to a similar trend, another research points out that men are now

Figure 1. Opinions about what red meat symbolises

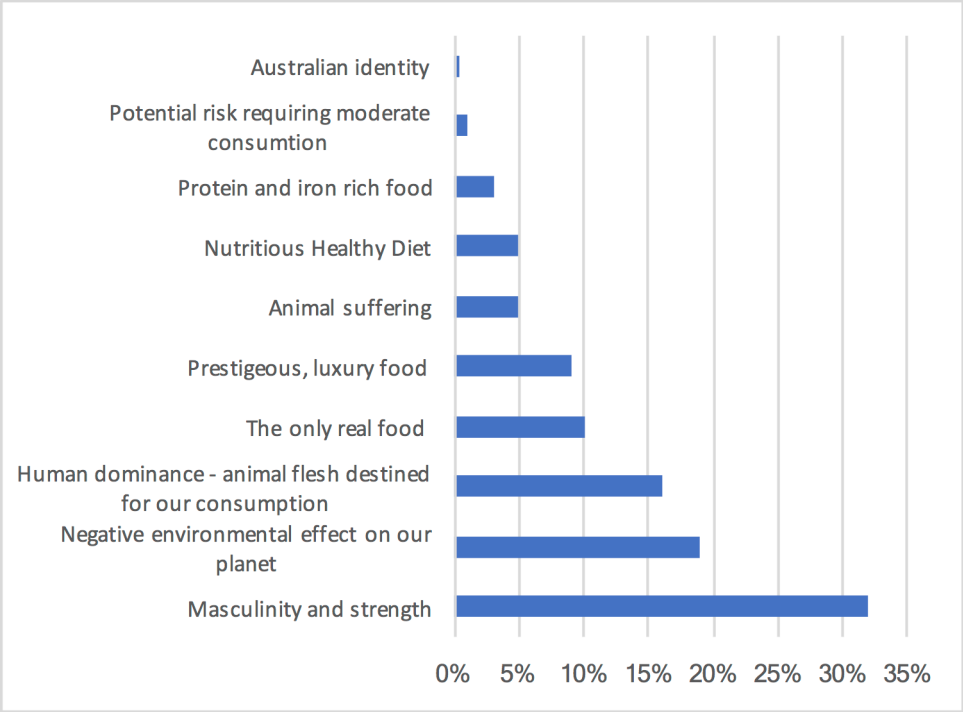

Table 2. Meat and health

Options	Number of respondents	Percentage
Meat consumption has nothing to do with health and health related issues	286	52%
Eating meat in moderation up to a maximum of 100g - 2-3 times a week is good for your health	109	20%
Excessive meat consumption - 300-500g and above daily causes disease	74	14%
Eating meat is bad for your health	76	14%
TOTAL	545	100%

building their identity through becoming healthier, exercise conscious, prioritising family, putting children before work, appreciating a more equal social position for women, being open to new experiences and overall enjoying happiness over more traditional signs of power, virility and success (Connelly, 2016). This emerging trend of health self-consciousness and family values is an important influential factor for Australian male meat consumers that could become a driving force towards reduction in meat intake. It should be vigorously explored by marketers and producers of plant-based alternatives as a start of a substantial move towards eating less or no meat to achieve more sustainable consumption for human, planetary and animal wellbeing benefits.

Further interesting results are generated by the question about factors that can influence men to reduce their meat intake (see Table 3). Health-related factors are the most influential for the Sydney men, namely: personal health for 58% (317), dietary requirements for 51% (280) and health problems of relatives/friends for 21% (117). Environmental reasons are also a highly ranked factor with 40% (216) of the men indicating that they will respond to them. Animal welfare is an influential factor for 34%

Table 3. Factors that could influence men to reduce meat consumption (multiple choice)

Factor	Number of Respondents	Percentage
Personal health problems	317	58.2%
Dietary requirements	280	51.4%
Environmental reasons	216	39.6%
Marketing campaigns	193	35.4%
Animal welfare	186	34.1%
Relative/friend health problems	117	21.5%
Peer pressure	114	20.9%
Government (Federal, State) regulations	106	19.4%
Vegetarianism/veganism	36	6.6%
Other factors	31	5.7%

(186) of the Sydney male respondents. Of interest are also external factors that can push men's dietary choices towards meat reduction – marketing campaigns are likely to influence 35% (193) of them; peer pressure will have an impact on 21% (114) and government regulations on 19% (106). Understanding better vegetarianism and veganism will influence only 7% (36) of the Sydney men.

These results manifest that the new contemporary masculinity concept places under threat the old-school masculine identity passed through generations, from father, grandfathers and beyond. Coupled with proper social marketing messages about health, the natural environment and animal wellbeing, this new trend can lead to individual meat consumption behaviour changes.

Restricting red meat consumption to the limit put forward by the Australian health authorities, namely no more than 455g/week of cooked red meat (NHMRC, 2013; van Dooren & Kramer, 2012) and adopting more sustainable plant-based diets (Audsley et al., 2009; van Dooren & Kramer, 2012; Bogueva et al., 2017) will be positive for the environment, producing less greenhouse gas emissions compared to current levels of intake and will also lower the risk of chronic and non-communicable diseases (Pan et al., 2012), including diabetes (Feskens et al., 2013; Li et al., 2014; Micha et al., 2010), various types of cancer (WCRF/AICR, 2007; Giles et al., 1997; Bosland et al., 1999), stroke and other hearth disease (Dauchet et al., 2005, 2006, 2009; Greger, 2010; Micha et al., 2010). As voluntary dietary alterations, men can choose fluctuating the frequency of meat consumption or retaining the typical meal patterns, but opting to reduce the meat portions.

DISCUSSION

Health perception usually carries varieties of complexities linked with dietary types and strong masculinity appearance. They are difficult to define as often males treat their health-related symptoms in the traditional masculinity way of considering them as effeminate quality (Reeser, 2010; Devaney, 2005). A man is also seen not as masculine if he suffers from illnesses related to his manly attributes like prostate (Reeser, 2010). With 1 in 7 men diagnosed with prostate cancer during his lifetime (AIHW, 2017), awareness about the link between meat and cancer is essential.

Environmental considerations are already affecting Sydney men's meat consumption and this is likely to expand in the future. A radical alteration in western diets towards severe cuts in meat consumption can help curb the world's huge and increasing appetite for meat (Bogueva et al., 2017) to avoid devastating climate change to which agricultural livestock is contributing significantly (Bailey et al., 2014; Hedenus et al., 2014; Raphaely & Marinova, 2016; Stehfest et al., 2009). Climate change requires urgent action from consumers, producers and introduction of government policies. As the Sydney men's survey shows, the first steps are changing the notion about responsible consumption and no longer being ignorant about the carbon footprint of food.

Depersonalising and deidentifying ourselves with animal cruelty and slaughter remove the relation with meat production in our contemporary world. A large share of the Sydney participants pointed out animal welfare as a potential factor for swaying their attitude against meat consumption.

Masculinity norms are influenced by peer pressure reflecting socially recognised men-related beliefs, expectations and values (Mahalik et al., 2003). Friends' peer pressure encourages diverse degrees of decision-making from benign types such as choosing hair styles, clothes, music, TV shows, electronic games to moral, values and belief-based challenging decisions as body piercing, bodybuilding steroids (Sagoe, 2014) and fuelling addiction to tobacco (Conrad et al., 1992; Turner et al., 2004; Walsh & Tzelepis, 2009), illegal drugs (Jaslow, 2012; Palmqvist & Santavirta, 2006; Karvelas, 2012; King, 2009) and alcohol as part of being a masculine macho (Iwamoto and Smiler, 2013, King 2009). The mass media are a most powerful conveyor of these masculine socio-cultural needs (Palmqvist & Santavirta, 2006) and can also influence meat consumption directions based on peer pressure.

Government regulations at a federal, state or local level is another change factor. Being influential in regards to tobacco smoking behaviour change through taxing cigarettes, banning advertising, plain packaging, setting age limits for purchases, smoking ban in workplaces, airplanes, bars and restaurants, government restrictions played role in encouraging smokers to abandon their habits. Effective regulation could be put in place for meat consumption in a similar way through policies regarding food labelling, advertising and the supply of environmentally friendly food data (Pollard et al., 2013).

Vegetarianism and veganism as a factor influencing changes in meat consumption remain least influential. Although men are becoming more conscious about their own health and the environment, there is still a long way to go before fully restraining the deeply-rooted social masculinity traits and start accepting as normal, natural, necessary and nice (Piazza et al, 2015) vegetarian or vegan food. An Indiana Earlham College study in USA found that men abstaining from meat because of personal choice, physical, health problems or love for animals are alleged to be less masculine (Thomas, 2015). However, research by the University of Harvard shows men who consume higher quantities of processed meat to be 30% less manly based on sperm count (Mendes, 2017). Furthermore, research shows that vegan men have higher levels of testosterone (Allan et al., 2000), a less intense and more pleasant and attractive scent compared to meat consumers' hedonistic body odour (Havlicek & Lenochova, 2006) and less erectile dysfunctions (Greger, 2013). It is likely that in the future these positive scientific findings about the benefits of excluding meat from the male diet may start having a stronger impact on those concerned about their health and sexual attractiveness.

IS MASCULINITY UNDER THREAT?

The societal pressure on men to be always masculine with optimal physical and well-defined muscular body image pitched to them and intensified by popular culture, other men, women, the media, advertising, marketing, magazines and social interaction with others (Parasecoli, 2006; Crawshaw, 2007) is massive. Faced with this, men unconsciously and habitually continue to consume animal-based nutrients and meat proteins in their strive for strength and muscle building to prove and improve their masculinity. The hegemonic notion of masculinity and the muscular body ideal is claimed by fitness and men's health magazines as something that is mass-attainable and instrumental to achieving good health (Parasecoli, 2006). It is an imperative physical manifestation of men-gendered specific masculine traits and performances (Bennett & Gough, 2012; Gill, 2005; Nash & Phillipov, 2014; Gattario et al., 2015).

In the pursuit of being perceived as macho, men naturally distance themselves from practices considered feminine (Gough & Conner, 2006; Nash & Phillipov, 2014), such as being on a diet, skipping meals, avoiding social spaces where food is consumed (Gough, 2007; Contois, 2013) or eating vegetables (Adams & Calarco, 2016). The male aversion to ordering anything different than meat off a menu is a result of social policing fear of being ridiculed and seen weak by other men because of considering vegetables deemed as not as manly and acceptable choice as eating a steak for instance (Nash & Phillipov, 2014; Oliffe et al., 2015). These old-fashioned norms about masculinity however could be changed as the Sydney men's study reveals – the male participants are open to embrace new consumption behaviour, including when challenged in relation to concerns about health, animal welfare and the environment. Also, there are numerous examples of leading world athletes, including bodybuilders, who exhibit muscles, strength, agility, speed and tenacity, and are vegetarian or vegan – Carl Lewis, Mac Danzic, Mike Tyson, to mention a few names (The Richest, 2017).

The old-fashioned, stereotypical views of masculinity clash with the modern-day manifestation of manliness. In addition to social perceptions (as was the case with high-heel shoes and wigs) and physical power (as was the case with chasing wild animals), environmental, health and compassion considerations coupled with technological and scientific advances are shaping masculinity in new directions as indicated in the Sydney men's survey. Men are searching for their new role in modern society (McAllister, 2009). Characteristics, such as gentle nature, not being bound by manliness, lack of aggression in romance, seeing women as equal and avoiding causing pain (Morioka, 2013), are defining a new category of men in Japan (referred to as the "herbivore men"). Contemporary men are evolving by transforming their attitude and perceptions with more respect not only toward the other gender, but also to other sentient beings and the surrounding environment.

The introduction of plant-based options offered as a healthy fashionable trend and more amenable to men can respond to the sustainability priorities and the shift towards new social and environment values within society. Men were introduced to stylish grooming products, including perfumes, moisturisers, hair colouring, beard caring products, oils, moustache waxes, intimate hair removal, depilation tools and anti-aging creams (Fury, 2016), there is surely the possibility to create the seeds of a mass acceptance of plant-based foods as being good for human health and the environment revolutionising the new masculinity perception.

CONCLUSION

With the Sydney survey we tried to answer the question as to what is more important for the contemporary Australian men – the existing perceptions of masculinity as they relate to the consumption of meat or personal health and environmental wellbeing. Although the majority of men still support the prevailing opinion about the place and role of meat in their diets, there are categorical new signs which indicate that a shift towards healthier and more sustainable food choices is possible.

Rather than juxtaposing these two concepts, it is time to bring them together in a new way which redefines masculinity in response to the current sustainability, climate change and health priorities. Social marketing, education, mass media – there are many channels that can be used to facilitate this process of transformation. It will free up men to demonstrate their true masculinity in making the best food choices for all.

ACKNOWLEDGMENT

The authors acknowledge the contribution of an Australian Government Research Training Program Scholarship in supporting this research.

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KEY TERMS AND DEFINITIONS

Animal Welfare: Consideration about the conditions in which animals live.

Health Consciousness: Behaviour and attitude which considers health considerations in a person's diet or lifestyle.

Macho: A man who is explicitly proud of his masculinity.

Manliness: A set of traits, abilities, attributes and qualities which characterise the male human species.

Masculinity: Manifestation of manliness.

Vegan: Related to a person, diet and lifestyle that voluntary excludes animal-based products.

Vegetarian: Related to a person or diet that voluntary excludes meat and meat-based products.

PUBLICATION 6

Bogueva, D., Marinova, D., Phau, I. (2018) Is meat a luxury? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 172-186

Chapter 12
Is Meat a Luxury?

Diana Bogueva
Curtin University, Australia

Dora Marinova
Curtin University, Australia

Ian Phau
Curtin University, Australia

ABSTRACT

Once perceived as a nutritional and occasional bonus, meat has now daily presence in the affluent West, serving human appetite for food. Although meat is not a product typically associated with luxury, its large ecological footprint poses the question whether it is time to challenge consumers' perception about animal-based proteins. The purpose of this chapter is to gain a perspective on how consumers respond to the idea of meat being a luxury product. A 2017 Sydney study investigated the concept of luxury meat and meat consumption amongst three generations – Xers, GenY and GenZ. It shows the emerging meaning of luxury goods related to meat that is sustainable, healthy and socially responsible, in response to climate change and feeding the world's population. The Sydney evidence also suggests meat is no longer essential for human health. A shift towards plant-based and new meat alternatives can create more compassionate and environmentally responsible choices.

The monopolising eater of animal flesh would no longer destroy his constitution by eating an acre at a meal. Percy Shelley, A Vindication of Natural Diet (1813)

INTRODUCTION

The concept of luxury has had various descriptions throughout the years (Hennings et al., 2013a and b). According to the French fashion icon Coco Chanel: "Luxury is a necessity that begins where necessity ends" (in Husic & Cicic, 2009, p. 235). This famous quote refers to a particular life style described by the Oxford Latin Dictionary (1992, p. 30) as "extravagant living, (over)-indulgence". Similarly, luxury

DOI: 10.4018/978-1-5225-4757-0.ch012

is defined as enlightening, providing extra pleasure and flattering simultaneously all senses and is "the appendage of the ruling classes" (Kapferer, 1997, p. 253). Luxury provides numerous forms of physical and psychological values (Wiedman et al., 2007). The Merriam-Webster dictionary (2009, n.p.) explains luxury as "a condition of abundance or great ease and comfort" or "something adding to pleasure or comfort but not absolutely necessary". Phau and Prendergast (2000) suggest that luxury brands evoke exclusivity, high brand awareness and perceived quality, and consequently attract customer loyalty. The qualities of: (1) life style; (2) abundance and access; (3) pleasure; and (4) loyalty, are major characteristics associated with luxury. What this chapter does is look at meat through the lens of luxury.

Meat's four luxury characteristics differ in a historical perspective – they manifest differently in the past, the present and the future. Whilst in the past availability and economic affordability determined meat's luxury status, its environmental and public health impacts combined with ethical considerations are likely to influence its future. A diet with high meat intake has a much bigger environmental footprint – in relation to greenhouse gas emissions and climate change (Hedenus et al., 2014), biodiversity loss, land and water use (Marinova & Raphaely, 2017), peak phosphorus (White & Cordell, 2015), as well as serious negative consequences for public health (Marsh et al., 2016). Nevertheless, the global population continues to expand its per capita meat supply and consumption (Raphaely & Marinova, 2016) augmenting the need to understand the link with luxury.

The consumption of meat also differs across geographies and nations. In the West nowadays meat is a daily nutritional source and not considered a luxury food while in cuisines like Korean, Bangladeshi or Ethiopian, it is more like a seasoning rather than main meal (Kaye, 2014; Smith, 2017). Environmental and animal rights groups (e.g. Animal Liberation Front, 2006) on the other hand argue that meat should be treated as a luxury because of livestock welfare and ecological considerations. A shift to seeing meat as a luxury in the West, can also potentially help preserve and reaffirm the traditional diets in the developing world which are generally healthier and rely more on plant-based products. The aim of this chapter is to unpack the four luxury characteristics of meat in order to encourage a new attitude and behavioural changes towards reduction in the consumption of animal-based products.

MEAT AND LUXURY IN THE PAST

With industrialisation and economic development, meat has obtained an established presence for the mass-market consumers in the affluent Western countries as well as for those with higher incomes in the burgeoning economies of the developing world. This is a very new situation compared to meat's previous status of rarity, exclusiveness and prestige in the past. Meat throughout human history was perceived as uncommon luxury symbolising unrestrained pleasure, power, dominance, virility, status and pure manliness. It was surrounded by many prohibitions, taboos, understanding for dominance and social hierarchy and meat myths (Fessler & Navarrete, 2003; Rozin et al., 2012; Dhont et al., 2014; Bogueva & Phau, 2016).

Life Style

In the olden times of ancient places such as Greece, Rome, Sparta and Egypt, meat – including beef, pork, sausages and poultry, was solely enjoyed by the wealthiest people in society (Fresco, 2016; Toussaint-Samat, 2009; Stambaugh, 1988). The best and most uncommon meat was usually devoured

by rich people. In the ancient Roman city meat "was scarce except at sacrifices and the dinner parties of the rich" (Stambaugh, 1988, p. 148). Fresco (2016, p. 121) succinctly summarises meat as a life style luxury stating that "a rich person eats meat; an even richer person eats the best, most uncommon meat".

Heroes, fighters, warriors and athletes were also privileged in ancient societies. They preferred consuming meat, and specifically red meat, because of the belief it was giving them the courage and strengths needed to defeat the enemies, battle opponents and maintain their glory, dignity and reputation (Nenova, 2015). The famous distinct "black broth" of the Spartans was a pork stew made with pig legs, blood and vinegar and itself required exceptional bravery to be consumed (Nenova, 2015; Flacelière, 2002). Olympic athletes who previously ate dried fruits, grains and cheese, turned to meat in the 3rd century (Grivetti & Applegate, 1997). Eating meat, as well as drinking wine, was believed to give them competitive advantage (Grivetti & Applegate, 1997).

Meat was strongly associated with social and physical power. However, Fresco (2016) points out that refusal to eat meat was used as an expression of rejection of power. The Pythagorean sect in ancient Greece was vegetarian in protest to the ruling state (Fresco, 2016).

Abundance and Access

Prior to industrial farming of both, crops for feed and animals for slaughter, access to meat was restricted because it was simply not available in the quantities required for it to be the main part of every meal. In historical periods of famine, associated with plagues, cholera and other epidemic diseases, droughts, frosts, floods and further climatic and geological events, wars, revolutions, blockades and governance failures (The Free Library, 2004), supply of food, and particularly meat, was highly restricted (Ó Gráda, 2009). During the two World Wars meat like many other foods was difficult to obtain and became a wartime necessity. Rationing was widely introduced to manage shortages and control civilian consumption with equitable distribution of food which was often barely edible (Lee, 2014). People in Europe and to some extent in the United States and Australia experienced meatless years as meat was shipped to feed the soldiers at the frontline (Sundin, 2011; BBC, 2014; Australian War Memorial, n.d.). Internal animal organs such as hearts, livers, tripe, tongue and kidneys, were introduced as a mainstream part of dining (Romm, 2014).

In the last 55 years however, things drastically changed and meat became the norm, very affordable for many. Worldwide meat consumption surged from 61 g per person per day (Sans & Combris, 2015) or 21.7 kg per person per year in 1961 to 96 g per person per day or 34.3 kg per person per year in 2017 (OECD, 2017). In the most developed countries, animal protein intake now exceeds nutritional needs (Sans & Combris, 2015). There meat has become a food in abundance, easily accessible affordable luxury offering gastronomic comfort.

Pleasure

Luxury is an indulgence which generates physical, mental or emotional pleasure. For meat eaters, the sensation of eating this food is described as "mouth-watering", "delicious", "more than simple enjoyment. It's like orgasm" (Bogueva et al., 2017, p. 485, 486, 488). Silverstein and Fiske (2003, p.1) depict meat as a new luxury belonging to a class of premium highly desirable goods to which consumers are attached on an emotional level perceiving them to be of higher levels of quality, taste and aspirational achievement compared to the alternatives. In fact, humans are the only animal which eats not just to

satisfy energy and nutritional needs, but for pleasure (Fresco, 2016). Throughout human history, abundance of meat has been a symbol of "lavish hospitality" (Fresco, 2016, p. 103).

Loyalty

The loyalty of consumers to meat is demonstrated in their attachment to and explicit preference of this kind of food over other vegetarian and vegan options. Whilst meat intake has been on a constant increase to reach unhealthy levels in Western diets (Marsh et al., 2016), consumption of fruits and vegetables is significantly below recommended daily doses. In fact, in 2010 Greece was the only developed country where the average consumption of vegetables, including legumes, was at the recommended level (Micha et al., 2015). No developed country had average consumption of fruit at the recommended level (Micha et al., 2015). This loyalty to meat also expands to people getting out of poverty in the emerging economies where traditional diets rich in plant-based nutrients are gradually replaced by animal proteins. Consumers seem unconscious about how their daily food reaches their plates (Fresco, 2016) and the environmental and health consequences of their loyalty to meat.

MEAT AND LUXURY TODAY

In order to understand the link between meat and luxury today, a survey was conducted in Sydney, Australia in 2017. Being Australia's largest city and one of the world's most liveable urban environments (Arlington, 2016), Sydney is representative of a wealthy economy characterised with a predominantly western type of diet which has embraced the multi-cultural nature of the Australian society (Wells, 2015). Any insights from Sydney can be extrapolated to many other Australian cities as well as affluent western societies.

The anonymous, randomly selected representative sample included 1100 participants – 545 males and 555 males representing three generations of consumers – Generation X or Xers (born between 1965 to 1976), Millennials or Generation Y (born between 1977 to 1995) and adult Centennials or Generation Z or iGen (born between 1996 and 1999). Although sociologists and psychologists assign different influences, core values and characteristics to these three generations (McCrindle Research, 2012; Centre for Generational Kinetics, 2016; Generational Differences Chart, n.d.), what was of interest in this survey was for these adults to be in full or part-time employment imposing less financial restrictions on their dietary choices.

Following ethics approval obtained from Curtin University, the survey was sent to 1500 people. The 73% response rate was high and indicated interest and engagement with the topic. Table 1 shows the survey participants by generation. The Millennials engaged strongly with the issue as indicated by their high response rate of 99.6% and overall large representation in the survey sample at 45%. Generation X and the Centennials were respectively represented at 32% and 23% (see Table 1).

In Australia, consumption of meat, and especially red meat, is very popular (Bogueva et al., 2017) and with 93 kg per year per person, the country had one of the highest per capita rates in the world in 2016 (OECD, 2017). The popularity of meat is also manifested in Sydney. Almost 80% (875 people) of the participant sample included meat in their diet (see Table 2) with the remaining 20% being either vegetarian or piscetarian (eating fish but not poultry, red or game meat). This is in line with the 2016 Roy Morgan Research poll which reports that 14.4% of the Sydney residents eat an almost vegetarian diet.

Table 1. Sydney survey participants by generation, 2017

Year Born	Generation	Number of Participants	Percentage of Total Sample
1965 – 1976	Generation X	354	32%
1977 – 1994	Millennials	498	45%
1995 – 1999	Centennials	248	23%
Total		1100	100%

Table 2. Profile of the participants per generation groups

Generation	Meat Eaters (%)	Non-Meat Eaters (%)	Meat Perceived as Luxury (%)
Generation X	291 (82%)	63 (18%)	247 (70%)
Millennials	418 (77%)	124 (23%)	384 (71%)
Centennials	166 (81%)	38 (19%)	151 (74%)
Total	875 (80%)	225 (20%)	782 (71%)

A large share of the Sydney respondents – 71% (or 782 people), across the three generational groups described meat as a luxury product (see Table 2). It appears that the younger people are, the more likely they are to see meat as a luxury with 74% of the Centennials agreeing with this statement (see Table 2). The reasons behind this are described below.

Life Style

Climate change and other environmental concerns are influencing people's life style in Australia. This large continent is exposed to the effects of more aridity, heavier rainfalls and record high temperatures and combinations of these extreme weather events (Bao et al., 2017). Sydney is already experiencing such changes and environmental considerations are increasingly shaping the city dwellers' attitudes as demonstrated with adoption of renewable energy and more sustainable transport options. However, despite the confirmed scientific evidence and a lot written about livestock's impact on greenhouse gas emissions and the ecology (e.g. Raphaely & Marinova, 2016), the link between maintaining the current livability and life style of Sydney and meat consumption is yet to be widely understood. Less than a third of the Sydney participants, namely 28% (refer to Table 3), see meat as an environmentally expensive dietary option which could potentially seriously impact on their wellbeing. On the other hand, there seems to be a trend of younger generations being more aware of the heavy environmental footprint of meat (see Table 4).

Furthermore, meat consumption has been associated with health risks. Processed meat is Group 1 carcinogenic and red meat is Group 2A probably carcinogenic (WHO, 2015). The use of antibiotics in industrial chicken factories poses threats to the development of widespread antimicrobial resistance (Review of Antimicrobial Resistance, 2015). Again, only a small share of the survey participants, namely 9% (see Table 3), realised that consuming meat is optional for human health and in fact, larger quantities and particular meats can be detrimental and negatively impact on life style. Education and social marketing (Bogueva et al., 2017) are most needed to inform better the Sydney public.

Table 3. Is this a reason for meat to be perceived as a luxury product?

Reasons	Yes, i.e. Luxury (%)	No, i.e. Non-Luxury (%)
Eating meat is rare and exclusive	69 (6%)	1031 (94%)
Meat conveys a special social status of prestige and prosperity	80 (7%)	1020 (93%)
Meat is optional for human health	102 (9%)	998 (91%)
Meat is environmentally expensive	309 (28%)	791 (72%)
Meat is sustainably produced	514 (47%)	586 (53%)
Meat has expensive premium cuts	589 (54%)	511 (46%)

Table 4. Environmental aspects of meat

Generation	Meat Needs to be Sustainably Produced to be a Luxury (% of Generation Respondents)	Meat is Environmentally Expensive Luxury (% of Generation Respondents)
Gen X	91 (25.7%)	65 (18.3%)
Millennials	306 (56.4%)	177 (32.6%)
Centennials	118 (57.8%)	67 (32.8%)

Abundance and Access

Almost all Sydney participants, namely 94%, did not consider meat to be a rare and exclusive food and 93% did not associate it with social status of prestige or prosperity (see Table 3). This is a big change from previous times and/or other places where meat is not as widely affordable. Industrial farming combined with increased purchasing capacity has contributed to this widespread attitude. Compared to traditional diets and other not as wealthy societies, the abundance and easy access to livestock meat products in Sydney are turning what used to be an exclusive and luxury product to an everyday option with many seeing this change as improvement in living standards (Bogueva et al., 2017). In other words, the desire for luxury foods based on animal proteins has triggered industrial livestock farming which has made meat accessible and affordable and hence no longer perceived as a luxury. To paraphrase Chanel Coco, meat has become a necessity where the necessity for meat had ended.

Pleasure

The Sydney participants were asked to describe in their own words when and why meat could be considered a luxury. Many used explanations that evoke the sense of pleasure from consuming meat (see Table 5). Descriptions, such as: "Gourmet… meat is luxurious", "Meat shows good social standing" clearly indicate feelings of comfort and enjoyment when eating meat. There were a few voices, however, which argued that for food to be pleasurable, it doesn't need to contain animal-based ingredients. For example: "vegan dishes… are just as filling" and "Meat is so bad… we are all guilty of eating it" (see Table 5).

Table 5. Descriptions of meat as a luxury product in the words of Sydney participants

The way meat is cooked and presented make it look luxurious.
Gourmet, rare meat is luxurious.
Good meat is a premium product that needs hips of water, good food and space to produce.
It depends on the animal, cut, grade and recipe; e.g. rump steak vs traditional beef wellington
Quality and preparation of meat is important when dining to know you will receive good meal.
Meat is expensive and shows good social standing.
Meat is expensive nowadays especially when compared to most vegetarian/vegan dishes that are just as filling.
As a vegan the amount of harassment, ridicule and judgement I get from meat-eaters is astounding. It really confronts them to have someone around them be vegan.
Meat is so bad sustainability-wise to produce and we are all guilty for eating it.

Loyalty

When meat is largely available and accessible in affluent societies such as Australia, USA or Western Europe, its status as a luxury food is manifested by the consumption of either very expensive cuts or from organically raised animals. More than half of all Sydney participants – 54%, were of the opinion that the expensive premium cuts explain the meat's status as a luxury product. The Sydney sample was also divided in its perception of the link between sustainably produced meat and luxury – 47% thought that this was the case while 53% disagreed. In other words, consumers' loyalty to meat persists in this day and age but there is a shift in their attitude to luxury related not to meat in general, but to the more expensive meats.

The sustainably produced meat is an emerging new meaning of luxury in response to environmental awareness. When this becomes reflected in consumer behaviour, meat consumption around the globe, including in Australia, will drastically reduce as there is not enough available agricultural land on the planet to raise livestock organically for the current levels of animal protein intakes. A study by Erb et al. (2016) modelled whether the world's estimated population of 9.6 billion by 2050 can be fed without expanding the currently used agricultural land in order to arrest deforestation and avoid further environmental harm. It concludes that only 15% of the 2050 world population would be able to be fed on a Western-type meat-based diet compared to everybody on an organic vegan diet. For those whose loyalty to meat is likely to continue in a world of high environmental consciousness, the concept of organic meat as a luxury will be further reinforced.

MEAT AND LUXURY IN THE FUTURE

Luxury is rooted in human culture and possesses special attributes including premium price, unique ownership, a degree of craft, high level of quality, strong aesthetics and positive social perception. As our value systems develop and change, things that were once acceptable as luxury objects, such as elephant ivory, rhinoceros horns, lion heads, crocodile and tiger skins, are no longer seen as such and the practices

which allowed them to exist are often subjected to strong moral judgements and rejected as things of the past not acceptable in the future. With society embracing environmental and sustainability values at large, there is ample evidence that industrially produced livestock meat, and in fact any animal meat, may soon become an outdated way to feed a hungry global population. Although there is a long way to go before this becomes a reality, the climate change imperatives combined with the planet's ecological limits are already imposing the need for a social transformation towards predominantly plant-based diets. Social marketing is urgently needed to counteract the existing trends and facilitate such a shift (Bogueva et al., 2017).

Life Style

Contemporary luxury is extremely difficult to define beside the basic consensus that it is an expenditure beyond what is considered necessary (Godart & Seong, 2014). Understanding luxury is even more challenging with marketing and advertising efforts consistently targeting a broad mass-consumer market as distinctive to images of rarity and exclusivity (Kapferer & Bastien, 2010). The Greek philosopher Plato (482 BC–348 BC) explained luxury as scarcity, a battle over highly desirable resources and hence, at the root of wars and conflicts; those who are successful obtain high social status and associated life style (in Godart and Seong, 2014). According to Godart and Seong (2014), there are two fundamental philosophical positions associated with luxury and they are likely to persist into the future. The first is that originating from the French philosopher Voltaire (1694–1778) for whom luxury is joy and a stimulus for economic development; the French philosopher Rousseau (1712–1778), on the other hand, sees luxury as detrimental not only because it causes conflicts but also because it detracts from more meaningful pursuits (in Godart & Seong, 2014). Within the new culture of sustainability, developments around food are likely to exhibit both philosophical views.

As with clothes, food will "not only be the vehicle for more respect for the environment and social development, but it will also be synonym of culture, art and innovation" (Gardetti & Justo, 2017, p. 347). This creative and entrepreneurial aspect is most needed in opening up and developing the market of new meats (Schmidinger et al., 2018). Organically and sustainably produced meat is also part of the solution of maintaining the current life style food choices and culture through innovative environmentally friendly approaches. At the other end of the spectrum are reclaiming and resurrecting the meaning of "meat" as the flesh of fruits and vegetables – the most common objection to the efforts to create new plant-based alternatives and analogues to animal proteins, including lab meat.

Abundance and Access

The pursuit of luxury places an individual at the top of the social hierarchy and can be desirable if seen as part of improving the overall quality of life. However, as meat's ecological footprint uses scarce resources, generates high levels of greenhouse gas emissions, causes deforestation, land misuse, fresh water depletion and biodiversity loss, the increase in the global demand for animal products combined with population growth, the price of meat will naturally raise restricting its abundance and access. Climate change fluctuations, including extreme temperatures, droughts and floods, will disproportionately affect livestock production. Furthermore, grain as animal feed will continue to compete with food for human

consumption raising moral concerns about justice and equity. Western consumers will also start feeling the environmental price as they start competing with wealthy elites from developing countries such as China who are not far behind in following the meat indulgence steps (Bogueva et al., 2017). Meat is unlikely to remain a viable luxury food option on the supply side of the global economy, particularly if government subsidies are withdrawn (Shapiro, 2016).

From a demand perspective, meat and animal products are also likely to face decreased popularity. As the results from the Sydney survey show, the younger generations of Millennials and Centennials are conscientiously evolving through a different mindset, more environmental awareness and perhaps not as easily deceived by the livestock industry's marketing campaigns. These generations are increasingly becoming more aware of the environmental havoc caused by animal agriculture, intense meat farming and the gruesome process of transforming animals in the slaughterhouses into food. They embrace technology and have information on their fingertips, including when actively searching for answers, participating in social media, freely discussing issues they are passionate about. Opinionated, health conscious and knowledgeable, these generations are likely to want to avoid the causes (e.g. cancer, obesity, diabetes, heart disease and stroke) killing their parents and grandparents through better nutritional choices. They also care for the future of the planet and will have to deal with the environmental consequences of the previous generations. It will come as no surprise if they are willing to embrace the new meat alternatives and a more plant-centric way of eating making smart environmental and health choices. These new generations are also more spiritual (Robey-Graham, 2008) and highly likely to be more compassionate to other living animals compared to the individualist and self-absorbed baby boomers (Robey-Graham, 2008) and the conservative traditionalist silent generation borne prior to the end of World War Two (Generational Differences Chart, n.d.).

Pleasure

A modern socio-economic trend amongst the mass middle-market consumers is the "new luxury" (Silverstein & Fiske, 2003) described with terms, such as true luxury, masstige, premium, ultra-premium, opuluxe, casual luxury, accessible luxury, hyperluxury and meta luxury (Kapferer & Bastien, 2009). Instead of being unreachable, luxury is becoming more accessible to many. Consumers are accountable for democratising the access to the luxury market (Tsai, 2005) and conquering the perception of prosperity (Schwartz, 2002). In wealthy societies, consumers who have surmounted the phase of securing basic survival and comfort, are seeking expansion of pleasure (Patrick & Hagtvedt, 2015, p. 269).

Food is part of this new luxury market. Represented by advertising images, symbols and luxury brands (Chevalier & Mazzalovo, 2012; Freire, 2014), the food industry and fine dining are penetrating the emotions and experiences of consumers, reflective of the changing nature of their needs and preferences (Danziger, 2005). With the transition to a more sustainable way of living, meat is unlikely to be able to keep its position of pleasure and will be replaced by other more sophisticated plant-based food products. In fact, meat-free options are becoming the new luxury offering colour, flavour, texture and sensational taste in fine dining and in response to the increasing prevalence of climatarian, flexitarian, vegetarian and vegan dietary styles in Australia (Roy Morgan Research, 2016) and across the globe (Cormack, 2016).

Loyalty

Although "organic agriculture has an untapped role to play when it comes to the establishment of sustainable farming systems" (Reganold & Wachter, 2016, n.p.), those loyal to meat as food will have to drastically reduce its consumption within the context of environmental and sustainability priorities. This will be in line with dietary recommendations (e.g. WCRF/AICR, 2007; SACN, 2011; NHMRC, 2013; NHMRC, 2016; FIA Communications, 2016) which restrict the intake of red meat because of health reasons, including its link to cancer. Poultry consumption would similarly have to be reduced as the current methods for industrial production of chicken meat is threatening the availability of antibiotics for human use (Review of Antimicrobial Resistance, 2015). Realistically, humanity is unlikely to give up livestock meat completely. However, the only place such meat is likely to have in people's diet is as an occasional luxury product and something that is neither necessary nor good for human health.

CONCLUSION

Luxury and sustainability are not a usual pair you expect to find combined in the same sentence as they describe largely different concepts. Symbolising prosperity, power, social status (Kapferer & Bastien, 2010) and a highly desirable luxury product in the past, meat nowadays has become the norm and affordable to many due to economic development, higher incomes and the industrial farming practices of the livestock industry. Meat is no longer perceived as a luxury and the production methods, shear volume of livestock animals, resources they use and associated greenhouse gas emissions make it also unsustainable.

The four characteristics of luxury, namely life style, abundance and access, pleasure and loyalty, and their association with meat, have changed drastically throughout the years in response to the broader socio-economic, cultural and environmental contexts. So has the luxury market which has become more democratised and embraced new luxury products, including foods. The Sydney survey shows that firstly, people perceive as luxury only particular types of meat, namely organic and sustainably produced as well as expensive cuts and gourmet meats; and secondly, that there is lack of understanding about the environmental and health impacts of meat production and consumption with the younger generations being relatively more aware of the problems.

Deep values like environmental, social and animal welfare issues can be encompassed by consumer aspirations in luxury products (Bendell & Kleanthous, 2007). According to Hashmi (2017), currently there is a shift in the luxury realm and consumers from all walks of life "are increasingly concerned about social and environmental issues, and prefer ethical and green products that reflect their own values and beliefs" (Hennigs et al., 2013, p. 25). This is the case with meat where consumers are now either looking for organic and sustainable products or shifting altogether towards plant-based options. The new luxury mass market which reflects improved prosperity and quality of life, will continue to include food but with dominating sustainability and climate change concerns it is very likely that livestock meat will soon be replaced as a desirable product by non-animal based options which reflect the art, creativity and innovation in dealing with the challenges of feeding a healthy global population. This will bring the new luxury consumption in line with the sustainability imperatives.

ACKNOWLEDGMENT

The first and second author acknowledge the contribution of an Australian Government Research Training Program Scholarship in supporting this research.

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KEY TERMS AND DEFINITIONS

Centennials: Generation Z or iGen, people born between 1996 and 1999.

Generation X: Xers, people born between 1965 to 1976.

Life Style: The way a person lives, including the objects and services s/he consumes.

Loyalty: Support, allegiance or attachment demonstrated towards a particular person, place, organisation or objects.

Luxury: A perceived necessity in excess of normal necessities which makes us feel better.

Millennials: Generation Y, people born between 1977 and 1995.

New Meat: Plant-based alternatives to animal products, including the flesh of fruits and vegetables.

PUBLICATION 7

Schmidinger K., **Bogueva D.,** Marinova, D. (2018) New meat without livestock. In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Handbook of Research on Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA, pp. 344-361

Chapter 23
New Meat Without Livestock

Kurt Schmidinger
University of Vienna, Austria

Diana Bogueva
Curtin University, Australia

Dora Marinova
Curtin University, Australia

ABSTRACT

This chapter summarizes the global problems associated with livestock production and meat consumption and shows solution strategies through replacing animal products with plant-based alternatives. The positive effects of plant-based alternatives on human health and the environment are reviewed together with approaches for reducing world hunger. Psychological strategies for nutritional transitions towards more sustainable consumption patterns and criteria for market success of meat alternatives are presented. This is followed by an overview of meat alternatives – from soy[1], lupine or wheat based, to bleeding burgers and artificial intelligence concepts. Marketing strategies and best practice policy suggestions complete the chapter.

INTRODUCTION

Global mass production of livestock and the consumption of animal products are the major cause of a wide range of serious problems – environmental, health-related, concerning animal welfare and world nutrition. Environmentally, livestock production is a, or the, leading factor in land use, water consumption, pollution, rainforest destruction, climate change, loss of biodiversity and soil erosion (Steinfeld et al., 2006). The main reason for most of these problems is the inefficiency of livestock, where the largest share of the feed calories is used in the animals' metabolism and converted to excrements instead of food for human consumption. Such lengthened food chains, namely plant to animal to human, are heavily inefficient in resource use compared to short food chains, namely plant to human (see Figure 1). This inefficiency also explains why mass production of livestock is associated with world hunger (see later for more detail).

DOI: 10.4018/978-1-5225-4757-0.ch023

Most of the 70 billion animals (excluding sea creatures) produced annually for food consumption live in confined conditions raising severe concerns for their welfare. Although animal welfare is beyond the scope of this chapter, it is a major consideration for the wellbeing of all living beings on this planet. Intensive livestock production is a major risk factor for new global pandemics originating from industrial types of facilities as well as for antibiotic resistances while excessive consumption of meat, eggs and dairy is associated with lifestyle diseases, such as obesity, type 2 diabetes, cancer and heart disease (Schmidinger, 2012).

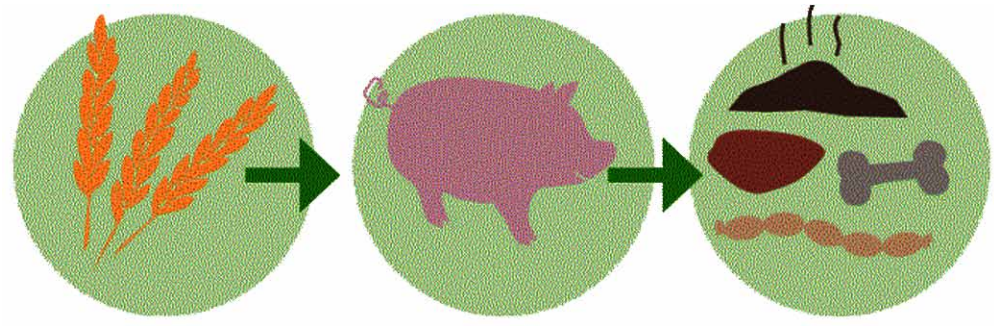
Given the convincing evidence about the negative impacts of animal-based dietary choices (Raphaely & Marinova, 2016), the question arises how to make consumers consume less of such food and whether a meat-free future is possible. This chapter explores plant-based alternatives to meat and other animal products together with strategies to encourage their acceptability. It also outlines criteria for market success which can trigger positive responses from the consumers and beneficial outcomes.

MAKING CONSUMERS EAT LESS ANIMAL PRODUCTS

Promoting plant-based food diets has a solid environmental and especially health case and is increasingly finding space in the EU countries. This is the case in the food guidelines of Sweden (Fischer et al., 2016), France (ANSES France, 2017), the UK Eatwell Guide (Public Health England, 2017) and Germany (DGE, 2017). Producing, distributing, selling and promoting meat is a seriously lucrative business, which relies heavily on the well-established forms of animal mass production at a minimum cost for the producer and especially on the ever-increasing consumption of meat and other foods of animal origin. The existing marketing and advertising efforts aim at bolstering further the intake of animal-based proteins (Bogueva and Phau, 2016). This is despite the clear evidence about the positive consequences, for both human health and the environment, of dietary changes toward healthier and more sustainable plant-based intake (Raphaely and Marinova, 2016; Bogueva et al., 2017; Springmann et al., 2016) and meat alternatives (Schmidinger, 2012). A major shift is clearly necessary.

In principle, a shift could be achieved with existing foods which do not contain animal products, but new plant-based innovations can assist such a transition and make it more realistic (Aiking and de

Figure 1. Livestock's long food chain
Note: Lengthening the food chain by livestock production leads to a loss of a big share of calories from plants within the metabolism of the farmed animals, only a small share of the plant calories is converted to animal products, the major share is converted to excrements and lost for human nutrition.



Boer, 2006). As it stands, at the moment the consumption of new alternatives has a long way to cut across existing habits before achieving mass popularity globally. Within any given society, the majority of people tend to adhere to an average diet. In traditional societies, this diet uses more plant-based ingredients, but globalisation triggers widespread westernisation of consumer tastes and with it higher intake of animal products (Hossain, 2016). Furthermore, improvements in people's earning capacity in developing countries also result in preferences for animal-based food (Raphaely & Marinova, 2014). On the other hand, people are influenced by the food choices made by others – relatives, friends, peers, celebrities, as well as advertising, availability and accessibility of products.

Stability/Energy Minimum Hypothesis

The *Stability/Energy Minimum Hypothesis* is a model derived from the theory of Balluch (2009). Adapted to nutritional aspects it shows the need for concerted actions instead of relying only on behaviour changes by billions of individuals.

The basic assumption of this hypothesis is that most individuals in a society try to live in a way that requires least effort or minimum energy. In Figure 2 this is represented by the trough, the area around the minimum of the curve. Applied to eating habits, this means that people tend to eat what is cheap, widely available, socially accepted and tastes well. In industrialised societies, this overwhelmingly involves animal-based products. Living as a vegan, an individual might be excluded from eating in certain restaurants. It may also cause stressful situations when attending business lunches or being invited for dinner or barbecue where vegan options are not served. Furthermore, it may cost more energy and longer shopping times to find the right foods. When abroad in a country with a foreign language, it will be harder to identify all ingredients of food products or dishes. It could be harder for vegetarian parents to find all-day school places offering a varied vegetarian menu for their children. Furthermore, for the children it might cost more energy to avoid becoming an outsider by not joining their friends in going to fast-food restaurants and eating non-vegetarian burgers.

Many individuals who originally were willing to change, tend to "save energy" and revert back to behaviour that makes their lives easier and matches that of the majority of the society to which they belong. In Figure 2, the red minimum represents the behaviour which requires the minimum energy associated with heavy use of animal-based foods in industrialised societies. The right side from the curve's minimum represents a more sustainable/ethical diet, while the left side is a less sustainable diet. Both require more individual energy than adhering to the average diet of a western society. The problem of minimum energy arises from both sides of the curve. A vegan or vegetarian diet is an example from the more sustainable right hand-side of the curve. Eating dogs may be acceptable in some parts of the world (see Figure 3), but would require more energy in the West where such animals are considered pets and domestic companions. This is an example of a less ethical diet from the left hand-side of the curve.

Living outside the trough around the minimum of the curve (see Figure 2) costs energy and requires more effort than following the nutritional mainstream. Such individuals need a lot of motivation and perseverance not to roll back and keep their position stable in the long term.

Shifting to a More Sustainable Diet

In Figure 4, the trough of the curve is pushed to the right, towards a more sustainable form of eating within a society. A wider range of new and attractive plant-based foods offered in markets, supermarkets,

Figure 2. Stability/energy minimum hypothesis in industrialised countries
Note: This graph shows how much energy an individual needs to keep up a certain diet. The political and economic system shape the curve. The trough (in red) is the minimum energy area. Outside the minimum, the individuals have to invest perpetual energy not to "roll back" into the trough, so their position is not stable.

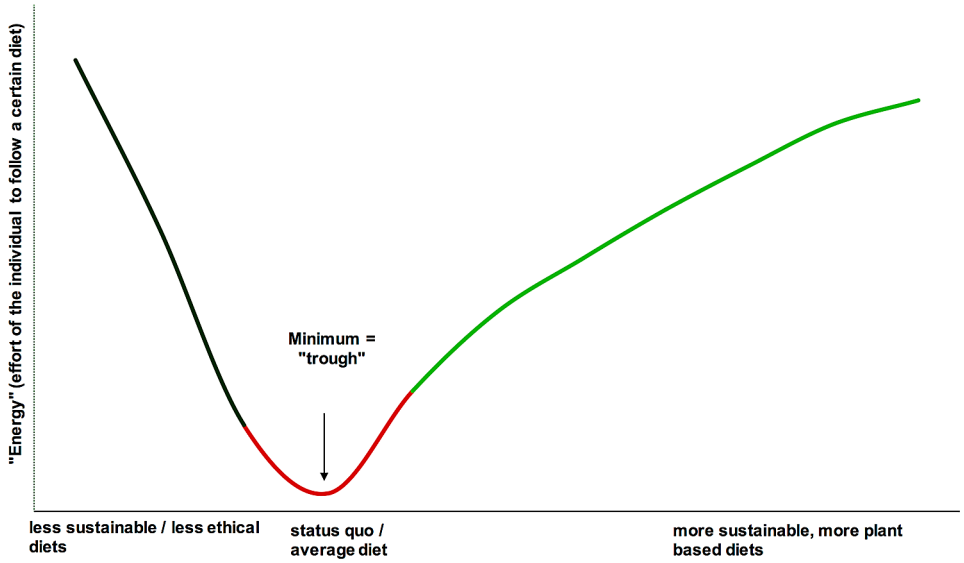


Figure 3. Dog meat sold in the streets of Hanoi, Vietnam, March 2017

shops, restaurants and canteens can help push the trough towards a more sustainable consumption if these new choices become easily available, cheaper and their marketing is successful. The reminder of the chapter presents ideas how to make possible and pleasant to eat more sustainably, which pushes the minimum energy trough to the right and with it the majority of individuals in a society towards a more sustainable nutrition.

Figure 5 shows a further variation of this model taken from Schmidinger (2012). In it, communities within a society define their own, more sustainable "rules" of nutrition, and the process of adhering to these agreements leads to social acceptance and affirmation creating local troughs in the right part of the curve. Examples are the vegan movements in Europe or the US since 2012 – it has become trendy to live without animal products (e.g. Harvard Medical School, 2016). Being part of such movements and adhering to their vegan agreements form local troughs in the curve on the right of the status quo minimum.

Let's use the example of the vegan movement and illustratively draw an optimistic picture for its future. The more like-minded people form such vegan groupings, the easier it is for each individual to stick to the lifestyle of the group. Figuratively, the more individuals such a social grouping consists of, the more "weight" will be exerted on the curve and the deeper such a local minimum will become. The markets will respond with new varieties of vegan products and food offers, labelling them as vegan. Politics will change due to the influence of vegan voters; the media will react, making the vegan lifestyle even more attractive, and the vegan energy minimum (the trough on the right of the curve) will become deeper and deeper. Such local minimums could eventually also lead to a shift of the energy minimum to the right as shown in Figure 4. Ideally if the more sustainable local minimums become deeper than the current minimum, many individuals from the current trough will roll over to the new minimum to the right of the curve. This will make the old trough disappear with not many individuals there and less weight and the curve from the old minimum will go directly up. Finally, this will lead to a new trough further right than before, and thus a more sustainable diet is achieved.

If broad target groups of people or even the majority of society are to shift to the right of the respective curves as postulated by the Stability/Energy Minimum-Hypothesis, many actions would be required. Given the seriousness of the problems associated with the consumption of animal-based products, it is

Figure 4. Push to a more sustainable diet

Note: Changed conditions in a society (e.g. food markets, political actions etc.) can push the energy minimum to the right, to a more sustainable diet

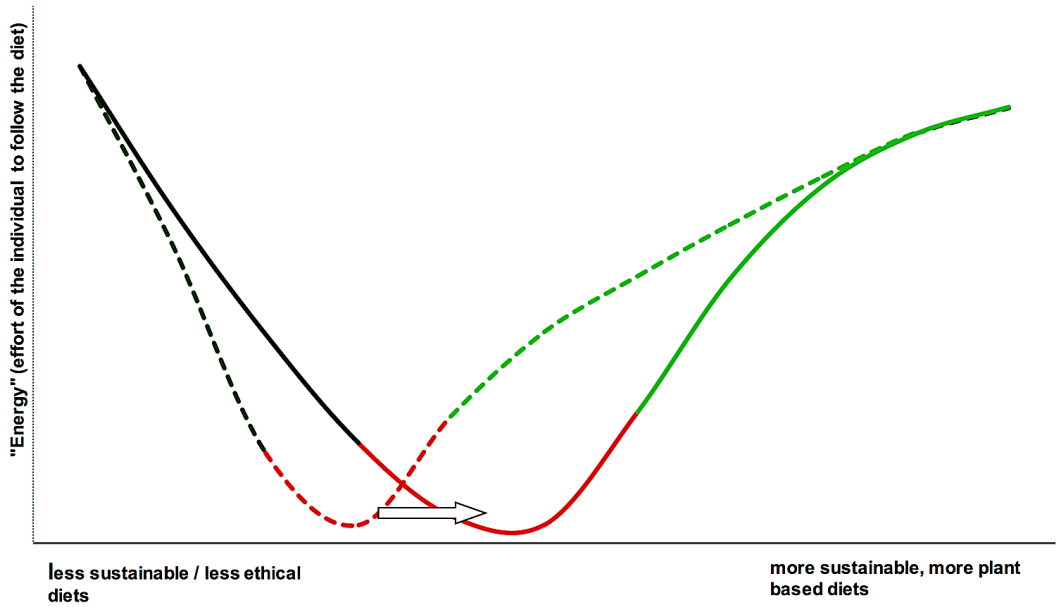
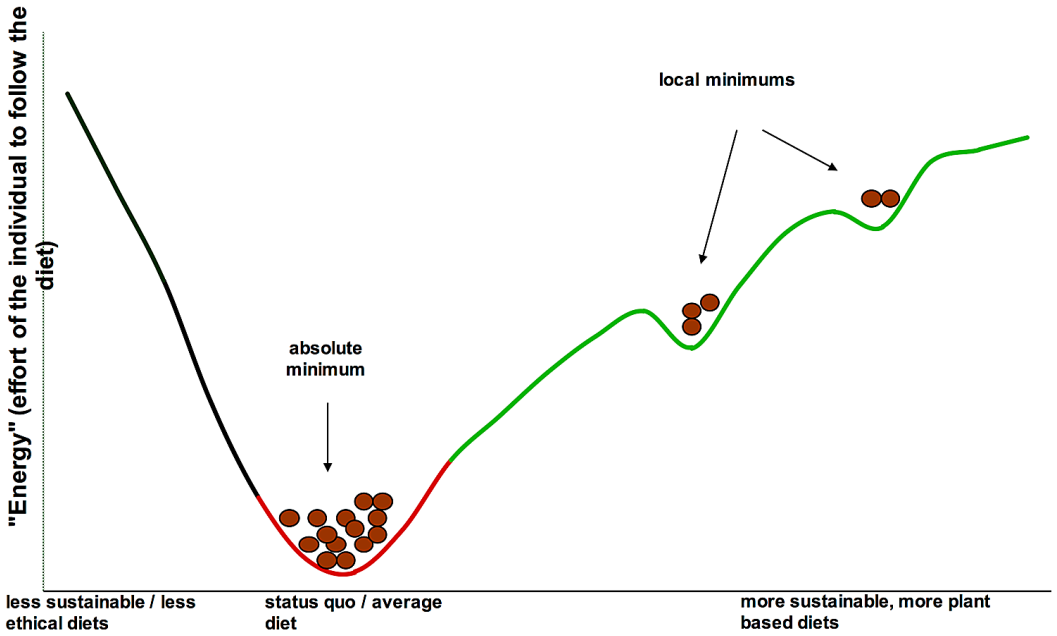


Figure 5. Push to a more sustainable diet
Note: Local minimums might also attract groups of individuals to practise a more sustainable diet. The more popular such a diet becomes, the deeper and relatively more stable the local minimums are. An optimum final consequence might be that such a new local minimum becomes deeper than the original minumum, making people roll over from the old to the new (more sustainable) minimum trough as shown in Figure 4.



important that such a transition occurs smoothly with wide social acceptance. People however are generally reluctant to make drastic changes in their diets, even when their personal health is threatened (Blanchard et al., 2008). What criteria should the new plant-based food options fulfil? What requirements should the new plant-based alternatives to animal products, including alternatives to beef, veal, pork, poultry, lamb, mutton, venison, eggs and dairy products, satisfy to be accepted by the majority of consumers? Would even cultured meat grown in vitro in labs become an acceptable alternative? The section below lays out criteria for the success of alternatives to animal products in order to shift the average consumer diet towards more sustainable nutrition.

SUCCESS CRITERIA FOR ALTERNATIVES TO ANIMAL PRODUCTS

The original definition of "meat" refers to the core of a food as distinctive to its husk, shell or to a drink (Merriam–Webster, 2017). More recently however the word "meat" began to be associated with the flesh of an animal used for food. Irrespective of the term's etymology, what is important in this day and age is to break the largely spread assumption that when we eat meat we need to consume animal-based products. We need to reclaim the word together with encouraging food choices healthier for consumers and the planet. Hence, we refer to the entire spectrum of sustainable food options which do not involve livestock as the *new meat*. This includes traditional fruit and vegetables, classical products using tofu as well as new plant-based products, such as vegetarian sausages and soy mince, and meats produced in laboratory conditions. They all share the common characteristic of being animal-free food products.

In order for the new meat to be socially acceptable and to become a preferred option for consumers, it needs to satisfy several criteria. Below is a list of five main criteria informed by the work of Molnár (1989), de Boer and Hoek (2006) and Schmidinger (2012) developed predominantly for western consumers and individuals who are in a position to make food choices.

1. **Sensual Properties and Flavour – Taste, Texture, Satiety Feeling and Aroma:** In the perception of the majority of people within society, the flavour of alternatives to animal products should completely satisfy their preferences. Textures can be fibre-like – such as in meat products, gel-like – such as in yoghurt, coagulated – such as in cheese, and so on (O'Kane, 2006). Hence the alternatives to animal products must fulfil various texture tasks. Meat-like sensory properties and luxury aspects are relevant for plant-based alternatives with higher protein content in a product improving satiety sensations (Hoek, 2006). For example, favoured properties for vegetarian meat products are: brown, soft, smooth, crispy, seasoned, spicy and meat-like flavour (Elzerman, 2006).
2. **Price:** Alternatives to animal products should be affordable, preferably cheaper than the livestock-based products. The lengthened food chain and the losses of plant food calories through metabolism make animal products costly in principle. Model calculations for pea-based meat alternatives show that they should be cheaper than pork (Apaiah, 2006). Applications for the byproducts of, for example, pea- or soy-based meat alternatives exist (Willemsen, 2006), but should be economically optimised. Efficient alternatives to the byproducts of livestock production, such as leather, gelatine or pet food, need to be found (Willemsen & Apaiah, 2006), although many already exist while others need to be improved and made economically viable.
3. **Marketing, Target Groups and Advertising:** Alternatives to animal products should appeal to a wide target group, not only to vegans, vegetarians or health-conscious people! In fact, the target should be the general or average consumer. Information about new foods should "evoke feelings like comfort, familiarity, happiness, ease, low price and popularity" (Goodland & Anhang, 2009, p. 17). Advertising campaigns should "pitch the theme of eating all week long a line of food products that is tasty, easy to prepare and includes a superfood, such as soy" that will enrich the consumers' lives (Goodland and Anhang, 2009, p. 17). Availability in supermarket and discount stores as well as advertising, especially at the point of sale, are essential and have massive room for improvement (Ruiz, 2007). Also, plant-based alternatives should be placed side by side on the same shelf with livestock products to achieve the same exposure to consumers (Goodland and Anhang, 2009).
4. **Health:** Fruits and vegetables have numerous health benefits and their consumption should continue to be encouraged. The new plant-based foods should also be healthier than the animal products in an overall health appraisal. This should be valid at a personal level as well as being a public health consideration. Their use could minimise the risk of formation of new pandemics, antibiotic resistance (Raphaely et al., 2016) and development of salmonella, E. coli and other infections (Review of Antimicrobial Resistance, 2015). They should also be able to outperform animal products in terms of personal health issues. With reference to cultured meat, for example, it should be possible to optimise the fatty acid or amino acid composition of the final product and leave out cholesterol, Neu5GC and other unwanted compounds, making a healthier meat than those currently existing.
5. **Shelf Life and Hygiene:** Existing plant-based meat-, egg- or dairy-alternatives typically have a longer shelf-life than their equivalent livestock products – a fact that easily can be verified in any supermarket. For example, dried products, such as textured vegetable protein (TVP) chunks, have shelf lives of a year or longer. In fact, manufacturers of meat products use plant-based solutions as

a natural way to extend shelf life, control bacteria development and improve food safety (Pelligrini, 2014). With the majority of foodborne diseases originating from animal products, plant-based foods carry lower risk and hence, their shelf life is longer representing weighty advantages for the consumer and the food industry alike.

PRODUCTS MAKING THE CHANGE POSSIBLE

There is plenty of more or less well-known plant-based alternatives to meat, milk and eggs on the market, but certain innovations – recent or still being developed, could have a bright future. Some common or promising livestock-free solutions are presented below. The focus is on meat alternatives (sometimes even difficult to distinguish visually as shown in Figure 6), but similar innovations are also available to replace egg or dairy products.

Classic Plant-Based Meat Alternatives

The most common base materials for meat alternatives are wheat gluten (also called seitan) and soy-based ingredients, such as tofu and textured soy protein (abbreviated as TSP or TVP), also called soy meat. Seitan is obtained simply by rinsing wheat dough and washing out the starch until the protein components gliadin and glutenin are isolated from the wheat. Tofu is a worldwide well-known traditional Asian foodstuff, where a coagulant (traditionally nigari salt) is added to soy milk and the resulting protein solids are pressed into a desired form. Soy meat is produced using hot extrusion of defatted soy proteins, resulting in expanded high protein chunks, nuggets, strips, grains and other shapes. The fibrous, insoluble, porous soy meat can soak up water or other liquids a multiple of its own weight.

Figure 6. Plant based chicken drumsticks

Unlike tofu, seitan and even more soy meat show consistencies which are remarkably similar to the stringy fibres that make up animal-based meat. Often, you find products made of mixes of soy- and wheat-based protein ingredients. The disadvantage of this mix is that these products are not suitable for consumer groups suffering from soy allergies or gluten intolerance (coeliac disease). For the other consumers, such mixes represent perfect meat-like textures as well as optimised protein contents and quality. The protein quality can be explained by the fact that the profiles of the essential amino acids contained in soy and wheat complete each other well and compensate the deficiencies of their individual amino acid profiles.

Another classical plant-based meat alternative is tempeh which has a very old tradition in Indonesia. Controlled fermentation of soaked, hulled, hacked and damped soybeans with a Rhizopus mold binds them together into a compact, firm white patty form. The protein content makes tempeh a suitable ingredient for meat alternatives, whereas its texture is not meat-like. Experiments to produce tempeh based on barley and oats instead of soy have also been made (Swedish-Research-Council, 2008).

Other Meat Alternatives

These ingredients are innovative, some already available on the market, others on the way to being commercialised. The list of such alternatives is long and expanding in response to rising consumer interest, mainly from vegans and vegetarians. Below is a selection of such new meats.

Quorn, based on the so called Mycoprotein, is a commercially successful meat alternative range introduced by the English company Marlow Foods. Mycoprotein is a fermented fungus which is processed and textured to produce meat alternatives. Quorn products include steaks, burgers, chicken breasts as well as sliced meats and ready meals. It is marketed in European countries, USA, South Africa and Australia.

Sweet lupines have become another, increasingly popular base ingredient for meat or dairy alternatives, especially in Europe. Meatless was one of the first companies to use lupine-based fibres for the production of meat substitutes. The already completed Like Meat project funded by the European Union similarly used lupines as one of its experimental base materials.

Sprouted soybeans are used commercially, even though on a small scale, especially by the Hungarian company Yaso. Rice protein and pea protein have also been introduced for the production of meat alternatives together with vegetable fibres used by companies like Wiefleisch or the former company Proviand, taken over by the German veggie meat specialist Like Meat.

Using fresh mushrooms could be another option, as the company Fresh'shrooms has shown. Algae similarly holds huge potential for meat alternatives. Nuts (e.g. pecans) and garbanzo beans are the main ingredients for meat alternatives produced by Neat.

Science-Intensive Plant-Based Alternatives

This category of new meats includes innovations underpinned by scientific work which aims at reproducing the appearance of animal products to our senses A plant-based, perfect *bleeding beef burger* is the flagship of Impossible Foods in the USA, using heme (haem) from plants as a "bloody" juice. The burger exhibits a meat-like exterior fulfilling the equation: plants + science = meat. With funding from Google and Bill Gates (Woods, 2015), the company was able to create plant-based meats that give people the texture, flavour, aroma, taste and nutritional benefits of animal meat, without the negative health and environmental impacts of livestock products (Belvedere, 2016; Herships, 2016; Fellet, 2015; Gates, 2013).

The Not Company in Chile also explores path-breaking ways. Currently it focuses on dairy alternatives, but the same ideas will be applied to meat analogues. The company uses Guiseppe – the smartest food scientist on earth, who studies the perceptions about foods by humans (Sunder, 2016). However, Giuseppe is not a person, but an artificial intelligence robot that replicates the taste, texture and even smell of animal-based products by copying their molecular structure. Guiseppe uses plant-based ingredients for its food creations with the aim to achieve high nutritional values with low ecological impacts. Unlike humans, Giuseppe's knowledge is ever-increasing as the robot never forgets anything it has learned.

Real Meat of the Future out of the Lab

Besides plant-based meat alternatives, there are even more futuristic approaches. The concept is called *in vitro* meat or cultured meat, and the process is in principle as follows. Starting cells are taken painlessly from live animals; they are put into plant-based culture media, including growth factors, where they start to proliferate and grow independently from the animal. This all should happen in large bioreactors which can be monitored and controlled. To achieve a fibrous and three-dimensional texture, various concepts are applied – using edible scaffolds to which the cells could attach, 3-D-printing to print meat or electrical stimulation on the cells as a training to build muscle-like fibres.

Mark Post and his team in the Netherlands were the first to produce a burger in vitro, with financial support from the Google founder Sergey Brin. The burger was presented in 2013 in London and while still extremely expensive at an estimated cost of around US$ 300,000, it was a striking achievement (Shen, 2013). Memphis Meats recently produced several cultured meat balls. Modern Meadow are US-based projects also working on cultured meat. In Israel, Supermeat with Yaakov Nahmias and the Kitchen FoodTech Hub similarly pursue cultured meat efforts. The list of organisations and initiatives which are active in this domain includes New Harvest, the Good Food Institute, Future Food and the Modern Agriculture Foundation. They are making good progress with a lot of publicly available information.

MARKETING OF FUTURE FOOD ALTERNATIVES

Currently worldwide there exist many plant-based meat alternatives and plant-based protein products – enough to fill up a meatless butcher shop. The producers are concentrated mainly in (Shurtleff & Aoyagi, 2014; Schmidinger, 2012): USA and Canada in North America, Germany, the Netherland, UK, Italy, Czech Republic, Austria, France and Hungary in Europe, Australia and New Zealand in the Asia Pacific, Taiwan, China and Thailand in Asia, Brazil and Argentina in South America. Meat alternatives are projected to be soon stretched out of their niche market segment and as per the Allied Market Research (2016) forecast this trend is going to grow substantially offering many business opportunities (The Economist, 2017). Similarity to animal flesh-food composition, appearance and flavour is one reason for these plant-based food alternatives starting to make their way and gradually becoming popular amongst consumers. Another reason is their improved performance in relation to human health – they are cholesterol-free, have lower risks for numerous chronic diseases, such as cancer and cardiovascular disease. They also perform better in response to environmental concerns. In countries, such as USA, Germany and UK, these new meat alternatives are gaining good market shares and are no longer limited to a display at the back shelves of the supermarket. Nevertheless, the new meat alternatives still require

more intense and competitive market strategies to establish themselves in the consumers' mind and to break out of their niche label into the mainstream.

Marketing strategies used by new meat producers usually follow the traditional mix around the 4P – product, promotion, place and price (Luca & Suggs, 2010; Thackeray & McCormack Brown, 2010), focused on increasing awareness about the existence of new cutting edge innovative plant-based products and promoting them among consumers. Some however are utilising novel approaches. Injecting culturally relevant concepts which resonate with people, through social media (e.g. Facebook) into brand communication was used by the advertising campaign of Alternative Meat Co (2017). The campaign ridiculed the Lambasador used by livestock advertisers to create a cultural identity of the multicultural Australian society around eating lamb on Australia Day. Alternative Meat Co used a mocking advertisement highlighting the increasing number of Australians who represent the changing food trends towards reduced meat consumption. The advertisement encourages people to try an alternative, e.g. vegetables, on Australia Day in line with the social trend away from animal-based products. This online advertisement received more than 1.1 million views, 13.5 thousand shares, 11 thousand likes and 5 thousand comments (Australian Meat Co, 2017). Tofurky can replace the turkeys traditionally consumed on Thanksgiving in USA (Shurtleff and Aoyagi, 2014).

Endorsement by celebrities is a marketing strategy employed by the California-based start-up Impossible Foods (Woods, 2015; Belvedere, 2016; Herships, 2016; Fellet, 2015). Promoting famous vegetarians who symbolise strength and masculinity is also a good way to increase the attractiveness of new meats. The list of names includes Mike Tyson – the undisputed heavyweight boxer champion, Carl Lewis – the nine-time Olympic gold medallist athlete, Brendan Brazier – the Ironman triathlete, Daniel Sturridge – premier league club Liverpool footballer, Serena and Venus Williams – the superstar tennis players and athletes, and many others.

Sensing the consumer shift to protein alternatives, major global meat producers are keen to stay in the game by participating in the new meats market. Tyson Foods in USA acquired a 5 percent share in the plant-based protein food manufacturer Beyond Meat. Similarly, the German meat packer company Rügenwalder Mühl and the Canadian Maple Leaf Foods are tailoring their marketing strategies to establish a strong platform in the plant-based proteins market (Strom, 2016).

A major component of the attractiveness of animal meat is its taste, smell, textural properties, fibrous structure, deliciousness and juicy mouth-feel – attributes stated by Australian Sydney residents (Bogueva et al., 2017). Using new meats' resemblance to these qualities can be a successful marketing strategy for a transition to healthier, environmentally better and morally higher diets.

The qualities of the new meats will continue to improve and their prices will become increasingly compatible. Any marketing and advertising campaigns will need to use this to reform and rebrand the consumer perceptions about food. However, there is a role for government and other institutions to play in supporting and facilitating these changes.

Against the ample evidence about the need to move towards healthier and environmentally respectful dietary patterns, the new meats alternatives are perfect novelties that must be supported as a trendy shift. Instead of lagging behind, government bodies should take an active stance and start developing and disseminating official dietary guidelines and recommendations, embedding health and sustainability objectives and creating policies fostering them (Fischer et al, 2016).

In addition to financial support for the new meats and removal of any funding benefiting the livestock sector (Hamilton, 2016; Di Croce et al. 2016), the government needs to engage in promoting the alternatives. In a similar way to dealing with tobacco and cigarettes, this should include freeing up the public advertising space from undesired messages and instigating social marketing of better alternatives. New meat options should be made available in public institutions, such as school canteens, hospitals and promoted in supermarkets, foodcourts and restaurants. Marketing strategies using the 4S model – sustainability, strength, self-confidence and sharing (Bogueva et al., 2017) can encourage transitioning to more sustainable diets.

WORLD HUNGER AND FOOD ALTERNATIVES

Although nearly half a billion people in the world identify themselves as vegetarians (Meat Atlas, 2014), the consumption of animal products continues to be strong in Western countries, including Australia, USA and Europe. Moreover, traditional diets are changing in places such as China and India exacerbating the seriousness of the climate change challenges (Myers & Kent, 2003; Vidal, 2013; Yu, 2015). Adding to this is the world's hunger problem of 1 billion people, among them 3 million children and 20 million people dying from starvation each year (Lappé & Collins, 2015). Global hunger will not be resolved by using the inefficient lengthened plant–to animal–to human food chains.

As seen in Figure 1, the losses of calories for global nutrition due to livestock production are enormous – 36 percent of the global cereal harvests (Schmid & Goldhofer, 2016) as well as 70 to 75 percent of the global soy harvests (Brack et al., 2016) are used for livestock. In 2016, 320 million tonnes of meat have been produced (FAO, 2016). According to Alexander et al. (2017), 1060 million tonnes of feed from crops plus 440 million tonnes of forage crops (e.g. alfalfa and forage maize) plus additional grass from grassland make up just 240 million tonnes of animal products in dry matter.

An average German person wastes about 400 kg of plant food just by eating meat. This is based on an average of 7 to 8 calories of plant-based feed to produce 1 calorie of meat (an estimate based on Smil, 2002 and Garnett, 2009). Milk and eggs are not even included in these figures. This waste of food for meat consumption alone is much higher than the annual 179 kg of wasted food per capita in the EU from private households, producers, supermarkets and gastronomy all together (European Commission, 2010)! The world produces more than enough to feed all humans on the planet Earth but not through inefficient food chains.

In response to the myriad of negative consequences triggered by livestock products, many are opting for plant-based alternatives (Market and Markets, 2016; Roy Morgan Research, 2016). This is also where the future of food lies and the quicker the transition, the better will be the outcomes for all.

CONCLUSION

The consumption of animal-based products is associated with serious impacts on human health, the natural environment and world hunger. The Stability/Energy Minimum hypothesis explains people's dominant eating behaviour as the one which conforms with the majority preferences within the society, circle of friends or at home and requires the least effort. A push towards more sustainable dietary choices needs to be facilitated by making plant-based options attractive in terms of flavours, textures,

price, availability and varieties. By satisfying the five criteria related to taste, cost, health, shelf life and marketing, the alternatives to animal-based products can find their way into society and contribute to the creation of new more sustainable minimum energy conditions that encourage better health and environment related options.

As diets are expressed as a personal choice, the new meats based on fruit, vegetables, plants, TPV, cultured meat and other innovations can enrich the options available to the consumers who opt to exclude animal-based products from their dietary preferences. When wisely and properly marketed, these new meat food products will help shift the average diet and make it more sustainable. On a global scale this will free up a lot of waste associated with the current inefficient lengthened food chain, which feeds livestock first before feeding people, and allow world hunger to be eliminated. The future of food lies in many plant-based innovations as well as other options away from livestock products. Meat without livestock is the alternative we need to embrace if we are to dream for a brighter future.

ACKNOWLEDGMENT

The second and third authors acknowledge the contribution of an Australian Government Research Training Program Scholarship in supporting this research.

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KEY TERMS AND DEFINITIONS

Cultured Meat: Meat grown in vitro in laboratories which does not involve the slaughter of animals.

Meat Alternative: A substance with a high protein content used to replace animal flesh as food.

New Meat: Covers the entire spectrum of traditional and new food options which do not involve livestock.

Shelf Life: The recommended time for the sale of a food product.

Stability/Energy Minimum Hypothesis: A model which explains eating behaviour as a process conforming with the majority preferences in a society.

Textured Vegetable Protein (TVP): Dried vegetable matter with a high protein content by-product of extracting soybean oil used as a new meat in vegetarian and vegan food products.

World Hunger: Inefficient use and distribution of food resources, including feeding livestock instead of directly feeding people.

ENDNOTE

[1] The terms soy and soya refer to the same bean – a legume type, with the preferred spelling in the USA being "soy" and in Europe – "soya". We have opted to use "soy" in this chapter; however, all products described here may also appear in the literature and on the market as "soya".

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Appendix A

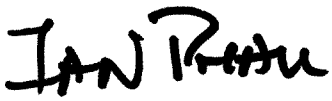
STATEMENTS BY CO-AUTHORS

Publication 1

To Whom It May Concern

I, Diana Bogueva, contributed 80 (eighty) percent to the paper/publication entitled “Meat myths and marketing” (Bogueva, D., Phau, I. (2016) Meat myths and marketing. In Raphaely, T., Marinova, D. (eds) *Impact of Meat Consumption on Health and Environmental Sustainability*, IGI Global, Hershey, PA, pp. 264-276).

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.



Publication 2

To Whom It May Concern

I, Diana Bogueva, contributed 50 (fifty) percent to the paper/publication entitled "Reducing meat consumption: the case for social marketing" (Bogueva, D., Marinova, D., Raphaely, T. (2017) Reducing meat consumption: the case for social marketing, *Asia Pacific Journal of Marketing and Logistics*, 29(3), 2017)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Prof. Dora Marinova (Co-Author 2)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Dr Talia Raphaely (Co-Author 3)

Publication 3

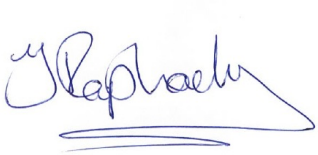
To Whom It May Concern

I, Diana Bogueva, contributed 60 (sixty) percent to the paper/publication entitled "Red meat consumption and social marketing interventions promoting appetite for change" (Bogueva, D., Marinova, D. Raphaely, T. (2017) Red meat consumption and social marketing interventions promoting appetite for change, *International Journal of Food Engineering*, 3(2), pp.154-158, 2017)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Prof. Dora Marinova (Co-Author 2)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.



Dr Talia Raphaely (Co-Author 3)

Publication 4

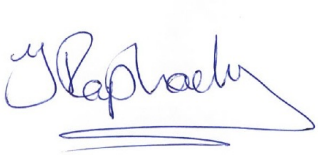
To Whom It May Concern

I, Diana Bogueva, contributed 50 (fifty) percent to the paper/publication entitled "Sustainability social marketing" (Bogueva, D., Raphaely, T., Marinova, D., Marinova, M. (2017) Sustainability social marketing, in Hartz-Karp, J., Marinova, D. (eds) *Methods for Sustainability Research*, Edward Elgar, Cheltenham, UK, pp. 280-291)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Prof. Dora Marinova (Co-Author 2)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.



Dr Talia Raphaely (Co-Author 3)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

MD Mira Marinova (Co-Author 4)

Publication 5

To Whom It May Concern

I, Diana Bogueva, contributed 70 (seventy) percent to the paper/publication entitled “What is more important perception of masculinity or personal health and the environment?” (Bogueva, D, Marinova, D. (2017) What is more important perception of masculinity or personal health and the environment? In Bogueva, D., Marinova, D, Raphaely, T. (eds) *Social marketing and its influence on animal origin food product consumption*, IGI Global, Hershey, PA (forthcoming)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Prof. Dora Marinova (Co-Author 2)

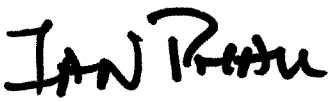
Publication 6

To Whom It May Concern

I, Diana Bogueva, contributed 60 (sixty) percent to the paper/publication entitled “Is meat a luxury?” (Bogueva, D, Phau, I. Marinova, D. (2017) Is meat a luxury? In Bogueva, D., Marinova, D, Raphaely, T. (eds) *Social marketing and its influence on animal origin food product consumption*, IGI Global, Hershey, PA (forthcoming)

I, as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Prof. Dora Marinova (Co-Author 2)



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Publication 7

To Whom It May Concern

I, Diana Bogueva, contributed 35% to the paper/publication entitled “New meat without livestock” (Schmidinger, K., Bogueva, D., & Marinova, D. (2018). New meat without livestock. In D. Bogueva, D. Marinova, & T. Raphaely (Eds) *Social marketing and its influence on animal-based products*, Hershey, PA: IGI Global (forecoming).

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3. **Bogueva, D.,** Marinova, D., Phau, I. (2018) Is meat a luxury? In Bogueva, D., Marinova, D., Raphaely, T. (eds) *Social Marketing and Its Influence on Animal Origin Food Product Consumption*, IGI Global, Hershey, PA (forthcoming)
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Yours sincerely

Diana Bogueva

From: Jan Travers <jtravers@igi-global.com>
To: Diana Bogueva
CC: Colleen Moore
20 Oct at 3:18 AM

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发件人: Diana Bogueva <diana.bogueva@postgrad.curtin.edu.au>

发送时间: 2017年10月19日 星期四

收件人: icfes <icfes@cbees.net>, "ijfe@ejournal.net" <ijfe@ejournal.net>

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Diana Bogueva

From: Chris Berry <chris@e-elgar.co.uk
To: koprinkova@yahoo.com
24 Oct at 12:55 AM

Dear Diana (if I may),

Thank-you very much for your email. My colleague Samantha has forwarded your request onto me. Before I proceed, I would be very grateful if you could confirm who the author of the PhD thesis is - yourself, or Diana Bogueva.

Many thanks,

Chris
Chris Berry
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From: **Diana Koprinkova** <koprinkova@yahoo.com>
To: Chris Berry
CC: Samantha Brown Dora Marinova
24 Oct at 3:49 PM

Hi Chris,

Thank you for your reply. I am Diana Bogueva and I am the author of PhD thesis and the first author of the chapter 18 you have published in the "Methods of Sustainability Research" book edited by Janette Hartz-Karp and Prof. Dora Marinova namely "Sustainability Social Marketing". I have CC: Prof. Dora Marinova as she is my main supervisor.

This email address koprinkova@yahoo.com is my personal email address I used to correspond with Samantha and I assume you are asking me the above question as you are confused by the other name I do have Koprinkova (it is my maiden name). I hope this explains the situation and I would be really grateful if you could proceed positively with my request.

Kind regards,
Diana

From: Chris Berry <chris@e-elgar.co.uk
To: Diana Koprinkova
CC: Samantha Brown Dora Marinova

24 Oct at 9:34 PM

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Appendix C

QUESTIONNAIRES

Publication 2 and Publication 3

Question 1: Do you eat red meat?

a. Every day.
b. Three to five times per week
c. Twice a week
d. Less than twice a week.
e. No, I don't eat red meat

Question 2: What associations do you make when you hear the word meat?

(Participant free answer is required)

Question 3: How worried are you personally about the following issues?

a. Global warming
b. The red meat cost on the environment
c. Cost of living
d. Action to fight climate change

Question 4: What quantity of red meat do you eat?

a. Eat more than 300g red meat a day
b. Eat up to 150g red meat a day
c. None
d. Other

Question 5: What are the reasons for you to eat or not to eat meat?

a. Health (healthy and natural food)
b. Essential for weight loss diet
c. Religious/cultural reasons
d. Symbol of masculinity
e. Economic (availability and price)
f. Animal welfare
g. Social status
h. Meat as cause for diseases
i. Environmental reasons

j. Prestige food
k. Family
l. Other

Question 6: Could you explain the reasons for you to eat or not to eat meat?

(Participant free answer is required)

Publication 5

Question 1: Do you eat red meat?

f. Yes, I do eat red meat.
g. No, I don't eat red meat - I eat only white meat.
h. No, I don't eat red meat - I am a vegetarian.
i. No, I don't eat red meat - I am a vegan.
j. No, I don't eat red meat for religious reasons.
k. Other

Question 2: What do you think red meat symbolises?

a. Nutritious Healthy Diet
b. Protein and iron rich food
c. The only real food
d. Human dominance - animal flesh destined for our consumption
e. Masculinity and strength
f. Prestigious, luxury food
g. Negative environmental effect on our planet
h. Animal suffering
i. Other

Question 3: Do you think eating meat and particularly red meat is detrimental for your health? Please indicate which of this statements applies to you?

e. Meat consumption has nothing to do with health and health related issues.
f. Eating meat in moderation up to a maximum of 100gr - 2-3 times a week is good for your health.
g. Excessive meat consumption - 300-500gr and above daily causes disease.
h. Eating meat is bad for your health.

Question 4: What factors could influence change in your meat consumption?

e. Peers pressure
f. Personal health problems
g. Relative/friend health problems
h. Animal welfare
i. Marketing campaigns
j. Environmental reasons

k. Government (Federal, State) regulations
l. Dietary requirements
m. Vegetarianism/veganism
n. Price
o. Other

Publication 6

Question 1: Do you eat meat?

a. Yes, I do eat meat.
b. No, I don't eat meat.

Question 2: Do you think that meat can be perceived as a luxury product/ brand?

a. Yes
b. No

Question 3: Why do you think meat can be perceived as a luxury product/ brand?

i. Meat is a crucial for our health food
j. Meat is not easily affordable and accessible by everyone
k. Meat is rarity and exclusive
l. Meat conveys special social status of prestige and prosperity
m. Meat has expensive premium cuts
n. Meat needs to be sustainably produced to be a luxury
o. Meat is part of our everyday diet
p. Meat is environmentally expensive luxury
q. Other