

Plant-Based is the New Meat

Promoting plant-based meat alternatives through persuasive communication:
An experimental study

Student Name: Friederike Bente Glauner
Student Number: 684074

Supervisor: dr. Yijing Wang

Master Media Studies - Media & Business
Erasmus School of History, Culture and Communication
Erasmus University Rotterdam

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ABSTRACT

With meat consumption being identified as a key contributor to climate change and the degradation of public health, there have been calls to reduce the consumers' intake of meat and motivate them to transition to more plant-based diets. Against this background, plant-based meat alternatives (PBMA) have entered the market as a way of facilitating the transition to more plant-based diets. Nevertheless, at the same time, consumers are still hesitant to purchase PBMA, which is why in light of the need to reduce global meat consumption there is a need to investigate strategies how PBMA consumption can be promoted. As past research studying meat reduction strategies identified persuasive messages as effective in prompting attitudinal and behavioural change among consumers, this study focusses on three persuasive communication strategies from the nutrition and health communication (information provision highlighting environmental or health motives for PBMA consumption, message framing, endorser type) and tested which strategies led to more positive consumer outcomes. Moreover, as past research found that the effectiveness of information provision using an expressed motive may be contingent on a person's average meat consumption, this study explores whether this relationship is also present in the context of enhancing the consumption of PBMA. As a result, the following research questions were examined: *To what extent do expressed motives for eating PBMA (health vs. environment), message framing (gain vs. loss) and type of endorser (expert vs. influencer) affect consumers' attitudes and purchase intention to buy PBMA? How is the effect of motives on purchase intention of PBMA moderated by people's average meat consumption?* To answer the research questions, a between-subjects factorial quasi-experimental design with eight experimental conditions was conducted, for which 312 participants were recruited through Prolific. The results revealed that for high-level meat consumers purchase intention of PBMA can be better influenced by communicating health instead of environmental motives, whereas for consumers eating less or no meat, the effect was not significant. Nonetheless, since health motives were not less influential than environmental motives for meat reducers or abstainers, it can be said that health motives should predominantly be utilized in advertising. In addition, the results also indicated that influencers had a stronger positive effect on consumer attitudes and purchase intention than an expert endorser when source expertise was adjusted for, which points to the fact that other source characteristics associated with influencers may be more persuasive in the context of PBMA promotion. In contrast, message framing did not yield a significant effect on consumer attitudes or purchase intention. Overall, the results contribute to the growing field of plant-based food promotion by showing that persuasive messaging strategies from a meat reduction context can partially also be applied to the promotion of PBMA. At the same time, the results also highlight the need for further research, so that the promotion of PBMA can be enhanced and global meat consumption reduced.

KEYWORDS: *plant-based meat alternatives, persuasive communication, environmental and health information, endorser types, message framing*

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1. Introduction

“Food in the Anthropocene is one of the greatest health and environmental challenges of the 21st century” (Willett et al., 2019, p. 449)

The above evaluation of the EAT-Lancet Commission, a group of world-class scientists that defined targets for healthy diets and sustainable food, illustrates the need for necessary changes in our food system. As of now, the current global food system is a major negative contributor to human and planetary health (WHO & FAO, 2019, p. 21). More precisely, due to rising urbanisation, demographic changes and globalisation, dietary patterns are shifting worldwide towards increasingly “unhealthy, cheap and convenient diets”, which are amongst others characterised by a high intake of red and processed meat (Fanzo & Davis, 2019, p. 497). This is not just unhealthy, but also unsustainable and damaging to our environment since livestock production has been identified as a crucial contributor to climate change, adding significantly to the global emission of greenhouse gases (GHG) (McMichael et al., 2007, pp. 1253–1255; Steinfeld et al., 2006, pp. 80–83, 112–114).

Accordingly, the Intergovernmental Panel on Climate Change (IPCC, 2023, p. 490) and other scientific studies have identified meat reduction and the adoption of plant-based diets as a major opportunity for mitigating climate change due to the diet’s reduced GHG emissions (Cleveland & Gee, 2017, pp. 148–149; Fanzo & Davis, 2019, p. 499; Hedenus et al., 2014, p. 89). On top, although technological advances in agriculture can contribute to more sustainable production, changes in consumer diets are a decisive factor and critical to reducing GHG emissions (Poore & Nemecek, 2018, p. 5), considering that consumers make more than 200 food-related decisions per day (Wansink & Sobal, 2007, p. 119).

Nevertheless, it is not easy to convince consumers to reduce their meat intake or to adhere to a plant-based diet altogether (He et al., 2020, p. 2649; Macdiarmid et al., 2016, p. 490; Rosenfeld et al., 2022, p. 1). The reasons are multifold, ranging from but not limited to underestimating the environmental impacts of meat production (Hartmann & Siegrist, 2017, p. 15; Macdiarmid et al., 2016, p. 490; Siegrist et al., 2015, p. 37; Tobler et al., 2011, p. 679), to believing that not eating meat leads to nutritional deficiencies (Fehér et al., 2020, p. 11). Especially plant-based meat alternatives (PBMA) have been identified as valuable in paving the way towards reduced meat consumption because they mimic the taste and texture of meat and provide consumers with proteins that they would usually gain from meat consumption (He et al., 2020, p. 2642; Macdiarmid, 2022, p. 163; Machovina et al., 2015, p. 427; Schwarz et al., 2024, p. 7). Although PBMA can also be criticized because some of them can be

classified as ultra-processed convenience foods, Macdiarmid (2022, pp. 164–166) and Messina et al. (2023, p. 399) contend that these products are still valuable since they allow for more convenient dietary shifts and can thus function as a catalyst in introducing consumers to other plant-based foods.

However, even though PBMA seem promising in supporting people to transition to (more) plant-based diets, He et al. (2020, pp. 2650–2651) explained that consumers are still hesitant to buy them, which is why in light of the need to reduce global meat consumption, strategies enhancing PBMA consumption need to be further investigated. Past research on inducing consumers to reduce their meat intake revealed that persuasive messages are effective in prompting attitudinal and behavioural change among consumers (Dijkstra & Rotelli, 2022, p. 2), whereby especially the influence of information provision on the consequences or benefits of (not) eating meat has been proven successful (Carfora et al., 2019, p. 7). Furthermore, compared to more far-reaching nutrition-political tools, like the introduction of a meat tax, information provision also has the advantage of involving only little intervention in market processes (Cordts et al., 2014, p. 88). As some past studies have also shown that the success of information provision may be contingent on the presence of additional factors (Harguess et al., 2020, p. 4), it was decided to also take the effect of message framing and the type of endorser into account, which have both been successfully applied in the field of health communication (C.-W. Hsu, 2023, p. 477).

Thus, this study focuses on the effect of these three communication strategies – the expressed motive for PBMA consumption, message framing and endorser type – on consumer attitudes and behavioural intention, which have been identified by Stiff and Mongeau (2016, p. 4) as key targets of persuasive messages. Moreover, as past research found that the effectiveness of information provision using an expressed motive may be contingent on a person's average meat consumption, this study explores whether this relationship is also present in the context of enhancing the consumption of PBMA. This leads to the following research questions:

To what extent do expressed motives for eating PBMA (health vs. environment), message framing (gain vs. loss) and type of endorser (expert vs. influencer) affect consumers' attitudes and purchase intention to buy PBMA? How is the effect of motives on purchase intention of PBMA moderated by people's average meat consumption?

1.1. Scientific Relevance

Hartmann and Siegrist (2017, p. 23) have called for further research that explores strategies to enhance consumers' motivation to reduce their meat consumption. Since then, scholars have investigated how consumers can be persuaded to reduce their meat intake through a lot of different strategies (Bianchi et al., 2018, pp. 4, 18–19; Harguess et al., 2020, pp. 3–8), ranging from but not limited to information provision about environmental, health or animal-related consequences of meat consumption (Cordts et al., 2014, pp. 87–88; Dijkstra & Rotelli, 2022, p. 6; Graham & Abrahamse, 2017, p. 100) over the use of goal-reminders (Carfora et al., 2017, p. 245, 2019, p. 3) to altering the food choice environment or nudging (Hansen et al., 2021, p. 393; Reinholdsson et al., 2023, pp. 558–559; Vandenbroele et al., 2020, pp. 134–140). As was discussed above, PBMA can function as a catalyst in altering people's diets towards lesser meat consumption, but so far research on PBMA promotion is sparse, which is why it also needs to be investigated further (Carfora et al., 2022, p. 4801). Carfora et al. (2022, pp. 4818–4819), building on previous research on meat reduction, showed that messaging interventions highlighting environmental aspects of PBMA were effective in increasing consumption intentions and thus advised future research to also examine the influence of other message contents, such as health motives, that worked well for meat reduction. Accordingly, this study seeks to fill this gap by presenting either environmental or health aspects of PBMA consumption to test which has a bigger influence on consumer attitudes and behavioural intentions. Besides, it is of course also important that especially people who do not already adhere to a plant-based or vegetarian diet can be persuaded to purchase PBMA (E. Martinelli & De Canio, 2021, p. 15), which is why this study also accounts for the influence of consumers' average meat consumption that has been proven to affect the results of information provision for meat reduction (De Backer & Hudders, 2014, pp. 650–652; Lentz et al., 2018, pp. 235–238).

Furthermore, this study seeks to contribute to academic literature by also investigating the effects of message framing and endorser types, which are both important persuasive tools in health communication (C.-W. Hsu, 2023, p. 477). In particular, gain-loss framing has been considered powerful for various public health outcomes (e.g., smoking prevention, sunscreen use). Gain-loss framing has also been applied successfully for meat reduction (Carfora, Di Massimo, et al., 2020, p. 35967; Carfora et al., 2021, p. 11), but research using gain-loss framing for PBMA promotion is sparse (Carvalho et al., 2022, p. 2) and needs to be investigated further. Finally, also the effects of different endorsers will be examined. The use of endorsers in advertising enjoys increasing popularity and has gained even more traction

with the advent of social media and influencer marketing. With experts proven to be successful endorsers in the health and food domain (e.g., Jenkins et al., 2020, p. 11; Rollins et al., 2020, p. 6) and influencer marketing becoming more popular (Kadekova & Holienčinová, 2018, p. 95), it was decided to compare between expert and influencer endorsers. All in all, investigating the individual effects of these factors and also their interaction contributes to further understanding of how PBMA can be promoted.

1.2. Societal Relevance

Naturally, this study does not only seek to contribute to academic literature but also has broader societal implications. In essence, the promotion of PBMA and by that, a reduction in meat consumption has advantages both for planetary and human health. It is undoubted that human nutrition has an impact on our environment and is a great contributor to anthropogenic climate change (IPCC, 2015, p. 384; Steinfeld et al., 2006, p. 5; Willett et al., 2019, p. 449). This does not only include food consumption but rather the whole food supply chain (Garnett, 2011, p. 23; Rojas-Downing et al., 2017, pp. 151–156). In fact, Cleveland and Gee (2017, p. 136) estimate that our food system is responsible for at least one-third of global GHG emissions. Also the IPCC (2015, p. 354) highlighted that between 1970 and 2010 there was an 80% increase in anthropogenic GHG emissions, whereby the last decade accounted for the highest emissions in human history. In their most recent report, the IPCC (2023, pp. 4–5) emphasised that in 2019, GHG emissions were 54% higher than in 1990, making the decade between 2010 and 2019 the most emission-intensive ever recorded. Similarly, the human diet changed in the recent past with an increased availability and consumption of animal protein. This is problematic since livestock has been identified as a crucial contributor to climate change (McMichael et al., 2007, pp. 1253–1255; Steinfeld et al., 2006, p. 4). For instance, livestock increases the concentration of GHGs in our atmosphere, either directly through digestive processes or indirectly through deforestation (Steinfeld et al., 2006, pp. 80–83, 112–114). In sum, compared to plant-based diets, meat-based diets tend to produce higher GHG emissions (Macdiarmid & Whybrow, 2019, p. 382).

Besides, meat consumption has also a strong effect on human health. Various studies showed that especially red and processed meat consumption is positively associated with all-cause mortality, whereby they highlight the increased risk for cardiovascular diseases, various types of cancer and other non-communicable diseases, such as diabetes type 2 or obesity (Bonnet et al., 2020, p. 3; Godfray et al., 2018, pp. 2–3; He et al., 2020, p. 2642; Micha et al., 2010, pp. 2280–2281; Rohrmann et al., 2013, pp. 8–10). In contrast, the increased intake of

healthy food components, such as legumes, in combination with the adherence to a (mainly) plant-based or vegetarian diet (Sabaté, 2003, p. 504), reduces one's risk of these diseases (Fehér et al., 2020, p. 8; Hemler & Hu, 2019, p. 282; Salas-Salvadó et al., 2019, p. 327). Although it must be considered that a diet is not necessarily healthy just because it is plant-based, for example when a person eats only ultra-processed PBMA (Macdiarmid, 2022, p. 164), PBMA are still effective in guiding consumers towards more plant-based diets (Messina et al., 2023, p. 399). Against this background, it is important that consumers change their diets and reduce their meat intake and as PBMA can facilitate this change, studying how PBMA consumption can be promoted is relevant for society.

1.3. Chapter Outline

The remaining sections are structured as follows: Chapter two introduces the theoretical framework. In essence, the chapter first discusses how persuasive communication may guide consumers to more sustainable diets and then introduces the outcome variables (consumer attitudes and purchase intentions). The remainder of the chapter is devoted to the development of the hypotheses, which predict the effect of the three communication strategies (motive, framing, endorser) on both consumer outcomes, the effect that consumers' average meat consumption has on the effectiveness of the motive intervention, the mediating effect of attitudes, the influence of subjective norms on purchase intention and finally, interaction effects between the communication strategies. After that, the methodology is introduced in chapter three, which elaborates on the reason for choosing a quantitative approach, the research design including the variables' operationalisation and experimental conditions and finally, the reliability, validity and ethical considerations. The fourth chapter then presents the results of the statistical analyses and by that, also depicts which hypotheses are accepted or rejected. Afterwards, chapter five discusses the findings and presents the theoretical and managerial implications. The final chapter summarises the results, sheds light on the study's limitations and highlights avenues for future research.

2. Theoretical Framework

2.1. Persuasive Health and Nutrition Communication

As a way of counteracting the effects that excessive meat consumption has both on our climate and public health, it is necessary to convey the relevant knowledge and to educate people on the consequences of meat consumption and the benefits a (largely) plant-based diet can have. The communication of these effects falls in the scope of nutrition communication, on the one hand, and health communication on the other.

Nutrition communication is defined as "any type of human communication related to nutrition" (Höhn, 2021, p. 1). This includes, next to the exchange of information, opinions, and emotions, also systematic communication activities that aim at influencing people's opinions and behaviours in a socially desirable way (Maschkowski & Büning-Fesel, 2010, p. 677). Moreover, van Trijp (2009, pp. 42–43) argues that nutrition communication is also a way of diminishing the information asymmetry that persists between consumers and other actors in the food industry. The asymmetry results from consumers being unable to verify health or environmental claims just from consuming the product, which is why they either have to trust the information they receive from others or rely on cues presented to them, from which their beliefs about the product are ultimately formed. Nutrition communication is executed and distributed by various actors (e.g., corporations, NGOs, individuals) and throughout a variety of channels, such as newspapers or television, but also through nutritional information on the packaging or advertisements (Maschkowski & Büning-Fesel, 2010, p. 676; van Trijp, 2009, p. 43). Although other nutrition-political tools go beyond information provision (see e.g., Spiller et al., 2017, pp. 148–149), it was decided to focus on information provision as an instrument to increase PBMA consumption because it involves only little intervention in market processes and is the precondition for building consumer acceptance for possible policy options (Cordts et al., 2014, p. 88).

Similarly, health communication is defined as "a multifaceted and multidisciplinary approach to [...] share health-related information with the goal of influencing, engaging, and supporting individuals, communities, health professionals, special groups, policymakers and the public to champion, introduce, adopt, or sustain a behaviour, practice, or policy that will ultimately improve health outcomes" (Schiavo, 2007, p. 7). For that, health communication makes mostly use of message and delivery strategies, such as message framing, narratives or tailoring (Krieger et al., 2021, p. 38). On top of that, also the effects of using endorsers have been investigated within health communication, due to their ability to create a persuasive effect (C.-W. Hsu, 2023, p. 477). Within this study, it has been decided to use message

framing, one of the most successful persuasive strategies of environmental health communication (Chadwick, 2021, pp. 494–495), and endorsers, due to their appeal to consumers, as variables to enhance information provision on the impact of eating PBMA.

The effect of intentionally exercising influence on the message recipients in an attempt to achieve positive nutritional outcomes, allows nutrition and health communication to be allocated to the field of persuasive communication, which Stiff and Mongeau (2016, p. 4) define as “any message that is intended to shape, reinforce or change the responses of another, or others”, whereby the authors also emphasized the intentional character of this form of communication. While a great variety of “responses” fall under this definition, literature established that especially attitudinal change and behaviours are the key targets of persuasive communication (Petty & Cacioppo, 1986, p. 5; Stiff & Mongeau, 2016, p. 4), making them the main variables to be influenced by information-provision strategies (Weingarten et al., 2022, p. 1). Another reason for targeting consumer attitudes is their influence on behavioural intentions and actual behaviour, whose relationship was specified, amongst others, by Fishbein and Ajzen’s (1975) theory of reasoned action (TRA), which has been deemed vital for understanding the effects of persuasive communication (Stiff & Mongeau, 2016, p. 23).

2.1.1. Outcome Variables: Consumer Attitudes and Purchase Intention

The TRA is a social-psychological model, aimed at explaining human behaviour in “non-routine thinking decisions” (Paul et al., 2016, p. 124), where they have full volitional control (Han & Kim, 2010, p. 660). More precisely, the TRA posits that an individual’s behaviour is predominantly predicted by one’s behavioural intentions, which is defined as the willingness of an individual to execute some type of behaviour, for example purchasing a particular good (i.e., purchase intentions) (Ajzen, 1991, p. 181; Han & Kim, 2010, p. 661). Purchase intention, thus a form of behavioural intention, is defined as an individual’s deliberate choice to buy a product (Spears & Singh, 2004, p. 56).

Furthermore, the TRA posits that behavioural intentions are affected by attitudes and subjective norms (Hale et al., 2002, p. 260). According to Ajzen (1991, p. 188), attitude means “the degree to which a person has a favourable or unfavourable evaluation [...] of the behaviour in question”. This includes, for example, whether people consider an issue to be good or bad and whether they think it is an acceptable behaviour (Bakr et al., 2023, p. 424; Paul et al., 2016, p. 125). With both attitudes and behavioural intention being targets of persuasive messages, both of them constitute ideal outcome variables for this study.

The effect of subjective norms will be elaborated upon more below, as it is not an

outcome of persuasive communication, but an extrinsic component, shaped by one's social environment.

2.1.2. Previous application of the TRA within meat reduction scholarship

Due to their ability to make inferences about (the formation of) behaviour, both the TRA and its extension, the theory of planned behaviour (TPB), have been successfully applied in a variety of different contexts. Amongst others they have been deemed useful in predicting green consumer behaviour (e.g., Han & Kim, 2010; Paul et al., 2016) or health-related behaviours, which is why also scholarship interested in predicting meat reduction (e.g., Carfora, Conner, et al., 2020; Carfora et al., 2017; Seffen & Dohle, 2023) or PBMA consumption (e.g., Bakr et al., 2023; Kopplin & Rausch, 2022; Seo et al., 2023) often employed the TRA/TBP as theoretical foundation. Within this study, the TRA will be used as the basis for the conceptual framework to understand and predict people's behavioural intention towards purchasing PBMA after being exposed to the different communication strategies, which makes consumer attitudes towards and purchase intention of PBMA the main dependent variables.

2.2. Activating motives for PBMA consumption through information provision

As was established above, information provision is an effective persuasive tool, aimed at influencing consumer attitudes, behavioural intentions and actual behaviour. As there are not many studies investigating the promotion of PBMA consumption (Carfora et al., 2022, p. 4802), this study will mainly build on the findings of the meat reduction scholarship. When studying the motives of people already adhering to a plant-based diet, Janssen et al. (2016, p. 644) revealed that there are three major motives that made people go plant-based: concerns for animal welfare, the environment or one's health. Concerns for the environment and animal welfare are altruistic motives, whereas health concerns are an egoistic motive since a plant-based diet is adopted for one's personal benefit compared to the more philanthropic reasons underlying the former two motives that do not primarily concern the individual, but rather humanity as a whole or animals (Phua et al., 2020, p. 687; Yadav, 2016, p. 93). Similarly, studies aimed at reducing people's meat consumption by means of information provision have predominantly used these motives and tested their effects. Overall, the systematic reviews by Bianchi et al. (2018, p. 20) and Harguess et al. (2020, p. 8) indicate that information provision is successful in the context of meat reduction, but it is to date unclear which motive is most effective in persuading consumers to alter their meat consumption. For example, both Carfora

et al. (2019, p. 7) and Bertolotti et al. (2020, p. 480) were able to show positive effects of health-related information on attitudes and intention, whereas Graham and Abrahamse (2017, p. 11), Wolstenholme et al. (2020, p. 11) and Abrahamse (2020, p. 11) illustrated positive effects of environmental information and Cordts et al. (2014, p. 96) and Mathur et al. (2021, pp. 12–13) also for animal-related motives. For PBMA promotion, there is just one study that examined the effect of information provision. In essence, Carfora et al. (2022, pp. 4802, 4818) investigated the effect of information provision on environmental consequences for purchasing PBMA, which they found to be present and advised future research to compare environmental to other motives for purchasing PBMA, which this study follows.

Nevertheless, it has been decided to only compare between health and environmental benefits of PBMA consumption and to exclude animal welfare. The reason for this is that, as was argued by Carfora and colleagues (2022, p. 4802), talking about animal welfare can lead to “meat-related cognitive dissonance”, which describes discomfort caused by on the one hand, eating meat and on the other hand, feeling affection towards animals. This leads to a polarizing effect, where those who are less attached to meat-eating will lower their meat consumption, whereas others with high meat attachment will even eat more meat (Rothgerber & Rosenfeld, 2021, p. 9).

In a comparison between the effectiveness of motives as persuasive messages, Dijkstra and Rotelli (2022, p. 7) found that health arguments were most influential, which they attributed to the fact that high personal relevance to the issue at stake leads to a defensive reaction towards the persuasive message, whereby message recipients will differentiate between “strong” and “weak” arguments: While strong arguments are concrete, hard to refute and associated with undeniable consequences that create “vivid mental images”, weak arguments are more indirect and refer to abstract and complex phenomena that produce “less vivid mental images” (Dijkstra & Rotelli, 2022, p. 3). Accordingly, the latter may seem more “far-fetched” and thus, less relevant for the individual, which makes them easier to reject (Dijkstra & Ballast, 2012, p. 63). Therefore, the authors reasoned that for comparing environmental and health arguments, health aspects implying direct effects on an individual’s health and that are in their own control are considered stronger than environmental arguments, whose outcomes are collectively caused and, as a shared responsibility, impact the individual more indirectly (Dijkstra & Rotelli, 2022, p. 3). Similar findings have been produced by studies that focussed on values, preexisting motives or other psychological factors to reduce meat consumption.

Although Janssen et al. (2016, p. 647) found that people’s environmental concern was

positively associated with the adoption of a plant-based diet, there are also studies indicating that environmental concern is often not indicative of reducing one's meat consumption and is, according to Fox and Ward (2008a, p. 427), rather something that follows as a motive after people already reduced their meat consumption due to health or animal welfare. On top, research has also shown that consumers are often unaware of the environmental impact of meat consumption, with consumers overestimating the environmental benefits of reducing excessive packaging, whereas reducing one's meat consumption was regarded as the least environmentally beneficial option (Macdiarmid et al., 2016, pp. 489–490; Tobler et al., 2011, p. 679). Furthermore, some participants thought that their actions regarding meat reduction were not effective, as they are unable to make a difference, globally speaking, due to the increasing meat consumption in developing countries and the power of big corporations (Macdiarmid et al., 2016, p. 490). These feelings are also amplified by the fact that the connections between nutritional behaviour and climate change are only visible on a long-term basis.

This theme is related to “free riding”, which describes the feeling that one's own actions are too insignificant in their effect for the person to have an interest in maintaining the behaviour. Moreover, opting out of pro-environmental behaviours will not be directly noticeable to society as an individual's share in additional pollution can usually not be traced back to them (Evans et al., 2017, pp. 18–19; Grossman & Hart, 1980, pp. 42–43). Relating this to eating less meat or eating PBMA, means that people feel that their environmental behaviour does not have an impact, which is why they will not start acting that way. “Free riding” is a consequence of the “tragedy of the commons” (Hardin, 1968, pp. 1243–1245), which means that people “put their own self-interest over the interest of the community when it comes to the usage of public resources” (Evans et al., 2017, p. 18). The model offers a way of understanding why people, even when they are aware of the consequences of meat consumption on our planet, do not act in an environmentally responsible way.

Conversely, past research has identified health consciousness as the main driver of purchasing organic foods (Yadav, 2016, p. 93), eating less meat (Seffen & Dohle, 2023, p. 8) or eating solely vegetarian or plant-based (Janssen et al., 2016, p. 647; Lentz et al., 2018, p. 1340). The reason for that is that all of that is associated with benefits for one's health, which has become an important selling factor in the food industry (Ghvanidze et al., 2017, p. 864). Especially for PBMA, health consciousness leads to positive attitudes and behaviours because they tend to be associated with being healthy (Kopplin & Rausch, 2022, p. 1340; Rondoni et al., 2021, p. 7). Moreover, compared to environmental effects that are also dependent on other

people's actions, positive health outcomes are perceived to be more under one's control and closer to oneself (Seffen & Dohle, 2023, p. 8). Generally, Penny et al. (2015, p. 313) found that health concerns were the most mentioned motive to reduce one's meat consumption among all consumer groups. Yet, there are also differences noticeable, whereby vegetarians or vegans more often indicated ethical reasons, such as environmental protection or animal welfare, as their key motives, while omnivores and here, especially meat reducers indicated health and the high cost of meat as their prime motivators to adapting their meat consumption (de Boer et al., 2017, pp. 394–395; Lentz et al., 2018, p. 238). An explanation for this is provided by Fox and Ward (2008a, p. 427, 2008b, p. 2586) who found that health motives often precede ethical motives, when people adopt a vegetarian diet. In other words, the authors suggest that people often adopt a vegetarian diet due to health reasons, but then ethical motives evolve and become more prevalent over time. Accordingly, health motives can catalyse eating less meat or becoming vegetarian. On the same token, de Boer et al. (2017, p. 395) noted that health-focussed campaigns may be more effective in persuading omnivores to eat less meat since they are more neutral than campaigns targeting ethical motives because within the latter people might feel like their whole identity is challenged by seemingly “morally superior” vegetarians. Thus, following all that was argued above, and applying it to the context of PBMA promotion, it is hypothesised that:

***H1:** When persuading consumers to buy PBMA, communicating the health effects of eating PBMA has a more positive effect on a) attitudes and b) purchase intention than communicating environmental effects.*

2.3. The moderation effect of eating habits

As was discussed above, past research has found that there are different motives to reduce one's meat consumption and that the latter differs among different consumer groups. More precisely, Lentz et al. (2018, pp. 235–238) found that for standard meat consumers and also meat reducers health benefits worked better as a motive to reduce one's intake of meat than environmental motives. Conversely, for consumers who abstain from eating meat, the health argument is less prevalent, whereas environmental (and animal welfare) motives are more important. Likewise, De Backer and Hudders (2014, pp. 650–652) examined vegetarians' and semi-vegetarians' motives for eating less meat and also found health and environmental motives among the most prevalent motives to reduce one's meat intake. Yet, they were also able to find differences between semi-vegetarians and vegetarians: While the former opt to reduce their meat consumption primarily for personal motives, such as one's

health, full-time vegetarians were more likely to eat no meat due to moral reasons like animal welfare and the environment. From that, the authors deduce that to convince meat eaters to lower their meat intake, presenting the health benefits is most suitable. On the same token, they also explain that environmental motives do not work well in convincing regular meat eaters to eat less meat, but that they may convince stronger semi-vegetarians to cut out meat from their diets (De Backer & Hudders, 2014, pp. 650–652). Following that, it can be said that health motives worked better in motivating omnivores and consumers who slightly reduced their meat consumption, whereas for people who already reduced their meat consumption to a greater extent or completely, environmental motives are also appealing. Applying this to the promotion of PBMA, it can be hypothesised that:

H2: When persuading consumers to buy PBMA, eating habits moderate the strength of the relationship between the presented motive and the purchase intention of PBMA. More precisely, people who eat more meat are more likely to be persuaded by health-related stimuli, whereas for people who eat less or no meat, this is not the case.

2.4. Message Framing

Message framing was coined by Tversky and Kahneman (1981, p. 457) who showed that the way how an item may be framed may affect an individual's actions, even though the content is (almost) identical. Within persuasive health communication, message framing is commonly employed to understand communicative outcomes. More precisely, according to Guenther et al. (2021, p. 896), a majority of studies that tested framing effects, relied on gain-loss framing. Both gain and loss frames aim at convincing a target audience that the product or service in question should be used or bought by them (Gifford & Bernard, 2006, p. 155). Gain frames, thus a positive framing of the message, highlight the benefits of using a certain product or service, meaning what the consumer gains, whereas loss frames represent a negative framing of the message and hence, emphasise negative consequences of not consuming the product or choosing an alternative instead. As explained above, even though persuasive messages contain almost the same content, their effect, depending on the way they are framed, can differ according to the context where the message is presented (Salovey & Wegener, 2003, p. 56).

Message framing in health communication is based on Prospect Theory which aims to predict decisions made under risk conditions. In particular, the theory postulates that individuals evaluate potential gains and losses relative to a reference point, demonstrating risk aversion for gains, risk-seeking behaviour for losses, and a sensitivity to the framing of

decision options (Kahneman & Tversky, 1979, pp. 274–284; Salovey & Wegener, 2003, p. 57). People are generally more risk-averse when it comes to potential losses, meaning that when the potential losses of an action are emphasised, a person is more likely to choose or engage in risky behaviour to avoid the loss. Conversely, if a gain frame highlights the potential gains of an action, individuals tend to be less willing to choose the riskier option.

Building on prospect theory, Rothman and Salovey (1997, pp. 9–13) proposed a refined model that made prospect theory applicable to persuasive health communication, where they argued that the effects of gain or loss frames depend on the context that the decision-maker is exposed to. More precisely, the authors explain that gain-frames are more successful in promoting prevention behaviours, like using sunscreen for UV-protection, while loss-frames are more effective in stimulating detection behaviours, such as mammography scans, which are considered riskier due to potential negative outcomes. Generally, as a commonly used device in health communication, message framing has been applied to several health contexts already, with prominent examples being smoking or cancer screenings but also measures relating to nutrition (Guenther et al., 2021, p. 894; O’Keefe & Jensen, 2007, p. 631). Applying Rothman and Salovey’s (1997, pp. 9–13) arguments to the food context means that gain-framed messages should be more effective in encouraging sustainable and healthy diets. The superiority of gain frames, as it is a prevention behaviour, has been confirmed in a variety of scenarios in the food sector, ranging from encouraging fruit and vegetable intake (e.g., Binder et al., 2020; Dijkstra et al., 2011; Godinho et al., 2016), over reduction in sugar-sweetened beverages consumption (e.g., Zahid & Reicks, 2018) to organic food intake (e.g., Gifford & Bernard, 2006; C.-L. Hsu & Chen, 2014; Vega-Zamora et al., 2019).

Within meat reduction or plant-based food promotion scholarship, gain-loss framing has only been applied by a few studies so far. By differentiating not only between gain and loss frames but also including non-loss (avoiding negative consequences) and non-gain (missing out on positive consequences) frames, both Carfora, Di Massimo, et al. (2020, p. 35958) and Carfora et al. (2021, pp. 10–11) illustrated that positive frames (gain, non-loss) were more effective than negative frames (loss, non-gain) to reduce meat consumption. In particular, positive frames led to an attitudinal and subsequent behavioural intent change among participants' meat reduction behaviour, whereas this was not the case for negative frames. Carfora et al. (2021, p. 11) explained this by the emotions produced by both types of messages: While positive frames induced a moderate level of fear in the participants, participants in the negatively framed conditions experienced higher levels of fear, which, in turn, produced anger or resistance towards the message. This then inhibits systematic

processing of the message and subsequent attitudinal or behavioural changes because participants take “emotional shortcuts” in processing the message more heuristically (Carfora et al., 2021, p. 2). To the best of the author’s knowledge, so far only Carvalho et al. (2022, pp. 1–3) studied the effect of gain-loss frames for plant-based food promotion, whereby they examined the effect of gain and loss messages in the context of increasing plant-based foods in university canteens. The authors found that gain frames were more effective in achieving support for the proposed measures, which means that their findings align with the propositions of prospect theory and previous research that gain frames are more effective for prevention behaviours since people consider losses to be more impactful than gains.

Moreover, Carvalho and colleagues (2022, p. 3) suggest taking the influence of reactance into account. Reactance theory aims to explain behaviour when people are confronted with a situation that makes them feel that their freedom of choice is threatened by advice or recommendation (Brehm & Brehm, 1981, p. 4). In a situation like this, people want to protect their autonomy, which may induce them to act opposite to what they were asked to. By applying the theory to a health context using gain-loss frames, Reynolds-Tylus (2019, p. 7) explained that loss messages seem more freedom-threatening than gain messages, which leads to greater fear and, in turn, reactance. As a consequence, persuasive outcomes were more unfavourable. Accordingly, Carvalho et al. (2022, p. 3) suggest that it is more effective to promote the consumption of PBMA rather than calling for reducing meat consumption so that meat eaters do not feel as if their freedom of choice is infringed. Thus, following these previous findings, the following hypothesis is proposed:

***H3:** When persuading consumers to buy PBMA, gain frames have a stronger positive effect on a) attitudes and b) purchase intention than loss frames.*

2.5. Endorser

Endorsers are commonly defined as people who explicitly or implicitly endorse products or services in advertisements, and they can be a potent tool for persuasive communication (C.-W. Hsu, 2023, p. 477). In essence, Petty and Cacioppo's (1986, pp. 4, 10) Elaboration Likelihood Model of Persuasion (ELM) explains why endorsers can have an influential effect on individuals’ responses to persuasive messages. According to the model, people receive information differently based on their level of elaboration—that is, the importance they place on the subject (i.e. their motivation) and capability to process the message (i.e. their ability) - which leads to distinct ways of forming attitudes. Depending on their level of elaboration, people process messages on two different routes, the central and the

peripheral. High elaboration leads to central processing of the information and allows people to assess the problem critically in light of their personal experiences. Here, their focus is set on the content of the message conveyed. On the other hand, heuristic cues like the presence of and more so, the attractiveness or expertise of an endorser becomes more significant on the peripheral route because they provide a way of ensuring that what is communicated is correct without the need for deep cognitive processing (Dong, 2015, pp. 85–89; Wilson, 2007, p. 16). Since this study concerns a matter of food choice, which according to van Trijp (2009, p. 42) is often processed on the peripheral route anyway, and more precisely, deals with the effects of PBMA on the environment or one's health, a subject that the majority of people are not highly involved in, the message is likely processed on the peripheral route of persuasion, where the impact of the message source becomes more important. Yet naturally, not all endorsers possess the same qualities and characteristics, making it pertinent to study whether and if so, which endorser type is most persuasive.

Two types of endorsers that were traditionally used in the past are celebrities and experts, which both have individual strengths when it comes to persuasive power. Celebrities are public figures famous for activities that are normally not related to the product endorsed. They have been proven to be successful in various advertising campaigns and settings (Bergkvist & Zhou, 2016, p. 642). Experts, on the other hand, possess established authority on the product they endorse, due to special knowledge or training that exceeds that of ordinary individuals (Friedman et al., 1976, p. 22; Friedman & Friedman, 1979, p. 64). Therefore, they are often featured in pharmaceutical advertisements (Schimmelpfennig, 2019, p. 147).

However, with the advent of social media, another type of endorser gained popularity, namely social media influencers. Like traditional celebrities, influencers function as opinion leaders, whereby they can exert a strong influence on consumers' attitudes and purchase intentions (Vrontis et al., 2021, p. 618). However, while celebrities acquired their popularity outside of social media, influencers were not known to the general public outside of social media and became successful by presenting themselves as experts in their respective content fields (Campbell & Farrell, 2020, p. 471; Schouten et al., 2021, p. 210). Their expertise on a specific subject and the close relationships they have with their followers are inherently important for their success in changing consumer attitudes. More precisely, by comparing both traditional celebrities' and influencers' effectiveness in advertising, Schouten et al. (2021, pp. 224–226) illustrated that influencers were more effective in endorsing products than celebrities because they were considered more trustworthy. This is because influencers are considered experts in their field of specialisation, making them more knowledgeable about

the products they endorse, compared to celebrities who have other backgrounds than the product they endorse (Feng et al., 2021, p. 987). Yet, the differentiation between celebrities and influencers is sometimes also blurry because successful mega-influencers might start engaging in other activities (e.g., working as a model), whereas traditional celebrities are also active on social media and engage in cooperations, making them mega-influencers, as well (Schouten et al., 2021, p. 227).

For this study, it was decided to compare the effects of both a regular expert (i.e. doctor or scientist) and a plant-based influencer on attitudes and purchase intention of PBMA. The reason for this is that, when advertising the credence attributes of a product, that is attributes that cannot be verified by the consumer even after using it (Darby & Karni, 1973, pp. 69–70), consumers have to rely on the brand's promises to be true or, preferably on a third party's recommendation (Meijer, 2010, pp. 11–12). This makes endorser expertise crucial, as it provides consumers with additional information that can help them with their purchase decisions (Meijer, 2010, p. 16). Thus, experts and plant-based influencers, who are also knowledgeable by the nature of their content, seem to have more expertise on the issue than a celebrity, who only “used” the product beforehand and recommends it (Meijer, 2010, p. 16). Within this study, participants will receive information on either health or environmental consequences of PBMA consumption (see Chapter 3), which is a way of leveraging credence factors that consumers cannot verify after their purchase (Schroback et al., 2023, pp. 2, 16). Following this argument, this means that experts would be more persuasive than traditional celebrities because they are considered more knowledgeable when confirming a product's credence attributes. Whether that is also the case in comparison to an influencer, who is also an expert in the field, albeit somewhat differently, is to date unclear, as there are not many studies comparing experts' and influencers' effectiveness in product endorsements, especially when credence attributes are highlighted. Although many studies within influencer marketing have explored the influence of endorsers' source expertise (Choi et al., 2023, p. 1202), these studies have come to mixed results (D. Y. Kim & Kim, 2021, p. 229; Trivedi, 2018, p. 267). To the best of the author's knowledge, there is only one study that directly compares the effectiveness of expert endorsers and influencers in the field of nutrition: Contrary to their expectations that influencers will be considered more trustworthy and authentic than experts, which they based on the previous success of celebrity endorsers in advertising, Jenkins et al. (2020, p. 11) found that (nutrition) experts were considered more authentic and trustworthy than influencers. The authors explained this outcome by the vast amount of misinformation on social media, with some influencers endorsing dubious products. Due to the paucity of other

studies comparing influencer and expert endorsements in the field of nutrition, it was decided to also consider studies that compared the effectiveness of celebrities and expert endorsers in this context. Yet, there is no clear trend whether an expert (Dong, 2015, p. 93; Rollins et al., 2020, p. 6) or a celebrity (Emmers-Sommer & Terán, 2020, p. 156; Fung, 2017, p. 12; Wu et al., 2012, p. 70) is more successful, which indicates that source expertise may not be the only decisive factor. Nevertheless, due to the scarcity of studies comparing directly between knowledgeable influencers and regular experts in the field of nutrition, this study follows the findings of Jenkins et al. (2020, p. 11), who found experts to be considered more trustworthy and authentic, and thus more persuasive, and proposes the following hypothesis:

H4: *When persuading consumers to buy PBMA, an endorsement by an expert has a stronger positive effect on a) attitudes and b) purchase intention than a plant-based influencer's endorsement.*

2.6. The Theory of Reasoned Action

As was discussed above, this study takes the TRA as its conceptual framework. Amongst others, the theory posits that an individual's behavioural intention is affected by both attitudes and subjective norms. Accordingly, the influence of both will be elaborated upon in this section and as a second step, their relationship with other variables of this study will be predicted.

2.6.1. The Mediation Effect of Attitudes

The relationship between attitudes and behaviour has been deemed influential in predicting consumer behaviour (Riskos et al., 2021, p. 3; Yamoah & Acquaye, 2019, p. 174). In the TRA, Fishbein and Ajzen (1975, p. 241), explained how individual beliefs influence people's attitudes, and how these attitudes, in turn, connect to behavioural intentions. More specifically, they argued that attitudes towards a behaviour are a result of the perceived consequences of engaging in the behaviour and an evaluation of the latter. Applying this theory to this study, where participants are provided with information on the environmental and health effects of eating (plant-based) meat suggests that the information presented to them will affect consumers' attitudes towards PBMA, which will then affect their behavioural intentions. Past research related to meat reduction or plant-based diets and products mainly looked at the effect of attitudes on purchase intentions. For example, Carfora et al. (2017, p. 247) demonstrated that attitudes were a major predictor of the intention to reduce one's meat consumption. Likewise, two studies have also identified positive consumer attitudes as a

significant predictor of the intention to buy PBMA (Bakr et al., 2023, p. 430; Seo et al., 2023, p. 5). On top of that, Seo et al. (2023, p. 5) found that health and environmental benefits as reasons for consuming PBMA also had a significant effect on attitudes, indicating the presence of a mediation effect. A full mediation effect of attitudes was discovered by Carfora (2019, p. 6) for both health and environmental motives on behavioural intentions to reduce meat consumption. This leads to the following hypothesis:

H5a: *When persuading consumers to buy PBMA, attitude mediates the relationship between the communication of motives and purchase intention when promoting PBMA.*

The relationship between message framing, attitude and purchase intention has not been explored thoroughly in the food or meat reduction context, but a few studies managed to find meaningful results that help to further explore the relationship between framing, attitudes and behavioural intentions. Baum et al. (2021, p. 9) investigated consumers' attitudes and purchase intentions regarding cultivated meat and were able to show that explicit attitudes served as a mediator between gain-loss framing and purchase intentions. This suggests that a similar relationship could be present in the context of PBMA, where message framing could significantly affect consumer attitudes and, consequently, their purchasing behaviour. Similarly, Carfora et al. (2021, p. 9) found that gain-loss framing had an impact on attitudes, which subsequently influenced people's intention to reduce their meat consumption. Although they did not specifically test for a mediation effect, their findings imply a sequential relationship where message framing had an impact on attitudes, which then affected behavioural intentions. Likewise, in another social marketing context, a study investigating the reduction of plastic bag usage, also indicated the presence of attitudes as a mediator. In essence, the study found that for a gain frame, attitudes towards compliance and for a loss frame, attitudes towards reusable bags were indicative for consumer's behavioural intentions (Muralidharan & Sheehan, 2016, pp. 210–211). Accordingly, it is hypothesized that:

H5b: *When persuading consumers to buy PBMA, attitude mediates the relationship between the message frame and purchase intention when promoting PBMA.*

Finally, research investigating the effect of endorser types on purchase intention with attitudes as a mediator is sparse. To the best of the author's knowledge, no study has tested this relationship in the food or health context, which is why the effects within other sectors are taken into consideration. For example, Chin et al. (2020, p. 906) examined the relationship between an endorser's credibility and purchase intention of local apparel brands, which they

found to be mediated by both the attitude towards the brand itself and brand credibility. Furthermore, S.W. Wang et al. (2017, p. 14) investigated the effects of celebrity endorsements on both attitudes and intention in the airline sector, whereby they found that consumers' brand attitudes were predicted by the perceived credibility of the celebrity, and also, that purchase intention was predicted by these attitudes, which allowed them to conclude that the way consumers see an endorser also affects their attitude towards the brand, indicating a mediation effect. However, whether these findings are also applicable to the plant-based food context is unclear and needs to be further examined. Nevertheless, it is hypothesised that:

H5c: *When persuading consumers to buy PBMA, attitude mediates the relationship between the message endorser and purchase intention when promoting PBMA.*

2.6.2. Subjective Norms

While attitudes represent the intrinsic component that affects behavioural intentions, subjective norms represent the extrinsic or social component (Kopplin & Rausch, 2022, p. 1337). Subjective Norms were defined by Ajzen (1991, p. 188) as “the perceived social pressure to perform or not to perform the behaviour”. Accordingly, this refers to what people who are close to the individual (e.g., friends, family, partners) think about the behaviour and whether the individual feels forced to comply with this social pressure. This means that positive subjective norms (i.e., the individual's environment wants them to engage in the behaviour) can have a positive impact on an individual's behavioural intentions (Paul et al., 2016, p. 125). Conversely, when consumers face high reactance from these actors, this can impact behavioural intentions negatively (Aschemann-Witzel et al., 2021, p. 3124). In the context of meat reduction, past research has found that social factors often pose an obstacle to people, who want to reduce their meat consumption or adopt a vegetarian or plant-based diet. More precisely, Aschemann-Witzel et al. (2021, p. 3124) and Graça et al. (2019, pp. 383, 387) explained that consumers who intend to reduce their meat consumption are often confronted with negative reactions from their friends and family and that vegetarians and vegans often face stigmatisation in society. Vice-versa, a supportive environment can also be a driver of eating less meat. Accordingly, the effect of subjective norms has been thoroughly examined in various studies that also incorporated the TRA or TPB as conceptual framework in the context of meat reduction or plant-based food promotion. Bakr et al. (2023, p. 424) reviewed several studies in the context of plant-based food, where they acknowledged that some studies were unable to find a significant relationship between subjective norms and behavioural intentions (e.g., Miguel et al., 2021, p. 11). However, the authors themselves (Bakr et al., 2023, p. 430)

and other studies (e.g., Contini et al., 2020, p. 3; O. Wang & Scrimgeour, 2021, p. 8) found a significant relationship between the two variables, making it a meaningful variable in understanding people's purchasing intentions of PBMA. Thus, it is hypothesized that:

H6: *When persuading consumers to buy PBMA, higher subjective norms have a positive effect on purchase intention.*

2.7. Interaction Effect: The Moderating Effect of Motives

Finally, as one of the goals of this study is to determine which communication strategy is suited best to promote PBMA consumption, it has been decided to investigate whether there are interaction effects between the information provided to the participants (i.e. health or environmental aspects) and the other communication strategies adopted (i.e. message framing and type of endorsers). Due to the centrality of information provision aimed at triggering either health or environmental motives for purchasing PBMA, it was decided to only test for an interaction whereby the type of information provided acts as a moderator. Accordingly, an interaction effect between message framing and endorser type will not be examined.

As was described in the corresponding subchapters above, both the persuasive effects of gain and loss framing and point of reference (i.e. the motive) were extensively studied before, yet there is almost no literature studying an interaction effect between the two (Chung & Chon, 2024, p. 4; Loroz, 2007, p. 1010; Segev et al., 2015, p. 39), although, as was argued by Segev et al. (2015, p. 39), the combination of the two is quite common in the context of green advertising, where the benefits or consequences for consumers or the environment are frequently mentioned. Three studies detected a significant interaction effect between the two variables, yet pointing in different directions: Loroz (2007, p. 1016) and Segev (2015, p. 48) concluded that the combination of loss and health (self-related) messages and gain and environmental (other-related) messages were most effective in exercising persuasive effects since the combinations required either both a high or a low level of cognitive processing. Conversely, Chung and Chon (2024, p. 12) found a significant difference between gain/self-related and gain/other-related messages, whereby the former were more persuasive, but no significant difference concerning the loss messages was found. An explanation for this finding can be provided by Dijkstra et al. (2011, pp. 1042–1045), who explained that the effectiveness of gain-loss framing can be influenced by how self-relevant the message is to a person. More precisely, while gain frames are usually more effective in risk-averse situations than loss frames, it can be the case that a person does not perceive the situation depicted in the loss frame to be threatening enough, which in turn does not cause reactance. Now, for this study, it

can thus be argued that the point of reference (i.e. one's health or the environment) is also indicative of the effectiveness of gain-loss framing, since, as was argued above, consumers may perceive arguments about their health as more relevant because the consequences affect them directly. This means that when the health effects of PBMA are emphasised, consumers may perceive the argument as more relevant, which then leads to reactance in the loss condition. Contrarily, when the environmental effects of PBMA are emphasised, consumers may not consider the issue as personally relevant, whereby loss messages do not lead to reactance. Hence, the following hypothesis is proposed:

***H7:** The presented motive moderates the relationship between gain-loss framing and purchase intention in the context of PBMA promotion. When health aspects are emphasised, gain frames will lead to a higher purchase intention compared to loss frames. When environmental aspects are emphasised, this effect does not hold.*

Lastly, with the advent of social media that reinforces the use of endorsers and the rising awareness of the advantages of plant-based diets, it is likely that the combination of different endorser types with egoistic or altruistic motives to follow a plant-based diet gains more traction in green advertising, which is why it is relevant to determine whether a combination works particularly well. Yet, to the best of the author's knowledge, no study has investigated the interaction of the type of endorser used with health or environmental motives for purchasing PBMA. Similarly, there are no studies that investigated related relationships in other contexts, for example, whether egoistic vs. altruistic motives or self vs. other-related values were more effective if a specific endorser was used. However, Sternthal et al. (1978, pp. 291–292) showed that endorser characteristics are likely to interact with message and recipient factors, amongst others the level of threat posed by a message. Following their argument about the interaction of endorser type and threat level, this would mean that the combination of health effects, which pose a higher level of personal threat to the participants than environmental effects, and a more credible source (possibly the expert) would be likely to have the strongest influence on purchase intention, whereas any other combinations would not significantly differ from each other. As this proposition supports what has been hypothesised for both motives and endorser type, the following hypothesis is proposed:

***H8:** The presented motive moderates the relationship between endorser type and purchase intention in the context of PBMA promotion. When health aspects are emphasised, experts will lead to a higher purchase intention compared to influencers. When environmental aspects are emphasised, this effect does not hold.*

2.8. Conceptual Model

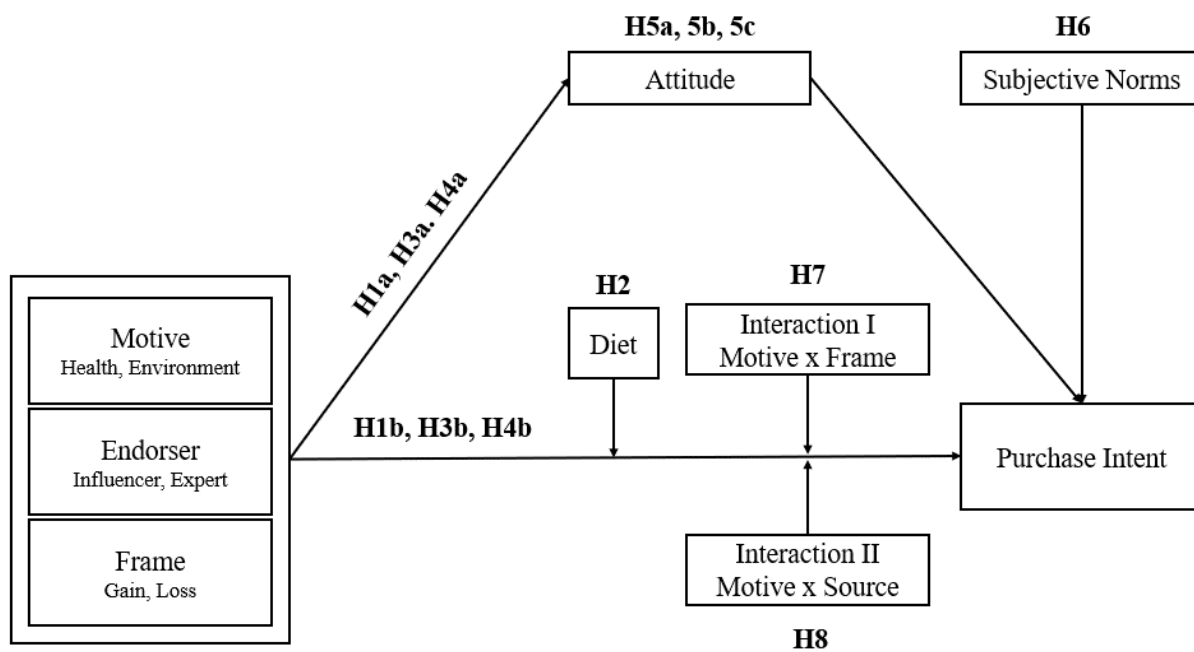


Figure 2.1. Conceptual Model

3. Methodology

3.1. Research Design

To answer the research questions posed above, a quantitative research approach was adopted because it enables the researcher to test the effect of different treatments or variables on a specific outcome and to understand the relationships between different variables (Creswell, 2009, p. 137). Through the quantification of data and the use of statistics, quantitative research helps uncover empirical relationships between variables (Stockemer, 2019, p. 8). Other than qualitative research, quantitative research usually builds upon a deductive research approach, which involves testing theories and follows the norms of positivism, which amongst others considers social reality as external and objective (Bryman, 2016, pp. 32–33). As this study's objective was to empirically test the relationship between various variables related to PBMA promotion, a quantitative methodology was most suitable.

More precisely, a quasi-experimental factorial research design was used to answer the research questions. Experiments, according to Neuman (2008, p. 282), are considered one of the strongest methods to test causal relationships as they meet the three conditions for causality: a) the temporal precedence of independent before dependent variables in terms of order, b) the proof of an association and c) the lack of other causes. Essentially, an experimental setting allows for isolating and controlling for individual variables' effects, since any outside factors are removed or acknowledged in the analysis (Neuman, 2008, p. 283). On top of that, quasi-experimental factorial designs do not only let the researcher test the main effect of one variable on another but also enable the examination of interaction effects.

The objective of this research is to test the effect of three different communication strategies on consumers' purchase intentions and attitudes towards PBMA. To this end, a quasi-experimental factorial between-subjects 2 (motive: health/environment) x 2 (framing: gain/loss) x 2 (endorser: expert/influencer) research design was employed, resulting in eight experimental conditions (see Table 3.1).

3.2. Operationalisation

3.2.1. Stimulus Material

As was explained above, this study sought to operationalise three independent variables (motive for eating PBMA, framing and endorser) across eight experimental scenarios. Within all scenarios, participants saw an advertisement for PBMA, which was chosen, since advertisements (both on- and offline) are quite common in the food sector.

Table 3.1. Overview of the experimental conditions (N = 312)

Case 1: Health Motive

Endorser	Framing	
	Gain Frame	Loss Frame
Expert	<i>Scenario 1 (n = 39)</i>	<i>Scenario 2 (n = 40)</i>
Influencer	<i>Scenario 3 (n = 39)</i>	<i>Scenario 4 (n = 40)</i>

Case 2: Environmental Motive

Endorser	Framing	
	Gain Frame	Loss Frame
Expert	<i>Scenario 5 (n = 39)</i>	<i>Scenario 6 (n = 40)</i>
Influencer	<i>Scenario 7 (n = 36)</i>	<i>Scenario 8 (n = 39)</i>

To avoid participant bias towards an existing brand, expert or influencer, a fictitious brand and endorsers were shown in the advertisement (Y. Kim, 2014, p. 839). Likewise, a female endorser was chosen for all experimental scenarios to avoid bias towards gender (see e.g., Lien et al., 2012, p. 294). The name of the fictitious PBMA brand used in this study was *Plantasia*, while both the influencer and the expert were named *Lauren Phillips*. Yet, the influencer was primarily introduced as *@GreenFoodista*, whereas the expert was introduced with Dr. in front of her name. The advertisement used as stimulus material featured the name of the brand, a photo of a hamburger using a plant-based burger patty and at the bottom the picture of either the influencer or the expert, who said something about the product using a speech bubble, prominently placed in the advertisement.

All three independent variables were operationalised within the advertisement: The motives were expressed in the endorsers' statements, where they highlighted the effects of (not) choosing PBMA on people's health or the environment. The percentual claims made in the statements regarding the impact were scientifically proven or estimated (see e.g., Craig, 2009; Crippa et al., 2021; Poore & Nemecek, 2018; Quek et al., 2021; Salehin et al., 2023). Secondly, for framing, the endorsers' statements were either phrased as benefits (i.e. health or environmental gains) of eating PBMA or as the negative consequences for either one's health or the environment if regular meat were to be chosen instead of PBMA. Finally, the endorser type was operationalised by two different pictures of women as endorsers: one wearing a white lab coat (the expert) and the other one without. Next to their pictures, an explanatory sentence explained who they were: The influencer was introduced as regularly posting easy

plant-based recipes on her Instagram Channel and blog, whereas the expert's introduction depended on whether the advertisement featured the environmental or the health motive. Within the health scenarios, the expert was introduced as a doctor and dietician, while in the environmental conditions, she was a geographer focussing on the impact of human nutrition on our climate. Besides the manipulated elements, the layout, images and names used were identical to avoid unintentional effects. The experimental stimuli can be found in Appendix A.

3.2.2. Consumer Attitude

The first outcome and also mediator variable, consumer attitude towards PBMA, was operationalised with a validated scale from Y. Kim and Han (2010, pp. 1004–1005), who adapted the TPB items from Fishbein and Ajzen to fit the context of green consumption. With a Cronbach's alpha score of $\alpha = .98$ and a factor analysis, the authors showed that their scale is a reliable measurement of the concept. As the original scale by Kim and Han dealt with consumers' attitudes towards green hotels, the wording was adapted within this study to fit the context of PBMA. For using accurate wordings, this study took the scale by Bakr et al. (2023, p. 425) into account, who also used TPB items to measure people's attitudes towards PBMA. Yet, as the latter study only used three items, whereas Kim and Han used seven, it was decided to use the seven-item scale to cover more dimensions of the concept. Moreover, Kim and Han's scale is commonly used in studies dealing with green consumption (e.g., Yadav, 2016, p. 735). The seven-item scale measures consumers' attitudes on a seven-point bipolar scale across the following dimensions: bad/good, undesirable/desirable, unpleasant/pleasant, foolish/wise, unfavourable/favourable, unenjoyable/enjoyable and negative/positive, whereby 1 = the most negative and 7 = the most positive evaluation. Accordingly, a higher score means a more favourable attitude. As the scale contains seven items, the items were entered into an exploratory factor analysis using Principal Components extraction with Direct Oblimin rotation based on Eigenvalues (>1.00), $KMO = .91$, $\chi^2 (N = 312, 21) = 2122.66$, $p < .001$. The resultant model explained 76.2% of the variance in attitudes. Factor loadings on the one factor extracted can be found in Table 3.2. The subsequent reliability analysis confirmed that with a Cronbach's alpha of $\alpha = .95$, the scale possesses high internal consistency. Hence, a new variable was computed through an equal-weighted average of the seven items.

3.2.3. Purchase Intention

Purchase Intention was operationalised through a three-item scale by Bakr et al. (2023, p. 425), who relied on the guidelines of Ajzen (2006) in constructing their scale. The authors

conducted a factor analysis, where they found that all three items had high loadings on one factor, which was also confirmed by the subsequent reliability analysis, where they found the scale to have a Cronbach's alpha score of $\alpha = .94$. The three items were measured on a seven-point Likert scale that asked participants to what extent they agree with the statements presented to them, ranging from 1 = strongly disagree to 7 = strongly agree. Hence, higher scores expressed a greater intention to purchase PBMA. Also, within this study, the scale had high internal consistency with a Cronbach's alpha of $\alpha = .96$. Thus, a new variable was computed through an equal-weighted average of the three items.

Table 3.2 Factor loadings, explained variance and reliability of the one factor found for "attitude".

Item: For me, buying plant-based meat alternatives is...	Attitude
Unfavourable (1) – Favourable (7)	.92
Unpleasant (1) – Pleasant (7)	.91
Undesirable (1) – Desirable (7)	.90
Negative (1) – Positive (7)	.87
Bad (1) – Good (7)	.86
Unenjoyable (1) – Enjoyable (7)	.85
Foolish (1) – Wise (7)	.80
R^2	.76
Cronbach's α	.95

3.2.4. Subjective Norms

Subjective norms were operationalised with a validated scale adapted from Han et al. (2010, p. 333), who used three items to measure subjective norms concerning staying in a green hotel. Within this study, instead of "staying at a green hotel", the statements asked about "eating more PBMA", where Bakr et al. (2023, p. 425) were taken as a reference to formulate the statements. Han and colleagues conducted a factor analysis to confirm the one-dimensionality of the construct and reliability analysis, whereby a Cronbach's alpha score of $\alpha = .91$ indicated high internal consistency. The three items were measured on a seven-point Likert scale that asked participants to what extent they agreed with the statements shown to them, ranging from 1 = strongly disagree to 7 = strongly agree. Thus, higher scores signified higher subjective norms, meaning that the participant's social environment was supportive of PBMA. With a Cronbach's alpha score of $\alpha = .92$, this scale had high internal consistency. From the three items, a new variable was computed through an equal-weighted average.

3.2.5. Meat Consumption

Finally, the moderator variable that asked about people's eating habits was assessed with one question, taken from Lentz et al. (2018, p. 233), that asked participants "On average, how often do you consume meat or products that include meat?", whereby they could choose between one of the following answer options: "never", "rarely", "several times a week", "daily", and "several times a day". Before the question, a definition of meat was provided to ensure that all participants had the same definition of meat when answering the question. Originally, it was planned to operationalise people's eating behaviour through a scale by De Backer et al. (2020, p. 4), who asked people how many days a week they eat meat on average. Yet, during pilot testing, several participants following a flexitarian diet said that this question was possibly misleading since they often go weeks without eating meat but made exceptions, which made them unsure which answer to put.

3.2.6. Control Variables

Moreover, several control variables were assessed. Past research has identified gender as influential for people's purchase behaviour of plant-based products and attitudes towards both plant-based products and plant-based diets, in general (De Backer et al., 2020, p. 5; D. Martinelli & Berkmaniené, 2018, p. 527; Seffen & Dohle, 2023, p. 6). Moreover, also two questions regarding participants' awareness and previous purchases of PBMA were included in the survey, to assess whether this influenced attitudes or purchase intentions. Finally, as this study seeks to compare the effectiveness of both expert and influencer endorsers, perceived source expertise was also included as a control variable. The scale was operationalised with a validated five-item scale from Weismueller et al. (2020, p. 165), who conducted a factor analysis, where they found that all five items had high loadings on one factor, which was also confirmed by the subsequent reliability analysis, where the authors found high internal consistency with a Cronbach's alpha score of $\alpha = .92$. The five-item scale measures consumers' perceptions of the endorser's expertise on a seven-point bipolar scale across the following dimensions: not an expert/expert, inexperienced/experienced, unknowledgeable/knowledgeable, unqualified/qualified and unskilled/skilled, whereby 1 = always the most negative and 7 = the most positive evaluation. Accordingly, a higher score means that the participants perceived the source to have more expertise. Within this study, the scale had high internal consistency with a Cronbach's alpha of $\alpha = .94$. Accordingly, a new variable was computed through an equal-weighted average. An overview of all multiple-item scales can be found in Table 3.3.

Table 3.3. Overview of the Operationalisation of the Variables

Scale	Items	Source	Measurement	Cronbach's Alpha
Purchase Intent (PI)	<p>“In the future, I intend to buy more plant-based meat alternatives.”</p> <p>“In the future, I intend to include plant-based meat alternatives in my diet.”</p> <p>“In the future, I intend to try eating more plant-based meat alternatives.”</p>	Bakr et al. (2023, p. 425)	Seven-point Likert Scale	.96
Attitudes (ATT)	<p>“For me, [buying plant-based meat alternatives] is...</p> <p>“unfavourable – favourable”</p> <p>“unpleasant – pleasant”</p> <p>“undesirable – desirable”</p> <p>“negative – positive”</p> <p>“bad – good”</p> <p>“unenjoyable – enjoyable”</p> <p>“foolish – wise”</p>	Kim & Han (2010, pp. 1004-1005)	Seven-point Bipolar Scale	.95
Subjective Norms (SN)	<p>“Most people who are important to me think I should [eat more plant-based meat, instead of regular meat].”</p> <p>“Most people who are important to me would want me to [eat more plant-based meat, instead of regular meat.]</p> <p>People whose opinions I value would prefer that [I eat more plant-based meat, instead of regular meat.]</p>	Han et al. (2010, p. 333)	Seven-point Likert Scale	.92
Source Expertise (SouEx)	<p>“In my opinion, the person shown in the advertisement is:”</p> <p>“not an expert – an expert”</p> <p>“inexperienced – experienced”</p> <p>“unknowledgeable – knowledgeable”</p> <p>“unqualified – qualified”</p> <p>“unskilled – skilled”</p>	Weismueller et al. (2020, p. 165)	Seven-point Bipolar Scale	.94
Meat consumption (MC)	<p>“On average, how often do you consume meat or products that include meat?”</p> <p>“never”</p> <p>“rarely”</p> <p>“several times a week”</p> <p>“daily”</p> <p>“several times a day”</p>	Lentz et al. (2018, p. 233)	Five-point Likert Scale	N/A

3.3. Experimental Procedure

The experiment was conducted online, using the online surveying platform Qualtrics. There were no prerequisites for participating in this study, other than having sufficient knowledge of the English language, which is a pre-screener recommended by Prolific, the crowdsourcing platform that was used for recruiting participants of this study. The experiment began with an introductory text that explained the general purpose of the experiment to the participants and informed them about the voluntary nature of the participation, the possibility of discontinuing their participation at any time, the guaranteed anonymity of their data that was only used for the study at hand and the protection of personal data. To start with the study, participants were asked for informed consent. If they did not agree to participate, they were automatically redirected to the end of the survey.

Participants who chose to continue were first asked to fill in their Prolific-ID which was necessary to issue the financial compensation. When participants completed the survey, they received 0.50 pounds (with an hourly rate of 6.00 pounds and an estimated completion time of five minutes). To get all participants on a common ground and to introduce them to the topic, short definitions of meat and PBMA were provided before participants were asked to indicate how often they consume meat, if they have ever heard of PBMA and if they have ever bought PBMA. After that, the 2x2x2 factorial design followed, whereby the Qualtrics randomizer assigned participants randomly to one of the eight experimental conditions (see Table 3.1.). According to Neuman (2008, pp. 287–289), random assignment is key for between-group experiments, as it enables the creation of similar groups, that do not have systematic differences, which allows the researcher to make comparisons between them. Moreover, random assignment is a way of forestalling selection bias because participants are not assigned according to a participant's or the researcher's preferences, but automatically (Neuman, 2008, p. 300). Following the exposure to one of the eight advertisements, which participants had to look at for at least 15 seconds, the dependent and mediating variables were measured. Then three manipulation checks with multiple-choice questions about the independent variables were conducted. At the end, participants were asked demographic questions about their gender, age, nationality and level of education. Additionally, following Demartini et al. (2022, p. 4), participants' consumption habits were assessed by asking whether they were responsible for their daily food purchases and which diet they were following. Last, but not least, participants were debriefed, since the endorsers, the brand and the advertisement used were fictitious and informed about the goals of the experiment in more detail. The full experimental flow can be found in Appendix B.

3.4. Sampling and data collection

3.4.1. Pilot Test

A pilot test was conducted between the 6th and the 12th of April 2024. For that, 14 participants were recruited through the researcher's network. To ensure that formatting worked adequately on different devices, six pilot participants used their phones, while the other eight participated on their computers. Afterwards, participants gave either written or oral feedback about the experiment's flow, the wording and comprehensibility of the questions and the experimental scenario they saw. On top, two additional participants looked at all the advertisements and gave detailed feedback about them. Thanks to the feedback of the pilot testers, three areas for improvement were identified.

Firstly, some participants expressed concerns about the wording of specific items or scales. Two participants following a flexitarian diet noted that the intended item used to measure average weekly meat consumption was hard to answer and possibly misleading since they often go weeks without eating meat but made exceptions, which made them unsure which answer to put. Hence, in consultation with them it was decided to use a different scale with the following options: "never", "rarely", "several times a week", "daily", and "several times a day". Likewise, one participant noted that the question asking participants where they are from might be unclear, as it could mean both country of origin or country of residence, it was decided to rephrase the question and ask for participants' nationality instead. The second area of improvement concerned the answer options of the type of diet people follow. One participant noted that some of the answer options (e.g., omnivore) might be unclear to participants who never heard about these terms. Therefore, a short explanation was added behind these terms. Finally, as some of the pilot testers were English native speakers, a few grammatical or wording mistakes were also corrected.

3.4.2. Data Collection

As this research aims to assess people's attitudes and purchase intentions towards PBMA, this experiment's unit of analysis was individual people. Other than in the pilot test, participants were recruited through Prolific, an online crowdsourcing platform designed specifically for the recruitment of research participants, whereby participants are financially remunerated for their participation. Prolific provides clear guidelines about participants' payment (e.g., minimum wage) and offers transparency in their recruitment processes both to the researcher and the participants, who are aware that they are recruited for research (Palan & Schitter, 2018, pp. 23–26). Yet, it must be noted that crowdsourced samples cannot be

considered a form of random sampling and is thus a form of non-probability or convenience sampling. The use of crowdsourcing platforms, compared with other non-random sampling methods (e.g., snowball sampling) is still advantageous, since it provides the researcher with a more diverse and less biased sample. On the other side, compared to random sampling, it is more convenient and cheaper to execute (Mullen et al., 2021, pp. 222–223).

At least 30 participants needed to be recruited per experimental condition. Considering that this experiment has eight conditions, this study aimed to recruit at least 240 participants. In the end, a total of 317 responses were collected through Prolific, so that invalid or low-quality data could be deleted without falling under the threshold. After data cleaning, the final sample included $N = 312$ participants. Five participants had to be excluded from further analyses because they did not fully complete the survey. Although a few outliers were found, the 5% trimmed mean for the dependent, mediator and moderator variables (see Table 3.4) was not substantially different from the original mean, nor was it outside the 95% confidence interval of the original means. Therefore, no outliers needed to be removed from the sample.

Table 3.4. Descriptive Statistics and Trimmed Mean ($N = 312$)

	<i>M</i>	<i>SD</i>	95% confidence interval		5% trimmed mean
			Lower Bound	Upper Bound	
Purchase Intent	4.56	1.69	4.37	4.75	4.62
Attitudes	4.67	1.54	4.50	4.84	4.72
Subjective Norms	2.98	1.47	2.82	3.15	2.92
PBC	4.64	1.17	4.51	4.77	4.66
Source Expertise	4.75	1.52	4.58	4.92	4.82
Meat Consumption	3.33	1.01	3.22	3.44	3.37

Note: Each of the variables was measured on a seven-point Likert or bipolar scale.

3.5. Demographics, Consumption Behaviour and Descriptive Statistics

The final sample comprised 169 women (54.2%), 137 men (43.9%) and six people (1.9%) identifying as non-binary/third gender. The average age of the participants was 30.26 years ($SD = 9.55$) with the youngest participant being 18 and the oldest 72. The sample includes 33 different nationalities with the most prominent being South African (26.0%), Polish (12.2%), Portuguese (9.9%), Mexican (9.6%) and British (8.0%). In terms of education, most participants indicated having completed a bachelor's degree (49.7%), followed by high school (26.9%) and a master's degree (17.6%). Moreover, a majority of the participants follow an omnivore diet (82.1%), but also flexitarians (7.4%), vegetarians (4.2%),

pescatarians (2.6%) and vegans (2.6%) were represented in the sample. A majority of the participants are responsible for their food purchases (82.7%), almost all participants previously heard about PBMA (94.6%) and more than half (62.5%) have bought them before. Furthermore, descriptive statistics were calculated for all the remaining continuous variables (see Table 3.4) and a Spearman's rank-order correlation analysis was conducted which indicated significant correlations between various variables (see Table 3.5).

For example, attitude is positively correlated with purchase intention ($r_{ATT-PI} = .78, p < .001$), which is in line with the predicted relationship between the two variables. Likewise, subjective norms are positively correlated with purchase intention ($r_{SN-PI} = .59, p < .001$). Besides, there is a correlation between all the control variables (source expertise, gender, meat consumption and previous PBMA purchase) and purchase intention and attitudes. More precisely, source expertise, gender and previous purchase are positively correlated with purchase intention ($r_{SouEx-PI} = .25, p < .001$; $r_{gender-PI} = .22, p < .001$; $r_{PBMb-pur-PI} = .39, p < .001$) and attitudes ($r_{SouEx-PI} = .25, p < .001$; $r_{gender-PI} = .30, p < .001$; $r_{PBMpur-PI} = .42, p < .001$), whereas meat consumption is negatively correlated with purchase intention ($r_{MC-PI} = -.35, p < .001$) and attitude ($r_{MC-PI} = -.40, p < .001$).

Table 3.5. Spearman Rank-Order Correlations

	<i>PI</i>	<i>ATT</i>	<i>SN</i>	<i>SouEx</i>	<i>Gender</i>	<i>MC</i>	<i>PBM Purchase</i>
Purchase Intent (PI)	1						
Attitudes (ATT)	.78***	1					
Subjective Norms (SN)	.59***	.49***	1				
Source Expertise (SouEx)	.25***	.25***	.157**	1			
Gender	.22***	.30***	.02	.32***	1		
Meat consumption (MC)	-.35***	-.40***	-.18***	-.07	-.29***	1	
Previous purchase of plant-based meat (PBM)	.39***	.42***	.28***	-.05	.12*	-.17**	1

Note: Significance levels: *** $p < .001$ (2-tailed), ** $p \leq .01$ (2-tailed), * $p \leq .05$ (2-tailed)

3.6. Manipulation Check

Three manipulation checks in the form of a multiple-choice question were conducted at the end of the experiment to test whether the experimental manipulations of motives, framing and endorsers were successfully operationalised. More precisely, each manipulation check question asked which of the two conditions of each independent variable they saw in the advertisement they looked at. To test whether participants were able to correctly identify the experimental conditions they were assigned to, a Chi-Square test of independence was conducted. The first manipulation check on motives for the consumption of PBMA asked participants whether the advertisement they saw highlighted the implications of eating (plant-based) meat for the environment or personal health. As indicated in Table 3.6, the Chi-Square test revealed that 97.1%, thus almost all participants, identified the correct answer. With 95% certainty, the manipulation was successful, $\chi^2(1, N = 312) = 277.94, p < .001$.

Table 3.6. Manipulation Check - Motives

Motive	Did the ad you just see highlight the implications of eating (plant-based) meat for the environment or for personal health?		
	Health	Environment	Total
Health	158	0	158
Environment	9	145	154

The second manipulation check asked participants whether the advertisement they saw highlighted the benefits of PBMA (i.e., a gain frame) or the negative consequences of meat consumption (i.e., a loss frame). The Chi-Square test showed that 83.7%, hence the majority of the participants, correctly identified their assigned experimental condition, which is shown in Table 3.7. Therefore, with 95% confidence, the second manipulation was also successful, $\chi^2(1, N = 312) = 143.28, p < .001$.

Table 3.7. Manipulation Check - Frame

Frame	Did the ad you just see highlight benefits of a plant-based meat or the negative consequences of meat consumption?		
	Benefits	Consequences	Total
Gain	136	17	153
Loss	34	125	159

Finally, the third manipulation check asked participants what kind of person they saw in the advertisement, whereby they could choose between a scientist/doctor or an influencer. As can be seen in Table 3.8, the Chi-Square test indicated that 95.2%, thus almost all participants, identified the correct answer. Hence, within a 95% confidence interval, the third manipulation was successful, $\chi^2 (1, N = 312) = 255.16, p < .001$. With all manipulation checks being successful, the three independent variables can be used for further analyses.

Table 3.8. Manipulation Check - Endorser

Endorser	What kind of person did you see in the ad?		
	Scientist/doctor	Influencer	Total
Expert	148	10	158
Influencer	5	149	154

3.7. Data Analysis

After the data collection in Qualtrics was completed, the data was analysed with SPSS (Version 29.1), which is a statistical software package for data analysis. Before the analyses were executed, the data was cleaned and prepared for analysis, which means that the data had to be checked for incomplete data, outliers and other irregularities. Following that, the scales were tested for reliability using Cronbach's alpha and a Principal Component Analysis. Moreover, a Chi-Square Test of Independence was conducted for all three experimental manipulations to test whether the experimental manipulations were successful.

After that, hypotheses 1, 3 and 4 were tested through an independent samples t-test to determine whether there were statistically significant differences between the attitude and purchase intention mean scores of participants who saw a different motive, frame or endorser in the advertisements presented to them. To determine the effect size, eta squared was calculated according to the formula provided by Pallant (2020, pp. 254–255) and to interpret the effect size, this study relied on the recommendations by Cohen (1988, pp. 284–287). For hypothesis 4 an additional analysis of covariance (ANCOVA) was conducted to test the effect of source expertise as a control variable.

Next, hypothesis 2, which predicted a moderation effect of people's meat consumption on the relationship between the motives for eating PBMA and purchase intention, was analysed by using Hayes (2022) SPSS PROCESS macro plug-in (Version 4.2.). Although there are other tools to test moderation and mediation effects, Hayes (2018, p. 23) explained that PROCESS integrates the functions of previous tools that specialised in one task only. On

top, the robust bootstrapping method employed allows researchers to evaluate the direct and indirect effects of variable predictors, mediators, and moderators within a 95% confidence interval (Hayes, 2018, pp. 97–98).

Hypothesis 5a/b/c was tested also using Hayes' (2022) SPSS PROCESS macro plug-in which assists the researcher in conducting mediation analyses by performing the necessary ordinary least square (OLS) regression analyses and on top, delivers a calculation of the indirect effect of the mediator on the dependent variable (Hayes, 2018, pp. 82–86). The PROCESS macro calculates a 95% bootstrap confidence interval for the mediation effect based on 5,000 bootstrap samples, which allows the researcher to draw reliable inferences about the indirect effect. According to Hayes (2018, pp. 97–98), bootstrapping is advantageous to use since, compared to other methods such as the Sobel test, it does not necessarily need a normal distribution. For the mediation analysis, this study adopted the approach by Baron and Kenney (1986, pp. 1176–1177), who proposed four conditions that need to be met for a relationship to qualify as a mediation (see Figure 3.1):

- a. The independent variable must have a significant effect on the dependent variable (path c),
- b. The independent variable must have a significant effect on the mediator (path a)
- c. The mediator must have a significant effect on the dependent variable (path b),
- d. The relationship between the independent and dependent variable is not significant anymore when paths a and b are controlled for (path c')

The effect of subjective norms on purchase intention, predicted in hypothesis 6, was tested using a regression analysis. Finally, hypotheses 7 and 8, which anticipated an interaction effect between the motive for eating PBMA and framing and the motive and endorser used on purchase intention, were tested employing an in-between-subject two-way analysis of variance (ANOVA).

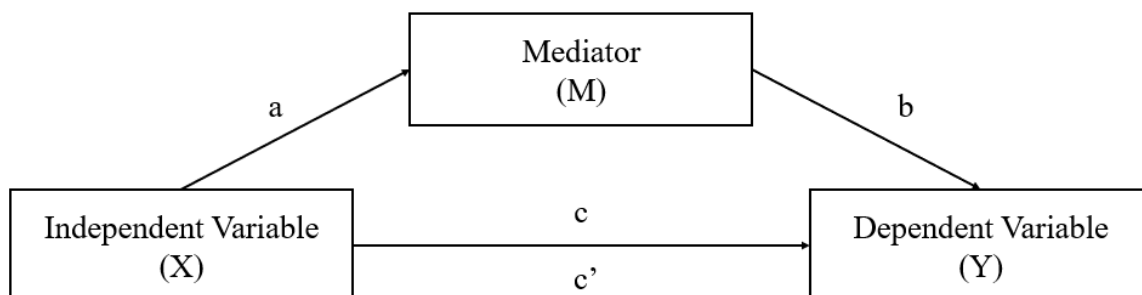


Figure 3.1. The Simple Mediation Model, adapted from *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-based Approach* (p. 83), by A. F. Hayes, 2018, The Guilford Press.

3.8. Validity, Reliability and Ethics

Whilst it is impossible to achieve perfect validity and reliability, this study has taken measures to increase validity and reliability to enhance the integrity and trustworthiness of its findings. Validity refers to whether the research tool used measures what it is employed to measure (Bryman, 2016, p. 158; Matthews & Ross, 2010, p. 216). It is often differentiated between internal validity, which means that only the independent variable and no other factors affect the dependent variable, and external validity, which means the generalisability of the experimental findings (Neuman, 2008, pp. 298–299, 306). According to Neuman (2008, p. 308), (laboratory) experiments often possess high internal validity, whereas external validity is low. For external validity, it must be acknowledged that the artificial design of an experiment that aims at isolating other variables within controlled settings, is not always applicable to real life. Yet, as this experiment took place online and participants could fill in the questionnaire from within their natural environment, external validity is enhanced compared to lab-only experiments. To enhance internal validity, a pilot test of all the experimental conditions and the final experiment was conducted to assess whether all manipulations were understood correctly. Moreover, several control variables have been included in the experimental design to account for possible confounding variables. Likewise, at the end of the experiment, three manipulation checks were conducted to check whether participants correctly recognised the experimental manipulations they were exposed to. In other words, the manipulation checks made sure that the effect that was measured was also what was supposed to be measured. Besides that, this study made use of multi-item scales that have been validated within previous research to measure the essential variables. Using multi-item scales obtains triangulation since it accounts for depicting multiple dimensions of the concepts studied. Reliability deals with the extent to which results and measures are consistent (Bryman, 2016, p. 156). To account for high reliability, a reliability analysis (Cronbach's alpha) was conducted for each used scale. As can be seen above, the Cronbach's alpha scores were all larger than .80, indicating high reliability.

Finally, for gathering the empirical data research ethics regarding participants' voluntary participation and privacy have been complied with. In essence, this means that participants were informed about the nature of the study and asked for informed consent for their participation which they could revoke at any time. Likewise, their data was anonymised, meaning that additional data that is automatically recorded by Qualtrics (e.g., IP-address, location) were deleted during data cleaning and also participants' Prolific IDs were removed from the sample to guarantee anonymity after they were paid.

4. Results

4.1. Results of independent samples t-tests (H1, H3, H4)

The effects of the three communication strategy variables (motives, framing and endorser type) were each tested with an independent samples t-test. One requirement to conduct an independent samples t-test is a normal distribution of variables (Pallant, 2020, p. 214). The histograms of both consumer attitudes and purchase intention were slightly skewed to the left, meaning that they were not normally distributed. Yet, due to the large sample size of $N = 312$, the violation of this assumption was not anticipated to cause any major problems.

4.1.1. Motives for purchasing PBMA (H1)

An independent t-test was conducted to test the effect of the communicated motive for eating PBMA (health/environment) on consumer attitudes (H1a) towards and purchase intention (H1b) of a PBMA product. It was hypothesised that health motives have a stronger positive effect on attitudes and purchase intention, compared to environmental motives. For attitudes, a non-significant Levene's test $F(1, 310) = 1.14, p = .287$ revealed that equal variances could be assumed. The t-test showed that there was not a significant difference in attitudes between communicating health motives ($M = 4.74, SD = 1.48$) or environmental motives ($M = 4.60, SD = 1.60$), $t(310) = .77, p = .440$. As a consequence, the difference in means was rather small $M_{difference} = .13, 95\% CI [-.20, .48]$ and the effect size of $\eta^2 = .01$ was also small. **Hence, H1a was rejected.** Also for purchase intention as an outcome variable, a non-significant Levene's test $F(1, 310) = 3.38, p = .067$ showed that equal variances could be assumed. The t-test indicated that there was no significant difference in purchase intention between health motives ($M = 4.70, SD = 1.61$) and environmental motives ($M = 4.42, SD = 1.76$), $t(310) = 1.49, p = .136$. As a result, the difference in means was rather small $M_{difference} = .28, 95\% CI [-.90, .66]$ and the effect size of $\eta^2 = .01$ was also small. **Thus, H1b was rejected.**

4.1.2. Framing (H3)

To test the effect of message framing (gain/loss) on consumer attitudes towards (H3a) and purchase intention (H3b) of a PBMA product, another independent t-test was conducted. It was hypothesised that gain frames have a stronger positive effect on consumer attitudes and purchase intention, compared to loss frames. For attitudes, a non-significant Levene's test $F(1, 310) = .41, p = .524$ revealed that equal variances could be assumed. The t-test showed that there was not a significant difference in attitudes between gain frames ($M = 4.76, SD = 1.52$) or loss frames ($M = 4.58, SD = 1.56$), $t(310) = 1.02, p = .308$. Accordingly, the difference in

means was rather small $M_{difference} = .18$, 95% $CI [-.16, .52]$ and the effect size of $\eta^2 = .00$ was marginal. **Accordingly, H3a was rejected.** Likewise, for purchase intention a non-significant Levene's test $F(1, 310) = .17$, $p = .685$ showed that equal variances could be assumed. The t-test showed that there was no significant difference in purchase intention between gain frames ($M = 4.72$, $SD = 1.68$) and loss frames ($M = 4.41$, $SD = 1.68$), $t(310) = 1.64$, $p = .102$. As a result, the difference in means was rather small $M_{difference} = .31$, 95% $CI [-.06, .69]$ and the effect size of $\eta^2 = .01$ was also small. **Hence, H3b was also rejected.**

4.1.3. Endorser type (H4)

An independent t-test was also conducted to test the effect of the type of endorser in the advertisement (expert/influencer) on consumer attitudes towards (H4a) and purchase intention (H4b) of PBMA. It was hypothesised that an expert has a stronger positive effect on attitudes and purchase intention, compared to an influencer. For attitudes, a non-significant Levene's test $F(1, 310) = 2.37$, $p = .125$ revealed that equal variances could be assumed. The t-test showed that there was not a significant difference in attitudes between using an expert ($M = 4.57$, $SD = 1.61$) or an influencer as an endorser ($M = 4.77$, $SD = 1.46$), $t(310) = -1.17$, $p = .242$. The difference in means was rather small $M_{difference} = -.20$, 95% $CI [-.55, .14]$ and the effect size of $\eta^2 = .00$ was marginal. **Thus, H4a was rejected.** For purchase intention, a non-significant Levene's test $F(1, 310) = .38$, $p = .537$ showed that equal variances could be assumed. The t-test showed that there was no significant difference in purchase intention between experts ($M = 4.43$, $SD = 1.71$) and influencers ($M = 4.69$, $SD = 1.65$), $t(310) = -1.38$, $p = .170$. As a result, the difference in means was rather small $M_{difference} = -.26$, 95% $CI [-.64, .11]$ and the effect size of $\eta^2 = .01$ was also small. **Therefore, H4b was also rejected.**

4.1.4. Additional Analyses for H4

To account for the possible effect of perceived source expertise, it was decided to conduct two one-way between-group analyses of covariance (ANCOVA) to compare the effectiveness of both endorsers. The independent variable was the different endorsers, and the dependent variables were again a) attitudes and b) purchase intentions, but this time source expertise was entered as a covariate in both models. With attitudes as the dependent variable, controlling for source expertise led to a significant difference in attitudes between the endorser type conditions, $F(1, 309) = 7.89$, $p = .005$, partial $\eta^2 = .03$. Moreover, there was a significant relationship between the source expertise scores and attitudes ($p < .001$). Likewise, for purchase intention, when source expertise was controlled for, there was a significant

difference in purchase intention between the endorser type conditions, $F(1, 309) = 8.48$, $p = .004$, partial $\eta^2 = .03$. Moreover, there was a significant relationship between the source expertise scores and purchase intention ($p < .001$). An overview of the results can be found in Table 4.1.

Table 4.1. Attitudes and Purchase Intentions before and after controlling for source expertise

	Consumer Outcomes			
	Attitudes		Purchase Intention	
	<i>M</i> (<i>SD</i>)	<i>M</i> _{adjusted} (<i>SE</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> _{adjusted} (<i>SE</i>)
Expert ($n = 158$)	4.57 (1.61)	4.43 (.19)	4.43 (1.71)	4.29 (.13)
Influencer ($n = 154$)	4.77 (1.46)	4.91 (.12)	4.69 (1.65)	4.84 (.13)

4.2. Results of the Moderation Analysis (H2)

For hypothesis 2 it was hypothesised that people's average meat consumption moderates the relationship between the expressed motives and purchase intention of PBMA. The hypothesis stated that consumers who eat more meat are more likely to be persuaded by health-related stimuli, whereas for consumers eating less or no meat, this would not hold. The hypothesis was tested using Hayes (2018, pp. 238–239, 2022) PROCESS model 1. The independent variable, motives for purchasing PBMA, was dummy coded (1 = health, 0 = environment). Meat consumption was entered as a moderator and purchase intention as the dependent variable. The overall model was found to be significant, $F(3, 308) = 21.42$, $p < .001$, $R^2 = .17$ and explained 17% of the variance in purchase intention. When testing the different effects of each variable there was no significant main effect found between motives and purchase intention, $b = .34$, $p = .052$, 95% *CI* [.00, .68]. Yet, the analysis did yield a significant main effect between people's meat consumption and purchase intention, $b = -.82$, $p < .001$, 95% *CI* [-1.05, -.59]. Accordingly, for each point increase in people's meat consumption, purchase intention decreased by .82. Finally, a significant interaction effect was found on purchase intention perceptions between the motives for buying PBMA and average meat consumption, $b = .36$, $p = .042$. For consumers with a low level of meat consumption (-1SD), there was no significant difference in purchase intentions between the health and environmental motive conditions, $p = .937$. However, for high-level meat consumers (+1SD), there was a significant difference in purchase intentions, $b = .70$, $p = .005$, whereby purchase

intentions were higher in the health than in the environmental condition (see Figure 4.1).

Accordingly, **H2 was accepted.**

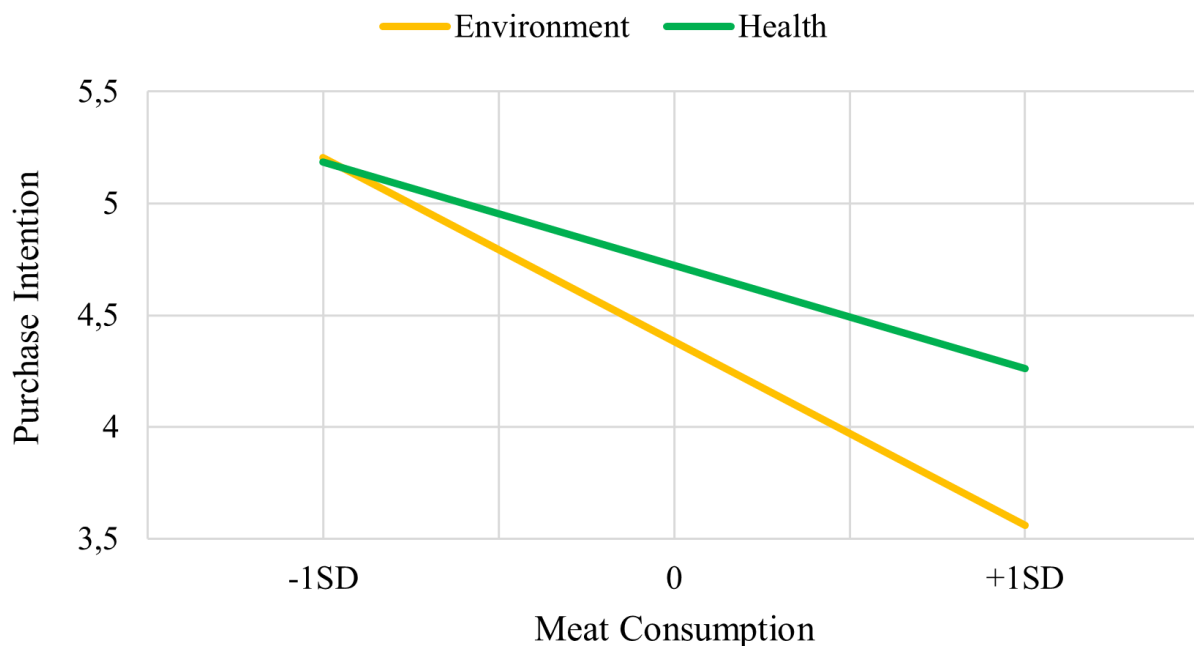


Figure 4.1. Visualisation of the Moderation Effect of Meat Consumption

4.3. Results of the Mediation Analysis (H5)

For hypothesis 5a/b/c it was hypothesised that consumer attitude mediates the relationships between the three communication strategies (motives, framing and endorser type) and purchase intention. The hypothesis was tested using Hayes' (2018, pp. 92–93, 2022) PROCESS model 4, which uses OLS regressions to test the mediation effect and follows the approach by Baron and Kenny (1986, pp. 1176–1177) for simple mediation. Since all three independent variables were dichotomous, they had to be dummy-coded. Before the analysis, all regressions were controlled for outliers, whereby a few outliers with standardised residuals over 3.3 could be detected. Yet, due to the large sample size ($N = 312$), they did not need to be removed from the sample. In a second step, the assumptions of regression analysis were controlled for, meaning that all regressions were tested for independence of residuals, linearity, normality, and homoscedasticity through an examination of the regressions' normality plots and residual scatterplots. Likewise, also the independent variables were controlled for multicollinearity. As no violations of assumption could be detected, the regression models were deemed suitable for further analyses.

4.3.1. *Motives as independent variable and attitude as mediator*

To test hypothesis 5a, Hayes (2022) PROCESS model 4 was employed, whereby motive was entered as independent variable (1 = *health* vs. 0 = *environment*), attitude as mediator, and purchase intention as dependent variable. To control for the first criterion of a mediation effect (path c), a regression analysis was performed with motive as independent and purchase intention as dependent variable. The model was not significant, $F(1, 310) = 2.23$, $p = .136$, $R^2 = .01$, which means that different motives for eating PBMA did not predict purchase intention of PBMA. As this violates the first criterion of Baron and Kenny, this means a complete mediation effect did not take place. Yet, to provide a complete picture, it was decided to test for the other criteria of the mediation approach to uncover other possible effects and to check for an indirect mediation. To test the second mediation criterion (path a), motives were entered as independent variable and attitude as dependent variable. Again, the model was not significant, $F(1, 310) = .60$, $p = .440$, $R^2 = .00$. Finally, motive and attitudes were both entered as independent variables and purchase intention was entered as dependent variable. The resulting model was found to be significant, $F(2, 309) = 238.95$, $p < .001$, $R^2 = .61$, which shows that the model had good predictive power since it explained 61% of the variance in purchase intention. When motives were controlled for, attitudes had a significant effect on purchase intentions (path b), $b = .85$, $t = 21.73$, $p < .001$, 95% CI [.77, .93]. Accordingly, for each point increase in attitudes, purchase intention increased by .85. Yet, when attitudes were controlled for, motives did not have a significant effect on purchase intention (path c'), $b = .17$, $t = 1.41$, $p = .158$, 95% CI [-.67, .41]. Accordingly, as there was no significant effect of motives on neither purchase intention nor attitudes, a mediation did not take place. On top, there was also no significant indirect effect of motives on purchase intention via attitudes, $Mediation_{attitudes} = .11$, 95% CI [-.18, .40]. **Thus, H5a was rejected.**

4.3.2. *Framing as independent variable, attitudes as mediator*

To test hypothesis 5b, framing was entered as independent variable (1 = *loss* vs. 0 = *gain*), attitude as a mediator, and purchase intention as dependent variable into Hayes (2022) PROCESS model 4. To test the first criterion of a mediation effect (path c), a regression analysis was performed with framing as independent and purchase intention as dependent variable. The model was not significant, $F(1, 310) = 2.69$, $p = .102$, $R^2 = .01$, which means that gain-loss framing was not suitable for predicting purchase intention of PBMA. This already means that a complete mediation effect did not take place. However, it was again decided to test for the other criteria of the mediation approach. To test the second mediation

criterion (path a), framing was entered as independent variable and attitude as dependent variable. Again, the model was not significant, $F(1, 310) = 1.04, p = .308, R^2 = .00$. Finally, framing and attitudes were both entered as independent variables and purchase intention was entered as dependent variable. The resulting model was found to be significant, $F(2, 309) = 238.68, p < .001, R^2 = .61$, meaning that the model had good predictive power since it explained 61% of the variance in purchase intention. When framing was controlled for, attitudes had a significant effect on purchase intentions (path b), $b = .85, t = 21.69, p < .001, 95\% CI [.77, .93]$. Accordingly, for each point increase in attitudes, purchase intention increased by .85. Yet, when attitudes were controlled for, framing did not have a significant effect on purchase intention (path c'), $b = -.16, t = -1.34, p = .182, 95\% CI [-.40, .08]$. Thus, a mediation did not take place, since there was no significant effect observed for framing on neither purchase intention nor attitudes. There was also no significant indirect effect of framing on purchase intention via attitudes, $Mediation_{attitudes} = -.15, 95\% CI [-.44, .14]$. **Therefore, H5b was rejected.**

4.3.3. Endorser type as independent variable, attitude as mediator

To test hypothesis 5c, endorser type was entered as independent variable (1 = *influencer* vs. 0 = *expert*), attitude as a mediator, and purchase intention as dependent variable into Hayes (2022) PROCESS model 4. To control for the first criterion of a mediation effect (path c), a regression analysis was conducted with endorser type as independent and purchase intention as dependent variable. The model was not significant, $F(1, 310) = 1.89, p = .170, R^2 = .01$, which means that endorser type was not suitable for predicting purchase intention of PBMA. As this violates the criteria of Baron and Kenny, a complete mediation effect did not take place. Nevertheless, the other criteria of the mediation approach were still tested. To test the second criterion of a mediation effect (path a), endorser type was entered as independent variable and attitude as dependent variable. Again, the model was not significant, $F(1, 310) = 1.37, p = .242, R^2 = .00$. Finally, endorser type and attitudes were both entered as independent variables and purchase intention was entered as dependent variable. The resulting model was significant, $F(2, 309) = 237.10, p < .001, R^2 = .61$, which shows that the model had good predictive power since it explained 61% of the variance in purchase intention. When endorser type was controlled for, attitudes had a significant effect on purchase intentions (path b), $b = .85, t = 21.67, p < .001, 95\% CI [.77, .93]$. Accordingly, for each point increase in attitudes, purchase intention increased by .85. Yet, when attitudes were controlled for, endorser type did not have a significant effect on purchase intention (path c'), $b = .09, t = .73, p = .463, 95\% CI [-$

.15, .33]. Thus, a mediation did not take place, since there was no significant effect observed for endorser type on neither purchase intention nor attitudes. Likewise, there was also no significant indirect effect of endorser type on purchase intention via attitudes, $Mediation_{attitudes} = .17$, 95% $CI [-.12, .46]$. **Hence, H5c was rejected.**

4.4. Results of the Regression Analysis (H6)

A regression analysis was conducted with purchase intention as dependent variable and subjective norms as predictor. Before the analysis, the model was controlled for outliers, whereby only a few outliers with standardised residuals over 3.3 could be detected. Yet, due to the large sample size ($N = 312$), they did not need to be removed from the sample. Then, the assumptions of regression analysis (independence of residuals, linearity, normality, and homoscedasticity), were controlled for through an examination of the regressions' normality plots and residual scatterplots. The assumption of homoscedasticity was slightly violated in the model, but according to Tabachnik and Fidell (2013, p. 127), this does not make the analysis invalid but just weakens its explanatory power. The model was found to be significant, $F(1, 310) = 148.42$, $p < .001$, $R^2 = .32$. Subjective Norms were found to be a significant positive predictor of purchase intention ($\beta = .57$, $p < .001$), **supporting H6.**

4.5. Results of the Interaction Effects (H7, H8)

Hypothesis 7 and 8 speculated that the communicated motives moderate the relationship between both framing and the type of endorser respectively and purchase intention. For each interaction, a two-way between-groups ANOVA was conducted.

4.5.1. The Moderation Effect on Framing

Hypothesis 7 contemplated that when the health motive was used, gain frames would lead to higher purchase intention, while with an environmental motive, this would not be the case. A non-significant Levene's test $F(3, 308) = 1.15$, $p = .331$ showed that homogeneity of variances could be assumed, meaning it was suitable for further analysis (Pallant, 2020, p. 254). The ANOVA indicated that there was no significant interaction effect between motive and framing $F(1, 308) = .16$, $p = .692$, partial $\eta^2 = .00$. **Therefore, H7 was rejected.**

4.5.2. The Moderation Effect on Endorser Type

Hypothesis 8 suspected that when health motives were communicated, an expert would lead to higher purchase intention, while with an environmental motive, this would not

be the case. A non-significant Levene's test $F(3, 308) = 1.08, p = .357$ indicated that homogeneity of variances could be assumed, meaning it was suitable for further analysis (Pallant, 2020, p. 254). The ANOVA revealed that there was no significant interaction effect between motive and endorser, $F(1, 308) = .99, p = .321, \text{partial } \eta^2 = .00$. **Therefore, H8 was rejected.**

4.6. Robustness Check

To examine the robustness of the results, the analyses were repeated with a modified dataset, which excluded respondents who did not pass all the manipulation checks. The modified dataset had a sample size of $N_{\text{modified}} = 240$. Yet, the robustness check did not change the acceptance or rejection of the hypotheses, meaning that like in the original sample, H2 and H6 were accepted, whereas the other hypotheses were rejected. However, in the modified sample, H3b and H8 could have been accepted at a ten percent significance level. Table 4.2 provides an overview of all the hypotheses.

Table 4.2. Overview of hypotheses

Hypothesis	Original Analysis ($N=312$)	Robustness Check ($N=240$)
H1a	Rejected	Rejected
H1b	Rejected	Rejected
H2	Accepted	Accepted
H3a	Rejected	Rejected
H3b	Rejected	Rejected ¹
H4a	Rejected	Rejected
H4b	Rejected	Rejected
H5	Rejected	Rejected
H6	Accepted	Accepted
H7	Rejected	Rejected
H8	Rejected	Rejected ²

¹Note. H3b could have been accepted at the 10% level, Levene's $F(1, 238) = .69, p = .407, t(238) = 1.90, p = .058, \eta^2 = .01$

²Note. H8 could have been accepted at the 10% level, Levene's $F(3, 236) = 1.53, p = .209, F(1, 236) = 3.19, p = .075, \text{partial } \eta^2 = .01$.

5. Discussion

5.1. Theoretical Implications

The first hypothesis set stated that communicating the health motives for PBMA consumption has a stronger positive effect on consumer attitudes (H1a) and purchase intention (H1b) than communicating environmental motives. Yet, the results were not able to confirm this hypothesis and revealed that there was no significant difference in attitudes and purchase intention for either health or environmental motives. Thus, although Dijkstra and Rotelli (2022, p. 7) found health motives to be more effective than environmental motives in persuading consumers to reduce their meat consumption, this study could not support this finding for PBMA consumption. Nevertheless, albeit not significant, comparing the mean scores of both conditions revealed that people in the health condition had higher attitudes and purchase intentions than the people in the environmental condition. A potential reason why the difference was not significant is that many of the studies that successfully showed an effect of information provision, made use of multiple exposures to the information through text messages (Carfora et al., 2019, p. 5; Wolstenholme et al., 2020, p. 3), whereas this study relied on a single exposure of information to its participants. Hence, it may be that the participants' exposure to the information was not long enough to induce enough attitudinal or behavioural change. Another reason for the results of this study could be that some participants were not convinced by the health argument, as some PBMA are highly processed food products, which makes the health claim potentially dubious (Macdiarmid, 2022, p. 164). This is illustrated by Peschel et al. (2019, p. 154) who found that PBMA with low processing levels benefited from highlighting health benefits, whereas products that risked not being perceived as healthy by consumers due to high processing levels benefited more from highlighting sustainability aspects. Thus, negative perceptions about the healthiness of the advertised PBMA product may have influenced the results.

Next, the second hypothesis proposed that eating habits moderate the strength of the relationship between the expressed motive and the purchase intention of PBMA. More precisely, it was hypothesised that people who eat more meat are more likely to be persuaded by health-related stimuli, whereas for people who eat less or no meat, this is not the case. The findings of this study support this hypothesis, as it was shown that for people consuming more meat, purchase intention was significantly higher when they were assigned to the health condition, instead of the environmental condition. Conversely, for participants who indicated eating little or no meat, there was no significant difference in purchase intentions detected. This finding is consistent with previous research in the context of meat reduction, which

found that standard meat eaters and light meat reducers were more likely to mention, or be persuaded by, health arguments as a reason for eating less meat, whereas people who significantly reduced their meat consumption or did not eat meat at all tended to mention environmental motives, as well (De Backer & Hudders, 2014, pp. 650–652; de Boer et al., 2017, pp. 394–395; Lentz et al., 2018, pp. 235, 238; Penny et al., 2015, p. 313). Hence, this study illustrates that this finding also applies to PBMA promotion, where it can function as a catalyst to introduce meat eaters to more plant-based options in general (Messina et al., 2023, p. 399). Thus, since there was no difference between environmental and health motives for no and low meat consumers, but health motives were more effective for heavy meat consumers, who should be targeted primarily to encourage them to reduce their meat intake, health motives should be used to encourage them to buy more PBMA.

The next set of hypotheses focussed on the effect of gain-loss framing. More precisely, due to the enormous amount of literature that investigated the effectiveness of gain-loss framing in the health and general food but also in the meat reduction (Carfora, Di Massimo, et al., 2020, p. 35958; Carfora et al., 2021, p. 11) or plant-based food context (Carvalho et al., 2022, pp. 1–3), it was predicted that gain frames have a stronger positive effect on attitudes (H3a) and purchase intention (H3b), compared to a loss frame. The reason for that was that gain-frames have been proven to be more effective in promoting prevention behaviours (Rothman & Salovey, 1997, pp. 9–13), which a healthier and more sustainable diet can be classified since it reduces the risk of non-communicable diseases and environmental degradation. On top, loss frames have been found to induce higher levels of fear and anger in consumers, which inhibits systematic processing of the message (Carfora et al., 2021, p. 2) and can lead to reactance (Carvalho et al., 2022, p. 3; Reynolds-Tylus, 2019, p. 7). Surprisingly, this study was unable to provide support for this hypothesis as the difference in means of the gain and the loss condition, despite leaning in the hypothesised direction, was not significant. Dijkstra et al. (2011, p. 1042) provide an explanation of why eating plant-based products, despite being considered a prevention behaviour, did not have the desired effect on participants. The authors explained that in situations where gain frames should be more persuasive than loss frames, but such an effect does not hold, it is likely that the loss message was not strong enough to cause a defensive reaction in participants although the latter is the main reason why gain frames are more effective in promoting prevention behaviours. It is henceforth possible that within this study, the loss message was not strong enough to cause a defensive reaction because, besides heart disease, it did not mention serious diseases but rather intermediary outcomes of the latter (e.g., high cholesterol levels) and also

the environmental effects are rather abstract. On top, Dijkstra et al. (2011, p. 1046) note that gain-framed arguments aimed at changing unhealthy behaviours can often not strictly be differentiated from non-losses, which may contribute to making them less persuasive.

Hypotheses set four concerned the type of endorser used and speculated that an expert's endorsement had a stronger positive effect on attitudes (H4a) and purchase intention (H4b) than a plant-based influencer's endorsement. This hypothesis was not supported as there was no significant difference in neither attitudes nor purchase intention between the influencer or the expert endorser conditions. A reason why there was no significant difference in effects found between the two endorser types is that within this study, both endorsers' respective expertise presented in the advertisement was similar. Unlike a comparison between a regular celebrity and an expert, whereby experts are often perceived as more credible and knowledgeable and celebrities as more authentic, familiar and attractive (Dong, 2015, p. 479; Moulard et al., 2015, p. 183), a strict juxtaposition like this has not taken place in this study. Interestingly, however, it became visible that, albeit not significant, influencers had a slightly more positive effect on attitudes and purchase intention than experts, which is contrary to what was hypothesised in the first place. To further explore the relationship, perceived source expertise was entered as a control variable. The analysis revealed a significant difference in attitudes and purchase intention between influencer and expert endorsers when source expertise was adjusted for, whereby the influencer had a significantly stronger positive effect on attitudes and purchase intention. This finding reveals that attitudes and purchase intentions may be driven more by other factors, such as relatability or emotional affect, which have been commonly associated with influencer endorsers in advertising (Vrontis et al., 2021, p. 625), while source expertise is not that decisive. Yet, as these other factors were not assessed, this requires further research.

Building on Fishbein and Ajzen's (1975) TRA, the fifth set of hypotheses contemplated that consumer attitudes mediate the relationship between the type of motive (H5a), message framing (H5b) and endorser (H5c) respectively and purchase intention. However, within this study, a mediation effect did not occur, which is why neither of the sub-hypotheses could be supported. More precisely, a detailed inspection of the mediation models indicated that there was no significant effect of neither the motives or the type of framing or endorser used on either attitudes or purchase intention. Yet, this was not particularly surprising since it was already found that neither of the manipulated variables affected attitudes or purchase intention. Accordingly, even though all three communication tactics can be allocated to the field of persuasive communication, they were unable to induce attitudinal

change among the participants, which could be a consequence of the single intervention. In contrast, for example, Carfora et al. (2019, p. 6), who showed a successful mediation effect between motives for meat reduction and behavioural intention with attitudes as a mediator, relied on multiple exposures to the messages at different points in time. Nonetheless, as was also already confirmed in previous research (e.g., Baum et al., 2021, p. 9; Carfora et al., 2019, p. 6, 2021, p. 9), the results indicate that within all three manipulations, attitudes significantly predicted purchase intention. Accordingly, while the information provided was not able to significantly influence attitudes, the above finding still confirms that attitudes are a significant determinant of behavioural intention in the field of PBMA. Likewise, following the TRA, hypothesis 6 suspected that higher subjective norms, thus a supportive environment towards PBMA, had a positive effect on purchase intention. By that, this study follows previous studies that found a positive relationship in the context of PBMA promotion or meat reduction (Bakr et al., 2023, p. 430; Contini et al., 2020, p. 3; O. Wang & Scrimgeour, 2021, p. 8), which contributes to a consolidation of the finding that a supportive environment is an important driver of purchasing PBMA.

Finally, the last hypotheses set suggested an interaction effect between the motive for buying PBMA and message framing (H7), as well as between the motive and endorser type (H8). It was hypothesised that in the health condition, gain framing and the use of experts would lead to higher attitudes and purchase intentions, while it was expected that this effect would not hold in the environmental condition. Yet, the results indicate that there is no such interaction effect. Considering that neither the motive, framing nor endorser types used had a direct effect on purchase intention, this finding does not come as a surprise. For framing, it means that there was possibly no suspected difference in relevance between health and environmental motives for consumers, whereas, for endorser type, this means that health arguments were not perceived as significantly more threatening than their environmental counterparts.

5.2. Managerial Implications

The findings of this study showed that effectively influencing consumers' attitudes and purchase intentions of PBMA depends on the communication strategy used. However, more importantly, the results of this study indicate that the effectiveness of a communication strategy in the realm of PBMA also depends on the audience that is targeted by the message, meaning that for marketers it is important to note that their respective effects sometimes differ depending on the consumer group receiving the message. In essence, this study was able to

show that the effectiveness of different motives for PBMA consumption differs according to the amount of meat people regularly eat. While for meat abstainers or low-amount meat-eaters, no difference in effects for motives could be detected, it was proven that heavier meat eaters were better convinced to purchase PBMA when health-related, rather than environmental, effects of (plant-based) meat consumption were emphasised. Accordingly, although at first sight no significant difference in effects between health and environmental motives was detected, marketers are best advised to highlight the health aspects that go in hand with PBMA consumption since these are more persuasive for people who eat a lot of meat. As it is desirable that especially high-meat consumers reduce their meat consumption and PBMA has been identified as helpful in transitioning to a more plant-based diet (Messina et al., 2023, p. 399), it is hence effective to emphasise health-related arguments. This recommendation is amplified by the fact that there was no significant difference in the motives' effectiveness among low-meat consumers or abstainers, meaning that refraining from using environmental arguments is not harmful to reaching this consumer group.

Furthermore, this study also revealed interesting points to consider regarding the choice of endorsers for promoting PBMA. In essence, it was shown that source expertise is not very decisive for attitudes and purchase intention, but rather that other source factors should be considered in choosing the right endorser for promoting PBMA. Specifically, as controlling for source expertise revealed that influencers have a significantly stronger positive effect on consumer attitudes and purchase intentions than regular experts, this illustrates that source characteristics associated with influencers, such as relatedness or the formation of a parasocial relationship (Vrontis et al., 2021, p. 625), may be more influential in affecting consumer attitudes and purchase intention. Yet, to thoroughly determine the influence of these characteristics in the PBMA context, further research needs to be conducted. Generally, the findings show that influencers familiar with a plant-based diet (e.g., a plant-based food blogger like in this study) are influential sources when it comes to driving consumer outcomes, making influencer marketing a promising tool for advancing the consumption of plant-based products.

6. Conclusion

6.1. Summary

The current global food system has adverse consequences both for planetary and human health (WHO & FAO, 2019, p. 21), whereby especially meat consumption has been considered detrimental for both. As it is not easy to motivate consumers to reduce their meat consumption (Rosenfeld et al., 2022, p. 1), PBMA have been identified as potential catalysts for inducing a dietary shift among consumers because they mimic the taste and texture of meat and also work well in introducing consumers to other plant-based foods (Macdiarmid, 2022, p. 163; Machovina et al., 2015, p. 427; Messina et al., 2023, p. 399). Yet, consumers are still hesitant to purchase PBMA (He et al., 2020, pp. 2650–2651), which is why this study sought to research how PBMA consumption can be further enhanced. Due to the previous success of persuasive communication in inducing attitudinal and behavioural change among consumers in the context of meat reduction (Dijkstra & Rotelli, 2022, p. 2), whereby especially information provision on the consequences or benefits of (not) eating meat has been proven successful (Carfora et al., 2019), it was decided to use information provision as a method to increase PBMA consumption. Since the influence of information provision may be contingent on the presence of additional factors (Harguess et al., 2020, p. 4), it was decided to also take the effect of message framing and the type of endorser into account. Moreover, as the effectiveness of expressed motives for meat reduction has proven to be dependent on a person's average meat consumption, this study explored whether this also applies to PBMA promotion. Accordingly, this study sought to examine different persuasive strategies aimed at promoting the consumption of PBMA to answer the following research questions: *To what extent do expressed motives for eating PBMA (health vs. environment), message framing (gain vs. loss) and type of endorser (expert vs. influencer) affect consumers' attitudes and purchase intention to buy PBMA? How is the effect of motives on purchase intention of PBMA moderated by people's average meat consumption?*

Therefore, building upon previous findings in the context of meat reduction, an online experiment with eight experimental conditions was conducted, whereby the motive for choosing PBMA, the type of message framing and the type of endorser were manipulated. The findings of this study suggest that persuasive communication tactics can have an impact on consumer attitudes and purchase intentions of PBMA. It must be noted, however, that this effect is contingent on the communication strategy used, and more importantly, on the audience targeted by the communication. In essence, it was revealed that while there was no significant difference in effects for either environmental or health-related motives for the

overall sample, for people with a high level of meat consumption, emphasising the health effects of PBMA resulted in more positive purchase intention than environmental effects. This result supports the notion already indicated by previous research that both health and environmental motives may be effective in encouraging the consumption of PBMA but was able to add that health-related effects of a plant-based diet are more effective in motivating high-meat consumers to purchase PBMA. Moreover, the results of this study also provide insights into the realm of using different product endorsers for the promotion of PBMA. Essentially, it was revealed that perceived source expertise is not a decisive criterion for influencing consumer attitudes and purchase intention, but that other source characteristics seem to be indicative of the success of an endorser. In particular, as influencers had a significantly more positive effect on consumer attitudes and purchase intentions compared to experts when source expertise was controlled for, it is possible that source characteristics associated with influencers, such as relatedness or wishful identification been decisive. On the other hand, message framing was unable to produce a significant effect on either of the consumer outcomes. Likewise, no significant interaction effect was found between the persuasive communication strategies, meaning that no evidence for an overarching best-practice strategy was found.

6.2. Limitations

Like any other study, also this study is not without limitations. First of all, both the brand and the endorsers presented in the experimental scenarios of this study were fictitious, which can have an impact on the generalisability of the results. In particular, although the use of fictitious brands or endorsers allows researchers to control for potential biases that participants could have regarding the person or organisation (Y. Kim, 2014, p. 839), it must be acknowledged that this has an effect on external validity, which makes the findings less generalisable. This is specifically pertinent to the study of influencers. Essentially, Folkvord et al. (2020, p. 5) compared the effects of using real or fictitious influencers in advertising and showed that real influencers were more likely to induce a positive attitude and purchase intention among consumers compared to the fictitious influencer because the former were able to establish a parasocial relationship with consumers. As this effect cannot be properly examined with the use of fictitious influencers, although it is an important dimension of the effectiveness of influencer marketing, makes it a limitation of this study.

Secondly, due to the scope of this study, not consumers' actual behaviour but rather their behavioural intention was measured. Although past research has found behavioural

intention and actual behaviour to be correlated, it must be acknowledged that oftentimes other factors not accounted for in this study may affect purchasing behaviour, for example, pricing or lack of choices (Hassan et al., 2016, p. 233; Vermeir & Verbeke, 2006, pp. 187–188). Relatedly, as participants were only exposed once to the experimental intervention, it is unclear whether this has any long-term effects on participants' attitudes, behavioural intentions and actual behaviour (Carfora et al., 2022, p. 4819).

Finally, this study relied on the online crowdsourcing platform Prolific to gather its data. While data collection through platforms like Prolific results in a more representative sample than other convenience sampling strategies, it must be considered that although a great variety of nationalities are represented in the sample, the dataset is slightly skewed towards South African participants. This prevalence of South African participants may have an impact on the generalisability of the results. Similarly, it must also be noted that while the sample size of $N = 312$ is sufficient for an experiment of this scope, a bigger sample would have further increased the validity and reliability of the results.

6.3. Directions for Future Research

Research on the promotion of PBMA is gaining more and more traction in academia. This study's findings on the effectiveness of different persuasive communication strategies to promote PBMA consumption provide several opportunities for future research. Firstly, this study was able to show that, when perceived source expertise is controlled for, influencers are more effective than experts in increasing consumer attitudes and purchase intention of PBMA, which points to the influence of other source characteristics, most likely associated with influencers. Accordingly, future research should investigate what exactly drives the success of influencers in PBMA advertising. For example, a new study by Leite et al. (2024, pp. 8–9) investigated the effects of some influencer characteristics in the context of cultivated meat, whereby they found that micro-influencers can be more effective than mega-influencers. In sum, more research is necessary to examine which influencer characteristics are decisive in leveraging support for PBMA consumption. Relatedly, future research should also consider using real influencers in their studies, since it allows them to test characteristics, such as a parasocial relationship that is established with their audiences (Hassan et al., 2016, p. 233).

Secondly, this study only compared environmental and health motives for purchasing PBMA, as it was suspected by other studies that animal welfare motives may lead to cognitive dissonance among the participants (Carfora et al., 2022, p. 4802; Rothgerber & Rosenfeld, 2021, p. 9). Nevertheless, as past research has also found animal welfare to be an important

driver mentioned in the context of adopting a plant-based diet or reducing one's meat consumption, further research should compare its effectiveness to both health and environmental motives, and in a second step also investigate its effectiveness within different consumer groups. Next to consumers' average meat consumption, other sociodemographic factors should be considered to further refine strategies aimed at convincing consumers to choose a plant-based alternative over meat.

Thirdly, further research should continue to examine the role of message framing in the context of PBMA. Although this study's results were insignificant, past research in meat reduction and other food-related contexts, showed that gain-loss framing was effective in stimulating healthier food choices. As was argued above, it is likely that in this study the contrast between the gain and loss conditions may not have been serious enough to cause diverging reactions among the participants (Dijkstra et al., 2011, p. 1046). Therefore, it is recommended that future research focuses on presenting gain-framed arguments as real gains, thus strictly differentiating them from non-losses.

Fourthly, due to the scope of this study, participants were only exposed to the advertisements once and their attitudes and purchase intentions were recorded right after. This limits participants' ability to process the message over a longer time frame and it is thus unclear what, if any, the long-term effects of advertisements, such as shown in this study are. Henceforth, further research should follow, for instance, Carfora et al. (2019, p. 3) or Wolstenholme et al. (2020, p. 5) who conducted longitudinal research and measured participants' attitudes and intentions at multiple points during the research.

Finally, qualitative research should also complement the results of this study. While past qualitative research has mainly focused on reasons why people eat or do not eat meat or why they adhere to a plant-based diet, it would be interesting to conduct a focus group or interview-based research to determine other potential factors that drive or inhibit the consumption of PBMA among different consumer groups.

7. References

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8. Appendices

8.1. Appendix A: Stimulus Material



Plantasia.
THE NEW WAY
OF MEATING



Did you know? Choosing regular meat over plant-based meat increases your carbon footprint up to an alarming 60%!

Eating regular meat contributes enormously to climate change. Opt for Plantasia and take a significant step towards a greener, sustainable future!

@GreenFoodista
Lauren Phillips posts easy & affordable plant-based recipes on her Instagram Channel and Blog.

Appendix A1: Environment - Loss Frame - Influencer



Plantasia.
THE NEW WAY
OF MEATING



Did you know? Choosing regular meat over plant-based meat increases your carbon footprint up to an alarming 60%!

Eating regular meat contributes enormously to climate change. Opt for Plantasia and take a significant step towards a greener, sustainable future!

Dr. Lauren Phillips
Laura obtained a PhD in Geography and focuses on the impact of human nutrition on our climate.

Appendix A2: Environment - Loss Frame - Expert





Did you know? By opting for plant-based meat over regular meat, you can reduce your carbon footprint by up to an impressive 60%!

Choosing plant-based meat contributes to combating climate change, opt for Plantasia and take a significant step towards a greener, sustainable future!

@GreenFoodista
Lauren Phillips posts easy & affordable plant-based recipes on her Instagram Channel and Blog.

Appendix A3: Environment - Gain Frame - Influencer







Did you know? By opting for plant-based meat over regular meat, you can reduce your carbon footprint by up to an impressive 60%!

Choosing plant-based meat contributes to combating climate change, opt for Plantasia and take a significant step towards a greener, sustainable future!

Dr. Lauren Phillips
Laura obtained a PhD in Geography and focuses on the impact of human nutrition on our climate.

Appendix A4: Environment - Gain Frame - Expert






Did you know? Eating regular meat elevates your cholesterol levels, and blood pressure, and increases the risk of heart disease up to 20%, compared to plant-based meat.

Don't compromise your health – make the switch to a nutritional powerhouse with Plantasia!

@GreenFoodista
Lauren Phillips posts easy & affordable plant-based recipes on her Instagram Channel and Blog.

Appendix A5: Health - Loss Frame - Influencer



Did you know? Eating regular meat elevates your cholesterol levels, and blood pressure, and increases the risk of heart disease up to 20%, compared to plant-based meat.

Don't compromise your health – make the switch to a nutritional powerhouse with Plantasia!

Dr. Lauren Phillips
Lauren works as a doctor and dietician and focuses on the impact of plant-based diets on our health.

Appendix A6: Health - Loss Frame - Expert

 **Plantasia.**
THE NEW WAY
OF MEATING




Did you know? Eating plant-based meat reduces your cholesterol levels blood pressure, and risk for heart disease up to 20%, compared to regular meat.

Embrace your nutritional powerhouse with Plantasia!

@GreenFoodista
Lauren Phillips posts easy & affordable plant-based recipes on her Instagram Channel and Blog.

Appendix A7: Health - Gain Frame - Influencer

 **Plantasia.**
THE NEW WAY
OF MEATING




Did you know? Eating plant-based meat reduces your cholesterol levels blood pressure, and risk for heart disease up to 20%, compared to regular meat.

Embrace your nutritional powerhouse with Plantasia!

Dr. Lauren Phillips
Lauren works as a doctor and dietician and focuses on the impact of plant-based diets on our health.

Appendix A8: Health - Gain Frame - Expert

8.2. Appendix B: Experimental Flow

Thank you very much for participating in this research.

As part of my master's thesis in Media & Business at Erasmus University Rotterdam, Department of Media and Communication, I am conducting research on the marketing of plant-based meat alternatives.

During the survey, you will be shown an advertisement about a plant-based meat alternative called "Plantasia". After that, you will be asked a few questions regarding your opinions about the advertisement.

The survey will take approximately 5 minutes to fill in. Please read the instructions carefully and answer each question honestly. There are no right or wrong answers.

Be aware that your participation is completely voluntary, and you are free to terminate your participation at any time. The data retrieved will be treated anonymously and your personal information will be kept strictly confidential. The data will be solely used for the purpose of this research and will not be shared with other third parties. Your privacy will be protected to the maximum extent. No personally identifiable information will be reported in any research product.

If you have any questions regarding the survey, you can contact me via the following e-mail address: 684074fg@eur.nl

Thank you for your participation!
Friederike Glauner

To proceed with the questionnaire, please click on the text box below. With this you indicate that you are at least 18 years of age, you have read and understood this consent form, and you voluntarily agree that you will participate in this study.

I agree.

I do not agree.

Appendix B1: Introduction and Consent Form

Please enter your unique Prolific ID.

Appendix B2: Question asking about participants' Prolific ID

Before you will see the advertisement, please answer this question about your current regular meat consumption.

In this survey, the term 'regular meat' encompasses a variety of animal-derived protein sources commonly consumed in meals. This includes but is not limited to beef, pork, poultry (such as chicken and turkey), lamb, fish, and seafood. It also encompasses processed meats like sausages, bacon, deli meats, and meat-based products such as burgers and meatballs. Please do not include plant-based meat alternatives or substitutes in your response to this question.

On average, how often do you consume meat or products that include meat?

Never

Rarely

Several times a week

Daily

Several times a day

Appendix B3: Definition of Meat and Question about Meat Consumption

The focus of this study are plant-based meat alternatives. To get to a common ground, you can find a short definition below:

Plant-based meat alternatives are food products designed to mimic the taste, texture, and appearance of traditional animal-derived meats, but they are made entirely from plant-based ingredients. These alternatives typically utilize ingredients such as soy protein, pea protein, wheat gluten, mushrooms, or other plant-based sources to replicate the mouthfeel and nutritional profile of meat. Examples include plant-based burgers, sausages, chicken nuggets, and meatballs.

Have you ever heard of plant-based meat alternatives?

No

Yes

Have you previously bought plant-based meat alternatives?

No

Yes

Appendix B4: Definition of PBMA and Questions about Awareness and Previous Purchase of PBMA

Imagine you come across the following advertisement for a plant-based meat alternative by the food company "Plantasia". Please have a close look at the advertisement below and then answer some questions about it on the upcoming pages.

Note: You won't be able to see the advertisement again after you click the arrow to continue to the questions section. So make sure you have a good look! You will be able to click on the arrow after 15 seconds.

Appendix B5: Introduction for the Advertisement on PBMA

For me, buying plant-based meat alternatives is

bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant
foolish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	wise
unfavorable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	favorable
unenjoyable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	enjoyable
negative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	positive

Appendix B6: Measurement of Consumer Attitudes

In the future, I intend to buy more plant-based meat alternatives.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

In the future, I intend to include plant-based meat alternatives in my diet.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

In the future, I intend to try eating more plant-based meat alternatives.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

Appendix B7: Measurement of Purchase Intention

Most people who are important to me would want me to eat more plant-based meat, instead of regular meat.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

Most people who are important to me think I should eat more plant-based meat, instead of regular meat.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

People whose opinions I value would prefer that I eat more plant-based meat, instead of regular meat.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

In my opinion, the person shown in the advertisement is

not an expert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	an expert
inexperienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	experienced
unknowledgeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	knowledgeable
unqualified	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	qualified
unskilled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	skilled

Appendix B9: Measurement of Source Expertise

What kind of person did you see in the ad?

A scientist / doctor

A plant-based influencer

Did the ad you just see highlight benefits of a plant-based meat or the negative consequences of meat consumption?

Benefits of plant-based meat

Negative Consequences of regular meat consumption

Did the ad you just see highlight the implications of eating (plant-based) meat for the environment or personal health?

Health

Environment

Appendix B10: Manipulation Check

Almost done! Which gender do you identify with?

Male

Female

Non-binary / third gender

Prefer not to say

What is your age? (Please use full numbers only)

What is your nationality?

What is the highest level of education you have completed?

Less than High School

High School

Bachelor's Degree or Equivalent

Master's Degree or Equivalent

PhD, Doctorate, MBA or Equivalent

Other

Which term describes your current diet best?

Vegan

Vegetarian

Flexitarian (mostly vegetarian, but makes exceptions)

Pescetarian (vegetarian, but eats fish)

Omnivore (eats everything, including meat)

Other

Are you responsible for your daily food purchase? In other words, do you do your own groceries?

No

Yes

Appendix B11: Demographics and Consumption Behaviour

Thank you for participating in this survey! Your answers are very valuable to me.

If you have any questions or concerns regarding this study, its purpose or procedures, or if you have a research-related problem, please feel free to contact me at 684074fg@eur.nl.

In case you want to know what this experiment was about, you can read the text below. Otherwise, you can just advance to the next page and complete the survey, where you will be redirected to Prolific and get the code!

--

This study contributes to research on how to promote the consumption of plant-based meat alternatives in our society. Our current food system, as it is right now, is not sustainable and is a major negative contributor to both human and environmental health. The Intergovernmental Panel on Climate Change (IPCC) has identified the adoption of plant-based diets as a major opportunity for mitigating climate change due to the diet's reduced GHG emissions. Also, it has been found that plant-based diets bring various benefits for public health, e.g., a lower risk for chronic diseases.

Within this experiment, all participants were assigned to one of eight experimental conditions, whereby different aspects of the advertisement were manipulated to see which combinations works best.

At this point, I also want to disclose to you that both the brand and the brand endorsers depicted were fictitious and just created for the purpose of this research.

Thank you! Please don't forget to hit the submit button below.

Appendix B12: Deception and Thank you Message

8.3. Appendix C: Declaration Page: Use of Generative AI Tools in Thesis

Student Information

Name: Friederike Glauner
 Student ID: 684074
 Course Name: Master Thesis CM5000
 Supervisor Name: dr. Yijing Wang
 Date: 25.06.2024

Declaration:

Acknowledgment of Generative AI Tools

I acknowledge that I am aware of the existence and functionality of generative artificial intelligence (AI) tools, which are capable of producing content such as text, images, and other creative works autonomously.

GenAI use would include, but not limited to:

- Generated content (e.g., ChatGPT, Quillbot) limited strictly to content that is not assessed (e.g., thesis title).
- ~~Writing improvements, including~~ grammar and spelling corrections (e.g., Grammarly)
- Language translation (e.g., DeepL), without generative AI alterations/improvements.
- Research task assistance (e.g., finding survey scales, qualitative coding verification, debugging code)
- Using GenAI as a search engine tool to find academic articles or books (e.g.,

I declare that I have used generative AI tools, specifically Grammarly (Free Version)¹ and DeepL Translate, in the process of creating parts or components of my thesis. The purpose of using these tools was to aid in generating content or assisting with specific aspects of thesis work.

I declare that I have NOT used any generative AI tools and that the assignment concerned is my original work.

Signature: [digital signature]

Date of Signature: [Date of Submission]

Extent of AI Usage

I confirm that while I utilized generative AI tools to aid in content creation, the majority of the intellectual effort, creative input, and decision-making involved in completing the thesis were undertaken by me. I have enclosed the prompts/logging of the GenAI tool use in an appendix.

Ethical and Academic Integrity

I understand the ethical implications and academic integrity concerns related to the use of AI tools in coursework. I assure that the AI-generated content was used responsibly, and any

¹ Only for the purpose of grammar and spelling corrections.

content derived from these tools has been appropriately cited and attributed according to the guidelines provided by the instructor and the course. I have taken necessary steps to distinguish between my original work and the AI-generated contributions. Any direct quotations, paraphrased content, or other forms of AI-generated material have been properly referenced in accordance with academic conventions.

By signing this declaration, I affirm that this declaration is accurate and truthful. I take full responsibility for the integrity of my assignment and am prepared to discuss and explain the role of generative AI tools in my creative process if required by the instructor or the Examination Board. I further affirm that I have used generative AI tools in accordance with ethical standards and academic integrity expectations.

Signature: 

Date of Signature: 25.06.2024

8.4. Appendix D: GenAI Logbook

Appendix D1: Use of Grammarly for Basic Grammar and Spelling Check

Grammarly was used for correcting grammar and spelling (mainly prepositions, commas and verb form) on the following dates:

- May 30, 2024
- June 03, 2024
- June 21, 2024

Appendix D2: Use of DeepL Translate

- DeepL was used to translate Höhn's (2021, p. 1) definition of nutrition communication as "jedem Typus menschlicher Kommunikation, der mit Ernährung zusammenhängt" from German to English as "any type of human communication related to nutrition". The quote was used on page 6 of this thesis.
- Furthermore, DeepL was used to doublecheck the meaning of any other paraphrased sources that were published in German (Maschkowski & Büning-Fesel, 2010; Spiller et al., 2017)