

**WHAT IS THE DIFFERENCE BETWEEN RESISTANCE AND (NON-)  
ADOPTION OF INNOVATIONS?** AN EMPIRICAL STUDY WITHIN THE  
CONTEXT OF PLANT- BASED MEAT ALTERNATIVES

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## **Abstract**

Resistance to innovations is an understudied topic in the literature on innovations. Some researchers argue that it can be viewed as either different or the same as non-adoption. However, empirical evidence for these assumptions is difficult to find. As a result, this study begins by conceptualising resistance to innovations and then investigates consumer motivations for resisting an innovation. We revealed some intriguing findings that may be of interest to both marketing and innovation managers and academics. We discovered that resistance to innovations by consumers can be classified as either emotional or behavioural resistance. Emotional resistance encompasses all consumers' emotions and thoughts about an innovation that can eventually lead to resistance. Behavioural resistance encompasses all actions taken to oppose the spread of innovations. Furthermore, we discovered that the reasons for a consumer to resist an innovation differ from the reasons for a consumer to non-adopt an innovation. Although perceived healthiness is a reason for adopting plant-based meat alternatives (PBMA), it has no effect on resistance to PBMA. However, it is possible that the reasons for adopting and resisting are the same. The perceived unnaturalness of PBMA was a reason for non-adoption and resistance to PBMA.

Another contribution of our research is that we empirically prove that resistance can hinder the adoption of PBMA. However in contrast to current research, we prove that only emotional resistance has an influence on the adoption of PBMA and not behavioural resistance. This study contributes to a better understanding of resistance to innovation and paves the way for future research on this topic. Understanding resistance to innovations aids in understanding why certain innovations fail and how to avoid failure of future innovations in the future.

## 1. INTRODUCTION

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The Apple Newton, Colgate freezer lasagne and Google Glass share something in common, namely all three innovations failed, despite the fact that the companies expected them to be successful (Braineet, n.d.). These are not the only examples of unsuccessful innovations (Braineet, n.d.). Rather the list of unsuccessful innovations is long, but despite this, companies continue to spend vast sums of money on the development of new products (Heidenreich, 2016).

Innovations can provide numerous benefits to companies such as lowering manufacturing costs, improving product quality, capturing or establishing new product markets, and minimising a company's reliance on unreliable or erratic production elements (Webster, 2004). Together, all these different advantages of innovations together make it possible for a company to obtain a sustainable and long-term competitive advantage (Webster, 2004).

Research primarily focuses on the importance of innovations and thus is prone to a pro-change bias. This bias implies that all innovations are viewed as a benefit to the consumer and superior to the product they replace (Heidenreich & Handrich, 2015). However, considering the failure rate of numerous innovations, the idea that change is beneficial is not always justified (Talke & Heidenreich, 2013). Despite this, only a fraction of innovation research investigates why consumers do not want to buy or use innovations (Talke & Heidenreich, 2013).

The small amount of research about non-adoption of innovations is problematic because companies continue to develop unsuccessful innovations and still do not understand why consumers do not use these innovations. It could be a lack of interest or an inability to understand the product's benefits (Arts et al., 2011; Rogers, 2003). Within the literature on innovation, full usage of a product is referred to as adoption (Rogers, 2003). The adoption of innovations is a well-studied topic, but there is still a lot unknown since companies still introduce innovations without knowing if the adoption rate will be sufficient enough to be a profitable product and become successful.

There is also a lot unknown regarding resistance to innovations (Hwang, 2021). Consumers can resist innovations in addition to not adopting it. Protesting against the introduction or sale

of an innovation is one form of resistance to innovation (Kleijnen et al., 2009). Reasons to resist an innovation can differ from those to (non-) adopt an innovation. People who consume plant-based meat alternatives (PBMAs) may do so for environmental reasons, but it is unlikely that people resist the consumption of plant-based meat alternatives because they want to harm the environment (Claudy et al., 2015). This would not have been possible if non-adoption and resistance were the same. However, a part of innovations research still considers resistance and non-adoption to be the same, and this study will look into what the right perspective is.

### *Research relevance*

As previously stated, much remains unknown about resistance and its distinction from (non-) adoption. There are two major gaps in resistance to innovation research in general. The first gap concerns the lack of a definition of innovation resistance. Resistance to innovations has piqued the interest for innovators and marketing researchers, but finding a definition remains difficult (Huang, Coghlan, et al., 2021; Mani & Chouk, 2018). Most research defines resistance to innovations as follows: the resistance offered by a consumer to innovations, either because it poses potential changes from a satisfactory status quo or because it conflicts with their belief structure (Ram & Sheth, 1989). However, this definition focuses on the process of resistance rather than what it truly entails.

The ambiguity in the literature and disagreement among academics regarding the distinctions between innovation resistance and innovation adoption is the second gap in the literature that needs to be investigated in this study. According to some academics, resistance and adoption are opposites (Nabih, 1997; Reinhardt et al., 2019). Following these researchers, a person who does not want to adopt a new product, will resist it. When non-adoption and resistance are perceived as the same, they are frequently used interchangeably (Talke & Heidenreich, 2013; Talwar et al., 2020).

Other academics, by contrast, state that resistance is different from non-adoption. This indicates that resistance is influenced by different factors than non-adoption, implying that non-adoption and resistance are not opposites, but rather qualitatively distinct concepts (Claudy et al., 2015; Gatignon & Robertson, 1985; Kleijnen et al., 2009; Laukkanen, 2016; Ram & Sheth, 1989; Sun et al., 2021; Szmigin & Foxall, 1998). As an example linked to the research context of this study: People who adopt plant based meat alternatives (PBMAs) may

do so for health reasons, but it is unlikely that people resist the adoption of PBMA's because they are healthy (Claudy et al., 2015). As such, this study investigates the major studies on resistance to innovations in order to determine which perspective is most appropriate.

Investigating which perspective is most appropriate aids in understanding what resistance to innovation is and what companies can do to overcome consumer resistance to innovations.

For this reason, one of the aims of this study is the conceptualisation of resistance to innovations, which subsequently leads to a better understanding of what resistance to innovations is. To provide an answer regarding the literature gaps, the following research question is presented:

*To what extent are resistance to innovations and the adoption of innovations different within the plant-based meat alternatives context?*

#### *Practical relevance*

One of the primary goals of this research is to clarify resistance to innovations, enabling companies to better understand their consumers and their purchasing habits (Huang, Jin, et al., 2021). When it is unclear what resistance to innovations implies, this resistance becomes difficult to avoid, and companies may not be taking it into account. By contrast, when companies are aware of the implications for the success of innovations, they are more willing to reduce resistance to innovations (Huang, Jin, et al., 2021; Mani & Chouk, 2018).

Accordingly, this study begins with a conceptualisation of what resistance entails and what consumers drive to resist PBMA's.

A better understanding of the difference between resistance and non-adoption of innovations can also make managers better aware of how to identify either non adoption or resistance. Because resistance goes further than simply non adopting a product, it is necessary to identify resistance and prevent it at an early stage. As a result, some reasons for consumers to resist an innovation can be identified early in the production development phase and marginalised to the greatest extent possible.

#### *Research outline*

This study is structured as follows: after the introduction, the second chapter presents current perspectives regarding the difference between adoption and resistance. Following that, a conceptualisation of resistance, as well as current research on resistance and adoption, is

presented. The various hypotheses are presented in the theoretical sections on adoption and resistance. The third chapter then details the study's design, including the pre-test, participant selection, procedures, and research ethics. Following this, the fourth chapter elaborates on the statistical test results, and the final chapter will provides an extensive discussion and conclusion regarding the results, including suggestions for future research and practical implications for marketing and innovation managers.

## 2. THEORY

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### 2.1 RESISTANCE TO INNOVATIONS

The second chapter of this study begins with the conceptualisation of resistance. Following this, the current theory regarding adoption is presented and furthermore, the current perspectives on the difference between resistance and adoption are detailed. Beyond this, the theoretical chapter also goes over the various hypotheses and the conceptual model.

#### *Resistance to innovations research*

Even though resistance to innovations is not often addressed within the research, the most influential and widely used study about innovation resistance is the study of Ram & Sheth (1989). The current study perceives resistance to innovations as the resistance offered by a consumer to innovations, either because it poses potential changes from a satisfactory status quo or because it conflicts with their belief structure (Ram & Sheth, 1989, p.6). However, this definition does not describe what resistance to innovations entails nor the extent to which it can be perceived as the same as non-adoption. As such, the current study begins with a conceptualisation of resistance. To this end, the literature presents various approaches to conceptualise resistance. For this study however, we employ Breckler's attitude formation theory, which is based on affect, cognition, and behaviour. Given that resistance is an attitude, we chose this theory because it provides an effective understanding of the development of an attitude.

#### *Conceptualising resistance*

Since resistance to innovations is described by several authors as an attitude a consumer may have, the model of the formation of an attitude provides a helpful basis for defining what resistance actually is (Claudy et al., 2015). Specifically, an attitude can be described as a response to an antecedent stimulus or attitude object (Breckler, 1984, p. 1191). In the context of innovations, this refers to the consumer's reaction after being exposed to innovation. An attitude can further be divided into three different dimensions: affect, behaviour, and cognition (Breckler, 1984). These three dimensions are discussed in the following in greater detail.

### *Affective resistance*

Affect describes emotional response, gut reaction, or sympathetic nervous activity which differs for each individual (Breckler, 1984; Yeung & Wyer, 2004). Adapting this definition to the subject at hand: affective resistance to innovations can be defined as a consumer's response after being exposed to an innovation for the first time and resisting the idea of adoption based on emotion (Breckler, 1984). To make this more explicit, an example of affective resistance could be that a consumer has fear about a certain product. Other examples include feelings of anger, sadness and disgust, guilt, shame, contempt, envy or jealousy which may subsequently incite resistance to a product or innovation (Bettiga & Lamberti, 2018; Breckler, 1984). Emotional responses can occur in an unconscious manner, where aspects of a consumer's perceptions regarding the general idea of adopting an innovation may lead to negative emotional responses (Castro et al., 2020). The issue with measuring resistance to innovations based on affect is that this remains dependent on emotions which makes the reasoning behind resistance difficult to extract. For instance, it is not always easy for consumers to explain whether they are having a feeling about something or not (Breckler, 1984). It may be even more difficult to describe what this emotion entails and what it is based on (Breckler, 1984). However, because affect could play a significant role within resistance to innovations, it still needs to be considered when developing a definition.

### *Cognitive resistance*

The second part of the formation of an attitude is cognition which entails all beliefs, knowledge structures, perceptual responses, and thoughts of a consumer (Breckler, 1984, p. 1191). The cognitive component of resistance to innovations is related to the individual's purposeful examination of the innovation's attributes (Castro et al., 2020). The knowledge structures may have an influence in the formation of an attitude while it is an interconnected set of facts or knowledge about an innovation. When a consumer already has information about PBMA and receives new information. The consumer will form an opinion about PBMA which could either reinforce resistance or reduce it (Breckler, 1984). Early exposure to innovations can form prejudices that subsequently influence the final resistance to adopt (Heidenreich et al., 2016). As an example, if a consumer has a negative experience with a PBMA and did not enjoy the product at first, the likelihood that this consumer will resist to adopt the product soon is high (He et al., 2020). In this way, cognition plays an essential role

in the formation of an attitude and should be considered when conceptualising resistance to innovations (Sofi et al., 2020).

### *Behavioural resistance*

The third component of attitude formation is behaviour, which includes all visible behaviours, behavioural intentions, and verbal assertions regarding behaviour (Breckler, 1984). In turn, this relates to the actual resistance behaviour, the intention to resist innovations, and the consumer's rationale for why they resist or do not resist innovation. It could be that a consumer complains about a new innovation and refuses to use it. However, complaining could also change into actively lobbying and protesting against the adoption of an innovation (Kleijnen et al., 2009). This could become harmful for the reputation of the company when a consumer is opposing an introduction or the sales of an innovation (Kleijnen et al., 2009). Scholars also primarily concentrate on behavioural resistance because it is the only directly observable factor (Župerkienė et al., 2019). For this study however, the cognitive, affective, and behavioural aspects of attitude formation are investigated. In order to apply cognition, affect, and behaviour to this study, the following definition of resistance to innovations is developed:

*The degree to which a consumer is actively rejecting the adoption of an innovation based on the behavioural intentions, emotions, thoughts and current beliefs about innovations.*

## 2.2 ADOPTION OF INNOVATIONS

### *Adoption of innovations research*

The topic of why consumers want to buy a product has always been relevant for marketing and innovations management academics (Arts et al., 2011). The majority of such studies investigating adoption of innovations begin by discussing the Rogers' diffusion theory being one of the first studies to discuss this topic. Rogers (2003) describes adoption as the full usage of a product. Regarding this theory, consumers have several product characteristics that decide whether or not adopt a product. These include relative advantage, compatibility, complexity, trialability, and/or observability (Rogers, 2003). Later on, several scholars discussed adoption of innovations based on different perspectives like the theory of reasoned action (TRA) and theory of planned behaviour (TPB) (Valor et al., 2022). For our study we start with the conceptualisation of adoption based on the model of Breckler (1984) which consists of affect, emotion and behaviour. We opted to use this model since it was developed for the formation of an attitude (Breckler, 1984). Given that adoption is based on the formation of an attitude, it was deemed appropriate.

### *Affective adoption*

Affective adoption is defined as a consumer's emotional reaction after being exposed to an innovation and (non-) adoption of the product (Breckler, 1984). Examples of emotions that may turn into adoption of innovations include pleasant feelings such as joy, pride, optimism, love, or liking of the innovation (Bettiga & Lamberti, 2018). When a consumer is optimistic and positive, it will be more likely to try the innovation out and adopt it (Valor et al., 2022). Emotions can influence consumer adoption behaviour in a variety of ways. Adoption of an innovation necessitates effort, and emotions can help motivate consumers to adopt or intend to adopt a product (Bagozzi & Lee, 1999). Emotions also play an important role in the social context, as they can be observed or shared with others, subsequently influencing the spread and diffusion of innovations (Valor et al., 2022). Especially when a consumer is unfamiliar with an innovation, emotions can influence the adoption of an innovation. Since emotions can play an important role in innovation adoption, it should be considered within this study.

### *Cognitive adoption*

Cognition and affect are closely intertwined rather than independent processes (Sofi et al., 2020). To comprehend the distinction between the two, however, they must be explored independently. Adoption based on cognition refers to all of a consumer's beliefs, knowledge structures, perceptual responses, and ideas based on product exposure (Breckler, 1984). Examples of cognitive components of adoption include perceived usefulness, trust, people's opinion about the product, and the thoughts a consumer may have (Liu et al., 2019). Several notable adoption theories, such as the technology acceptance model (TAM), theory of reasoned action (TRA), and theory of planned behaviour (TPB), emphasise cognition's role in the adoption process (Bettiga & Lamberti, 2017). These theories assume that human judgments are rational, that attitude constitutes the fundamental determinant of consumer choices as a representation of cognitive processes, and that emotional and affective reactions only become relevant when the cognitive structure is not fully reflected (Bettiga & Lamberti, 2017). The fundamental criticism levelled at these theories, however, is that they do not consider the significance of emotions (Bettiga & Lamberti, 2017). As a result, this study considers affect, cognition and adoption behaviour alike.

### *Adoption behaviour*

The third component of the formation of an attitude concerns the behavioural component. The adoption behaviour entails the final decision for actual adoption or not and it can be described as the acceptance and continued use of an innovation (Nabih et al., 1997). Behaviour represents the final decision of whether or not to accept the innovation and it is mostly based on affect and cognition (Arts et al., 2011). A consumer may see some advantages from an innovation compared to a product it supersedes and thus adopt the innovation. In this case the adoption behaviour (the final decision to adopt the innovation) is based on cognition (the thoughts regarding the innovation).

### **2.3 ARE (NON-) ADOPTION AND RESISTANCE TO INNOVATIONS DIFFERENT?**

As stated in the introduction, the literature provides two perspectives regarding the difference between adoption and resistance. Resistance and non-adoption can be viewed as the same (and thus used interchangeably) or differently as illustrated in table 1 (Ram & Sheth, 1989; Talke & Heidenreich, 2013). Authors who argue for the latter have various reasons for doing so which are presented below.

A part of innovations literature agrees on the fact that non-adoption and resistance are the same (Reinhardt et al., 2019; Talke & Heidenreich, 2013; Talwar et al., 2020). This is based on the fact that reasons to non-adopt and reasons to resist can be the same (Reinhardt et al., 2019). Within this part of literature, the usage of resistance and non-adoption is interchangeably. This part of literature perceives resistance as an outcome of the adoption process where the consumer does not adopt the product at the end. Because non-adoption is the same negative outcome of the adoption process, they can be used interchangeably (Reinhardt, 2019). However, as visible in table three most of literature perceives non-adoption and resistance as different. The following arguments are given:

The reasons for not adopting a product may differ from those for resisting an innovation (Claudy et al., 2015). When an innovation requires a certain degree of change, it comes with more resistance to adopt the innovation (Claudy et al., 2015). The more barriers a consumer has to take, the less likely it is that this consumer will adopt the product and more resistance to adoption will be present (Claudy et al., 2015). Because the degree of change plays an important role within resistance to innovations, consumers have other reasons to resist than to non- adopt a product.

Another argument why resistance and adoption are different is the fact that resistance may occur prior to the adoption of innovations, and that adoption and resistance can co-exist (Laukkanen, 2016). This indicates that even when a consumer is resistant to innovations, he or she can be persuaded and decide to adopt the innovation in the future (Szmigin & Foxall, 1998). If non-adoption and resistance were the same, a consumer that resists an innovation would automatically non-adopt an innovation.

When examining table 1 it is visible that the majority of the researchers share the opinion that resistance and adoption are different. Therefore, it is reasonable to assume that this is the correct perspective. However, when examined more closely, none of the studies focussed on

the potential relationship between resistance and adoption and there is no empirical basis for this assumption that they are different. Accordingly, this study attempts to assess this relationship to determine if an empirical investigation can decide whether to view adoption or resistance differently based on current research. To this end, the following hypotheses is created:

*H1: Resistance to innovations has a weak or no relationship with adoption*

Author(s)	Resistance and adoption are not opposites. Resistance is a part of the adoption process	Resistance and non-adoption are used interchangeably
Gatignon & Robertson, (1989)	Rejection is not the opposite of adoption. Both are different forms of behaviour.	
(Ram & Sheth, 1989, p.6)	'Innovation resistance is not the obverse of innovation adoption.' Consequently, the adoption of an innovation is conditioned by the overcoming of consumers' initial resistance. Hence, resistance and adoption can coexist during the life of the innovation	
Szmigin & Foxall (1998)	Innovation rejection is a part of the adoption process where those who reject need to be convinced to adopt.	
Bagozzi & Lee, (1999)	Innovation resistance is part of an adoption process and happens throughout the process.	
Kleijnen, Lee, & Wetzels (2009)	Consumer resistance to innovation is a specific form of behaviour and conceptually separate from innovation adoption.	
Talke & Heidenreich (2014)		The usage of resistance and non-adoption is interchangeable
Claudy et al., (2015)	Reasons for resisting innovations are not necessarily the opposite of reasons for adoption.	
Laukkanen, (2016)	Resistance occurs prior to adoption	
Talwar, Talwar, Kaur, & Dhir (2020).		<b>Interchangeably used:</b> non-adoption and resistance have both as reaction: rejection, postponement, opposition
Sun et al. (2021)	However, consumer resistance to and adoption of innovation should not be seen as completely in opposition. Rather, these are two end processes that are the results of most consumers' natural tendency towards resisting change	
Reinhardt et al., (2019)		Recognise the difference between resistance however use non-adoption and resistance <b>interchangeably.</b>

Table 1: Two main perspectives on Resistance to and adoption of innovations

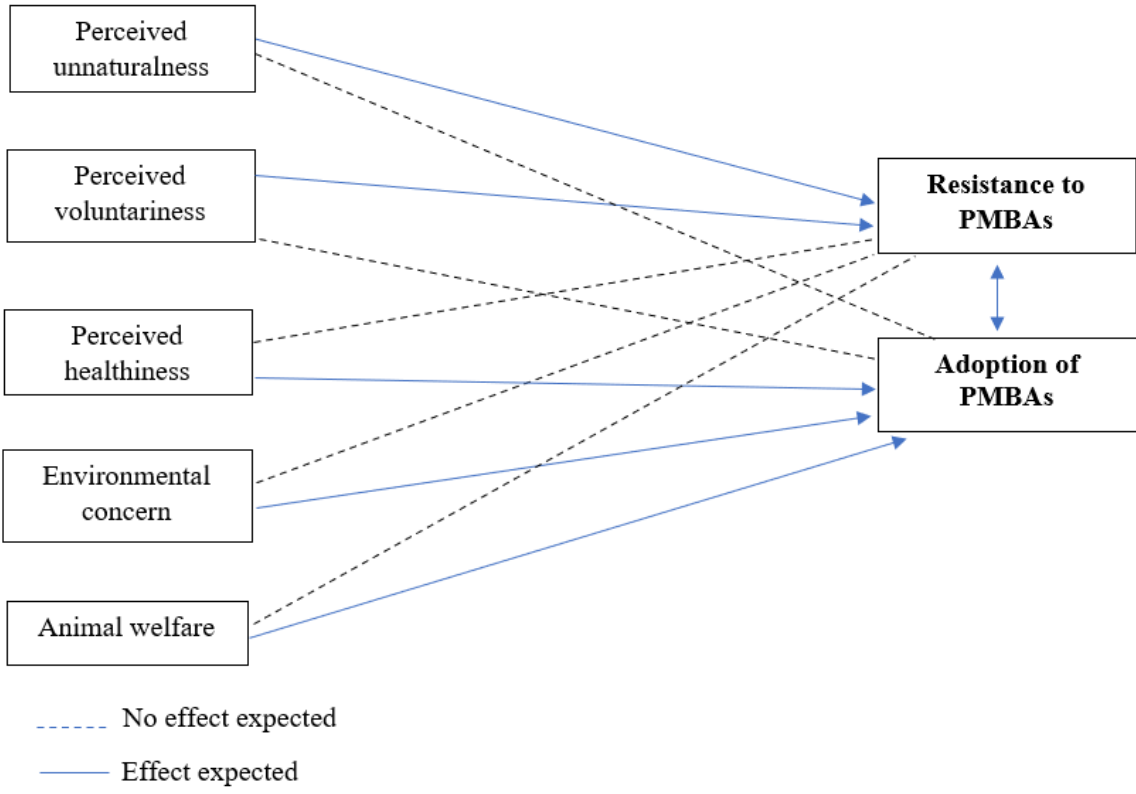


Figure 1: Conceptual model

## 2.3 HYPOTHESES DEVELOPMENT

The hypotheses and the investigated innovation are discussed in this chapter. First, the research context for PMBAs will be discussed in greater detail. Following that, we will go over all of the independent variables and why they are important to consider in our research. Finally, the conceptual model is presented.

### *Context of the study*

The innovation of focus of in this study consists of plant-based meat alternatives (PBMAs). These are considered controversial innovations as PBMAs may potentially impact consumers' everyday routines (Carlsson et al., 2022; Ram and Sheth, 1989). Ram and Sheth (1989) provide tofu as an example of a PBMA within their study where they discuss the fact that tofu does not have much flavour on its own. As a result, a consumer must blend numerous ingredients and devote considerable time to using the product, which may pose an impediment for purchasing it (Ram & Sheth, 1989). Meanwhile, however, there has been an increase in the number of PBMAs available over the years and the texture, taste, and preparation of the most recent variants of PBMAs are similar to those of meat (He et al., 2020). Because the latest generation of PBMAs does not require a different routine, they could offer an appealing alternative for meat (He et al., 2020). Nonetheless, the average meat consumption in the Netherlands is still 76 kg per person (Vleesconsumptie - WUR, n.d.). To understand why consumers, adopt or resist PBMAs, further investigation is required.

### *Hypotheses development*

Based on the existing literature, this study uses variables and their scales to measure resistance. The possible relationship with resistance and adoption is presented in the conceptual model<sup>1</sup>. The hypotheses and research question are assessed through the development of a conceptual model that considers both the drivers of adoption and the barriers of resistance to innovations. Since the primary objective of this study is to see if there is a difference between resistance and adoption, it is expected that the adoption drivers will have a positive influence on adoption and the resistance barriers will have a positive effect on resistance.

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<sup>1</sup> The conceptual model is visible in figure 1

However, as there is currently no consensus in the literature regarding the difference between resistance and adoption of innovations, this study also examines drivers of adoption of resistance and barriers to resistance of adoption, even if no effect or only a small effect is expected<sup>2</sup>.

### *Perceived voluntariness*

*Perceived voluntariness* can be described as the degree to which the choice one makes remains under the individual's volitional control (Plouffe et al., 2001). When a person feels obligated to eat PBMA's because no other options are available for instance, the feeling of voluntariness can decrease (Plouffe et al., 2001; Tosun & Yanar, 2020). When people are confined in some way, they feel a powerful impulse to resist and fight back in order to reclaim their freedom, according to the reactance theory. (Miron, 2006). If a consumer can only eat PBMA's instead of meat, a consumer may have a strong need to resist and fight back in order to have a deliberate choice. Following this theory, a decrease in voluntariness could subsequently increase the resistance to innovations. Accordingly, earlier studies found that *perceived voluntariness* plays a significant role in acceptance behaviour, both in current use and future use intentions (Agarwal & Prasad, 1997).

However, if people feel that there are no options to choose from and consumers are forced to consume PBMA's, this could impact their resistance to PBMA's (Plouffe et al., 2001; Tosun & Yanar, 2020). In this way, *perceived voluntariness* could help better clarify the difference between adoption and resistance. As one example, consumers are likely to resist PBMA's because they experience the choice as involuntary. However, people are unlikely to adopt

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<sup>2</sup> It is not common practice in innovation and marketing research to promote hypotheses with no or a little effect (Abrahamson, 1997). The main reason why these are included in this study is that the purpose of this study is to see if resistance and adoption are not the same. To determine that they are not the same, we have to test variables developed for measuring adoption on resistance to confirm that they do not have any relationship. When proving that it does not have any or a little effect, it can be assumed that resistance and adoption are different. This does also work for variables measuring resistance and adoption.

PBMAs because the choice is voluntary. Therefore, resistance and adoption cannot be seen as opposites. As a result, the following hypotheses are developed:

*H2: The perceived voluntariness of consumption of PBMA has a negative effect on resistance to innovations.*

*H3: The perceived voluntariness of consumption of PBMA has no or a weak effect on the adoption of innovations.*

#### *Perceived unnaturalness*

This study defines *perceived unnaturalness* as the degree to which the innovation contains additional elements that could be toxic, artificial, synthetic, and contrary to nature (Hwang et al., 2020). The fact that PBMA cannot exist without human intervention accounts for the perceived lack of naturalness of ultra-processed, plant-based products (Hwang et al., 2020). Unnatural food contains additives such as sugar or preservatives, whereas natural food has not been altered by humans (Jahn et al., 2021). Product rejection can occur as a result of *perceived unnaturalness* which bears consequences for product selection (Hartmann et al., 2022). Unnatural food products appear to be less acceptable among the general population, and unnaturalness may be one of the reasons why PBMA could cause resistance (Hartmann et al., 2022). As a result, there will be a negative perception of PBMA in general, which may explain the resistance to adopt PBMA (Jahn et al., 2021).

*Perceived unnaturalness* is considered in this study, as it may explain the difference between resistance and adoption. Consumers are likely to reject PBMA due to their perceived unnaturalness, for instance, but they are unlikely to purchase PBMA because they like unnatural food. To summarise, resistance and adoption of innovations are not opposed, and the perceived unnaturalness barrier will help to confirm this. In turn, this leads to the following hypotheses:

*H4: The perceived unnaturalness of PBMA has a positive effect on resistance to PBMA*

*H5: The perceived unnaturalness of PBMA has no or a weak effect on adoption of PBMA*

### *Perceived healthiness*

This study defines *perceived healthiness*: a consumer's expectation of a product's influence on his or her state of health (Plasek et al., 2020). Meat can be of an important nutritious value as it is rich in proteins, vitamins and minerals (Wood, 2017). The nutritious value of PBMA is not extensively investigated but a few researchers have found that the macronutrient content of numerous meat substitute products is similar to those of regular meat products (Hartmann et al., 2022). As a result, PBMA can be considered healthier given that meat consumption is associated with health issues such as cancer and cardiovascular disease (Tosun & Yanar, 2020). In addition, the specific medications and hormones employed in livestock raising are passed on to people during the consumption process (Tosun & Yanar, 2020). Meat production can also lead to disease transmission among livestock, as well as contamination during transportation and storage (Tosun & Yanar, 2020). As a result, consumers may regard meat consumption as unhealthy and seek healthier alternatives. In this way, health concerns have a significant direct effect on PBMA adoption intentions (Marcus et al., 2022). People may adopt PBMA because they are healthy, but they will not resist eating PBMA because they are healthy. As such, perceived healthiness can aid in understanding the difference between adoption and resistance as follows:

*H6: Perceived healthiness has a positive effect on the adoption of PBMA*

*H7: Perceived healthiness has no or a weak effect on the resistance to PBMA*

### *Environmental concern*

Consumers are becoming increasingly aware of the current climate change in the world and adapting their daily routines accordingly so that their environmental impact is as low as possible (Cruz & Manata, 2020). To this end, compared to meat, PBMA are better for the environment (He et al., 2020). In general, the production of meat comes with several environmental issues, including water usage, extensive energy usage and the emission of methane by animals (He et al., 2020). Therefore, consumers may want to search for alternatives for their meat consumption because they want to contribute to a lower environmental impact (Cruz & Manata, 2020). With *environmental concern* this study refers to a strong positive attitude towards preserving the environment (Minton & rose, 1997, p.38). This definition assumes that *environmental concern* is an affective attitude. According to some authors, *environmental concern* describes a predisposition for pro-environmental

behaviour (Takács-Sánta, 2007). If the consumer possesses a higher *environmental concern*, the consumer would potentially be more open to adopting PBMA's (Hwang et al., 2020). Including the variable *environmental concern* within this study could help explain the difference between adoption and resistance. People may adopt PBMA's because they have concerns about the environment, but they will not resist eating PBMA's because they want to harm the environment. As this study assumes that adoption and resistance are not opposites, *environmental concern* will help to clarify this, leading the following hypotheses:

*H8: Environmental concern has a positive effect on adoption of PBMA's*

*H9: Environmental concern has no or a weak effect on resistance towards PBMA's*

#### *Animal welfare*

Research indicated that people who follow a vegetarian diet are more concerned about *animal welfare* than people who eat meat (Michel et al., 2021). Furthermore, a significant number of vegan and vegetarian consumers do not consume meat for animal welfare reasons (He et al., 2020) *Animal welfare* refers to a state of complete mental and physical health, where the animal is in harmony with its environment (Carenzi & Verga, 2016, p.6). Meat production has an impact on animal welfare since animals are frequently subjected to stressful and painful situations during farm treatment, transport, and slaughter (He et al., 2020). Furthermore, health issues caused by a large number of animals in a small space can result in diseases that eventually kill a large number of animals (He et al., 2020). Despite the welfare situation having changed compared to some years ago, this remains one of the main reasons for consumers to adopt meat alternatives (Gregory et al., 2007). The reason this study takes *animal welfare* into account is because this could help further explain the difference between resistance and adoption of innovations. As an example: a consumer may adopt PBMA's because they think animal welfare is important, but they would not resist PBMA's, because they are against animal welfare. Therefore, adoption and resistance cannot be seen as opposites and animal welfare can be an important variable to confirm this assumption, leading to the following hypotheses:

*H10: Animal welfare has a positive effect on the adoption of PBMA's*

*H11: Animal welfare has no or a weak effect on resistance to PBMA's*

### 3. METHODS

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To answer the research question: ‘To what extent is resistance to innovations and the adoption of innovations different within the plant-based meat alternatives context?’ An exploratory survey was developed to investigate the resistance to and adoption of PBMA as well as their relationship. Such a survey supports this research as it provides an overview regarding the perceptions of a substantial number of respondents (Hair, 2011).

#### 3.1 Pre-test I

Prior to the final survey, two pre-tests were created to ensure that all questions were clear and that any errors or misunderstandings within the survey could be extracted so that the final version was error-free. 12 females and 7 males took the first pre-test. The majority of the respondents consisted of students (12 out of 19), between 15 and 30 years old (18 out of 19) and living in Nijmegen (10 out of 19).

The quantitative analysis revealed that the majority of the variables developed for this study possess a Cronbach's alpha of at least  $>.7$ , indicating reliability. A variable is reliable when all the items of a variable score higher than  $.7$  together. Only the variables *environmental concern* and *animal welfare* exhibited a low Cronbach's alpha, suggesting that the scale was unreliable. After performing a detailed analysis, the first item ‘*My work/school café expects me to eat PBMA*’ caused a Cronbach's alpha of  $.131$  for the variable *perceived voluntariness*. As a result, the only option left was to delete this item and replace it for the second pre-test. Another argument accounting for deletion concerns the fact that the question can be perceived as vague. Therefore, it could be that respondents did not understand the question. A positive outcome of deleting item one was that the Cronbach's alpha increased to  $.624$ . After the reliability test, a factor analysis was performed. Except for *perceived voluntariness* and *animal welfare*, the explained variance for the variables was sufficient. If the explained variance is less than 60%, it is possible that more factors than expected are present in a model. Therefore, for the next pre-test both variables should be adapted.

Variable	Number of items	Cronbach's Alpha	Explained variance
Perceived voluntariness	3	.624	58.1%
Perceived unnaturalness	3	.809	72.6%
Environmental concern	3	.520	86.7%
Animal welfare	3	.415	52.6%
Adoption	9	.901	75.9%
Resistance	9	.834	81.8%

Table 4: Reliability and validity statistics pre-test I

### 3.2 Pre-test II

After the first pre-test, it became clear that the questions for the constructs *animal welfare* and *perceived voluntariness* needed adaptation. Another adaptation consisted of adding the construct *perceived healthiness* to measure adoption of PBMA. After examining different studies regarding drivers for adopting PBMA it became clear that this variable could be an effective addition to our study (Profeta et al., 2021; Rodriguez-Herrera et al., 2019).

Furthermore, the first pre-test also revealed that the scenario needed to be better explained. With the scenario we mean the supporting text before respondents started the survey. In this scenario, the context of the research was explained and three examples of PBMA were provided<sup>3</sup>. This was not obvious to all respondents, however. Some respondents found it difficult to understand what the scenario meant and did not understand the scenario-related questions. The second pre-test featured a sample size of 19 people comprising 7 males and 12 females. The majority were students (12 out of 19) in the age category of 15-30 years old (18 out of 19).

When examining reliability and explained variance, it becomes clear that *perceived voluntariness* does possess a high reliability after deleting the third item: *My work/school café expects me to eat PBMA. Perceived unnaturalness* did possess a sufficient reliability, but the explained variance was perceived as low. Therefore, it was deemed a wise idea to explore whether the questions could be adapted to measure the same construct as validity was low for this variable.

To determine whether everything was understood correctly, three participants were observed during the completion of the survey<sup>4</sup>. In turn, this made it possible to determine how the

<sup>3</sup> The scenario can be found in appendix 1

<sup>4</sup> All comments and actions based on these comments can be found in appendix 1 table 15

participants completed the survey as well as to ask them some qualitative questions about the survey. During these short feedback moments, it became clear that some items needed to be improved. For instance, the scenario was still not clear to the respondents even after changing it. As such, we decided to adapt the scenario for the final survey. Some respondents also found that the term work/school cafeteria was not clear leading to being adapted for the final version.

Variable	Number of items	Cronbach's Alpha	Cronbach's alpha if item deleted	Item deleted	Explained variance
Perceived voluntariness	3	.131	.939	1	94.8%
Perceived unnaturalness	3	.778			54.8%
Perceived environmental concern	3	.515			73.3%
Animal welfare	3	.796			83.3%
Perceived healthiness	3	.841			78.8
Adoption	9	.913			78.4%
Resistance	9	.948			72.4%

*Table 5: Reliability and validity statistics pre-test II*

### 3.3 Population

This study employed adults ranging in age from 18 to 99 years old as a research sample. This group represents an important part of Dutch society as most adults possess the freedom to make their own decisions about their food intake. Respondents were approached at various locations in the Netherlands since the data was collected with a group of five researchers. Asking for response in more cities make results more generalisable since consumers in Utrecht may have a different opinion about PBMA's than consumers in Eindhoven. Finally, the majority of the respondents were approached at Utrecht, Nijmegen, and Eindhoven train stations. These locations were chosen because they attract a large number of diverse people. Another location where respondents were polled were the coop supermarkets in Nijmegen's city centre. A supermarket is another place with a diverse population, making it an ideal location for gathering responses. Additionally, effort was made to encourage customers to participate within the Nijmegen shopping district. However, due to unforeseen circumstances such as bad weather, approaching people on the street was difficult. Therefore, shopping malls were deemed more appropriate places to ask for participation. We intended to approach respondents in three different cities and locations as there are numerous places to solicit consumer feedback, and we wanted a sample population that was as generalisable as possible.

### 3.4 Procedure

The respondents were asked if they had time to fill out a survey regarding PBMA's. The respondents could either scan a QR code or use a tablet to complete the survey. Respondents could also ask the researcher questions during the completion of the survey. However, the intention was to not speak to respondents as this could have changed answers into more socially desirable ones, for instance. Before the questions and scenario were presented, the respondents had to confirm that they provided their consent<sup>5</sup>. To help clarify the scenario, three examples of PBMA's were presented so that the respondents could have an idea of what PBMA's are. The questions were measured using a seven-point Likert scale ranging from strongly agree (1) to strongly disagree (7), and the questions were presented in Dutch. The survey questions were translated from English to Dutch which was executed by the forward-backward translation technique. This method begins with the translation from the original English questions to the translation into Dutch. When the questions were translated, they were translated back to English. When a different English translation was found, the Dutch translation needed to be adapted. The various questions were arranged in such a way that each block of questions presented a single construct. Finally, the respondents were asked to fill out some personal information. These included *age*, *gender*, *meat consumption per day*, *perceived innovativeness*, and the city in which they completed the survey. At the end, respondents were thanked for their time.

### 3.6 Measurement and scales

The scale items used for the final version of the survey were extracted from different influential research papers<sup>6</sup>. For some of these studies, the research context of these studies differed from PBMA's, but they were still useful. For instance, the scale items for *perceived voluntariness* were taken from research regarding the exact card which is a payment system (Plouffe et al., 2001). The other study concerns an information technology innovation (Moore & Benbasat, 1991). The scale items of *perceived unnaturalness* were extracted from a research paper that investigated the PBMA purchasing intention by consumers which made it an appropriate scale to use (Hwang et al., 2020). For the scale items of *environmental concern*, an article concerning evaluations of the greenness of products was employed

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<sup>5</sup> The consent and the questions can be found in Appendix one

<sup>6</sup> The adapted and original scale items can be found in appendix one

(Gershoff & Frels, 2015). For the items of the variable *animal welfare*, three articles were selected to extract the items. The first one concerns the consumers' intention to eat meat alternatives, while the second and third articles discuss the consumer's perception of meat consumption. (Clonan et al., 2015; Estévez-Moreno et al., 2021; Marcus et al., 2022) The items for the construct *perceived healthiness* were extracted from literature regarding the selection of food and factors that predict the acceptance of processed meat (Shan et al., 2017; Steptoe et al., 1995). For the items for resistance and adoption, the model of the formation of an attitude was employed and adapted to this research context (Breckler, 1984). To conclude, most of the scale items were extracted from studies with the same topic. For the items that were originally from other research contexts, they were adapted so that they were appropriate for use in this study. An example is item one of the scales for measuring *perceived voluntariness*. The original item was 'my use of the exact card is voluntary.' We adapted this question to: 'the consumption of meat alternatives is voluntary.' All items can be found in Appendix 1.

Socio demographics	Frequency	Percentage in %
<b>Gender</b>		
Man	122	46.2
Woman	135	51.1
Gender Neutral	6	2.3
Other	1	.4
<b>Age</b>		
15-30	206	78.0
30-45	25	9.5
45-65	24	9.1
65+	9	3.4
<b>Meat consumption</b>		
0	19	7.2
1	11	4.2
2	33	12.5
3	38	14.4
4	52	19.7
5	49	18.6
6	23	8.7
7	39	14.8
<b>Status</b>		
Student	164	62.1
Working	92	34.8
Retired	4	1.5
Other	4	1.5

*Table 6: socio demographics of the final survey*

### *3.5 Final sample and missing values*

In total 306 Dutch people participated in this experiment by filling in the questionnaire. In the end 264 eligible participants remained, due to the fact that 37 participants did not complete the survey and were seen as missing values. Five other respondents were deleted because they were detected as outliers when examining their scores and using the function case wise diagnostics which can detect outliers (Hair, 2011). A general rule of thumb for sample size is 10 observations per variable. As such for this study, we should have had at least 50 respondents. Finally, the 264 participants in our study represent an effective sample to use for

our analyses. The majority of the participants in the questionnaire was between 15 and 30 years old (78%). A small majority of the participants identified themselves as female (51.1%) and the majority of the respondents were students (62.1%). The average number of days that the respondent's consumed meat was 4.98 (SD = 2.03; range: 0-7).

### *3.6 Construct reliability and validity*

Qualtrics and SPSS software were employed to collect data, process it into results, and test the various hypotheses. The items were subjected to a factor analysis to determine discriminant and convergent validity. The KMO<sup>7</sup> Bartlett's sphericity test has to be higher than .5 and significant in order to predict the extent to which a variable can be predicted by all other variables (Hair, 2011). Examining the different variables, the scores were sufficient enough to consider. However, it should be noted that *perceived unnaturalness* and *perceived voluntariness* scored .5 which meant that this score was not as convincing as others. However, they were still considered for this study since the constructs may explain the difference between resistance and adoption and the other statistical tests show that these constructs are following the requirements to take them into account.

A rotation approach (Varimax) was employed to test the discriminant validity. The factor matrix revealed components as well as discriminant validity among the items. For testing convergent validity, the combined explained variance of the six components equalled 71.5% which was sufficient. It was clear that most of the items scored differently on different factors, which demonstrated discriminant validity. The only exception was that items of resistance had a negative effect on adoption, but there were no cross-loaders within the model, so it did not impair results. Another finding from the factor analysis was that all constructs were consistent and adhered to the literature. Explained variance depicted the various constructs and their explanatory value.

### *Emotional and behavioural resistance*

After performing the factor analyses, it became clear that resistance loaded on two instead of one factor which is visible when examining the pattern matrix in appendix 3. This was not expected in advance, but it was clear that some adaptations needed to be made. As such, we decided to divide resistance into two dimensions. Emotional resistance which was existing

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<sup>7</sup> All KMO Bartlett's tests per variable can be found in appendix 3

from cognitive and affective resistance and behavioural resistance. The reason we made this decision concerns the fact that all items of affective and cognitive resistance loaded one factor. The theoretical explanation is the fact that affect, and cognition are closely related to each other and that they could be explained with the same items (Sofi et al., 2020). Dividing resistance into two sub-dimensions bears consequences for further analyses, however. As such, we perform all other tests with emotional and behavioural resistance as two distinct dependent variables.

Variable	Number of items	Cronbach's Alpha	Deleted items	Cronbach's alpha if item deleted	Explained variance before deletion	Explained variance
Perceived voluntariness	3	.076	1	.770	58.8%	81.9%
Perceived unnaturalness	3	.682	1	.718	62.8%	78.4%
Perceived environmental concern	3	.783	0			70.6%
Animal welfare	3	.852	0			77.3%
Perceived healthiness	3	.841	0			76.1%
Perceived innovativeness	3	.506	1	.725	53.7%	78.5%
Adoption	9	.959	1	.954	74.3%	75.9%
Emotional Resistance	6	.907	0			68.7%
Behavioural resistance	3	.895	0			82.9%

Table 7: reliability & validity statistics final sample

Reliability was tested by measuring Cronbach's alpha. Examining the different variables, reliability can be perceived as high. However, some variables required further attention. The first was *perceived unnaturalness* which did not reach the required level of  $> .7$ . When deleting item one: *'meat alternatives are artificial which causes authenticity loss of the product'* the Cronbach's alpha of the item *perceived unnaturalness* changes from .682 to .718. The explained variance improved from 62.8% to 78.4%. A theoretical argument for deleting this item is that consumers may think that meat alternatives could be artificial but that this does not harm the naturalness of the product. Research has found that unnaturalness plays a role in the acceptance of PBMA's (Hwang et al., 2020). It could be that consumers find that PBMA's to be more unnatural than meat but that they do not perceive PBMA's as inauthentic. Together with improvements to both explained variance and reliability, it was deemed wise to

delete this item. For the variable *perceived voluntariness*, the Cronbach's alpha was perceived as mediocre. When deleting item 3 of *perceived voluntariness*: '*I am expected to eat PBMs*', the Cronbach's alpha changed from .076 to .77. The explained variance also improved by more than 20%. Examining the question, it can be said that the question is not really clear. Therefore, deletion of the item was deemed appropriate.

Examining the rotated pattern matrix, the first item of adoption: '*I think meat alternatives are a good thing*' did possess a cross loader<sup>8</sup> which meant that the difference between the highest and the second highest score was less than .2 (Hair, 2011). Considering the number of items for adoption as well as the fact that adoption would not be a variable that exhibited discriminant validity when keeping the cross loader, it was deemed wise to delete<sup>9</sup> this item as well. Regarding the question itself, it can be said that the sentence is not clear. A good thing can be perceived in different ways, for instance.. In the end after deleting three items, all variables possessed a higher Cronbach's alpha than the required level of > .7 and there were no cross-loaders present in the model.

### 3.7 Control variables

The control variables present in the model included *age*, *gender*, *meat consumption*, *occupation (student, working or retired)* and *perceived innovativeness*. In turn, these variables provided insight into the sample's socio-demographics. For *perceived innovativeness*, a validity and reliability test were assessed. When performing a reliability analysis, it became clear that the first item: '*I first have to see people using an innovation before I consider them*' achieved a low reliability of .506<sup>10</sup>. When deleting this item, the Cronbach's alpha improved to .725 and a factor analysis indicated that the explained variance increased from 53.7% to 78.5%. A theoretical argument for removing the item concerns that it is more about the peer pressure someone experiences when using an innovation, whereas the other items focussed more on consumer's opinions about innovations. This could explain the low reliability and provides a theoretical foundation for deleting this item. Taking both improvements and theory into consideration, the first item had to be deleted. For the other control variables, a reliability and validity test could not be performed as they consisted of only one item.

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<sup>8</sup> The cross loader is visible in table 16 in appendix 6.

<sup>9</sup> The factor loadings after the deletion of adoption item one are visible in Table 18 in Appendix 6

<sup>10</sup> Cronbach's alpha and factor loadings for *perceived innovativeness* can be found in table 7

### *3.8 Research ethics*

This research was conducted in accordance with the current ethical restrictions. All information extracted from other sources is cited correctly. The survey was developed with the best care possible. All respondents will remain anonymous, and the emphasis is on filling out the survey without being pressured to fill in socially desirable answers. The respondents have the possibility to see the results of the survey when the thesis project is finished in order to ensure that there is no misuse of their opinion as well as to demonstrate their anonymity. The researcher was transparent at any time to the respondents and the supervisor regarding the results. All conducted analyses will be visible at any time for the supervisor. Furthermore, the outcomes of the research may be relevant for companies and other institutions; therefore, all sensitive information is excluded before companies and other institutions can view the results of the research.

## 4. RESULTS AND DATA ANALYSIS

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### 4.1 Descriptive analysis

The correlations matrix<sup>11</sup> revealed that most constructs are correlated to one another. The higher a correlation's score comes to one, the more the items are correlated to each other (Hair, 2011). A relative low correlation was identified between the items and resistance, it became clear that perceived *voluntariness* ( $R = -.162, p < .05$ ), *perceived unnaturalness* ( $R = .358, p < .01$ ) and behavioural resistance have a relative low correlation. For emotional resistance, the only significant correlation was with the items of *perceived unnaturalness* ( $R = -.470, p < .05$ ). However, this correlation is weak and negative. On the other hand, this still indicates that the higher a respondent perceived PBMA's as unnatural, the higher its emotional resistance is. There was a significant positive correlation between the items of *Animal welfare* ( $R = .558, p < .01$ ), *environmental concern* ( $R = .634, p < .01$ ) and *perceived healthiness* ( $R = .633, p < .01$ ) and adoption. So, a higher score of a respondent on *animal welfare*, *environmental concern* and *perceived healthiness*, the higher the adoption rate of PBMA's is. The correlation between emotional resistance and adoption was also weak ( $R = -.433, p < .01$ ) but between behavioural resistance and adoption, it was significantly higher and can be perceived as strongly negative ( $R = -.739, p < .01$ ). As such, the higher a respondent's behavioural resistance is, the lower its adoption rate of PBMA's. The correlations between *perceived voluntariness* with emotional resistance, perceived innovativeness and *perceived unnaturalness* were not significant.

### 4.2 Assumptions

The assumptions for a linear regression include the normality of the variables, homoscedasticity and linearity (Field, 2011). The variable's normality is tested by assessing a normality plot and a histogram together with observing the kurtosis and skewness. In this way, the different histograms and normality plots revealed that most of the dependent and independent variables are normally divided. Only behavioural resistance and *perceived voluntariness* had a normality plot that is divergent from the line. Regarding the skewness, only *perceived voluntariness* did not follow the standard of having a skewness between -2.58 and 2.58 which means that this construct is not normally divided. However, the variable is

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<sup>11</sup> Correlations matrix can be found in appendix 5,

following all other assumptions and for samples consisting of more than 200 respondents, the effect of non-normality can be negligible (Hair, 2011). Therefore, *perceived voluntariness* was still considered in further analyses.

A scatterplot<sup>12</sup> is used to measure the assumptions of linearity and homoscedasticity. Homoscedasticity is desirable because as this implies that dependent variables exhibit equal levels of variance across the range of predictor variables (Hair, 2011). The variance of the dependent variable being explained in the dependence relationship should not be concentrated in only a limited range of independent values (Hair, 2011). After analysing all scatterplots, it became clear that all variables perform both homoscedasticity and linearity as no pattern is visible. For both emotional and behavioural resistance, it is visible that the points are not as equally divided as for adoption but still is sufficient for assuming that the relationships are homoscedastic and linear.

Variable	Skewness	Standard error	Kurtosis	Standard error
Perceived voluntariness	-1.903	.150	4.027	.299
Perceived unnaturalness	-.226	.150	-.064	.299
Animal welfare	-.932	.150	.864	.299
Environmental concern	-.768	.150	.126	.299
Perceived healthiness	.494	.150	.806	.299
Adoption	-.114	.150	-.705	.299
Emotional resistance	.453	.150	-.593	.299
Behavioural resistance	1.689	.150	2.764	.299

Table 8: Skewness and kurtosis of the dependent and independent variables

#### 4.3 Hypotheses testing

The various regression analyses will be presented in this section. Some changes were made to the dataset prior to running these regression analyses. We used dummy coding as some control variables feature more than two groups. Dummy coding is a way of incorporating nominal variables into a regression analysis (Hair, 2011). Therefore, the control variables *gender*, *age* and *occupation* needed to be adapted. This indicates that the reference category is

<sup>12</sup> All scatterplots are visible in appendix 4

excluded from the analyses and all other variables receive a score based on 0 and 1. For this study the reference groups include *men*, *students* and *young* (15-30 years old) respondents.

#### 4.3.1 Regression analysis on emotional resistance

To test the hypotheses, a linear regression analysis for PBMA's resistance was created which is visible in table 9. The first regression analysis concerned the relationship between the independent variables and the dependent variable emotional resistance. Model 1 featuring only the control variables, indicates that this model possesses high explanatory value ( $R^2 = .602$   $F(11,252) = 12.988$   $p < .001$ ). Both tolerance and VIF were perceived as sufficient<sup>13</sup>, which implies that following the existing literature the VIF value should not be higher than 4 and the tolerance should not be lower than .25. When this is the case, it can be assumed that there is no multicollinearity embedded in the model (Hair, 2011). Multicollinearity entails the strong linear relationship explanatory variables may have which could harm the results (Hair, 2011).

When the different significant control variables were examined, it became clear that for gender both *women* and *gender neutral* scored negatively significant on emotional resistance. *Meat consumption* and *perceived innovativeness* were also significant, with *meat consumption* having a positive direct effect on emotional resistance and *perceived innovativeness* having a negative direct effect.

When examining model two, it is clear that the explanatory value is higher than in model one. With the explanatory value, the degree to which the (control)variables can explain the variation for the dependent variable is meant (Hair, 2011). This is expected because it does not only include control variables but also the independent variables ( $R^2 = .742$   $F(16,247) = 18.897$   $p < .001$ ). When the significance of the various variables in model 2 was examined, the variables *perceived unnaturalness*, *environmental awareness*, and *animal welfare* possessed a significant relationship with emotional resistance. *Perceived unnaturalness* and *meat consumption* had a positive effect on emotional resistance, implying that when consumers perceive PBMA's to be highly unnatural or they consume a greater amount of meat, the likelihood that they emotionally resist PBMA's increases. The effect of *perceived unnaturalness* ( $\beta = .348$ ) can also be perceived as high, which implies that this variable has a

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<sup>13</sup> All VIF and tolerance values can be found in appendix 7

considerable influence over *emotional resistance*. The effect is negatively significant for *women, perceived innovativeness, environmental concern, and animal welfare*. This means that *women* as well as people that score high on *perceived innovativeness, environmental concern* and find *animal welfare* important, are less emotionally resistant towards PBMA. From this, it became clear that the control variables *woman (gender), meat consumption, and perceived innovativeness* all had a significant impact on emotional resistance.

	Model 1 Control variables on emotional resistance			Model 2 Control variables and variables on emotional resistance		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	-.200	.195	.306	-.224	.168	.182
Retired	.409	.729	.576	.076	.624	.903
Other situation	.018	.583	.975	-.143	.503	.777
<b>Gender</b>						
Woman	-.537	.147	<.001	-.360	.128	.005
Gender neutral	-1.104	.514	.033	-.621	.442	.161
Other	-.827	1.150	.473	-.616	.979	.530
<b>Age</b>						
30-45 years old	-.075	.279	.790	-.044	.243	.856
45-65 years old	.456	.289	.116	.384	.246	.120
65+	-.044	.468	.926	-.118	.400	.768
Meat consumption	.252	.037	<.001	.158	.035	<.001
Perceived innovativeness	-.229	.044	<.001	-.159	.038	<.001
Perceived voluntariness				-.001	.050	.986
Perceived Unnaturalness				.348	.056	<.001
Environmental concern				-.206	.064	.001
Animal welfare				-.165	.052	.002
Perceived healthiness				.015	.054	.780
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.602(.334)			.742(.521)		

Table 9: regression analysis emotional resistance. Reference group dummy variables: student, men, 15-30 years old.

#### 4.3.2 Regression analysis on behavioural resistance

When measuring the control variable's effect on behavioural resistance visible in table 10, it became visible that this model possessed a mediocre explanatory value ( $R^2 = .440$  F (11,252) = 5.495  $p < .001$ ). There were some control variables that produce a significant direct effect on resistance behaviour. For *women*, *working consumers* and *perceived innovativeness*, there is a negative significant relationship with resistance behaviour. As such, when a consumer identified themselves as a woman, was working or scored high on *perceived innovativeness*, the chance that they resisted PBMA's is lower. For the control variable *meat consumption*, the direct effect was positive which meant that a consumer who ate meat more frequently, also performed more resistance behaviour.

Examining model four, it is visible that the explanatory value was higher but still perceived as mediocre ( $R^2 = .581$  F (16,247) = 7.849  $p < .001$ ). Both tolerance and VIF<sup>14</sup> values were perceived as sufficient which meant that there was no sign of multicollinearity in this model. It was also visible that the effect of *women* as gender was still significant. As such, when a consumer was a woman and/or working, the chance that this consumer performed resistance behaviour is lower. Regarding the added variables, *environmental concern* and *perceived unnaturalness* significantly affected resistance behaviour. For *perceived unnaturalness*, this effect is positive which indicates that when people perceive PBMA's as highly unnatural, there was a high chance that they performed resistance behaviour. For *environmental concern*, the effect on resistance behaviour is negatively significant which means that consumers who perceive the choice of PBMA's as highly environmentally friendly scored low on resistance behaviour.

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<sup>14</sup> All VIF and tolerance values can be found in appendix 6

	Model 3 Control variables on resistance behaviour			Model 4 Control variables and variables on resistance behaviour		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	-.467	.203	.022	-.426	.189	.025
Retired	.896	.760	.240	.549	.702	.435
Other situation	.825	.608	.176	.743	.566	.190
<b>Gender</b>						
Woman	-.435	.153	.005	-.283	.144	.050
Gender neutral	-.337	.536	.529	.029	.497	.953
Other	-.233	1.198	.846	-.280	1.102	.800
<b>Age</b>						
30-45 years old	.232	.291	.425	0	.274	.612
45-65 years old	-.038	.301	.899	-.145	.277	.602
65+	-.266	.488	.586	-.335	.451	.457
Meat consumption	.124	.039	.002	.059	.039	.133
Perceived innovativeness	-.130	.046	.005	-.082	.043	.059
Perceived voluntariness				-.105	.056	.062
Perceived Unnaturalness				.310	.063	<.001
Environmental concern				-.170	.072	.019
Animal welfare				-.115	.059	.052
Perceived healthiness				.082	.061	.183
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.440(.158)			.581 (.294)		

Table 10: regression analysis resistance behaviour. Reference group dummy variables: student, men, 15-30 years old.

#### 4.3.3 Regression analysis on adoption

As visible in table 11, models five and six summarise the different effect sizes of the different (control) variables on adoption. Adoption is not divided into emotional and behavioural factors because the factors are all loaded on one factor, which indicates that adoption can only be measured one dimensionally in this study. Model five exhibits a high explanatory value of the control variables on adoption ( $R^2 = .647$   $F(11,252) = 16.479$   $p < .001$ ). As control variables, *women*, *working*, *meat consumption* and *perceived innovativeness* have a significant

effect on adoption. For *women*, *working* and *perceived innovativeness* this effect was positive. To conclude, women, those who work and scored high on perceived innovativeness scored high on adoption. For *meat consumption*, this effect was negative which meant that people who eat meat more frequently, have a lower chance of adopting PBMA's.

For model six which consists of all (control) variables the explanatory value was perceived as high ( $R^2 = .834$  F (16,247) = 35.138  $p < .001$ ). Both tolerance and VIF<sup>15</sup> values were

perceived as sufficient which meant that there is no sign of multicollinearity in this model. *Meat consumption* and *perceived innovativeness*, as control variables, had a significant effect on adoption. Except for *perceived voluntariness*, all variables had a significant effect on adoption. The relationship between *perceived unnaturalness*, *meat consumption* and the dependent variable adoption was negative. As a result, if people perceived PBMA's as highly unnatural and ate meat more frequently, the degree of adoption was lower. This contradicted the hypothesis for perceived unnaturalness because there was a significant effect, whereas we expected that the variables measuring resistance would have no or little effect on adoption. On the other hand, the effect size was small.

The situation was differed for *perceived innovativeness*, *animal welfare*, *environmental concern*, and *perceived healthiness*. These variables produced a significant positive effect on adoption, which meant that when a consumer perceived PBMA's to be a good choice for *animal welfare*, *environmentally friendly* and *healthy*, and when the consumer was open to new innovations, the likelihood of adoption increased. This relationship was predicted by our hypotheses, with the exception of the effect of the control variable *perceived innovativeness*.

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<sup>15</sup> Tolerance and VIF values can be found in appendix 6

	Model 5 Control variables on adoption			Model 6 Control variables and variables on adoption		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	.082	.206	<.001	.259	.153	.092
Retired	-.356	.773	.669	.113	.571	.843
Other situation	-.522	.619	.622	-.115	.460	.803
<b>Gender</b>						
Woman	.330	.156	.036	.225	.117	.056
Gender neutral	.963	.545	.078	.616	.404	.129
Other	.123	1.220	.920	-.528	.897	.556
<b>Age</b>						
30-45 years old	.219	.296	.462	-.100	.223	.655
45-65 years old	-.359	.307	.242	-.375	.226	.098
65+	-.405	.496	.416	-.387	.366	.292
Meat consumption	-.357	.040	<.001	-.191	.032	<.001
Perceived innovativeness	.252	.047	<.001	.152	.035	<.001
Perceived voluntariness				.001	.046	.981
Perceived Unnaturalness				-.152	.051	.003
Environmental concern				.314	.058	<.001
Animal welfare				.153	.048	.002
Perceived healthiness				.280	.050	<.001
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.647(.393)			.834(.675)		

Table 11: regression analysis adoption. Reference group dummy variables: student, Men, 15-30 years old.

	Model 7 Control variables on adoption			Model 8 Control variables and variables on adoption		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	.082	.206	.691	-.009	.169	.958
Retired	-.356	.773	.646	-.164	.627	.794
Other situation	-.522	.619	.400	-.591	.503	.241
<b>Gender</b>						
Woman	.330	.156	.036	.004	.130	.974
Gender neutral	.963	.545	.078	.240	.445	.590
Other	.123	1.220	.920	-.420	.987	.670
<b>Age</b>						
30-45 years old	.219	.296	.462	.145	.240	.548
45-65 years old	-.359	.307	.242	-.043	.250	.863
65+	-.405	.496	.416	-.409	.401	.310
Meat consumption	-.357	.040	<.001	-.197	.035	<.001
Perceived innovativeness	.252	.047	<.001	.107	.040	.007
Resistance behaviour				.098	.064	.128
Emotional resistance				-.685	.067	<.001
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.647(.418)			.789(.604)		

Table 12: regression analysis adoption. Reference group dummy variables: Student, Men, 15-30 years old.

The correlation matrix exhibited a strong negative correlation between adoption and both emotional resistance and resistance behaviour. The purpose of this research was to determine what resistance to innovation is and how it differs from adoption. As a result, a regression analysis with both emotional and behavioural resistance was performed which is visible in table 12. To this end, model seven features the model with only the control variables. ( $R^2 = .647$   $F(11,252) = 16.479$   $p < .001$ ). From this, it became clear that the gender *woman*, that *meat consumption* and *environmental concern* were significant. Meanwhile, the model including all variables exhibited a high explanatory value ( $R^2 = .789$   $F(13,250) = 31.189$   $p < .001$ ). According to the regression analysis, emotional resistance produced a highly significant negative impact on adoption. This meant that if someone had a high level of emotional resistance, they had a low level of adoption of PBMA as well. The effect on behavioural

resistance is insignificant. It could be argued that resistance to PBMA has an impact on adoption, but only when it is emotional.

#### 4.4 Additional analyses

According to the previous regression analyses on adoption and resistance (both behavioural and emotional), *meat consumption* had a significant effect on emotional resistance and adoption. This effect was negative for adoption, which meant that when people consumed meat more frequently, their level of adoption decreased. The relationship between *meat consumption* and emotional resistance was also positive, which meant that when people consumed more meat, their emotional resistance increased. To investigate whether this effect was larger for consumers that consume meat more frequently (every day or six days per week), we performed several regression analyses. Within the first two regression models, the most frequent consumers of meat were considered (consumers who consume meat more than five days a week). The other regression analyses take consumers into account that consume meat in a less frequent amount (zero to five days per week).

##### 4.4.1 Regression analysis consumer who consume meat 6 or more days a week

As visible in table 13, model 9 with only control variables possesses a low explanatory value ( $R^2 = .472$  F (10,100) = 2.817 p < .001). The only significant control variables included *meat consumption* and the gender *women*. Both control variables scored high. Model 10 including all (control) variables had a high explanatory value ( $R^2 = .706$  F (15,95) = 6.310 p < .001). For this regression analysis, *perceived unnaturalness*, *environmental concern* and *animal welfare* had a significant effect on emotional resistance. When a consumer perceives PBMA as highly unnatural, there is a high chance that this consumer also bears a significant amount of emotional resistance for PBMA. For *animal welfare* and *environmental concern*, the effect was negative which implies that if a consumer finds *animal welfare* important and has concerns about the environment, the emotional resistance will be lower. For the control variables, *meat consumption* and *perceived innovativeness* were significant.

	Model 9 Control variables on emotional resistance			Model 10 Control variables and variables on emotional resistance		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	-.193	.353	.585	-.331	.302	.276
Retired	2.875	1.462	.052	2.037	1.219	.098
Other situation	.662	.897	.463	.143	.756	.850
<b>Gender</b>						
Woman	-.535	.239	.027	-.243	.208	.246
Gender neutral	-.954	.690	.170	-.369	.582	.528
<b>Age</b>						
30-45 years old	-.477	.593	.423	-.226	.511	.660
45-65 years old	1.092	.578	.062	.708	.484	.147
65+	.098	.687	.887	-.070	.572	.902
Meat consumption	.356	.134	.009	.274	.114	.018
Perceived innovativeness	-.166	.072	.024	-.143	.060	.019
Perceived voluntariness				-.022	.073	.763
Perceived Unnaturalness				.438	.098	<.001
Environmental concern				-.269	.104	.011
Animal welfare				-.165	.072	.025
Perceived healthiness				.052	.092	.568
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.472(.145)			.706(.420)		

Table 13: regression analysis emotional resistance. Reference group dummy variables: student, Men, 15-30 years old.

	Model 11 Control variables on adoption			Model 12 control variables and variables on adoption		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	.008	.357	.982	.417	.258	.110
Retired	-.697	1.481	.639	.266	1.043	.800
Other situation	-.552	.908	.545	.529	.647	.416
<b>Gender</b>						
Woman	.248	.242	.308	.198	.178	.269
Gender neutral	.765	.699	.036	.915	.498	.069
<b>Age</b>						
30-45 years old	.791	.600	.191	-.098	.437	.824
45-65 years old	-.591	.586	.315	-.225	.415	.588
65+	-.124	.695	.859	-.191	.489	.696
Meat consumption	-.229	.135	.094	-.046	.098	.642
Perceived innovativeness	.065	.073	.376	.049	.051	.345
Perceived voluntariness				.017	.062	.786
Perceived Unnaturalness				-.220	.084	.010
Environmental concern				.311	.089	<.001
Animal welfare				.052	.062	.399
Perceived healthiness				.386	.078	<.001
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.380(.059)			.778(.544)		

Table 14: regression analysis adoption. Reference group dummy variables: Student, Men, 15-30 years old.

For the second regression analysis which is visible in table 14, based on a population that consumes meat more frequently, the model with only control variables possesses a low explanatory value ( $R^2 = .380$   $F(10,100) = 1.693$   $p < .001$ ). The only significant control variable was *gender neutral*. For the model including all (control) variables, the explanatory value can be perceived as high ( $R^2 = .778$   $F(15,95) = 9.737$   $p < .001$ ). *Perceived unnaturalness*, *environmental concern* and *perceived healthiness* were significant. This means that when a consumer finds PBMA's unnatural, the consumer will exhibit a lower degree of

adoption. *Environmental concern* and *perceived healthiness* have a positive significant effect on adoption of PBMA. This indicates that when a consumer thinks that PBMA are healthy, and bears concerns about the environment that their adoption rate will be higher.

#### *Summary of the first additional analysis*

Summarising both regression analyses, it can be said that the different variables have a high explanatory value for both adoption and emotional resistance. For adoption, *environmental concern* and *perceived healthiness* exert considerable influence. For emotional resistance, *environmental concern* produces a substantial impact. For both emotional resistance and adoption, *perceived unnaturalness* had an influential role.

#### *4.4.2 Regression analysis consumer who consume meat less than 6 days a week*

The second part of this additional analysis investigates whether consumers that consume less meat have other reasons for resisting or adopting PBMA. As visible in table 15, the first regression analysis only included control variables and demonstrated a mediocre explanatory value ( $R^2 = .556$  F (11,141) = 5.747 p < .001). Gender (*gender neutral, women*), *meat consumption* and *perceived innovativeness* significant affected emotional resistance. For the model that includes all variables, the explanatory value is high ( $R^2 = .701$  F (16,136) = 8.203 p < .001). The variables *perceived unnaturalness* and *animal welfare* were significant. This implies that when a consumer perceives PBMA as highly unnatural that emotional resistance will increase. When a consumer finds *animal welfare* important, the emotional resistance towards PBMA will be smaller. The control variables *meat consumption*, *perceived innovativeness* and gender (*woman, gender neutral*) were also significant.

	Model 13 Control variables on emotional resistance.			Model 14 Control variables and variables on emotional resistance		
	<i>B</i>	<i>SE</i>	<i>P</i>	<i>B</i>	<i>SE</i>	<i>P</i>
<b>Occupation</b>						
Working	-.192	.234	.414	-.225	.210	.286
Retired	-.584	1.052	.579	-1.319	.948	.167
Other situation	-.503	.789	.525	-.400	.721	.580
<b>Gender</b>						
Woman	-.564	.188	.003	-.439	.167	.010
Gender neutral	-2.211	.866	.012	-1.635	.794	.041
Other	-.681	1.132	.548	-.547	.998	.585
<b>Age</b>						
30-45 years old	-.102	.319	.750	-.074	.289	.799
45-65 years old	.239	.336	.478	.272	.297	.360
65+	.645	.794	.418	.937	.707	.187
Meat consumption	.197	.070	.005	.136	.065	.039
Perceived innovativeness	-.283	.056	<.001	-.182	.052	.005
Perceived voluntariness				.024	.078	.760
Perceived Unnaturalness				.275	.073	<.001
Environmental concern				-.172	.088	.054
Animal welfare				-.195	.082	.018
Perceived healthiness				-.006	.069	.934
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.556(.256)			.701(.431)		

Table 15: regression analysis adoption. Reference group dummy variables: student, Men, 15-30 years old.

	Model 15 Control variables on adoption			Model 16 Control variables and variables on adoption		
	B	SE	P	B	SE	P
<b>Occupation</b>						
Working	.027	.255	.917	.165	.197	.403
Retired	-.609	1.146	.596	.571	.889	.522
Other situation	-.545	.860	.527	-.618	.676	.362
<b>Gender</b>						
Woman	.358	.205	.082	.243	.156	.122
Gender neutral	.118	.944	.901	.020	.745	.978
Other	-.233	1.233	.850	-.610	.936	.516
<b>Age</b>						
30-45 years old	.091	.348	.794	-.102	.271	.706
45-65 years old	-.101	.366	.783	-.282	.278	.312
65+	-.088	.865	.919	-.732	.663	.271
Meat consumption	-.342	.076	<.001	-.183	.061	.003
Perceived innovativeness	.370	.061	<.001	.207	.049	<.001
Perceived voluntariness				-.055	.073	.457
Perceived Unnaturalness				-.131	.068	.055
Environmental concern				.293	.083	<.001
Animal welfare				.277	.076	<.001
Perceived healthiness				.214	.065	.001
<i>R</i> <sup>2</sup> ( <i>adj. R</i> <sup>2</sup> )	.613(.326)			.812(.619)		

Table 16: regression analysis adoption. Reference group dummy variables: student, Men, 15-30 years old.

As visible in table 16, the last regression analyses exhibit a mediocre explanatory value ( $R^2 = .613$   $F(11,141) = 7.699$   $p < .001$ ). *Meat consumption* and *environmental concern* had a significant effect and presented a large effect size. For the model including all variables, the model scored high in explanatory value ( $R^2 = .812$   $F(16,136) = 16.422$   $p < .001$ ). The variables *environmental concern*, *animal welfare* and *perceived healthiness* were significant. This indicates that when a consumer score *has environmental concerns*, finds *animal welfare*

important and perceives PBMA as healthy, the adoption of PBMA will be higher. The control variables *meat consumption* and *perceived innovativeness* were significant.

*Summary of the second additional analysis*

Regarding both regression analyses on adoption and emotional resistance it can be said that the explanatory value is high. For emotional resistance this is slightly lower than for more frequent meat consumers. This is not the case for adoption though. As the explanatory value is significantly higher than for more frequent meat consumers. The first regression analysis in which we analysed the individuals who consumed meat less frequently indicates that *perceived unnaturalness* and, to a smaller degree, *animal welfare* had an influence on emotional resistance. For adoption, *environmental concern*, *animal welfare*, and *perceived healthiness* produce a considerable influence. *Perceived innovativeness* had an influence on both adoption and resistance.

## 5. CONCLUSIONS

### 5.1 Conclusion

Hypothesis	Independent variable	Dependent variable	Accepted or rejected	Reason
H1	Resistance	Adoption	Partly accepted	Adoption has a significant negative effect on emotional resistance but no effect on resistance behaviour
H2	Voluntariness barrier	Resistance	Rejected	No significant effect on both emotional and behavioural resistance which is not in line with the hypothesis
H3	Voluntariness barrier	Adoption	Accepted	No significant effect measured which was in line with the hypothesis
H4	Unnaturalness barrier	Resistance	Accepted	Significant on both behavioural and emotional resistance which is in line with the hypothesis
H5	Unnaturalness barrier	Adoption	Rejected	Significant on adoption which is not in line with the hypothesis
H6	Perceived healthiness driver	Adoption	Accepted	Significant positive effect which was in line with the hypothesis
H7	Perceived healthiness driver	Resistance	Accepted	No significant effect which was in line with hypothesis
H8	Environmental concern driver	Adoption	Accepted	In line with the hypothesis because there is an effect
H9	Environmental concern driver	Resistance	Rejected	Significant on both emotional resistance and resistance behaviour which is not in line with the hypothesis
H10	Animal welfare	Adoption	Accepted	In line with the hypothesis
H11	Animal welfare	Resistance	Partly accepted	Only significant on emotional resistance

Table 17: Hypotheses created in this study and the conclusion

Considering the research question: ‘To what extent are resistance to innovations and innovation adoption different within the context of plant-based meat alternatives?’ A conclusion can be drawn. To begin with, Adoption varies from resistance in that resistance can be emotional or behavioural, whereas adoption is one-dimensional. This research reveals

that emotional resistance exists in the form of cognitive and affective resistance, and it is to our knowledge the first to suggest that resistance should be defined as emotional or behavioural.

What became clear is that the reasons for customers' resistance or adoption can vary. People may like PBMA's because they are healthier than meat, but they are unlikely to resist them simply because they are healthier. Resistance and adoption are thus two distinct sorts of behaviour. This does not, however, rule out the possibility of both resisting and adopting for the same reasons. According to our findings, *perceived unnaturalness* is a reason for non-adoption of PBMA's, as well as a reason to emotionally or behaviourally resist to PBMA's.

With regard to the numerous variables employed in our study, it is obvious that some impacts on adoption and emotional/behavioural resistance are more likely to occur than others. As discussed, the items of *perceived unnaturalness* had an effect on both resistance and adoption. This was also true in terms of *environmental concern* which suggests that when a customer is concerned about the environment, the likelihood of emotional or behavioural resistance to PBMA's is lower.

For the items of *animal welfare*, the effect was only significant on the dependent variables adoption and emotional resistance. When a consumer values *animal welfare*, the likelihood that they will emotionally resist PBMA's decreases. The items of *perceived healthiness* are the only ones that have a single dependent variable. The sole effect measured is that between the items of *perceived healthiness* and adoption, which is consistent with the predictions. This impact demonstrates that the motivations for adopting or resisting can differ, but this is not always the case.

When considering the impact that emotional resistance can play in the adoption process, it is obvious that there is a direct negative effect between emotional resistance and adoption. This indicates that if there is a significant level of emotional resistance, the level of adoption will be low. Previous research has suggested that adoption resistance can play a role. However, this study discovered that only emotional resistance has an effect on the adoption of innovations, while behavioural resistance had no effect. This has implications on the perception of how future research perceives the role of resistance in the adoption process.

The additional analysis about *meat consumption* did prove that people who consume more meat have a higher resistance and a lower adoption to PBMA. For consumers who consume meat more often (every day or six days a week), *perceived unnaturalness* was the major reason to emotionally resist PBMA and *perceived healthiness* was the major reason to adopt PBMA. The effect of the different (control) variables on adoption of PBMA by consumers who consume meat less than six days per week, was exceedingly high.

To summarise, adoption and resistance are two distinct processes. Resistance must be understood as either emotional or behavioural, and the reasons for resisting or adopting can differ. Although emotional resistance may have an impact on adoption, this does not imply that they are the same.

## 5.2 Discussion

At the start of this study the role of resistance within adoption of innovations was not clear (Hwang, 2021). In fact, a part of innovations research perceives resistance as a part of adoption (Bagozzi & Lee, 1999; Laukkanen et al., 2007; Szmigin & Foxall, 1998). However, this study confirms a negative significant relationship between resistance and adoption, though, this is only significant for emotional resistance. As such, resistance based on cognition and affect could lower the degree of adoption. This is in line with literature assuming that resistance and adoption represent two different processes but that they can also influence each other (Claudy et al., 2015; Kleijnen et al., 2009; Ram & Sheth, 1989; Sun et al., 2021). For instance, Gatignon & Robertson, (1985) perceived adoption and resistance as two different forms of behaviour. This study confirms that this is the right perspective. An addition is that it could be that reasons to resist or adopt could be the same. *Animal welfare* is a reason to adopt and to resist the adoption of an innovation in a lesser degree.

Another contribution of this study concerns the fact that it developed a new scale to measure the two dimensions of resistance to innovations. Specifically, based on Breckler's (1984) model, both resistance and adoption were developed in this study based on the three dimensions: affect, cognition and behaviour. In this way, this study found that affect and cognition within resistance to innovations can be seen as one dimension instead of two separate ones. This contradicts another study assuming that resistance is three dimensional

(Sun, 2021). However, it must be noted that in our study we did not use customer loyalty as a mediator variable.

Our scale is partly based on existing studies and is partly exploratory which means that some items are based on expectations of the researchers. The scale scored high on both reliability and validity which implies that it could be used for further research. However, the variable *perceived voluntariness* did not have any effect on either resistance or adoption which indicates that it should be either excluded from further research or that it requires some adaptation. Continuing, this study contributes to further understanding of reasons why consumers adopt or resist PBMA. According to our study, reasons to adopt PBMA include *animal welfare*, *environmental concern* and *perceived healthiness* (He et al., 2020). However, *animal welfare* only influences consumers who consume less meat per week. The major reason to emotionally and behaviourally resist PBMA concerns *perceived unnaturalness*. For frequent meat consumers, *environmental concern* influences emotional resistance. For less frequent meat consumers, *animal welfare* also influences emotional resistance. Both effects were unexpected and are not in line with current research. However, it indicates that reasons to adopt and resist could be the same.

Regarding the different control variables considered, it is clear that the control variables influence the different dependent variables. For behavioural resistance, the gender *woman* and the occupation category *working* produce a significant negative effect on resistance. In this way, this study confirms earlier studies indicating that women have a more positive attitude towards the consumption of PBMA (Knaapila et al., 2022; Michel et al., 2021). Regarding emotional resistance, the gender *woman*, *perceived innovativeness* and *meat consumption* have a significant effect. *Meat consumption* and *perceived innovativeness* also produced a significant effect on adoption. For *meat consumption*, this stands in contrast to an earlier study stating that it did not have any effect (Hwang et al., 2020). *Perceived innovativeness* is never investigated in relation to resistance or the adoption of PBMA. However, this is a relatively new food innovation meaning that people who are more interested in new technologies, also possess a high tendency to try new food innovations (Bartels & Reinders, 2009).

### *5.3 Practical implications*

This study possesses numerous implications that may be of interest to managers, public policymakers, consumers, and anyone else who may benefit from it. To begin with, this study

may be of interest to managers in that it opens a door to a research topic that is not frequently discussed in innovation and marketing research. As stated in the introduction, because of the non-adoption of innovations, numerous innovations fail each year (Ram & Sheth, 1989). This study confirms that non-adoption can also be attributed to emotional resistance during the adoption process as well as to the specific innovation. In turn, the results of the effects between the items of the variables and resistance/adoption provide some interesting points to focus on in this study.

To overcome resistance to PBMA, it is crucial to first explore what resistance is and how it varies from non-adoption. We discovered that resistance can be either emotional or behavioural in this study. As a company, it is critical to investigate the feelings individuals have when observing the product and which thoughts may be retrieved in order to overcome emotional resistance by consumers. It is critical to study if people's strong negative emotions can be influenced. For PBMA, it could be a good idea to invest in improving the product's image by marketing that PBMA are natural, and that the majority of the ingredients are organically derived. This could change the image of PBMA, and consumers may have less prejudices and negative perceptions about the product.

The numerous analyses also revealed that persons who are more innovative have lower emotional resistance to PBMA. It may be advisable to target this market niche when launching a new PBMA to the market. If emotional resistance is minimal, it may have an impact on PBMA adoption. Because emotional resistance has a detrimental impact on adoption, reducing emotional resistance may increase the degree of adoption of PBMA.

It may be useful to study why consumers have a reason to oppose or protest the innovation in order to overcome behavioural resistance. Companies should focus on changing the impression of unnaturalness and emphasising the environmental benefits for PBMA. Environmental concerns were one of the reasons why people resisted PBMA to a lesser extent. What may also be interesting is that we suggest that people who believe PBMA contribute to better *animal welfare*, are environmentally friendly, and are healthier than meat are more likely to adopt PBMA. Following this thought, marketing managers should concentrate on translating these three variables within their marketing strategy in order to attract more consumers to eat PBMA.

Regarding the various control variables, it also is clear that younger consumers, consumers who are innovative, and consumers who consume less meat per week are more likely to adopt PBMA's. Furthermore, gender was also revealed to be an intriguing socio-demographic factor. According to our findings, women are more likely to adopt PBMA's than men. It could be wise to investigate how to attract men by the adoption of PBMA's. This could improve the adoption rate of PBMA's. This study provides information on which consumers managers should target when launching PBMA's. This study could be useful for the general launch of food innovations, as PBMA's are a representative (food) innovation.

#### *5.4 Limitations and suggestions for further research*

This study, like all research papers, possesses limitations. For instance, as a population sample, approaching respondents in only three cities may result in less generalisable results when compared to approaching respondents throughout the Netherlands. However, due to time constraints, additional locations could not be included. Furthermore, the population sample consists of adults aged 18 to 99. It could be that when we would have included consumers from all ages that results would have been changed. However, we think that this age category can make food choices deliberately and for children or people above the age of 99, this is more difficult. Regarding the socio-demographics, it is clear that the majority of respondents are between the ages of fifteen and thirty. There is no equal distribution of ages, which may have an impact on the results. The group with the least representation is those aged older than 65. It would be preferable to have a sample that is representative of all the age groups for future research. In turn, this would also make it possible whether age has an influence on the resistance or adoption of PBMA's. Because some groups were not well represented, this could pose a reason age did not demonstrate a significant relationship with resistance or adoption.

Another limitation is that our sample consists primarily of students. Reason for this was that this group was more approachable, the results would have been better if there had been better division between students, working people, and retirees. It may thus be helpful to approach the different age groups in different ways for future research. For instance, older generations are not as accustomed to tablets and smartphones as younger generations, having a paper version of the survey may be a good idea.

A critical point about the sample used within this study concerns the fact that we did not ask for an educational level. In other studies, this aspect is considered, but we did not include it here. This would have been an interesting control variable since it could have said something about the adoption/resistance to PBMA's. For further research, it would thus be worthwhile to include this control variable to see whether it could influence the results and if it has to be considered when targeting consumers.

Other variables could also be included within this study to explain the difference between resistance to and adoption of innovations, but due to time constraints and survey length, it was not possible to investigate all relationships between the variables and the dependent variables adoption/resistance here. For example, the price of PBMA's could influence on resistance to PBMA's, but we have chosen to investigate other barriers because the price of PBMA's depends on which product is selected. Tofu, for instance, is inexpensive but some PBMA's are more expensive than the original meat version (*Vegetarisch, Vleesvervangers — Jumbo Supermarkten*, n.d.). However, this could still have influenced resistance to PBMA's. When examining the different variables, it also could be said that there were some limitations. For *perceived voluntariness*, for instance, the variable did not load on both emotional, behavioural resistance and adoption which implies that these variable needs adaptation or cannot be perceived as suitable for this study. Meanwhile, it could also that it could work when using other items or a different context. Therefore, one suggestion for further research would be to further develop this variable or use a different one.

This study demonstrates the importance of investigating resistance to innovations because a great deal remains unknown in this regard. For further studies, we advise conducting the same research but within a context where it is expected that consumers possess a higher inclination to resist innovations. Most of these innovations come with a high degree of change. For PBMA's, there were a lot of respondents did not exhibit a high degree of resistance when asked after the completion of the survey. This could be due to the fact that it is easy to try the innovation out and it does not require a high degree of change. Were we would have included a more radical innovation; it could be that the results would have changed drastically. With radical innovations, consumers cannot remain within their status quo situation, which makes them feel more resistant. In our research, by contrast, people can still bring their own lunch and thus still have the option to choose meat instead of PBMA's. In this way, the status quo situation can remain unchanged.

It could also be an interesting extension of this study to employ an international sample. In the Netherlands, the consumption of PBMA is high in compared to other countries, so it could be interesting to implement this study in different countries where the meat consumption is higher to investigate resistance to PBMA. Examining the different analyses, for instance, it is clear that people do possess higher emotional resistance when consumers eat more meat.

As already discussed, this study highlights the importance of research about resistance to innovations, but great deal remains unclear. Therefore, it would be worthwhile to investigate the relationship between emotional and behavioural resistance and extend the scale developed in this study. Regarding the different statistics, the scale is reliable and explains resistance quite well. As such, it could be that if the scale was extended, it would offer a good instrument for testing resistance to innovations and it could make clear what different reasons are for consumers to resist an innovation. It could also be an interesting extension of this study to develop a conceptual model where emotional resistance is a mediator variable between the variables and adoption. The role of emotional resistance within the adoption process can be investigated when doing this. To summarise, this study is the starting point for innovations and marketing research on resistance to innovations, and as more knowledge is gained, it can aid in reducing the amount of failure by innovations, allowing the list of failed innovations to be completed once.

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## 7. APPENDICES

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### APPENDIX 1: SURVEY AND PRE-TESTS

#### Survey pre-test 1:

##### Introduction

Beste deelnemer/deelnemer,

Ja, u helpt ons met afstuderen! Onwijs bedankt voor uw tijd en hulp met ons onderzoek.

Wij zijn masterstudenten aan de Radboud Universiteit in Nijmegen. In dit onderzoek zijn we benieuwd naar uw mening over vleesvervangers. Als u een samenvatting van dit onderzoek wilt of als u vragen heeft, laat het ons dan weten.

Deelname is geheel vrijwillig. U heeft het recht om uw deelname aan het onderzoek te beëindigen en uzelf terug te trekken wanneer de deelname al is begonnen, zonder negatieve gevolgen en zonder reden. Zie voor meer informatie <https://www.ru.nl/privacy/>. De verzamelde informatie wordt gebruikt voor educatieve doeleinden en moet twee jaar worden bewaard. Hierna wordt deze informatie vernietigd.

Met vriendelijke groeten,

Jelita Rumengan, Joost Langhout, Natalia Cervantes, Sven Kuijsten en Amy van Nijnatten

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0683895012

**Bij deelname aan dit onderzoek accepteer ik dat mijn informatie wordt gebruikt voor academische doeleinden.**

Stel je voor, jouw werk/school cafe vervangt vleesproducten door vleesvervangers. Met vleesvervangers bedoelen wij producten die proberen de structuur en de smaak van vleesproducten

teiteren, zonder het gebruik van vlees.

### Q1 Vragenblok 1

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Het eten van vleesvervangers is vrijwillig (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Hoewel het mij voorgesteld is door vrienden, is het eten van vleesvervangers zeker niet verplicht (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Mijn werk cafe verwacht van mij dat ik vleesvervangers eet (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Q2 Vragenblok 2

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Vleesvervangers zijn te bewerkt waardoor de echtheid van het product verloren gaat (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers bevatten te veel smaakversterkers en andere toevoegingen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Vleesvervangers bevatten te veel kunstmatige ingrediënten (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Q3 Vragenblok 3

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Ik wil mezelf milieuvriendelijker gedragen en daarom eet ik vleesvervangers (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Het eten van vleesvervangers is respectvoller naar het milieu (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik geloof dat het eten van vleesalternatieven helpt om de natuurlijke omgeving te behouden. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Q4 Vragenblok 4

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Door het eten van vleesvervangers respecteer ik de kwaliteit van leven van dieren (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Plantaardige vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Door het eten van vleesvervangers lijden dieren minder. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Door het eten van vleesvervangers draag ik minder bij aan dierenleed (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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## Vragenblok 5

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Vleesvervangers houden mij gezond (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Vleesvervangers zijn gezonder dan vlees (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13 Stel je voor, jouw werk/school café vervangt vleesproducten door vleesvervangers. Met vleesvervangers bedoelen wij producten die proberen de structuur en de smaak van vleesproducten te imiteren, zonder het gebruik van vlees.

## Q5 Vragenblok 5

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Ik denk dat vleesvervangers iets goeds zijn (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers komen overeen met mijn overtuigingen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik heb een positieve mening over vleesvervangers (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Ik ben van plan om vleesvervangers te eten (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Ik heb de intentie om vleesvervangers te proberen (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Ik zal de vervanging van vlees door vleesvervangers actief ondersteunen (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ik verheug mij als ik denk aan vleesvervangers. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Het denken over vleesvervangers maakt me blij (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Het denken over vleesvervangers maakt me tevreden (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

## Q6 Vragenblok 6

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Ik word boos als ik aan de consumptie van vleesvervangers denk (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Ik voel sterke negatieve emoties als ik denk aan vleesvervangers (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik vrees de invoer van vleesvervangers (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Ik denk niet dat de invoer van vleesvervangers een goed idee is (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. De invoer van vleesvervangers is totaal niet in lijn met mijn overtuigingen (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Ik heb sterke negatieve vooroordelen over vleesvervangers (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ik ga een klacht indienen tegen de invoering vleesvervangers (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Ik ga de invoering van vleesvervangers tegenhouden (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Ik ga protesteren tegen het eten van vleesvervangers (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14 Wat is uw geslacht?

- Man (1)
  - Vrouw (2)
  - Gender neutraal (3)
  - Anders (4)
-

Q18 Wat is momenteel voor u van toepassing?

- Student (1)
  - Werkende (2)
  - Gepensioneerd (3)
  - Anders (4) \_\_\_\_\_
- 

Q15 In welke leeftijdscategorie bevindt u zich?

- 15 - 30 jaar oud (1)
  - 30 - 45 jaar oud (2)
  - 45 - 60 jaar oud (3)
  - 60 + (4)
- 

Q21 Vragenblok 7

	Sterk oneens (1)	Oneens (6)	Neutraal (7)	Eens (4)	Sterk eens (5)
Ik moet andere mensen een innovatie zien gebruiken voordat ik ze overweeg (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het leuk om innovaties uit te proberen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik ben welwillend tegenover innovaties (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Q16 Hoeveel dagen per week eet u vlees?

	0 (ik eet geen vlees) (1)	1 (2)	2 (3)	3 (4)	4 (5)	5 (6)	6 (7)	Click to write Scale Point 8 (8)
Dagen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q17 In welke stad ben je momenteel

- Nijmegen (4)
- Eindhoven (5)
- Utrecht (6)

**Introduction:**

Beste deelnemer/deelneemster,

Yes, u helpt ons met afstuderen! Onwijs bedankt voor uw tijd en hulp met ons onderzoek.

Wij zijn masterstudenten aan de Radboud Universiteit in Nijmegen. In dit onderzoek zijn we benieuwd naar uw mening over vleesvervangers. Als u een samenvatting van dit onderzoek wilt of als u vragen heeft, laat het ons dan weten.

Deelname is geheel vrijwillig. U heeft het recht om uw deelname aan het onderzoek te beëindigen en uzelf terug te trekken wanneer de deelname al is begonnen, zonder negatieve gevolgen en zonder reden. Zie voor meer informatie <https://www.ru.nl/privacy/>. De verzamelde informatie wordt gebruikt voor educatieve doeleinden en moet twee jaar worden bewaard. Hierna wordt deze informatie vernietigd.

Met vriendelijke groeten,  
Jelita Rumengan, Joost Langhout, Natalia Cervantes, Sven Kuijsten en Amy van Nijnatten

Contactpersoon: Amy van Nijnatten  
Amy.vannijnatten2@ru.nl  
0683895012

**Bij deelname aan dit onderzoek accepteer ik dat mijn informatie wordt gebruikt voor academische doeleinden.**

Voor het beantwoorden van de volgende vragen, lees onderstaande situatie:  
**Stel je voor, jouw werk/school kantine vervangt alle vleesproducten door vleesvervangers. Met vleesvervangers worden producten bedoeld die proberen de structuur en de smaak van vleesproducten te**

imiteren, zonder het gebruik van vlees (zie voorbeelden hieronder). Echter heb je nog steeds de keuze om je eigen lunch mee te nemen.

Q1 Vragenblok 1

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Het eten van vleesvervangers is vrijwillig (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Hoewel het mij voorgesteld is door mijn werk/school kantine, is het eten van vleesvervangers zeker niet verplicht (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Mijn werk/school kantine verwacht van mij dat ik vleesvervangers eet (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Q2 Vragenblok 2

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Vleesvervangers zijn te bewerkt waardoor de echtheid van het product verloren gaat (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers bevatten te veel smaakversterkers en andere toevoegingen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Vleesvervangers bevatten te veel kunstmatige ingrediënten (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Q3 Vragenblok 3

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Ik wil mezelf milieuvriendelijker gedragen en daarom eet ik vleesvervangers (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Het eten van vleesvervangers is respectvoller naar het milieu (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik ben ervan overtuigd dat het eten van vleesvervangers helpt om de natuurlijke omgeving te behouden (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4 Vragenblok 4

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Door het eten van vleesvervangers respecteer ik de kwaliteit van leven van dieren (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Door het eten van vleesvervangers lijden dieren minder (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Door het eten van vleesvervangers draag ik minder bij aan dierenleed (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20 Vragenblok 5

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Vleesvervangers houden mij gezond (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Vleesvervangers zijn gezonder dan vlees (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5 Vragenblok 6

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Ik denk dat het vervangen van vlees door vleesvervangers iets goeds is (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Het vervangen van vlees door vleesvervangers komt overeen met mijn overtuigingen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik heb een positieve mening over het vervangen van vlees door vleesvervangers (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Ik ben van plan om vleesvervangers te eten (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Ik heb de intentie om vleesvervangers te proberen (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Ik zal de vervanging van vlees door vleesvervangers actief ondersteunen (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ik verheug mij als ik denk aan de vervanging van vlees door vleesvervangers (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Het denken over de vervanging van vlees door vleesvervangers maakt me blij (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Het denken over de vervanging van vlees door vleesvervangers maakt me tevreden (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Q6 Vragenblok 7

	Sterk oneens (1)	Oneens (2)	Neutraal (3)	Eens (4)	Sterk eens (5)
1. Ik word boos als ik denk aan de vervanging van vlees door vleesvervangers (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Ik voel negatieve emoties als ik denk aan de vervanging van vlees door vleesvervangers (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik vrees de vervanging van vlees door vleesvervangers (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Ik denk niet dat de vervanging van vlees door vleesvervangers een goed idee is (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. De vervanging van vlees door vleesvervangers is totaal niet in lijn met mijn overtuigingen (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Ik heb negatieve vooroordelen over vleesvervangers (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ik ga een klacht indienen tegen de vervanging van vlees door vleesvervangers (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Ik ga de vervanging van vlees door vleesvervangers tegenhouden (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Ik ga protesteren tegen de vervanging van vlees door vleesvervangers (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14 Wat is uw geslacht?

- Man (1)
- Vrouw (2)
- Gender neutraal (3)
- Anders (4)

Q18 Wat is momenteel voor u van toepassing?

- Student (1)
- Werkende (2)
- Gepensioneerd (3)
- Anders (4) \_\_\_\_\_
- 

Q15 In welke leeftijdscategorie bevindt u zich?

- 15 - 30 jaar oud (1)
- 30 - 45 jaar oud (2)
- 45 - 60 jaar oud (3)
- 60 + (4)
- 

Q21 Vragenblok 7

	Sterk oneens (1)	Oneens (6)	Neutraal (7)	Eens (4)	Sterk eens (5)
1. Ik moet andere mensen een innovatie zien gebruiken voordat ik ze overweeg (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Ik vind het leuk om innovaties uit te proberen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik ben welwillend tegenover innovaties (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

Q16 Hoeveel dagen per week eet u vlees?

	0 (ik eet geen vlees) (1)	1 (2)	2 (3)	3 (4)	4 (5)	5 (6)	6 (7)	7 (8)
Aantal dagen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Q17 In welke stad bent u momenteel?

- Nijmegen (4)
- Eindhoven (5)
- Utrecht (6)

## Short qualitative analysis second pre-test

Respondent	Comment	Action needed
1	<i>'I do not understand what is suggested with the question: het eten van vleesvervangers is vrijwillig?'</i>	Making a connection between the scenario and the first questions
1	<i>'It is kind of logic that you can always bring your own lunch, I think it does not have to stand there.'</i>	Exclude that sentence
2	<i>'I do not have an opinion about these things, do you mean veggie burgers?'</i>	Everyone has an opinion. You do not have to be against, maybe it can be added
2	<i>'How do you mean a voluntary choice for PBMA's? You always have a choice isn't it?'</i>	Maybe it is wise to change the questions more in line with the scenario
3	<i>'Werk/school kantine does not make sense. What do you mean?. I do not understand this.'</i>	Changing this in het café van jouw werkgever of school
3	<i>'The second question is so long; I do not get it. You really have to change this one because I cannot understand this.'</i>	It is necessary to simplify this question. Maybe: eating PBMA's is not obligatory
3	<i>'I think the survey is not too long. Be aware that people are not thinking that all questions are the same, I could understand if they just randomly click on something.'</i>	Good comment, we will work on this.

Table 16: comments about the survey

### Final survey:

#### Introduction

Beste deelnemer/deelnemster,

Yes, u helpt ons met afstuderen! Onwijs bedankt voor uw tijd en hulp met ons onderzoek.

Wij zijn masterstudenten aan de Radboud Universiteit in Nijmegen. In dit onderzoek zijn we benieuwd naar uw mening over vleesvervangers. Als u een samenvatting van dit onderzoek wilt of als u vragen heeft, laat het ons dan weten.

Deelname is geheel vrijwillig. U heeft het recht om uw deelname aan het onderzoek te beëindigen en uzelf terug te trekken wanneer de deelname al is begonnen, zonder negatieve gevolgen en zonder reden. Zie voor meer informatie <https://www.ru.nl/privacy/>. De verzamelde informatie wordt gebruikt voor educatieve doeleinden en moet twee jaar worden bewaard. Hierna wordt deze informatie vernietigd.

Met vriendelijke groeten,

Jelita Rumengan, Joost Langhout, Natalia Cervantes, Sven Kuijsten en Amy van Nijnatten

Contactpersoon: Amy van Nijnatten

Amy.vannijnatten2@ru.nl

0683895012

**Bij deelname aan dit onderzoek accepteer ik dat mijn informatie wordt gebruikt voor academische doeleinden.**

**Voor het beantwoorden van de volgende vragen, lees onderstaande situatie:**

**Stel dat het cafe/restaurant van jouw werkgever of school alle vleesproducten door vleesvervangers vervangt. Met vleesvervangers worden producten bedoeld die proberen de structuur en de smaak van vleesproducten te imiteren, zonder het gebruik van vlees (zie voorbeelden hieronder).**

Q1

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (6)	Volledig mee eens (7)
1. Het eten van vleesvervangers is vrijwillig (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Het eten van vleesvervangers is zeker niet verplicht (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Er wordt van mij verwacht dat ik vleesvervangers eet (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (6)	Volledig mee eens (7)
1. Vleesvervangers zijn bewerkt waardoor de echtheid van het product verloren gaat (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers bevatten smaakversterkers en andere toevoegingen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Vleesvervangers bevatten kunstmatige ingrediënten (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q3

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (6)	Volledig mee eens (7)
1. Vleesvervangers verdienen het om gelabeld te worden als 'milieuvriendelijk' (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Het kopen van vleesvervangers is een milieuvriendelijke keuze (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Een persoon die geeft om het milieu zou waarschijnlijk vleesvervangers kopen (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

## Q4

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (6)	Volledig mee eens (7)
1. Door het eten van vleesvervangers respecteer ik de kwaliteit van leven van dieren (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Door het eten van vleesvervangers lijden dieren minder (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Door het eten van vleesvervangers draag ik minder bij aan dierenleed (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

Q5

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (7)	Volledig mee eens (8)
1. Vleesvervangers houden mij gezond (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Vleesvervangers zijn gezonder dan vlees (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (6)	Volledig mee eens (7)
1. Ik denk dat de vervanging van vlees door vleesvervangers iets goeds is (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. De vervanging van vlees door vleesvervangers komt overeen met mijn overtuigingen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik heb een positieve mening over de vervanging van vlees door vleesvervangers (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Ik ben van plan om vleesvervangers te eten (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Ik heb de intentie om vleesvervangers te proberen (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Waar mogelijk zal ik de vervanging van vlees door vleesvervangers actief ondersteunen (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ik verheug mij als ik denk aan de vervanging van vlees door vleesvervangers (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Het denken over de vervanging van vlees door vleesvervangers maakt me blij (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Het denken over de vervanging van vlees door vleesvervangers stemt me tevreden (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Volledig oneens (1)	Oneens (2)	Enigszins oneens (3)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (6)	Volledig mee eens (7)
1. Ik word boos als ik denk aan de vervanging van vlees door vleesvervangers (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Ik voel negatieve emoties als ik denk aan de vervanging van vlees door vleesvervangers (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik vrees de vervanging van vlees door vleesvervangers (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Ik denk niet dat de vervanging van vlees door vleesvervangers een goed idee is (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. De vervanging van vlees door vleesvervangers is totaal niet in lijn met mijn overtuigingen (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Ik heb negatieve vooroordelen over vleesvervangers (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Indien mogelijk zal ik een klacht indienen tegen de vervanging van vlees door vleesvervangers (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Indien mogelijk zal ik de vervanging van vlees door vleesvervangers proberen tegen te houden (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Ik ben geneigd om te protesteren tegen de vervanging van vlees door vleesvervangers (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8 Wat is uw geslacht?

- Man (1)
  - Vrouw (2)
  - Gender neutraal (3)
  - Anders (4)
- 

Q9 Wat is momenteel voor u van toepassing?

- Student (1)
  - Werkende (2)
  - Gepensioneerd (3)
  - Anders (4) \_\_\_\_\_
- 

Q10 In welke leeftijdscategorie bevindt u zich?

- 15 - 30 jaar oud (1)
- 30 - 45 jaar oud (2)
- 45 - 60 jaar oud (3)
- 60 + (4)

Q11

	Volledig oneens (1)	Oneens (6)	Enigszins oneens (7)	Niet mee eens/oneens (4)	Enigszins mee eens (5)	Mee eens (8)	Volledig mee eens (9)
1. Ik moet andere mensen een innovatie zien gebruiken voordat ik ze overweeg (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Ik vind het leuk om innovaties uit te proberen (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Ik ben welwillend tegenover innovaties (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

Q12 Hoeveel dagen per week eet u vlees?

	0 (ik eet geen vlees) (1)	1 (2)	2 (3)	3 (4)	4 (5)	5 (6)	6 (7)	7 (8)
Aantal dagen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

Q13 In welke stad bent u momenteel?

- Nijmegen (4)
- Eindhoven (5)
- Utrecht (6)

Scale items development table

Construct	Definition	Operationalisation & original scale	Items original	Items English	Items Dutch
Perceived voluntariness	The degree to which the choice one makes is under the individual's volitional control (Plouffe, 2011)	Plouffe, C.R. (2001). Intermediating technologies and multi-group adoption: A comparison of consumer and merchant adoption intentions toward a new electronic payment system. <i>Journal of Product Innovation Management</i> , 18, 65-81.	My use of an Exact card is voluntary  Although suggested to my company, using the Exact card system was not compulsory	Consumption of meat alternatives is voluntary  Consumption of meat alternatives is not compulsory	Het eten van vleesvervangers is vrijwillig  Het eten van vleesvervangers is zeker niet verplicht
		Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. <i>Information systems research</i> , 2(3), 192-222.		It is expected that I eat meat alternatives	Er wordt van mij verwacht dat ik vleesvervangers eet
Perceived unnaturalness	Perceived unnaturalness is the degree to which the innovation is perceived to contain additional elements that could be toxic, artificial, synthetic, and contrary to nature. (Hwang et al., 2020).	Factors Affecting Consumers' Alternative Meats Buying Intentions: Plant-Based Meat Alternative and Cultured Meat (Hwang et al., 2020) Food Choice Questionnaire (FCQ) revisited.	Eating human-made meat is an unnatural practice that separates us further from nature.  Contains no additives	Meat alternatives are processed, which causes authenticity loss of the product  Meat alternatives contain additives	Vleesvervangers zijn bewerkt waardoor de echtheid van het product verloren gaat  Vleesvervangers bevatten smaakversterkers en andere toevoegingen

		Suggestions for the development of an enhanced general food motivation model.	Contains no artificial ingredients	Meat alternatives contain artificial ingredients	Vleesvervangers bevatten kunstmatige ingrediënten
<b>Environmental concern</b>	The degree to which a consumer has a strong positive attitude towards preserving the environment (Minton & rose, p.38., 1997)	Gershoff, A. D., & Frels, J. K. (2015). What makes it green? The role of centrality of green attributes in evaluations of the greenness of products. <i>Journal of Marketing</i> , 79(1), 97-11.	This mattress deserves to be labeled environmentally friendly  To eat meat is disrespectful towards life and the environment	Meat alternatives deserve to be labeled environmentally friendly  Purchasing meat alternatives is a good environmental choice  A person who cares about the environment would be likely to buy meat alternatives	Vleesvervangers verdienen het om gelabeld te worden als 'milieuvriendelijk'  Het kopen van vleesvervangers is een milieuvriendelijke keuze  Een persoon die geeft om het milieu zou waarschijnlijk vleesvervangers kopen
<b>Animal welfare</b>	Refers to a state of complete mental and physical health, where the animal is in harmony with its environment (Carenzi & Verga, 2016, p.6).	Marcus et al. (2022) Clonan et al. (2015) Estevéz-Moreno et al. (2021)	In general, humans have too little respect for the quality of life of animals  Do you believe that farm animals can feel pain and suffering?  I choose food which has been produced in a way that	By eating meat alternatives, I respect the quality of life of animals  Meat alternatives reduce the suffering of animals  By eating meat	Door het eten van vleesvervangers respecteer ik de kwaliteit van leven van dieren  Door het eten van vleesvervangers lijden dieren minder  Door het eten van vleesvervangers

			minimises cruelty to animals	alternatives, I contribute less to animal cruelty	draag ik minder bij aan dierenleed
<b>Perceived healthiness</b>	Refers to a consumer's expectation of a product's influence on his or her state of health (Plasek et al., 2020)	<p>Steptoe, A., Pollard, T. M., &amp; Wardle, J. (1995). Development of a measure of the motives underlying the selection of food: the food choice questionnaire. <i>Appetite</i>, 25(3), 267-284.</p> <p>Factors that predict consumer acceptance of enriched processed meats (Shan et al. 2017)</p>	<p>Keeps me healthy</p> <p>Enriched processed meat is likely to have a beneficial impact on my health</p> <p>Enriched processed meat is healthier than conventional products</p>	<p>Meat alternatives keep me healthy</p> <p>Meat alternatives are likely to have a beneficial impact on my health</p> <p>Meat alternatives are healthier than meat</p>	<p>Vleesvervangers houden mij gezond</p> <p>Vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid</p> <p>Vleesvervangers zijn gezonder dan vlees</p>
<b>Innovation adoption</b>	The degree to which a consumer is adopting an innovation based on the behavioural intentions, emotions, thoughts and current beliefs about innovations (Breckler, 1984)	Model of Breckler 1984 (Tripartite model of attitude structure).		<p><b>Cognitive:</b> I think meat alternatives are a good thing</p> <p>Meat alternatives are in line with what I think</p> <p>I have a positive opinion about meat alternatives</p> <p><b>Behavior:</b> I intend to eat meat alternatives</p> <p>I intend to try out meat alternatives</p>	<p><b>Cognitie:</b> Ik denk dat de vervanging van vlees door vleesvervangers iets goeds is</p> <p>De vervanging van vlees door vleesvervangers komt overeen met mijn overtuigingen</p> <p>Ik heb een positieve mening over de vervanging van vlees door vleesvervangers</p> <p><b>Gedrag:</b> Ik ben van plan om vleesvervangers te eten</p>

				<p>I will actively support the consumption of meat alternatives</p> <p><b>Affect:</b> Thinking about meat alternatives makes me feel glad</p> <p>Thinking about meat alternatives makes me feel happy</p> <p>Thinking about meat alternatives makes me feel satisfied</p>	<p>Ik heb de intentie om vleesvervangers te proberen</p> <p>Waar mogelijk zal ik de vervanging van vlees door vleesvervangers actief ondersteunen</p> <p><b>Affect:</b> Ik verheug mij als ik denk aan de vervanging van vlees door vleesvervangers.</p> <p>Het denken over de vervanging van vlees door vleesvervangers maakt me blij</p> <p>Het denken over de vervanging van vlees door vleesvervangers stemt me tevreden</p>
<b>Innovation resistance</b>	<p>The degree to which a consumer is actively rejecting the adoption of an innovation based on the behavioural intentions, emotions, thoughts and current beliefs about innovations (Breckler, 1984)</p>	<p>Model of Breckler 1984 //(Tripartite model of attitude structure).</p>	<p><b>Affect:</b> I feel angry about the consumption of meat alternatives</p> <p>I feel strong negative emotions about the consumption of meat alternatives</p> <p>I fear the consumption of meat alternatives</p> <p><b>Cognitive:</b> I don't think that the</p>	<p><b>Affect:</b> Ik word boos als ik denk aan de vervanging van vlees door vleesvervangers</p> <p>Ik voel negatieve emoties als ik denk aan de vervanging van vlees door vleesvervangers</p> <p>Ik vrees de vervanging van vlees door vleesvervangers</p> <p><b>Cognitie:</b> Ik denk niet dat de vervanging van vlees door</p>	

				<p>consumption of meat alternatives is a good idea</p> <p>The consumption of meat alternatives is absolutely not in line with what I think</p> <p>I have strong negative prejudices about meat alternatives</p> <p><b>Behavior:</b> I will file a complaint against the consumption of meat alternatives</p> <p>I will hinder the consumption of meat alternatives</p> <p>I will protest against the consumption of meat alternatives</p>	<p>vleesvervangers een goed idee is</p> <p>De vervanging van vlees door vleesvervangers is totaal niet in lijn met mijn overtuigingen</p> <p>Ik heb sterke negatieve vooroordelen over vleesvervangers</p> <p><b>Gedrag:</b> Ik ga een klacht indienen tegen de vervanging van vlees door vleesvervangers</p> <p>Indien mogelijk zal ik de vervanging van vlees door vleesvervangers proberen tegen te houden</p> <p>Ik ben geneigd om te protesteren tegen de vervanging van vlees door vleesvervangers</p>
<b>Control Variables</b>					
<b>Gender</b>				<p><b>What is your gender?</b> Man/women/gender neutral/other</p>	<p><b>Wat is uw geslacht?</b> Man/vrouw/genderneutraal/anders___</p>
<b>Age</b>				<p><b>In which age category are you now?</b> 15-30, 30-45, 45-60, 60+</p>	<p><b>In welke leeftijdscategorie bevindt u zich?</b> 15-30, 30-45, 45-60, 60+</p>
<b>Meat consumption</b>				<p><b>How many days do you</b></p>	<p><b>Hoe vaak eet u vlees?</b> 0-7</p>

				<b>consume meat?</b> 0-7	
<b>Perceived innovativeness</b>	The degree to which a consumer is willing to try out new innovations (Lowe & alpert, 2015)	<i>H. Thomas Hurt, Katherine Joseph, Chester D. Cook, Scales for the Measurement of Innovativeness, Human Communication Research, Volume 4, Issue 1, September 1977, Pages 58–65,</i>	<p>I must see other people using new innovations before I consider them</p> <p>I enjoy trying out new ideas</p> <p>I am receptive to new ideas</p> <p>“I will continue using my existing learning method because it would be stressful to change.</p> <p>I will continue using my existing learning method simply because it is what I have always done.</p> <p>I will continue using my existing learning even though I know it is not the most effective way to do things.”</p>	<p>I must see other people using innovations before I consider them</p> <p>I enjoy trying out innovations</p> <p>I am receptive to innovations</p>	<p>Ik moet andere mensen een innovatie zien gebruiken voordat ik ze overweeg</p> <p>Ik vind het leuk om innovaties uit te proberen</p> <p>Ik ben welwillend tegenover innovaties</p>
<b>Work experience</b>				<b>What situation suits you best at the moment?</b> Student -Working - retired -Other,	<b>Wat is momenteel voor u van toepassing?</b> -Student -Werkende -Gepensioneerd -Anders, namelijk:

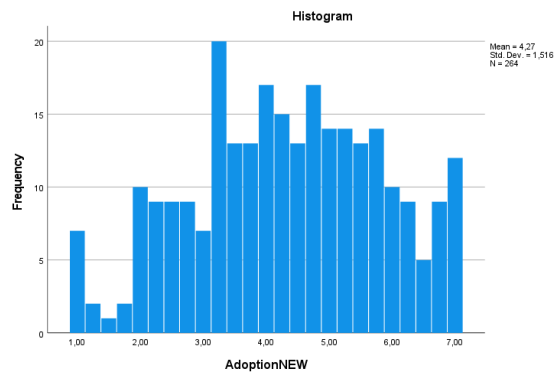
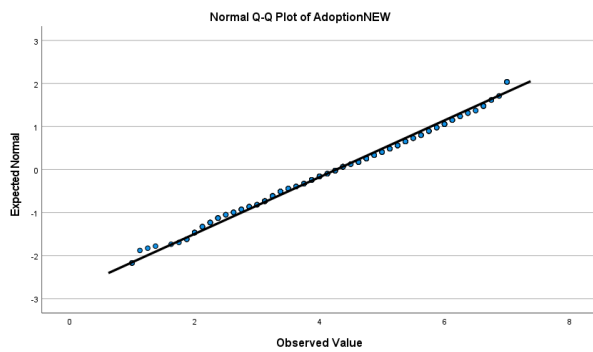
## APPENDIX 2: SAMPLE

	Numeric value	Percentage of total
No of participants	306	100%
Uncompleted surveys	37	12%
Outliers	2	.6%
Answers considered	267	87.3%

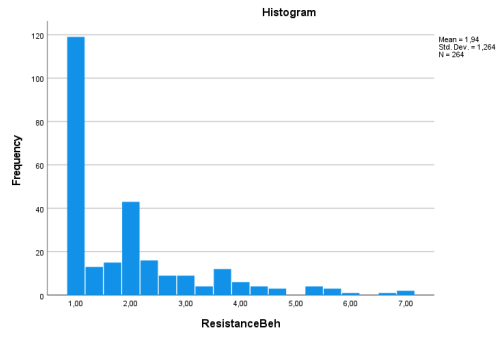
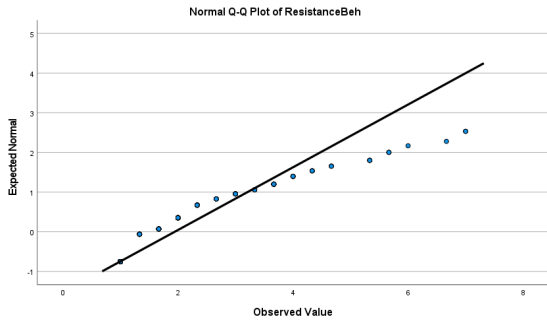
Table 18: Antecedents of resistance and adoption and their scale items

## APPENDIX 3: TEST FOR NORMALITY

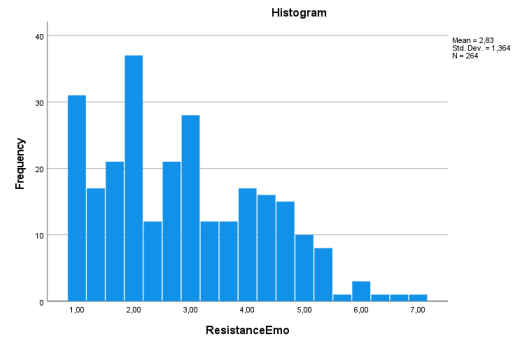
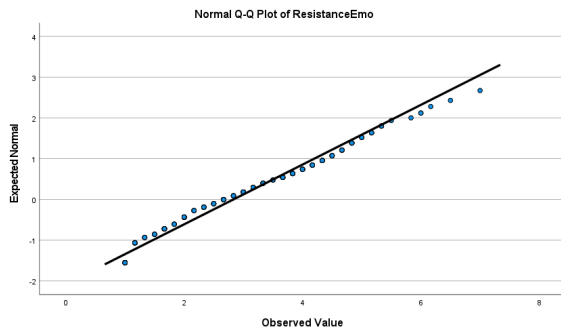
### Adoption



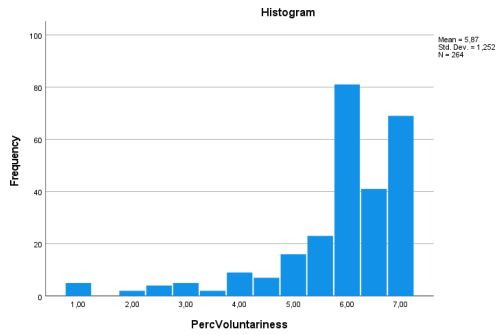
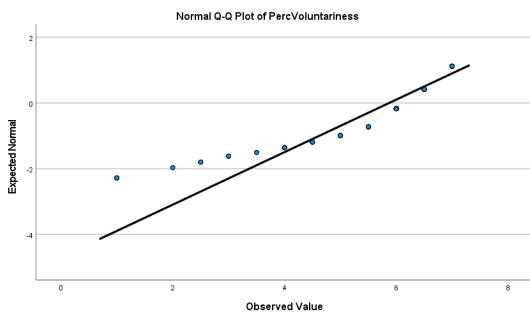
### Behavioural resistance



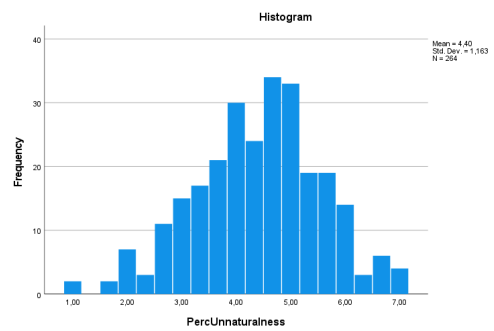
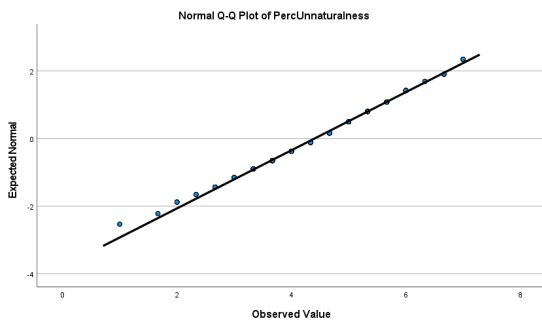
*Emotional resistance*



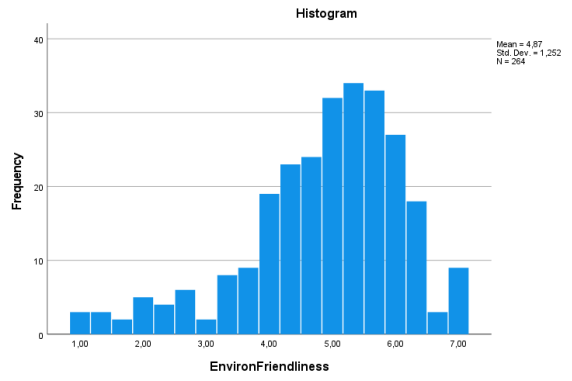
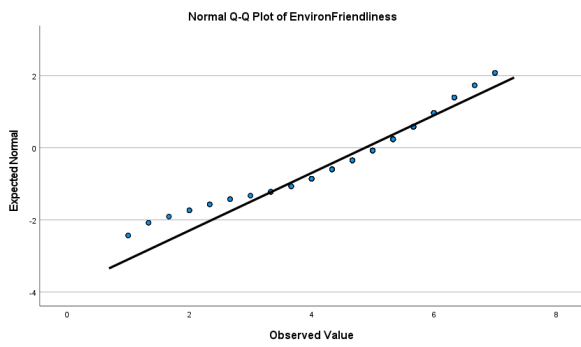
*Perceived voluntariness*



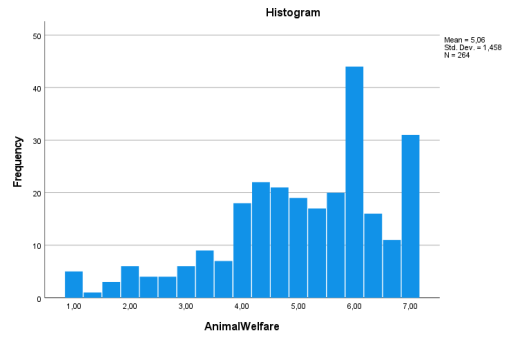
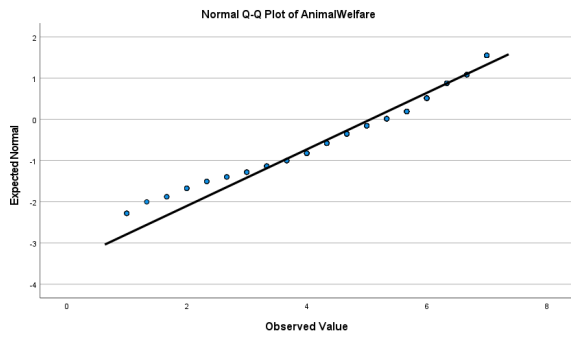
*Perceived unnaturalness*



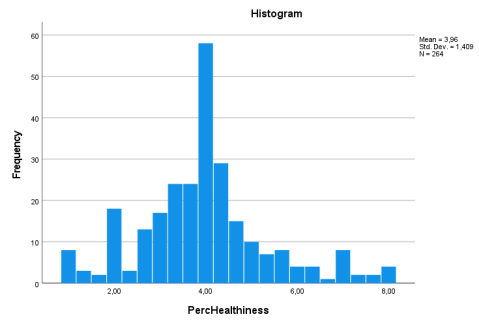
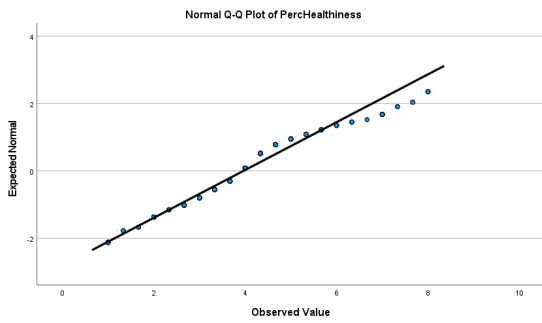
*Environmental concern*



*Animal welfare*

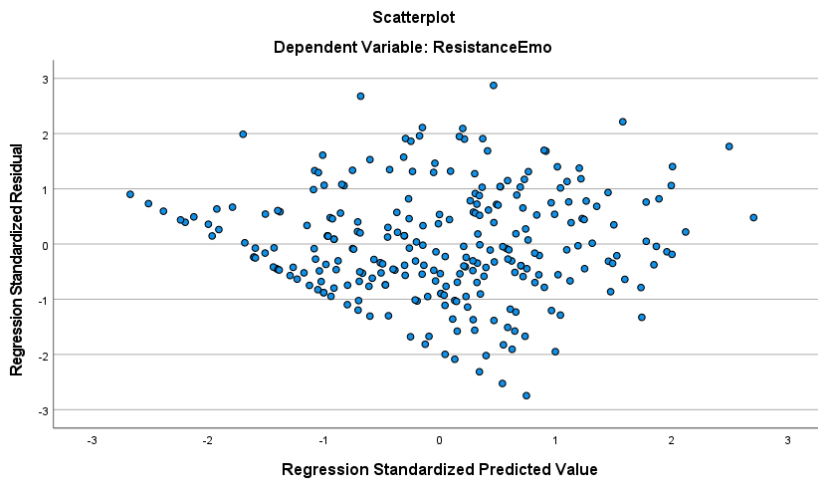


*Perceived healthiness*

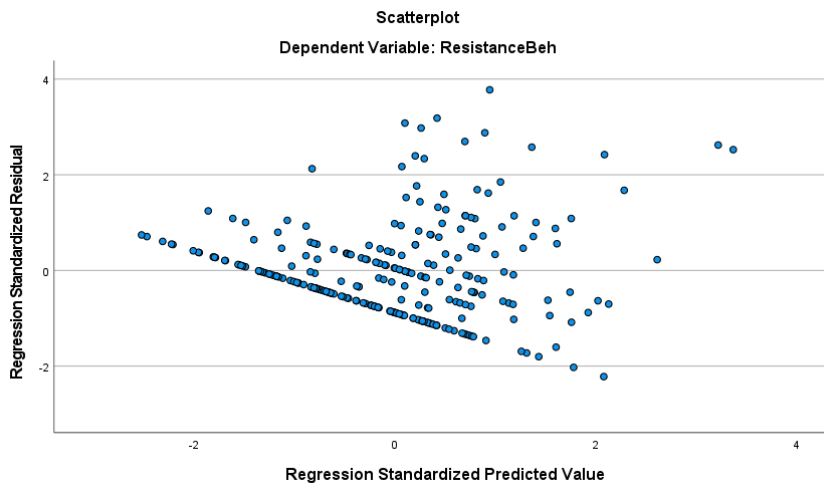


**APPENDIX 4: TEST FOR LINEARITY**

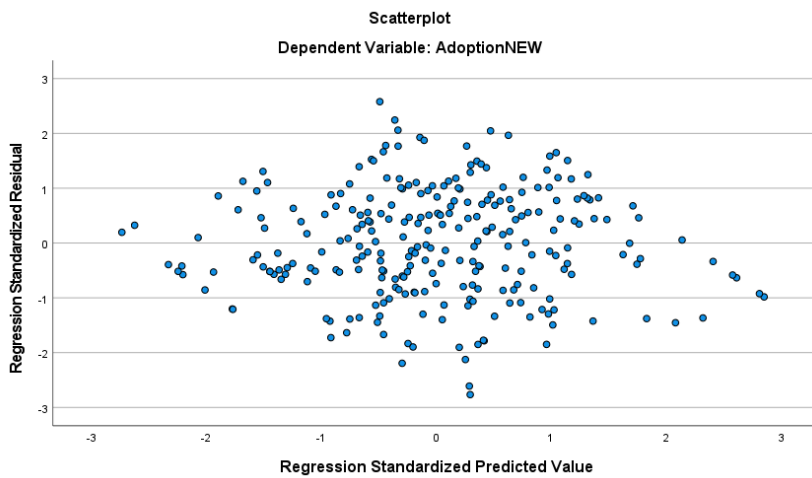
*Emotional resistance*



*Behavioural resistance*



*Adoption*



## APPENDIX 5: CORRELATIONS MATRIX

	1	2	3	4	5	6	7	8	9
Adoption	1								
Resistance behaviour	-.433**	1							
Emotional resistance	-.739**	.656**	1						
Perceived Voluntariness	.147*	-.162**	-.075	1					
Perceived Unnaturalness	-.392**	.358**	.470**	.101	1				
Environmental concern	.634**	-.363**	-.490**	.234**	-.269**	1			
Animal welfare	.558**	-.345**	-.470**	.175**	-.145*	.577**	1		
Perceived Healthiness	.633**	-.230**	-.401**	.138*	-.345**	.520**	.410**	1	
Perceived innovativeness	.363**	-.219**	-.348**	.016	-.146*	.196**	.169**	.215**	1
Mean	4.26	2.83	4.33	6.51	5.87	4.40	4.87	5.06	3.96
Standard deviation	1.52	1.36	1.49	1.62	1.25	1.16	1.25	1.46	1.41

Table 19: Correlations matrix and descriptive statistics N=264 P<.001 \*\*

## APPENDIX 6: FACTOR ANALYSES

### Perceived voluntariness

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.500
Approx. Chi-Square	135.419
Bartlett's Test of Sphericity	df
	1
	Sig.
	<.001

#### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.636	81.788	81.788	1.636	81.788	81.788
2	.364	18.212	100.000			

Extraction Method: Principal Component Analysis.

### Component Matrix<sup>a</sup>

	Component 1
Q1 - 1. Het eten van vleesvervangers is vrijwillig	.904
Q1 - 2. Het eten van vleesvervangers is zeker niet verplicht	.904

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### *Perceived unnaturalness*

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.500	
Approx. Chi-Square	101.484	
Bartlett's Test of Sphericity	df	1
	Sig.	<.001

#### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.567	78.357	78.357	1.567	78.357	78.357
2	.433	21.643	100.000			

Extraction Method: Principal Component Analysis.

### Component Matrix<sup>a</sup>

	Component 1
Q2 - 2. Vleesvervangers bevatten smaakversterkers en andere toevoegingen	.885
Q2 - 3. Vleesvervangers bevatten kunstmatige ingrediënten	.885

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### *Environmental concern*

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.615	
Approx. Chi-Square	294.442	
Bartlett's Test of Sphericity	df	3
	Sig.	<.001

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.114	70.463	70.463	2.114	70.463	70.463
2	.651	21.688	92.151			
3	.235	7.849	100.000			

Extraction Method: Principal Component Analysis.

### Component Matrix<sup>a</sup>

	Component 1
Q3 - 1. Vleesvervangers verdienen het om gelabeld te worden als 'milieuvriendelijk'	.870
Q3 - 2. Het kopen van vleesvervangers is een milieuvriendelijke keuze	.915
Q3 - 3. Een persoon die geeft om het milieu zou waarschijnlijk vleesvervangers kopen	.721

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### Animal welfare

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.731
Approx. Chi-Square	338.187
Bartlett's Test of Sphericity	df
	3
	Sig.
	<.001

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.310	76.995	76.995	2.310	76.995	76.995
2	.367	12.238	89.233			
3	.323	10.767	100.000			

Extraction Method: Principal Component Analysis.

### Component Matrix<sup>a</sup>

	Component 1
Q4 - 1. Door het eten van vleesvervangers respecteer ik de kwaliteit van leven van dieren	.873

Q4 - 2. Door het eten van vleesvervangers lijden dieren minder	.872
Q4 - 3. Door het eten van vleesvervangers draag ik minder bij aan dierenleed	.887

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### *Perceived healthiness*

#### **KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.712
Approx. Chi-Square	330.467
Bartlett's Test of Sphericity	df
	3
	Sig.
	<.001

#### **Total Variance Explained**

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.282	76.080	76.080	2.282	76.080	76.080
2	.430	14.345	90.425			
3	.287	9.575	100.000			

Extraction Method: Principal Component Analysis.

#### **Component Matrix<sup>a</sup>**

	Component 1
Q5 - 1. Vleesvervangers houden mij gezond	.871
Q5 - 2. Vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid	.900
Q5 - 3. Vleesvervangers zijn gezonder dan vlees	.845

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### *Adoption*

#### **KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.928
Approx. Chi-Square	2119.082
Bartlett's Test of Sphericity	df
	28
	Sig.
	.000

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.068	75.854	75.854	6.068	75.854	75.854
2	.567	7.083	82.938			
3	.392	4.896	87.834			
4	.280	3.499	91.333			
5	.239	2.993	94.326			
6	.192	2.402	96.728			
7	.158	1.978	98.706			
8	.103	1.294	100.000			

Extraction Method: Principal Component Analysis.

### Component Matrix<sup>a</sup>

	Component 1
Q6 - 1. Ik denk dat de vervanging van vlees door vleesvervangers iets goeds is	.868
Q6 - 2. De vervanging van vlees door vleesvervangers komt overeen met mijn overtuigingen	.823
Q6 - 3. Ik heb een positieve mening over de vervanging van vlees door vleesvervangers	.913
Q6 - 4. Ik ben van plan om vleesvervangers te eten	.855
Q6 - 5. Ik heb de intentie om vleesvervangers te proberen	.806
Q6 - 6. Waar mogelijk zal ik de vervanging van vlees door vleesvervangers actief ondersteunen	.867
Q6 - 7. Ik verheug mij als ik denk aan de vervanging van vlees door vleesvervangers	.889
Q6 - 8. Het denken over de vervanging van vlees door vleesvervangers maakt me blij	.893
Q6 - 9. Het denken over de vervanging van vlees door vleesvervangers stemt me tevreden	.899

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

*Resistance*

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.906
Approx. Chi-Square	1644.139
Bartlett's Test of Sphericity	df
	36
	Sig.
	.000

**Total Variance Explained**

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.564	61.823	61.823	5.564	61.823	61.823
2	1.126	12.510	74.333	1.126	12.510	74.333
3	.491	5.458	79.791			
4	.458	5.084	84.876			
5	.414	4.599	89.474			
6	.286	3.177	92.652			
7	.252	2.795	95.447			
8	.213	2.365	97.812			
9	.197	2.188	100.000			

Extraction Method: Principal Component Analysis.

**Component Matrix<sup>a</sup>**

	Component	
	1	2
Q7 - 1. Ik word boos als ik denk aan de vervanging van vlees door vleesvervangers	.825	.001
Q7 - 2. Ik voel negatieve emoties als ik denk aan de vervanging van vlees door vleesvervangers	.831	-.268
Q7 - 3. Ik vrees de vervanging van vlees door vleesvervangers	.765	-.341
Q7 - 4. Ik denk niet dat de vervanging van vlees door vleesvervangers een goed idee is	.781	-.196
Q7 - 5. De vervanging van vlees door vleesvervangers is totaal niet in lijn met mijn overtuigingen	.830	-.257
Q7 - 6. Ik heb negatieve vooroordelen over vleesvervangers	.729	-.331

Q7 - 7. Indien mogelijk zal ik een klacht indienen tegen de vervanging van vlees door vleesvervangers	.796	.450
Q7 - 8. Indien mogelijk zal ik de vervanging van vlees door vleesvervangers proberen tegen te houden	.813	.375
Q7 - 9. Ik ben geneigd om te protesteren tegen de vervanging van vlees door vleesvervangers	.694	.617

Extraction Method: Principal Component Analysis.  
a. 2 components extracted.

### Pattern Matrix

	Component	
	1	2
Q7 - 1. Ik word boos als ik denk aan de vervanging van vlees door vleesvervangers	.579	
Q7 - 2. Ik voel negatieve emoties als ik denk aan de vervanging van vlees door vleesvervangers	.853	
Q7 - 3. Ik vrees de vervanging van vlees door vleesvervangers	.880	
Q7 - 4. Ik denk niet dat de vervanging van vlees door vleesvervangers een goed idee is	.746	
Q7 - 5. De vervanging van vlees door vleesvervangers is totaal niet in lijn met mijn overtuigingen	.840	
Q7 - 6. Ik heb negatieve vooroordelen over vleesvervangers	.844	
Q7 - 7. Indien mogelijk zal ik een klacht indienen tegen de vervanging van vlees door vleesvervangers		.847
Q7 - 8. Indien mogelijk zal ik de vervanging van vlees door vleesvervangers proberen tegen te houden		.768
Q7 - 9. Ik ben geneigd om te protesteren tegen de vervanging van vlees door vleesvervangers		.997

Extraction Method: Principal Component Analysis.  
 Rotation Method: Oblimin with Kaiser  
 Normalization.  
 a. Rotation converged in 5 iterations.

Rotated component matrix before deletion of item one of adoption

	1	2	3	4	5	6
Perceivedvoluntariness1					.859	
Perceivedvoluntariness2					.881	
Perceivedunnaturalness1						.874
Perceivedunnaturalness2						.792
Environmentalfriendliness1			.521			
Environmentalfriendliness2			.626			
Environmentalfriendliness3			.508			
Animalwelfare1			.694			
Animalwelfare2			.822			
Animalwelfare3			.785			
Perceivedhealthiness1				.797		
Perceivedhealthiness2				.800		
Perceivedhealthiness3				.717		
Adoption1	.623		.445			
Adoption2	.717					
Adoption3	.751					
Adoption4	.733					
Adoption5	.626					
Adoption6	.754					
Adoption7	.813					
Adoption8	.821					
Adoption9	.790					
Resistance1	-.420	.663				
Resistance2	-.542	.583				
Resistance3	-.592	.508				
Resistance4	-.559	.508				
Resistance5	-.687	.485				
Resistance6	-.627	.416				
Resistance7		.835				
Resistance8		.848				
Resistance9		.827				

Table 20: Rotated pattern matrix using VARIMAX as rotation method before deletion of Adoption item 1

Rotated factor matrix able after the deletion of adoption item 1

	1	2	3	4	5	6
Perceivedvoluntariness1					.859	
Perceivedvoluntariness2					.881	
Perceivedunnaturalness2						.874
Perceivedunnaturalness3						.792
Environmentalfriendliness1			.521			
Environmentalfriendliness2			.626			
Environmentalfriendliness3			.508			
Animalwelfare1			.694			
Animalwelfare2			.822			
Animalwelfare3			.785			

Perceivedhealthiness1				.797		
Perceivedhealthiness2				.800		
Perceivedhealthiness3				.717		
Adoption2	.717					
Adoption3	.751					
Adoption4	.733					
Adoption5	.626					
Adoption6	.754					
Adoption7	.813					
Adoption8	.821					
Adoption9	.790					
Resistance1	-.420	.663				
Resistance2	-.542	.583				
Resistance3	-.592	.508				
Resistance4	-.559	.508				
Resistance5	-.687	.485				
Resistance6	-.627	.416				
Resistance7		.835				
Resistance8		.848				
Resistance9		.827				

Table 21: Rotated pattern matrix using VARIMAX as rotation method with the deletion of adoption item one

## APPENDIX 7: SPSS OUTPUT FOR THE RESULTS

Model 2 dependent variable: emotional resistance

Variable	Tolerance	VIF
Perc. voluntariness	.869	1.150
Perc. unnaturalness	.798	1.253
Environ. friendliness	.530	1.887
Animal welfare	.583	1.716
Perc. healthiness	.580	1.723
Meat consumption	.701	1.427
Perc. innovativeness	.886	1.129
Working	.529	1.891
Retired	.581	1.720
Other situation	.895	1.117
Woman	.828	1.207
Gender neutral	.779	1.284
Other	.933	1.072
middle	.665	1.503
older	.673	1.486
oldest	.640	1.563

Model 4 dependent variable: behavioural resistance

Variable	Tolerance	VIF
Perc. voluntariness	.869	1.150
Perc. unnaturalness	.798	1.253
Environ. friendliness	.530	1.887
Animal welfare	.583	1.716
Perc. healthiness	.580	1.723
Meat consumption	.701	1.427
Perc. innovativeness	.886	1.129
Working	.529	1.891
Retired	.581	1.720
Other situation	.895	1.117
Woman	.828	1.207
Gender neutral	.779	1.284
Other	.933	1.072
middle	.665	1.503
Older	.673	1.486
Oldest	.640	1.563

Model 6 dependent variable: adoption

Variable	Tolerance	VIF
Perc. voluntariness	.869	1.150
Perc. unnaturalness	.798	1.253
Environ. friendliness	.530	1.887
Animal welfare	.583	1.716
Perc. healthiness	.580	1.723
Meat consumption	.701	1.427
Perc. innovativeness	.886	1.129
Working	.529	1.891
Retired	.581	1.720
Other situation	.895	1.117
Woman	.828	1.207
Gender Neutral	.779	1.284
Other	.933	1.072
middle	.665	1.503
older	.673	1.486
Oldest	.640	1.563