LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

U LISBOA | UNIVERSIDADE DE LISBOA

MASTER

MARKETING

MASTER'S FINAL WORK

DISSERTATION

CONSUMER REACTION TO SUSTAINABLE FOOD CONSUMPTION: MOTIVATIONS SHAPING MEAT CONSUMPTION FREQUENCY IN SEMI-VEGETARIANS

PEDRO MANUEL SIMÕES FERNANDES

OCTOBER - 2019

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

U LISBOA | UNIVERSIDADE DE LISBOA

MASTER

MARKETING

MASTER'S FINAL WORK

DISSERTATION

CONSUMER REACTION TO SUSTAINABLE FOOD CONSUMPTION: MOTIVATIONS SHAPING MEAT CONSUMPTION FREQUENCY IN SEMI-VEGETARIANS

PEDRO MANUEL SIMÕES FERNANDES

SUPERVISION:
PROF. MARIA MARGARIDA DE MELO COELHO DUARTE

CO-SUPERVISION:
PROF. JOSÉ MANUEL NOVAIS DE MAGALHÃES SANTOS

OCTOBER - 2019

"At its essence, sustainability means ensuring prosperity and environmental protection without compromising the ability of future generations to meet their needs. A sustainable world is one where people can escape poverty and enjoy decent work without harming the earth's essential ecosystems and resources; where people can stay healthy and get the food and water they need; where everyone can access clean energy that doesn't contribute to climate change; where women and girls are afforded equal rights and equal opportunities."

Ban Ki-moon, 2015

ACKNOWLEDGMENTS

To my mother, Isabel Simões, who's strength, perseverance, and dedication to others is the most beautiful lesson I will ever take and cherish during my life; because this and all other conquests were made possible because of her and always for her.

To my father, Manuel Fernandes, who taught me that everything in life is possible through hard work; to never forget my roots and from where I come from; to stay humble and true to my values and, above all, to stay true to myself.

To my brother, Bruno Fernandes, for being a role model since the day I was born; who inspires and pushes me to be better every day; for being a second father to me during the early stages of my life.

To professor Margarida Duarte and professor José Santos, who've accompanied and mentored me during this process, for guiding me forward, especially through the moments where I seemed to lose track.

To all those who contributed in this research by participating and/or sharing the survey through their network.

To my friends for the support and for believing in me more than I believe in myself.

To Andreia Pancho, for being with me from the first until the last day of this journey, for all the advice and support and, above all, for the friendship. You may be the last, but you will never be the least.

RESUMO

A maior consciencialização da população sobre a necessidade de diminuir o consumo de carne é uma realidade dos dias de hoje. A indústria pecuária gera cerca de 14,5% das emissões de gases responsáveis pelo efeito de estufa, sendo atualmente o segundo maior emissor dos gases responsáveis por este fenómeno e, por inerência, um dos principais causadores das alterações climáticas. Adicionalmente, a causa do bem-estar animal e a relação do consumo excessivo de carne a doenças crónico-degenerativas são alguns dos exemplos que têm levado a mudanças no comportamento de alguns consumidores em relação ao consumo de carne. Neste estudo, motivações para o consumo de carne foram investigadas em omnívoros que reduzem significativamente o consumo de carne, mais conhecidos como semi-vegetarianos.

Este estudo, que teve lugar em Portugal, utilizou uma abordagem quantitativa, obtendo, através de um questionário *online* e autoadministrado, uma amostra de 442 semi-vegetarianos com o objetivo de avaliar como as motivações relacionadas com a saúde, o prazer associado ao consumo de carne (hedónico), aspectos sociais, o ambiente e o bem-estar animal, influenciam a frequência do consumo de carne.

Os resultados sugerem que a frequência do consumo de carne em semi-vegetarianos é melhor explicada por motivações hedónicas (impacto positivo no consumo de carne) e por motivações relacionadas com a saúde (impacto negativo no consumo de carne). Motivações relacionadas com a causa ambiental e a causa animal não parecem ser relevantes para explicar a frequência de consumo de carne neste estudo.

Palavras-chave: Comportamento do Consumidor, Motivação, Redução do Consumo de Carne, Vegetarianismo, Semi-Vegetarianismo, Sustentabilidade

ABSTRACT

Increasing public awareness of the need to reduce meat consumption is a reality nowadays. The livestock industry accounts for about 14.5% of greenhouse gas emissions, currently being the second largest emitter of greenhouse gases and, inherently, one of the main drivers of climate change. Additionally, the animal welfare cause and the relation between excessive meat consumption and noncommunicable diseases (NCD's) are some of the examples that have led to changes in the behaviour of some consumers regarding meat consumption. In this study, motivations about meat consumption were tested in omnivores that significantly reduce meat consumption, better known as semi-vegetarians.

This study, which took place in Portugal, was conducted using a quantitative approach, obtaining, through an online self-administered questionnaire, a sample of 442 semi-vegetarians with the purpose of assessing how motivations related to health, pleasure associated with meat consumption (hedonic), social aspects, environment and animal welfare, influence meat consumption frequency.

The results suggest that the frequency of meat consumption in semi-vegetarians is best explained by hedonic motivations (positive impact on meat consumption) and health-related motivations (negative impact on meat consumption). Environmental and animal causes do not seem to be relevant in explaining meat consumption frequency in this study.

Keywords: Consumer behaviour, Motivation, Meat Reduction, Vegetarianism, Semi-Vegetarianism, Sustainability

TABLE OF CONTENTS

ATTACHMENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 – INTRODUCTION

1.1. Contextualization and Problem's Delimitation

The livestock industry represents about 14.5% of greenhouse gas emissions, making it the second largest emitter of such gases and one of the main drivers of climate change (Gerber, Steinfeld, Henderson, Mottet, Opio, Dijkman, Falcucci, & Tempio, 2013). Additionally, current levels of meat consumption may also be associated with the increase of non-communicable diseases among the population (Mullee, Vermeire, Vanaelst, Mullie, Deriemaeker, Leenaert, De Henauw, Dunne, Gunter, Clarys, & Huybrechts, 2017), all in all contributing for meat consumption to be increasingly regarded as an unsustainable practice, prompting some consumers to change their eating habits towards a less frequent consumption of meat and leading them to adopt new dietary patterns based on meat consumption reduction, like semi-vegetarianism (De Backer & Hudders, 2014; Janssen, Busch, Rödiger, & Hamm, 2016), thus, it becomes relevant to analyze how motivational drivers explain meat consumption frequency in these consumers.

1.2. Research Purpose and Goals

It is expected with this research to be able to draw conclusions regarding the factors explaining consumer behaviour in meat consumption.

Recent research suggests that a considerable part of omnivore consumers is influenced to change behaviour towards meat consumption reduction, becoming the so-called semi-vegetarians (or flexitarians). As omnivore consumers compose the population's majority, a changing consumer behaviour towards semi-vegetarianism (Nielsen, 2017) has a much larger overall impact than that of a small number of consumers who follow plant-based diets.

This research results can have meaningful insights for businesses and entrepreneurs by allowing to take these findings into the equation when designing business models and planning strategies accounting a changing consumer behaviour towards meat consumption reduction.

1.3. Academic and Business Relevance

The agricultural sector is highly dependent on the sale of animal products and in many industrialized countries an increasing number of omnivore consumers has already reduced meat consumption (Janssen et al., 2016). A growing trend towards meat consumption reduction

represents a challenge for both livestock and agricultural industries, as well as for many food-related businesses.

According to projections of the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) of the United Nations (UN), *OECD-FAO Agricultural Outlook 2019-2028*, the pace of meat consumption growth will decrease in the United States (USA) and in the European Union (EU), ceasing the exponential growth trend that has been running ever since data started to be collected (OECD/FAO, 2019). At the same time, studies indicate the increase of plant-based diets followers and the first signs of a decrease in meat consumption frequency in some countries (Janssen et al., 2016; Nielsen, 2017). Considering that omnivores represent the majority of consumers and the signs of a considerable number of them adopting a semi-vegetarian diet (Nielsen, 2017), it is important to assess the current factors inflicting meat consumption frequency in this group. The literature's lack of responses regarding semi-vegetarians motivations on meat consumption frequency gives the rationale for this study to be carried out.

CHAPTER 2 - LITERATURE REVIEW

2.1. Consumer Behavior: Motivation

Motivation is a central topic in the study of consumer behavior. According to Solomon (2017, p. 173), "to understand motivation is to understand why consumers do what they do.". Motivation arises when a need emerges that the consumer wishes to satisfy, creating a state of tension which the consumer will pursue to reduce or eliminate. To understand consumer behaviour, it is then relevant to understand how motivation works as it offers a potentially powerful source to understand the forces behind consumers' actions.

It is often useful to consider the different types of needs when addressing motivation. Needs can be utilitarian, which are associated with functional and practical benefits, or hedonic (1), which are related to emotional responses or fantasies. When these needs are a cause of tension, one feels the urgency to reduce it (Solomon, 2017).

2.1.1. Drive Theory and Expectancy Theory

The degree of urgency is commonly referred in the literature as drive, which leads to two theories which aim to explain why we do what we do: *drive theory* and *expectancy theory* (Solomon, 2017). Solomon (2017) resorts to these two well-known theories commonly found in motivation-related research to explain how needs shape behaviour:

- *Drive theory*. Explains how biological needs produce unpleasant states of urgency. The tension caused by these states of arousal drives the individual to attempt to reduce the sources of tension by returning to a balanced state – homeostasis. Solomon mentions that this theory fails to explain some aspects of human behaviour, as people occasionally delay gratification and act in such a way to increase the tension rather than to decrease it, resisting a smaller but more immediate reward for a larger and enduring reward later (Solomon, 2017).
- *Expectancy theory*. Explains how the expectations of achieving desirable outcomes motivate human behaviour. Cognitive factors have a major role in explaining behaviour, rather than biological ones. This means that, when confronted with multiple choices, an individual might choose one option over the other because one believes that a specific decision has more positive consequences in the long-run rather than one which grants immediate satisfaction, but with less desirable outcomes (Solomon, 2017).

In the context of dietary, the dualism between *drive theory* vs. *expectancy theory* and *needs* vs. *wants* exists, as hunger is a body biological response for a state of tension caused by the lack of food, hence, causing a physiological need to eat (Egecioglu, Skibicka, Hansson, Alvarez-Crespo, Friberg, Jerlhag, & Dickson, 2011).

2.1.2. Needs and Wants

In 1943, in the acclaimed book, *A Theory of Human Motivation*, Abraham Maslow (1943) introduced what came to be known as Maslow's Hierarchy of Needs. This theory, conceptualized in a pyramid with five levels, describes the pattern through which human motivations generally move. From bottom (first level) to top (fifth level), they correspond to: psychiological needs, safety needs, love/belonging needs, esteem needs and self-actualization needs (Maslow, 1943). In order for motivation to occur at a certain level, the needs corresponding to the previous level

must first be attained. The first level of the pyramid, the most basic human needs, correspond to physiological needs. All behaviours required to maintain homeostais are grouped in this first level, including food ingestion (Betts, DeSaix, Johnson, Korol, Kruse, Poe, Wise, Womble & Young, 2017).

Even though there are multiple ways to ease this physiological need, - as many as the variety of food at disposal – individual preferences shape the type of food people actually want to consume, as some dietary options are perceived by consumers to have more desirable outcomes (Miller & Cassady, 2012).

Resorting to the *Expectancy Theory*, one is urged to think that people follow diets that limit or ban meat consumption because they believe this behaviour will have larger and more enduring benefits in the long-run (Summerfield, 2012). Therefore, to better understand how motivation works for food, it is important to conceptualize the multiple motivation driving forces taking place in dietary found in previous literature, specifically related to meat consumption.

2.2. Plant-based diets and Semi-Vegetarianism in Portugal

In order to better comprehend the possible consumers' responses regarding meat consumption, it is important to introduce and describe two major plant-based diets, *vegetarianism* and *veganism*, as well as one that highly restricts the consumption of meat, *semi-vegetarianism* (Summerfield, 2012).

Vegetarianism is a diet that excludes the consumption of meat, but in a broader sense, still includes the consumption of animal-based products that do not result on animals' death. Veganism, on the other hand, excludes the consumption of any animal products, both meat and dairy products. Semi-vegetarianism, or sometimes also referred in the literature as flexitarianism, is a more moderate diet that doesn't exclude meat altogether, but significantly reduces it. (Summerfield, 2012; De Backer & Hudders, 2014; Melina et al., 2016),

In Portugal, a 2017 study carried by Nielsen on behalf of *Centro Vegetariano*, showed there are 120,000 Portuguese vegetarians, corresponding to 1.2% of the country's population. In 2007, a similar study carried out by the same firm, revealed that at the time 0.3% of the population

claimed to be vegetarian, meaning that the number of Portuguese vegetarians quadrupled in a decade. The same study revealed that 60,000 Portuguese, 0.6% of the population, follows a vegan diet, thus, exhibiting a noticeable trend among the Portuguese in following plant-based diets. Moreover, Portuguese omnivores show a slight decrease in meat consumption frequency - in 2007 around 79% of omnivores claimed to consume meat frequently, contrasting with 77% in 2017. These figures suggest a possible propensity towards semi-vegetarianism by omnivore consumers, leading to a decrease in meat consumption based on a more occasional intake (Nielsen, 2017).

2.3. Motivations Shaping Meat Consumption

Diets evolve over time, being influenced by many factors that interact in a complex manner to shape individual dietary patterns. These factors include income, food prices, individual preferences, beliefs, cultural traditions and geographical and environmental aspects (World Health Organization, 2015).

In developed countries, with a wide range of food on offer, people can choose what, when and how much they eat (Brug, 2008). Therefore, it is especially important to understand the driving forces shaping the new perspectives on meat consumption in these countries, more specifically in semi-vegetarians.

In previous studies, consumers' driving forces shaping meat consumption patterns varied, but most mentioned five key drivers that help to explain it: (1) *health-related motives*, (2) *hedonic-related motives*, (3) *social-related motives***,** (4) *environment-related motives*, (5) *animal-related motives* (Lea & Worsley, 2001; De Backer & Hudders., 2014; Janssen et al., 2016).

2.3.1. Health-related Motives

Most research concerning dietary and nutrition indicate that vegetables, fruit and legumes are the center of a healthy diet (Waxman, 2003). At the same time, several other studies advocate excessive meat consumption, fat-rich dairy products, frieds and other processed food to have harmful impacts on health (Morenga & Montez, 2017).

According to the 2018 report of the World Health Organization, *Noncommunicable Diseases: Country Profiles 2018*, poor eating habits are, nowadays, a major risk factor for the appearance

of noncommunicable diseases (NCDs). In 2016, these diseases were responsible for more than 41 million of the world's 57 million deaths, 15 million of those premature, aged between 30 and 70 years old. Cardiovascular diseases account for most NCDs deaths: 17.9 million, followed by cancer (9 million), respiratory diseases (3.9 million) and diabetes (1.6 million). All in all, studies concerning dietary encourage the consumption of vegetables, fruit and legumes over meat in order to prevent NCDs (WHO, 2018).

Although there's evidence pointing towards the less risk of developing conditions such as heart disease (Tong, Appleby, Bradbury, Perez-Cornago, Travis, Clarke & Key, 2019), cancer (Tong, Appleby, Bradbury & Key, 2017) and type 2 diabetes (Papier, Appleby, Fensom, Knuppel, Perez-Cornago, Schmidt, Tong & Key, 2019), medical evidence also suggests potential health problems deriving from not following an appropriately planned vegetarian or vegan diet (Watanabe, Yabuta, Bito & Teng, 2014; Melina, Craig & Levin, 2016). Plant-based diet followers are considered to have a higher risk of developing health problems deriving from the lack of certain nutrients such as iron, calcium, protein, vitamin D, vitamin B12 and zinc, which are more easily found in the omnivorous diet (Watanabe et al., 2014; Melina et al., 2016). Additionally, there is still not enough data to say exactly how plant-based diets influence long-term health (Appebly & Key, 2015).

According to Joy (2010), there are three major justifications that meat eaters usually rely to justify their commitment on eating meat and to avoid any feelings of guilt that might otherwise occur as a consequence of consuming animal products. These justifications include that eating meat is *natural*, *normal*, and *necessary*, known as the "Three Ns of Justification" (Joy, 2010). In one of the three Ns proposed by Joy (2010), he argues that, through a recurrent process of socialization, people come to believe that eating meat is *necessary*, that we need meat for survival or that we need to consume some meat to be strong and fully healthy individuals.

Depending on each individual beliefs, health-conscious consumers might feel motivated to adjust their eating behaviour towards scientific evidence concerning on what is deemed to be a healthy diet. Hence, the following hypothesis is suggested:

H1: The lower the perception of negative health impacts deriving from plant-based diets, the lower will be meat consumption frequency in semi-vegetarians.

2.3.2. Hedonic-related Motives

Lea and Worsley (2001) found out that "meat appreciation and enjoyment" is one of the main obstacles for australians to consider a vegetarian diet. When meat-eaters are asked to defend their right to eat meat, the tastiness of meat, or the hedonic pleasure deriving from it, is recurrently used as a justification for its continued consumption.

One of the other Ns proposed by Joy (2010) in his "Three Ns of Justification" is that through a recurrent process of socialization, people come to believe that eating meat is *natural*, that eating meat is written in our biology, meat is what we naturally crave, and it is what our species evolved to eat.

Hence, evidence suggests that the enjoyment obtained from eating meat is a major barrier to reduce meat consumption or to adopt a vegetarian diet (Lea & Worsley, 2001). Therefore, the following hypothesis is proposed:

H2: The higher the hedonic pleasure deriving from meat consumption, the higher will be meat consumption frequency in semi-vegetarians.

2.3.3. Social-related Motives

Eating meat is perpetuated in society through many forms. Joy (2010) suggests that the 3Ns are widespread beliefs that are reinforced through various social channels, including family, media, religion and several private and public organizations (Joy, 2010).

A 2018 study by Gallup, conducted a survey in all 50 USA states and the District of Columbia, which revealed that only 5% and 3% of US citizens are vegetarians and vegans, respectively, meaning that the vast majority, 92%, are meat-eaters. Similar figures apply to many other developed countries where, in most cases, more than 90% of the population eats meat (Ipsos Global Advisor, 2018). Human behaviour research demonstrates our tendency to behave according to the majority, therefore, following the crowd seems to be a good path to move in a complex environment where popularity is taken as a good indicator that certain behaviours should be replicated (Cialdini, 2007). Moreover, by following the social norm, an individual finds it easier to feel integrated and accepted by others, fulfilling the human need for belonging, one of

the levels of Maslow's Hierarchy of Needs (Maslow, 1943). Similarly, Joy (2010), in one of the three Ns, explains that eating meat is regarded by people to be *normal*, it is what most people in civilized societies do and what most people expect others to do.

Nevertheless it should be noted that, according to Lea & Worsley (2001), the number of vegetarian friends is a negative predictor of meat consumption frequency and semi-vegetarians are expected to have a substantial number of friends following a plant-based diet, thus, the next hypothesis is suggested:

H3: The lower the perception of negative social life impacts caused by not following an omnivorous diet, the lower will be meat consumption frequency in semi-vegetarians.

2.3.4. Environment-related Motives

In recent decades, overall public opinion regarding global warming has been deeply shaped by media as it mediates the scientific evidence that human activities are playing a major role on climate change (Antilla, 2010).

A number of scientific evidence indicates human-induced emission of greenhouse gases to be the main reason behind global warming, with almost all scientific bodies (97%) agreeing with this view (Cook, Oreskes, & Doran, 2013). A 2013 report of the Food and Agriculture Organization (FAO) of the United Nations (UN), *Tackling on Climate Change Through Livestock*, reveals that animal agriculture is accountable for 14.5% of global greenhouse gas emissions, thus being the second highest source of total emissions responsible for global warming (Gerber et al., 2013). The same report claims that animal agriculture is accountable for the usage of 70% of agricultural land, resulting in being one of the leading causes of deforestation, biodiversity loss and water pollution (O'Mara, 2011).

Another report by Yale Program on Climate Change Communication, *Climate Change in the American Mind: December 2018*, concludes that 73% of US citizens believe global warming is happening and 62% understand that global warming is mostly human-caused (Leiserowitz, Maibach, Rosenthal, Kotcher, Ballew, Goldberg, & Gustafson, 2018). These figures are even higher among europeans, as stated in the European Social Survey's report, *European Attitudes on Climate Change and Energy*, which indicates that, in most european countries, over 90% of

the people believe climate is changing and that that is, at least partially, caused by human activity (Poorting, Fisher, Böhm, Steg, Whitmarsh, & Ogunbode, 2018).

Aware and in an effort of not backing industries contributing to these problems, environmental-conscious consumers may find the motivation to change their eating habits in accordance to their belief that such behaviour will allow to protect the environment and tackle the climate crisis. Accordingly, the subsequent hypothesis is proposed:

H4: The higher the perception of negative environmental impacts caused by meat consumption, the lower will be meat consumption frequency in semi-vegetarians.

2.3.5. Animal-related Motives

The well-known Theory of Evolution wrote by Charles Darwin in *On the Origin of Species* in 1859 is the landmark scientific work that revolutionized the way humans view their relationship with other species. Darwin believed that, not only human beings have a direct kinship with other animals, but the later also have social, mental and moral lives too (Darwin, 1859).

Recent events suggest people are increasingly concerned with not just their own well-being but also that of other animals as well. A study conducted by Packaged Facts, a leading market research company in the USA, shows that nearly 60% of the U.S. consumers are more concerned about animal-welfare than they were a few years ago, most of them believing livestock should be treated humanely and slaughtered in the least painful possible way. The same study indicates consumers' concerns regarding on how animals are housed, fed and handled (Market Research.com, 2017).

These figures seem to support that as human knowledge regarding itself and that of other species evolves, so does the relationship and behaviour towards them, resulting in the development of deeper feelings of empathy and concern for other animals (De Backer & Hudders, 2014). Consequently, animal welfare might have an impact among semi-vegetarians in such a way that results in a reduced consumption of meat, thus, the following hypothesis is suggested:

H5: The lower the perception of abuse towards animal welfare caused by meat consumption, the higher will be meat consumption frequency in semi-vegetarians.

CHAPTER 3 – RESEARCH QUESTION AND HYPOTHESIS

3.1. Research Question

As the impact of the so-called semi-vegetarians is much larger than that of the small number of consumers following plant-based diets, it is important to assess which motivations shape their meat consumption frequency. Considering the research problem previously exposed, the following research question is proposed to be answered:

1. What is the relation between motivations (health, hedonic, social, environment and animal) and meat consumption frequency in semi-vegetarians?

3.2. Conceptual Framework

The following conceptual framework (Figure 1) was designed to answer the research question. The proposed model was based on two previous researches. The first one, developed by Lea & Worsley (2001), evaluated how health, hedonic and social beliefs concerning vegetarianism and meat consumption predicted meat consumption frequency in Australian consumers, while De Backer & Hudders (2014) assessed through a logistic regression the likelihood of one falling into the vegetarian or the semi-vegetarian groups through environment and animal welfare variables in Belgian consumers. Thus, the proposed conceptual framework is:

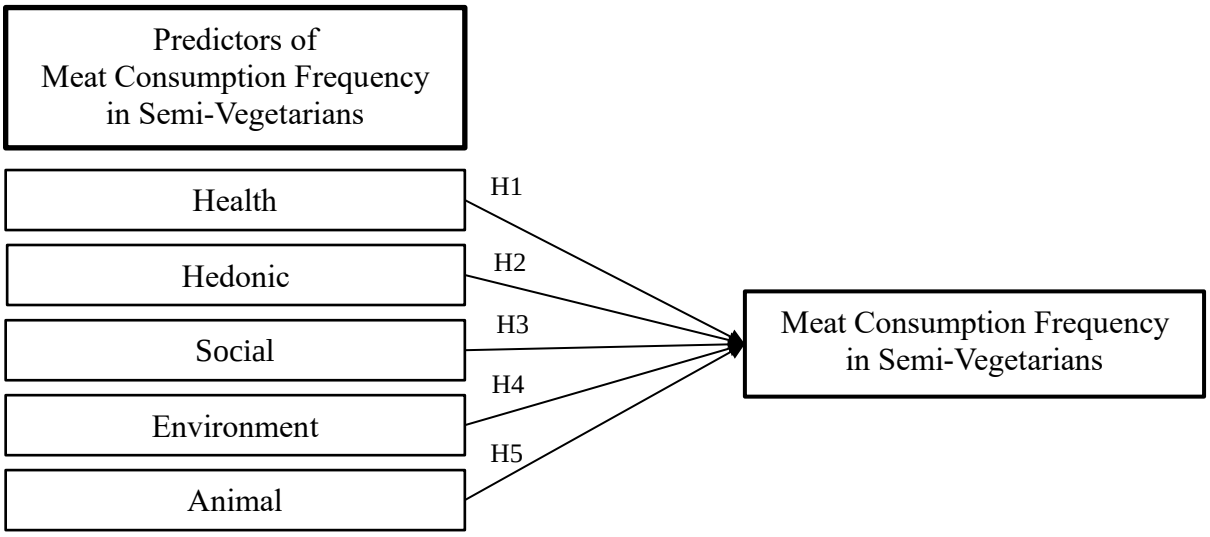


Figure 1 - Conceptual Framework

3.3. Research Hypothesis

As evidence suggests a relationship between *health-related motives* (1), *environment-related motives* (2), *animal-related motives* (3), *hedonic-related motives* (4) and *social-related motives* (5) concerning meat consumption, it is pertinent to test how these variables influence meat consumption frequency in semi-vegetarians (Lea & Worsley, 2001; De Backer & Hudders, 2014). The following hypothesis were designed in order to answer the research question:

Table 1 - Research Hypothesis

H1: The lower the perception of negative health impacts deriving from a vegetarian diet, the lower will be meat consumption frequency in semi-vegetarians.
H2: The higher the hedonic attachment to meat, the higher will be meat consumption frequency in semi-vegetarians.
H3: The lower the perception of negative social life impacts caused by not following an omnivorous diet, the lower will be meat consumption frequency in semi-vegetarians.
H4: The higher the perception of negative environmental impacts caused by meat consumption, the lower will be meat consumption frequency in semi-vegetarians.
H5: The lower the perception of abuse towards animals caused by meat consumption, the higher will be meat consumption frequency in semi-vegetarians.

CHAPTER 4 – METHODOLOGY

4.1. Type of Research

This research was conducted through a deductive approach, since it was based on existing academic theories (Lea & Worsley, 2001; De Backer & Hudders, 2014) with the main purpose to test the relation between the proposed variables and comprehend semi-vegetarian consumer behaviour in semi-vegetarians (Malhotra & Birks, 2007).

A quantitative method was employed through a survey strategy, resulting in an online questionnaire, which allowed a fast and economic collection of primary data and an overall stronger control of the research process. In turn, this data permits a statistical analysis to be conducted to answer the investigation question and test the proposed hypothesis (Malhotra & Birks, 2007; Saunders, Lewis, & Thornhill, 2012).

4.2. Population and Sample

The target population for this research were semi-vegetarians, this means someone who reduces meat intake at least three days a week (De Backer & Hudders, 2014), nevertheless, anyone with an opinion regarding meat consumption was invited to respond. This study followed a non-probabilistic convenience sampling method (Malhotra & Birks, 2007; Saunders et al., 2012).

4.3. Data Collection

The chosen method for data collection was based on a specific information collection procedure known as mono method (Saunders et al., 2012), resulting in a quantitative research. A structured questionnaire was prepared and hosted on the internet and made in such a way that could be self-administrated by the respondents (Malhotra & Birks, 2007; Saunders et al., 2012). The questionnaire was supported by Qualtrics, a well-known software for surveys, and its link was subsequently shared online across social media networks, more specifically Facebook, Instagram and LinkedIn. Family members, friends and acquaintances helped spreading the questionnaire by sharing it on their social media profiles, allowing their own family members, friends and acquaintances to respond. The link was also shared on some Facebook vegetarian groups with the purpose of reaching semi-vegetarians, the target of this research. Data collection was carried out between 29th July and 15th August 2019.

4.4. Survey

A self-completion questionnaire was developed with a total of 33 fixed-response alternative questions (except number of weekly meat meals and age), with the goal of reducing the variability of responses and consequent results (Malhotra & Birks, 2007). The questionnaire was divided in ten sections: firstly, a brief introduction of the research purpose was presented; the remaining nine sections were related to the respondents' perceptions towards dietary options (questions about consumers' followed diet, meat consumption frequency and health, environment, animal, hedonic and social perceptions related to meat consumption); the last section dealt with socio-demographic data.

To ensure the questionnaire's validity and clearness, a pre-test was conducted before the final data collection (Saunders et al., 2012). During the 25th/26th July a sample of 11 convenient people, both genders, between 25 and 65 years old, were requested to reply and express their thoughts on the survey's clearness. Some improvements were suggested, essentially in terms of specifying questions with actual examples and misspellings.

4.5. Measurement and Scales

Respondents were asked to indicate their degree of agreement or disagreement (Malhotra & Birks, 2007), ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with a series of items designed to measure perceptions and responses to meat consumption on the constructs of health, environment, animal welfare, pleasure associated to meat consumption (hedonic) and social life. The five constructs were measured with items adopted and modified from scales previously employed in the literature. All of them were measured using a 4-item scale. For reliability purposes, social construct was reduced to three items and animal construct to two items.

Omnivore respondents were specifically asked about their meat consumption habits by writing down their current average number of weekly meat meals (lunch and dinner) by filling the blank box space in the sentence "I consume around __ meat meals per week.". No absolute zero was used for this scale based on the assumption that an omnivore respondent necessarily eats meat at least once a week, thus, the scale ranged from a minimum of 1 to a maximum of 14, the latest to cover the all-out number of main meals of the week ($7\ days\ of\ the\ week \times 2\ main\ meals\ of\ the\ day = 14\ weekly\ meals$). The scale was not visible to respondents, being only shown in the event of a submitted value outside of the scale's range.

4.6. Data Processing and Preliminary Analysis

IBM SPSS Statistics was the software used to analyse the data collected through the survey. A total of 1,029 respondents fully completed the survey, resulting in 756 omnivores, 158 vegetarians and 115 vegans. Considering the specific interest on semi-vegetarian consumers, it was necessary to find a criteria to filter semi-vegetarians among the omnivorous group. The chosen criteria relied on De Backer & Hudders (2014) definition of semi-vegetarian as being someone who reduces meat intake at least three days a week ($3\ days \times 2\ main\ meals\ of\ the\ day = 6\ weekly\ meals$). In order to have a 50/50 proportion of meat

meals and meatless meals throughout the week, it was decided that the threshold for an omnivore to be considered a semi-vegetarian would be to not eat more than seven meat meals per week, rather than the eight meals that would result from the calculation of the difference. By applying this criteria, a sample of 442 semi-vegetarians is obtained.

Some preliminary procedures were followed to prepare data analysis (Malhotra & Birks, 2007), namely recoding and constructs (See Attachment 3). Age was recoded into generation groups according to *The Center for Generational Kinetics* generations classification, namely, Generation Z ($\leq 24\ years\ old$), Millennials ($> 24\ years\ old\ \wedge \leq 43\ years\ old$), Generation Y ($> 43\ years\ old\ \wedge \leq 55\ years\ old$), Baby Boomers ($> 55\ years\ old\ \wedge \leq 74\ years\ old$) and Traditionalists ($\geq 75\ years\ old$). The constructs - health, hedonic, social, environment and animal - were created based on the arithmetic mean of a group related indicators and statistically tested through an explanatory Principal Component Analysis (PCA – Varimax Rotation). The main goal of this procedure is to confirm if the indicators measure the expected construct (Marôco, 2014). First, to evaluate the data's suitability for PCA, the Kaiser-Meyer-Olkin (KMO) statistic and the Bartlett's test of sphericity were performed. Malhotra and Birks (2007) defend that KMO values from .5 to 1.0 indicate PCA's adequacy and, in this investigation. KMO's statistics ranged between .500 and .801, meaning that all variables can be categorized as adequate concerning PCA's quality recommendation options (Marôco, 2014). Additionally, Bartlett's test confirmed that all variables are significantly correlated (p = .000). These results confirmed that PCA is adequate and justified.

Table 2 - Summary of KMO and Barlett's Test

		Health	Hedonic	Social	Environment	Animal
KMO Test		.714	.801	.622	0.797	.500
Barlett's Test of Sphericity	Approx. Chi-Square	368.356	749.727	203.710	733.717	137.413
	Sig.	.000	.000	.000	.000	.000

Considered statistical significante level: 0.05

The extracted dimensions' internal consistency was also assessed by using Cronbach's Alpha Coefficient. This indicator varies from 0 to 1 and considers the ratio between the total variance of the indicators that compose the dimension and the variance of each indicator. All dimensions,

except social and animal (.654 and .680, respectively, which are still admissible), registered Cronbach's alphas above .7, meaning moderate to high consistency, thus the majority of the dimensions have high levels of consistency.

Table 3 - Summary of Cronbach's Alpha

	Health	Hedonic	Social	Environment	Animal
Cronbach Alpha	.705	.830	.654	.839	.680

CHAPTER 5 – DATA ANALYSIS

5.1. Sample Characterization

The sample is composed by 442 semi-vegetarian respondents. Table 4 describes the sample profile of the study.

Table 4 – Sample Profile

		N	%
Sex	Female	311	70.36
	Male	131	29.64
	Total	**442**	**100.00**
Generation	Generation Z (1996 and after)	115	26.02
	Millennial (1977-1995)	209	47.29
	Generation X (1965-1976)	80	18.10
	Baby Boomer (1946-1964)	38	8.60
	Total	**442**	**100.00**
Academic qualifications	Primary School	1	0.23
	Middle School	21	4.75
	High School	101	22.85
	Bachelor	191	43.21
	Master	114	25.79
	Doctorate	14	3.17
	Total	**442**	**100.00**
Subjective Income	The current income allows to live comfortably	208	47.06
	The current income allows to live normally	180	40.72
	It's hard to live with the current income	47	10.63
	It's very hard to live with the current income	7	1.58
	Total	**442**	**100.00**
Household composition	Lives with family members	208	47.06
	Lives alone	54	12.22
	Lives with friends/colleagues/acquaintances	31	7.01
	Lives with partner	149	33.71
	Total	**442**	**100.00**

Most respondents are female, 70.36%, and only 29.64% are male. Respondents' age ranged from 15 to 72 years old. A total of 26.02%, is aged between 24 years old or younger (Generation Z) and almost half of the sample, 47.29%, is aged between 25 and 43 years old (Millennials). The remaining generations represented 18.10% (Generation Y) and 8.60% (Baby Boomers) of the sample size. Concerning the respondents' academic qualifications, 43.21% hold a bachelor degree, 27.83% don't have any higher education degree, whilst the remaining 28.96% hold a master or doctorate degree. Regarding household composition, almost half of the respondents, 47.06%, lives with family members and another considerable amount, 33.71%, lives with its partner. The remaning 12.22% lives alone, while 7.01% lives with friends, colleagues or acquaintances. Finally, regarding respondents' income, 47.06% believe its current income allows to live comfortably and a similar percentage, 40.72%, corresponds to those who believe its current income allows to live normally. On the other hand, with much smaller percentages, are those who believe its hard or very hard to live with its current income, 10.63% and 1.58%, respectively.

5.2. Semi-Vegetarians' Meat Consumption Predictors

In order to answer the research question and to understand which are the predictors and their strength on meat consumption frequency, a multiple linear regression analysis was conducted to allow the testing of all the previously mentioned hypothesis. The model's dependent variable was meat consumption frequency and the independent variables were health-related motives, hedonic-related motives, social-related motives, environment-related motives and animal-related motives. Previous to the multiple linear regression, all the needed assumptions were analysed (Attachments 4, 5 and 6).

In order to test the regression model, the adjusted determination coefficient (Adjusted R^2) was determined and resulted in a Adjusted R^2 = .158, which means that 15.8% of the total variation of meat consumption frequency in semi-vegetarian consumers is explained by the variation in perceived health, hedonic, social, environment and animal impacts deriving from meat consumption. Analyzing the ANOVA results, it is confirmed that the model is significant ($F(5) = 17.568$; p-value = .000).

As hypothesised in H1, health-related motives have a negative impact on meat consumption frequency (β = -.151; t-value = -2.849; p-value = .005), thus, supporting H1. Concerning hypothesis 2, semi-vegetarians meat consumption frequency is positively related to hedonic-

related motives (β = .309; t-value = 5.906; p-value = .000), hence, supporting H2. Referring to hypothesis 3, social-related motives have a negative impact on the dependent variable (β = -.100; t-value = -2.177; p-value = .030), therefore, H3 was also supported. Concerning the variables appropriateness, it was possible to assess that environment-related motives (β = .060; t-value = 1.128; p-value = .260) and animal-related motives (β = -.010; t-value = -.203; p-value = .840) are not adequate in explaining the variance on meat consumption frequency, thus, not supporting H4 and H5. Table 5 summarizes the analysis results:

Table 5 - Predictors of Meat Consumption Frequency in Semi-Vegetarians

Independent Variables	Standardized Coefficients Beta (β)	
Health-related motives	-.151**	
Hedonic-related motives	.309**	
Social-related motives	-.100*	
Environment-related motives	.060	
Animal-related motives	-.010	
Adjusted *R* Square		.158**
F(5)		17.568

Dependent Variable: Meat Consumption Frequency
Significance: *($p < .05$);**($p < .001$)

CHAPTER 6 – CONCLUSIONS

6.1. Discussion

The aim of this research was to assess the predictors of meat consumption frequency in semi-vegetarian consumers and to further deepen the knowledge about semi-vegetarian consumer behaviour. More specifically, it was intended to analyse the impact of motivations linked to health, pleasure associated to meat consumption (hedonic), social life, environment and animal welfare in meat consumption frequency in semi-vegetarians.

The findings of this study indicate that health-related motives and social-related motives have a negative and significant relation with meat consumption frequency in semi-vegetarians. On the other hand, hedonic-related motives is the only assessed variable among the five studied

predictors with a positive and significant relation with meat consumption frequency in semi-vegetarians. Environment-related motives and animal-related motives are not significantly related to meat consumption frequency in semi-vegetarians.

Health-related motives have a negative impact on meat consumption frequency in semi-vegetarians, suggesting that the lower the perception of negative health impacts deriving from following a vegetarian diet, the lower will be meat consumption frequency in semi-vegetarians. Hence, the perception of low-risk of developing health problems when following a vegetarian diet is a suitable predictor of a lower meat consumption frequency in semi-vegetarians, which is not aligned Lea & Worsley (2001) finding that the perceived unhealthiness of vegetarian diets is a positive predictor on meat consumption frequency, not on semi-vegetarians, but on regular omnivore consumers. It is also consistent with the findings of De Backer & Hudders (2014), which states that the more one is concerned about health, the more likely they are semi-vegetarians.

Hedonic-related motives have a positive impact on meat consumption frequency in semi-vegetarians, implying that the higher the pleasure obtained by eating meat, the higher will be meat consumption frequency, which is aligned with the findings of Lea & Worsley (2001) in omnivore consumers. It follows, then, that hedonic-related motives is also a good predictor of a higher meat consumption frequency in semi-vegetarians.

Social-related motives have a negative impact on meat consumption frequency in semi-vegetarians, thus indicating that, the lower the perception of negative social life impacts caused by not following an omnivorous diet, the lower will be meat consumption frequency in semi-vegetarians. This can be explained by the higher probability of semi-vegetarians having a sizeable social group composed by plant-based diet followers, where eating meat is more of a disadvantage rather than an advantage. This is coherent with Lea & Worsley (2001) findings that the higher the number of vegetarian friends, the lower is meat consumption frequency.

Environment-related motives and animal-related motives, contrarly to what was initially expected, are not significant predictors in explaining meat consumption frequency in semi-vegetarians. These findings come rather as a surprise considering that the environmental and animal welfare causes are consistently in the literature as two major drivers why consumers

decide to follow plant-based diets. Possible explanations for these outcomes may be associated with the fact that environment-related and animal-related motives have a higher influence on attitudes and beliefs in semi-vegetarians (see item-scores means in Attachment 2) rather than on translating directly into actual behavioral change, since, by all means, semi-vegetarians do still eat meat. The suspicion of a possible relation between the environment and animal welfare causes in meat consumption frequency was pointed by Lea & Worsley (2001) and De Backer & Hudders (2014), although neither of the studies actually tested these suspicions on a linear regression model. These conclusions are fairly empirical as, to the best of the investigator's knowledge, there is no academic research so far explaining the relation between environment and animal welfare dimensions with meat consumption frequency in semi-vegetarians.

Table 6 - Research Question and Hypothesis Testing

Research Question: What is the relation between motivations (health, hedonic, social, environment and animal welfare) and meat consumption frequency in semi-vegetarians?
H1: The lower the perception of negative health impacts deriving from vegetarian diet, the lower will be meat consumption frequency in semi-vegetarians. **Supported**
H2: The higher the hedonic pleasure deriving from meat consumption, the higher will be meat consumption frequency in semi-vegetarians. **Supported**
H3: The lower the perception of negative social life impacts caused by not following an omnivorous diet, the lower will be meat consumption frequency in semi-vegetarians. **Supported**
H4: The higher the perception of negative environmental impacts caused by meat consumption, the lower will be meat consumption frequency in semi-vegetarians. **Not Supported**
H5: The higher the perception of abuse towards animal welfare caused by meat consumption, the lower will be meat consumption frequency in semi-vegetarians. **Not Supported**

6.2. Theorical Contributions

From an academic point of view, this research provides meaningful insights that diminish the gap and contribute to the discussion regarding semi-vegetarianism, which is still very scarse. Besides developing a theoretical framework that considered some possible drivers shaping meat consumption frequency in semi-vegetarians, the empirical data managed to refute some suspicions in the literature that environmental-related motives and animal-related motives, which are major predictors in explaining the adoption of a vegetarian and vegan diet (Janssen et al., 2015), do not seem to be reliable in explaining meat consumption frequency in semi-vegetarians. This research has contributed with a conceptual framework to help explain the relations of such motivations in semi-vegetarian consumer behaviour.

6.3. Managerial Contributions

Accounting to an increased movement towards sustainable behaviours translated on, among other things, in a decrease of meat consumption, this investigation offers meaningful insights that may be of interest to the food industry. After acknowledging a trend towards plant-based diets and a more occasional consumption of meat (Nielsen, 2017), practitioners should be aware of this reality and start to work on business models adapted to this new pattern of consumer behaviour towards meat consumption. Even though these findings can not be extrapolated to the population given the non-probablistic nature of the sample, one should not be indifferent to the fact that more than half of the 756 omnivores have avowed to eat, on average, seven or less meat meals per week. Moreover, more than half of the 756 omnivores have also declared to have already reduced meat consumption in the past. This is particularly true for women and younger generations, who seem to be more sensible to the topic (See Attachment 9). Together with other previous studies recurring to probabilistic samples (Nielsen, 2017), this seems to support that vegetarianism, veganism and, more particulary interesting for this research purpose, semi-vegetarianism, are trends that mark consumer behavior now and will mark further in the future.

Regarding semi-vegetarian consumers, managers and business owners with food-related businesses who have an offer largely based on meat should be aware that this increasing segment of consumers is sensible to health-related matters linked to meat consumption, hence, food options with good nutritional value should be thought out. Two possible ways of approaching this could be to offer a wider nutrititous range of plant-based dishes as well as, since pleasure

associated to meat consumption was also confirmed in semi-vegetarian consumers, by replacing red meat dishes with the known-as-healthier white meat dishes. Regarding the social component, even though it is of difficult control, entrepreneurs who wish to serve consumer segments with different diets, should guarantee that their business spaces have a policy of neutrality and that does not fuel prejudice over semi-vegetarians for opting for a meat dish over a vegetarian/vegan dish or vice versa. Even though environment-related and animal-related motives were not found to be predictors of meat consumption frequency in semi-vegetarians, that does not mean that this segment of consumers neglects them. As previously said, one should be alerted on the difference between attitudes and beliefs with the actual behaviour. For instance, a semi-vegetarian might have a belief that meat consumption is bad for the environment and animal welfare, but that belief might not be strong enough to translate into actual behavioural change. It is deduced that when environment and animal related motives are strong enough, they rather translate into the adoption of a plant-based diet rather than a decrease in meat consumption frequency (De Backer & Hudders, 2014).

6.4. Limitations and Future Research

This research has acknowledged several limitations, which limit the applicability of its results. First, the most important limitation lies with the use of a non-probabilistic sampling method, mainly the convenience method, indicating selection bias and less representativeness, which constrains the generalization of these findings to the population of Portuguese semi-vegetarians. Second, another limitation is related to the adoption of only one method of data collection, since the incorporation of other methods, such as interviews or focus groups, could bring more reliable and enriching results. Third, this research sample was largely composed by young women, which limited a fair comparison between sex and age groups concerning meat consumption frequency and its predictors (See Table 4). Finally, investigating dietary behaviours by using cross-sectional data becomes a limitation since eating habits are highly volatile and comprises itself a considerable complexity which needs to be further addressed in future research.

Further experimental investigations are needed to understand meat consumption frequency, specially through longitudinal studies in order to assess variances more accurately and reliably. Future studies should also consider to include new variables in order to strengthen the model, since 15.8% of explained variance in meat consumption frequency in semi-vegetarians is still rather small. Variables to be tested in future research may include convenience, by testing how

knowledge concerning plant-based diets and the availability of no-meat options influence consumer behaviour. The lack of knowledge or culinary skills to prepare vegetarian dishes may be stopping semi-vegetarians from reducing meat consumption frequency. Since the cultural component is proven to have an impact over dietary, it would be interesting to conduct similar studies in other countries. Finally, another interesting topic would be to include fish consumption on future research and study the impact of such variables on semi-vegetarians fish consumption frequency.

REFERENCES

Antilla, L. (2010). Self-censorship and science: A geographical review of media coverage of climate tipping points. *Public Understanding of Science, 19,* 240-256. doi:10.1177/0963662508094099

Appleby, P., & Key, T. (2016). The long-term health of vegetarians and vegans. *Proceedings of the Nutrition Society, 75*(3), 287-293. doi:10.1017/S0029665115004334.

Betts, J. G., DeSaix, P., Johnson, E., Johnson, J. E., Korol, O., Kruse, D. H., Poe, B., Wise, J. A., Womble, M., Young, K. A. (2017). *Anatomy and physiology*. Houston, Texas: OpenStax College, Rice University.

Brug, J. (2008). Determinants of healthy eating: motivation, abilities and environmental opportunities. *Family Practice, 25*(Supplement 1), i50–i55. doi:10.1093/fampra/cmn063.

Cialdini, R. (2007). *Influence: The psychology of persuasion.* 1st Edition. New York: Collins.

Cook, J., Oreskes, N., & Doran, P. T. (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letter, 8* (2), 024024. doi:10.1088/1748-9326/8/2/024024

Darwin, C. (1859). *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. 1st Edition. London, United Kingdom: John Murray.

De Backer, C. J. S., Hudders, L. (2014). From meatless mondays to meatless sundays: motivations for meat reduction among vegetarians and semi-vegetarians who midly or significantly reduce their meat intake. *Ecology of Food and Nutrition, 53* (6), 639-657. doi:10.1080/03670244.2014.896797

De Backer, C. J. S., Hudders, L. (2015). Meat morals: relationship between meat consumption consumer attitudes towards human and animal welfare and moral behavior. *Meat Science, 99*, 68–74. doi:10.1016/j.meatsci.2014.08.011

Earle, M., Hodson, G., (2017). What's your beef with vegetarians? Predicting anti-vegetarian prejudice from pro-beef attitudes across cultures. *Personality and Individual Differences, 119*, 52-55. doi:10.1016/j.paid.2017.06.034

Egecioglu, E., Skibicka, K. P., Hansson, C., Alvarez-Crespo, M., Friberg, P. A., Jerlhag, E., … Dickson, S. L. (2011). Hedonic and incentive signals for body weight control. *Reviews in Endocrine and Metabolic Disorders, 12*(3), 141–151. doi:10.1007/s11154-011-9166-4

Gerber, P., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A., Tempio, G. (2013). *Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities.* Rome, Food and Agriculture Organization of the United Nations (FAO).

Ipsos (2018). *An exploration into diets around the world*. Retrieved September 15, 2019, from https://www.ipsos.com/sites/default/files/ct/publication/documents/2018-08/an_exploration_of_diets_around_the_world.pdf

Janssen, M., Busch, C., Rödiger, M., & Hamm, U. (2016). Motives of consumers following a vegan diet and their attitudes towards animal agriculture. *Appetite, 105*, 643–651. doi:10.1016/j.appet.2016.06.039

Joy, M. (2010). *Why we love dogs, eat pigs and wear cows. An introduction to carnism.* San Francisco, CA: Red Wheel/Weiser.

Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Ballew, M., Goldberg, M., & Gustafson, A. (2018). *Climate change in the American mind: December 2018*. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.

Malhotra, N. K., & Birks, D. F. (2007). *Marketing research - An applied approach*. 3rd Edition. Harlow, England: Prentice Hall.

Market Research.com. (2017). Animal Welfare an Increasing Concern for Consumers. Retrieved December 9, 2018, from https://blog.marketresearch.com/animal-welfare-an-increasing-concern-for-consumers

Marôco, J. (2014). *Análise estatística com o SPSS Statistics*. 6th Edition. Pêro Pinheiro: Report Number.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50*(4),* 370–396. doi:10.1037/h0054346

Melina, V., Craig, W., & Levin, S. (2016). Position of the Academy of Nutrition and Dietetics: Vegetarian Diets. *Journal of the Academy of Nutrition and Dietetics, 116*(12), 1970-1980. doi: 10.1016/j.jand.2016.09.025

Miller, L. M. S., Cassady, D. L. (2012). Making healthy food choices using nutrition facts panels. The roles of knowledge, motivation, dietary modifications goals, and age. *Appetite, 59*(1), 129–139. doi:10.1016/J.APPET.2012.04.009

Morenga, L., Montez, J. (2017). Health effects of saturated and trans-fatty acid intake in children and adolescents: Systematic review and meta-analysis. *PLoS ONE, 12*(11). doi:10.1371/journal.pone.0186672

Mullee, A., Vermeire, L., Vanaelst, B., Mullie, P., Deriemaeker, P., Leenaert, T., De Henauw, S., Dunne, A., Gunter, M., Clarys, P., Huybrechts, I. (2017). Vegetarianism and meat consumption: A comparison of attitudes and beliefs between vegetarian, semi-vegetarian, and omnivorous subjects in Belgium. *Appetite, 114*, 299-305. doi:10.1016/j.appet.2017.03.052

Nielsen. (2017). *120 000 vegetarianos - Número quadruplica em 10 anos.* Retrieved December 9, 2018, from https://www.centrovegetariano.org/Article-620-Numero-vegetarianos-quadruplica-10-anos-Portugal.html

OECD/FAO (2019). *OECD-FAO Agricultural Outlook 2019-2028*, Paris, OECD Publishing. doi:10.1787/19991142

O'Mara, F. (2011). The significance of livestock as a contributor to global greenhouse gas emissions today and in the near future. *Animal Feed Science and Technology, 166–167,* 7–15. doi:10.1016/j.anifeedsci.2011.04.074

Papier, K., Appleby, P., Fensom, G., Knuppel, A., Perez-Cornago, A., Schmidt, J., Tong, T., & Key, T. (2019). Vegetarian diets and risk of hospitalisation or death with diabetes in British adults. *Nutrition and Diabetes, 9*(1), 7. doi:10.1038/s41387-019-0074-0

Poorting, W., Fisher, S., Böhm, G., Steg, L., Whitmarsh, L., Ogubonde, C. (2018). *European attitudes to climate change and energy: topline results from round 8 of the European Social Survey*. University of London, United Kingdom: European Social Survey ERIC.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students*. 6th Edition. Harlow, England: Prentice Hall.

Solomon, M. R., (2017). *Consumer Behavior: Buying, Having and Being*, 12th Edition. Essex, United Kingdom: Pearson.

Stuart, H. (2013). *Essential Microbiology*, 2nd Edition. University of Glamorgan, United Kingdom: Wiley-Blackwell.

Summerfield, M. L. (2012). *Nutrition, Exercise and Behavior: An Integrated Approach to Weight Management*, 2nd Edition. Belmont, CA: Wadsworth.

Tong, T., Appleby, P., Bradbury, K., & Key, T. (2017). Cross-sectional analyses of participation in cancer screening and use of hormone replacement therapy and medications in meat eaters and vegetarians. *BJM Open, 7*(12), e018245. doi:10.1136/bmjopen-2017-018245

Watanabe, F., Yabuta, Y., Bito, T., & Teng, F. (2014). Vitamin B_{12}-containing plant food sources for vegetarians. *Nutrients, 6*(5), 1861–1873. doi:10.3390/nu6051861

Waxman, A. (2003). Prevention of chronic diseases: WHO global strategy on diet, physical activity and health. *Food and Nutrition Bulletin*, *24*(3), 281-284. doi:10.1177/156482650302400306

World Health Organization. (2015). *Healthy diet*. Retrieved December 8, 2018, from https://www.who.int/news-room/fact-sheets/detail/healthy-diet

World Health Organization. (2018). *Noncommunicable Diseases*. Retrieved December 8, 2018, from https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

ATTACHMENTS

Attachment 1 - Online Survey

Block 1 – Introduction

Este questionário insere-se no âmbito da realização de uma dissertação de Mestrado em Marketing no ISEG - *Lisbon School of Economics and Management*, da Universidade de Lisboa. O estudo aborda a temática do **consumo alimentar sustentável**.

Todos os dados recolhidos serão anónimos e confidenciais, sendo apenas divulgados de forma agregada. Não existem respostas certas ou erradas, pelo que apelo à sua máxima sinceridade. O tempo estimado de preenchimento deste questionário é de cerca de 6 minutos.

Saliento que a sua participação é muito importante para a realização deste estudo.

Muito obrigado pela sua participação.

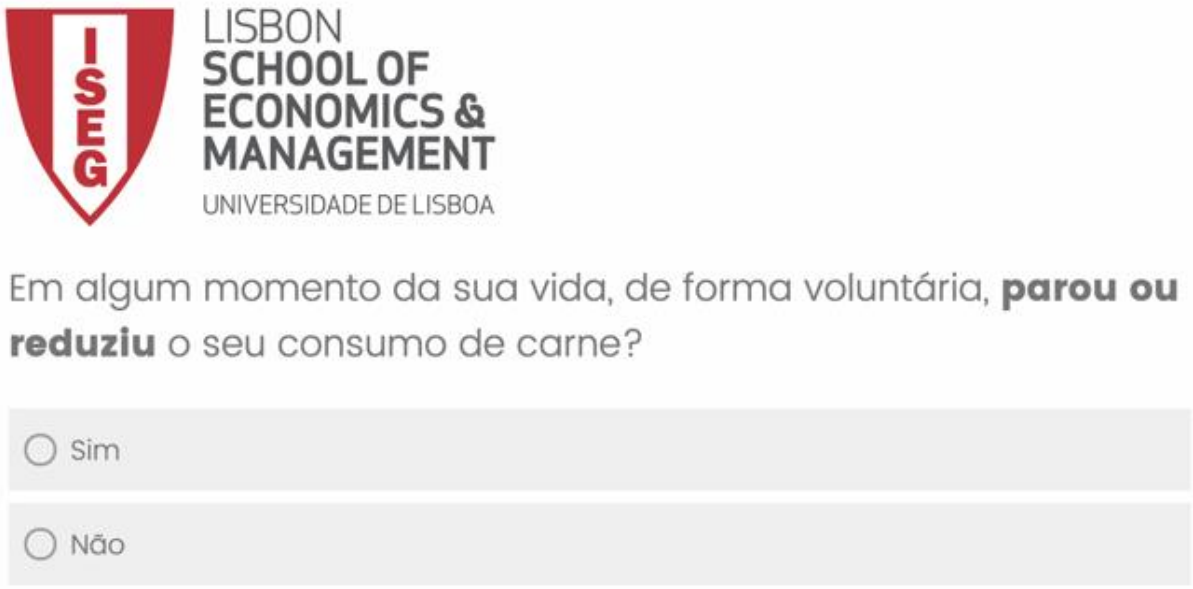
Block 2 – Diet Selection

Que **regime alimentar** melhor define a sua alimentação atual?

- ○ Sou **Omnívoro/a** (Consumo carne e/ou peixe, bem como outros alimentos de origem animal e vegetal).
- ○ Sou **Vegetariano/a** (Não consumo carne, não consumo peixe, mas consumo outros alimentos de origem animal tais como leite animal, ovos e mel, para além de alimentos de origem vegetal).
- ○ Sou **Vegano/a** (Consumo alimentos de origem vegetal, mas não consumo carne, não consumo peixe, nem quaisquer outros produtos de origem animal).

Block 4 - Meat Meals per Week

Block 3 - Past Meat Reduction



LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

O que pensa sobre o impacto do consumo de carne na **saúde**?

Indique ***o seu grau de concordância em cada uma das seguintes afirmações:***

	Discordo Totalmente	Discordo Parcialmente	Não concordo nem discordo	Concordo Parcialmente	Concordo Totalmente
Sinto-me com mais energia quando como carne.	○	○	○	○	○
Existe proteína suficiente nas dietas vegetarianas.	○	○	○	○	○
Existe ferro suficiente nas dietas vegetarianas.	○	○	○	○	○
É possível ser saudável sem consumir carne.	○	○	○	○	○

Block 6 - Hedonic

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Qual é a sua opinião quanto ao **prazer** que se retira ao comer carne?

Nota: Caso não consuma carne atualmente, recorde a sua experiência passada enquanto ex-consumidor

*Indique o **seu grau de concordância** em cada uma das seguintes afirmações:*

	Discordo Totalmente	Discordo Parcialmente	Não concordo nem discordo	Concordo Parcialmente	Concordo Totalmente
Gosto do sabor da carne.	○	○	○	○	○
Sinto-me bem quando como carne.	○	○	○	○	○
Comer carne dá-me prazer.	○	○	○	○	○
Pratos com carne são mais saborosos que pratos vegetarianos.	○	○	○	○	○

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

O que pensa sobre o impacto do consumo de carne na sua **vida social**?

*Indique o **seu grau de concordância** em cada uma das seguintes afirmações:*

	Discordo Totalmente	Discordo Parcialmente	Não Concordo nem Discordo	Concordo Parcialmente	Concordo Totalmente
Comer carne facilita atividades sociais como almoçar/jantar com amigos.	○	○	○	○	○
Existe pressão social para comer carne.	○	○	○	○	○
Não comer carne está associado a estereótipos negativos (por ex: quem não come carne é estranho/a).	○	○	○	○	○
Comer carne faz parte da nossa identidade cultural e gastronómica.	○	○	○	○	○

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

O que pensa sobre o impacto do consumo de carne no **ambiente**?

*Indique o **seu grau de concordância** em cada uma das seguintes afirmações:*

	Discordo Totalmente	Discordo Parcialmente	Não concordo nem discordo	Concordo Parcialmente	Concordo Totalmente
O consumo de carne é responsável por problemas ambientais que vivemos atualmente.	○	○	○	○	○
O consumo de carne contribui para o desaparecimento de espécies.	○	○	○	○	○
O consumo de carne contribui para o desaparecimento de florestas.	○	○	○	○	○
O consumo de carne implica um grande consumo de recursos naturais, tais como água potável.	○	○	○	○	○

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Como acha que os **animais** são geralmente vistos e tratados pela **indústria alimentar**?

*Indique o **seu grau de concordância** em cada uma das seguintes afirmações:*

	Discordo Totalmente	Discordo Parcialmente	Não concordo nem discordo	Concordo Parcialmente	Concordo Totalmente
Os animais utilizados pela indústria alimentar são bem-tratados.	○	○	○	○	○
Os matadouros abatem os animais sem dor.	○	○	○	○	○
Preocupa-me o bem-estar dos animais utilizados pela indústria alimentar.	○	○	○	○	○
A vida dos animais utilizados para alimentação humana é menos importante do que a vida dos outros animais.	○	○	○	○	○

Block 10 - Sociodemographic Data

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Idade:

☐ anos

Sexo:

- ◯ Feminino
- ◯ Masculino

Eu vivo:

- ◯ Com familiares
- ◯ Com amigos/colegas/conhecidos
- ◯ Sozinho/a
- ◯ Com o/a companheiro/a

Habilitações Literárias:
Selecione a opção correspondente ao seu grau de ensino completo mais elevado.

- ◯ Ensino Primário (4.º ano)
- ◯ Ensino Básico (9.º ano)
- ◯ Ensino Secundário (12.º ano)
- ◯ Licenciatura
- ◯ Mestrado
- ◯ Doutoramento

Qual das seguintes descrições se aproxima mais daquilo que sente acerca do rendimento atual do seu Agregado Familiar?
Nota: Assuma **Agregado Familiar** como um conjunto de indivíduos que vivem na mesma habitação e partilham entre si recursos económicos.

- ◯ O rendimento atual permite viver confortavelmente
- ◯ O rendimento atual dá para viver
- ◯ É difícil viver com o rendimento atual
- ◯ É muito difícil viver com o rendimento atual

Attachment 2 - Original and Adapted Scales of Measurement

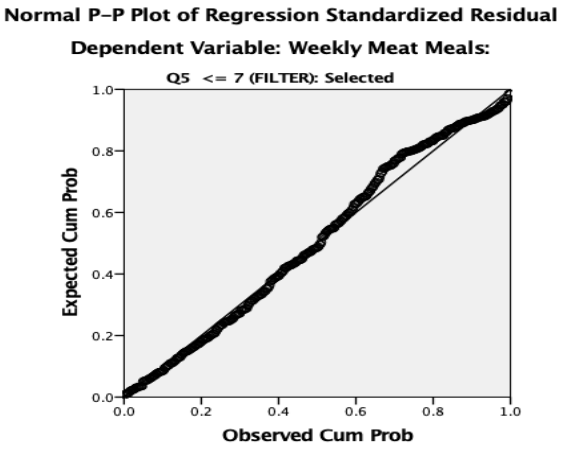
VARIABLES	REFERENCE AUTHORS	ORIGINAL ITEMS	ADAPTED ITEMS (PT: PORTUGUESE; EN: ENGLISH)
Health	Lea & Worsley (2001)	Non-vegetarians are healthier than vegetarians.	**PT:** É possível ser saudável sem comer carne. **EN:** It is possible to be healthy without eating meat.
		There is not enough protein in vegetarian diets.	**PT:** Existe proteína suficiente nas dietas vegetarianas. **EN:** There is enough protein in vegetarian diets.
		There is not enough iron in vegetarian diets.	**PT:** Existe ferro suficiente nas dietas vegetarianas. **EN:** There is enough iron in vegetarian diets.
		I wouldn't get enough energy or strength from the food [plant-based diet].	**PT:** Sinto-me com mais energia quando como carne. **EN:** I feel more energetic when I eat meat.
Hedonic	Lea & Worsley (2001)	I like eating meat	**PT:** Gosto do sabor da carne. **EN:** I like the taste of meat.
		I prefer to eat red meat more than fruit or vegetables.	**PT:** Pratos com carne são mais saborosos que pratos vegetarianos. **EN:** Meat dishes are more tasty than vegetarian dishes.
		Nothing satisfies my appetite like a tick juicy steak.	**PT:** Comer carne dá-me prazer. **EN:** Eating meat is pleasurable to me.
		I love to eat red meat such as beef, veal or lamb.	**PT:** Sinto-me bem quando como carne. **EN:** I feel good when I eat meat.
Social	Lea & Worsley (2001)	I don't want people to stereotype me negatively (for not eating meat).	**PT:** Não comer carne está associado a estereótipos negativos. **EN:** Negative stereotypes are associated to those who don't eat meat.
		There is too limited choice (of vegetarian dishes) when I eat out.	**PT:** Comer carne facilita atividades sociais como almoçar/jantar fora com amigos. **EN:** Social activities such as going out for lunch/dinner with friends are eased by eating meat.
		Someone else decides on most of the food I eat.	**PT:** Existe pressão social para comer carne. **EN:** There is social pressure to eat meat..
Environment	De Backer & Hudders. (2014)	I don't eat meat every day because it increases my ecological footprint.	**PT:** O consumo de carne contribui para o desaparecimento de espécies. **EN:** Meat consumption contributes to species disappearance.
		I don't eat meat every day because it increases my ecological footprint.	**PT:** O consumo de carne contribui para o desparecimento de florestas. **EN:** Meat consumption contributes to forests disappearance.
		I don't eat meat every day because it's better for the environment.	**PT:** O consumo de carne implica um grande consumo de recursos naturais, tais como água potável. **EN:** Meat consumption implies a big consumption of natural resources, such as drinkable water.
		I don't eat meat every day because it's better for the environment.	**PT:** O consumo de carne é responsável por problemas ambientais que vivemos atualmente. **EN:** Meat consumption is responsible for environmental problems we are currently experiencing.
Animal	De Backer & Hudders (2014)	I don't eat meat every day because animals need to be killed for food.	**PT:** Os matadouros abatem os animais sem dor. **EN:** Slaughterhouses slaughter animals painlessly.
		I don't eat meat every day because I defend animal rights.	**PT:** Os animais utilizados pela indústria alimentar são bem tratados. **EN:** Animals used by the food industry are well-treated.

Attachment 3 - Descriptive Statistics, Creation of Dimensions and Principal Component Analysis

Constructs	Items	*N*	Min.	Max.	Mean (*M*)		Std. deviation (*SD*)		Cronbach's Alpha	Unidimensional Loadings	Explained Variance
					Item	Constructs	Item	Constructs			
Health	It is possible to be healthy without eating meat.	442	1	5	4.07	3.675	1.071	.915	.705	.743	54.178%
	There is enough protein in vegetarian diets.	442	1	5	3.48		1.171			.843	
	There is enough iron in vegetarian diets.	442	1	5	3.48		1.115			.799	
	I feel more energetic when I eat meat.*	442	1	5	2.90		1.165			.516	
Hedonic	I like the taste of meat.	442	1	5	4.17	3.610	.980	.934	.830	.860	67.866%
	Meat dishes are more tasty than vegetarian dishes.	442	1	5	2.98		1.289			.694	
	Eating meat is pleasurable to me.	442	1	5	3.67		1.183			.874	
	I feel well when I eat meat.	442	1	5	3.62		1.115			.854	
Social	Negative stereotypes are associated to those who don't eat meat.	442	1	5	3.13	2.523	1.327	1.001	.622	.671	59.497%
	Social activities such as eating out with friends are eased by eating meat.	442	1	5	2.02		1.236			.808	
	There is social pressure to eat meat.	442	1	5	2.43		1.342			..825	
Environment	Meat consumption contributes to species disappearance.	442	1	5	3.39	3.539	1.301	1.059	.839	.732	67.638%
	Meat consumption contributes to forests disappearance.	442	1	5	3.27		1.379			.883	
	Meat consumption implies in a big consumption of natural resources, such as potable water.	442	1	5	3.94		1.193			.797	
	Meat consumption is responsible for environmental problems we are currently experiencing.	442	1	5	3.55		1.281			.869	
Animal	Slaughterhouses kill animals painlessly.	442	1	5	2.27	2.085	1.142	.798	.680	.871	75.908%
	Animals used by the food industry are well-treated.	442	1	5	2.04		1.017			.871	

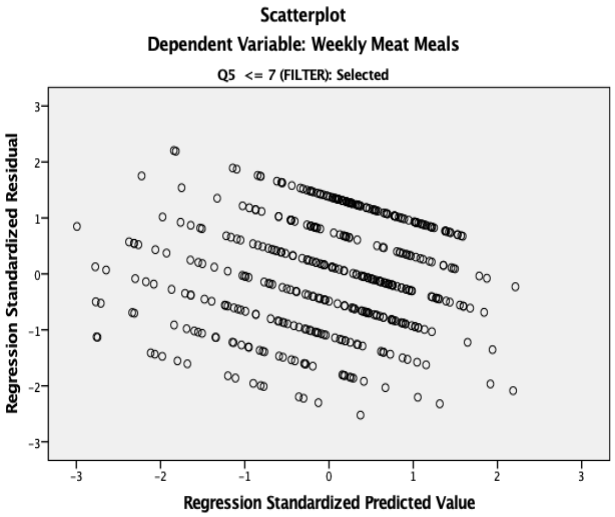
*Reversed item score

Attachment 4 - Normality of Residuals Assumption: Normal Probability Plot



The above histogram confirms that residuals are normally distributed. As it can be be observed, even though not matching perfectly, there is similar diagonal match, suggesting that residuals are approximately normally distributed.

Attachment 5 - Homocedasticity Assumption: Scatterplot



The homoscedasticity assumption can be checked through this scatterplot of the standardized residuals by the regression standardized predicted value. As it can be seen, all residuals approximately maintain a constant variance.

Attachment 6 - Summary of Multiple Linear Regression's Assumptions

Variables	*N*	Normality[1]		Independence of Errors[2]	Residual Statistics[3]	Colinearity Statistics[4]	
		K-S	Sig.	Durbin-Watson (*d*)	Residual's Mean	Tolerance	Variance Inflation Factor (VIF)
(Constant)	-	-	-	2.009	.000	-	-
Health	442	.078	.000			.682	1.467
Hedonic	442	.107	.000			.699	1.430
Social	442	.122	.000			.899	1.112
Environment	442	.101	.000			.667	1.500
Animal	442	.142	.000			.781	1.280
Meat Consumption Frequency	442	.135	.000				

(1) In terms of the variables' normality, none present a normal distribution ($p < 0.05$). However, it is possible to assume a normal distribution through the Central Limit Theorem (CLT), which states that given a considerable size of the sample (442 > 30) it is possible to assume a normal distribution.
(2) By analysing Durbin-Watson's test, it can be verified a score near 2 (2.009), meaning that residuals are not strongly correlated, which confirms the independence of errors assumption.
(3) In terms of the assumption that all random residual variables have a null expected value, the same is confirmed (residuals' mean equals .000).
(4) Concerning the inexistence of multicollinearity, this assumption is confirmed since tolerance's scores are close to zero and VIF values are inferior to 10.

Attachment 7 - Summary of Multiple Linear Regression Method (Enter Method)

Variables	Adjusted R_2	ANOVA			Std. Error of Estimate	Coefficients			
		F	*df*	Sig.		Standardized Coefficients (β)	*t*	Sig.	Unstandardized Coefficients (*B*)
(Constant)	.158	17.568	5	.000	1.605	-	5.472	.000	-
Health						-.151	-2.849	.005	-.320
Hedonic						.309	5.906	.000	.578
Social						-.100	-2.177	.030	-.175
Environment						.060	1.128	.260	.100
Animal						-.010	-.203	.840	-.019

Predictors: (Constant), Health, Hedonic, Social, Environment, Animal
Dependent Variable: Meat Consumption Frequency
Significance Level: .05

Attachment 8 - Semi-Vegetarians Sex and Generation Characterization

Generation	Female		Male	
	#	%	#	%
Generation Z	70	15.84	45	10.18
Millennial	175	39.59	34	7.69
Generation X	48	10.86	32	7.25
Baby Boomer	18	4.07	20	4.52
Total	**311**	**70.36**	**131**	**29.64**