

The differences between consumer innovation resistance and consumer innovation adoption

*Quantitative research on the qualitative differences between resistance and adoption in the
context of plant-based meat substitutes*

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Preface

At this moment, I proudly represent my master thesis with the title, *The differences between consumer innovation resistance and consumer innovation adoption*. This research marks the end of my master's programme in Innovation & Entrepreneurship within the Faculty of Management Sciences at Radboud University Nijmegen. From December 2021 to August 2022, I was engaged in researching and writing my master's thesis. Writing this research has been a complex and iterative process. I have learned a lot from studying theory, collecting data, analysing the data and answering the research question.

I want to thank my supervisor, Prof. dr. B. Hillebrand, for his excellent supervision, constructive feedback, guidance and trust in me during the thesis process. I also want to thank my fellow students for their great collaboration. In addition, a special thanks to the respondents who participated in the pilot studies and survey. Finally, I want to thank my girlfriend Carolina van Winkel, my family and my friends for their support and motivational words, which helped me complete this master thesis.

I hope you will enjoy reading this master thesis!

Sven Kuijsten

Eindhoven, August 2022

Abstract

Academics disagree on the meaning of resistance and how it differs from adoption. This study, therefore, provides more clarity about the meaning of resistance and its differences with adoption when looking at the innovation of plant-based meat substitutes. Resistance and adoption were both conceptualized with Breckler's attitude model, as it makes the comparison easier. The research used a quantitative survey filled in by 265 respondents. Results from the analyses in SPSS Statistics show that resistance is seen as a two-dimensional construct, consisting of 1) resistance emotion and cognition and 2) resistance behaviour. However, adoption is still seen as a one-dimensional construct. This difference in dimensionalities is one of the arguments for resistance and adoption being different concepts. Nevertheless, resistance and adoption can also be seen as opposites when looking at their significant and negative correlation. In addition, this study also uses antecedents that lead to consumer resistance and adoption of PBMS. Only one out of five antecedents showed a qualitative difference between resistance and adoption, namely perceived healthiness. Perceived voluntariness, perceived animal welfare and perceived healthiness also show the qualitative difference but only when using resistance behaviour. Therefore, resistance behaviour better shows the qualitative difference compared to resistance emotion and cognition as three out of five antecedents show the differences. As a result, consumer innovation resistance is, to a low extent, qualitatively different from adoption when looking at the differences between the dimensionalities of resistance and adoption and the antecedents that show qualitative differences. However, more research is needed to generalise the results of this study, as the sample was not representative. Future research should focus on further conceptualising resistance with Breckler's attitude model. In addition, group differences cause differences in outcomes for resistance and adoption, which academics could pay more attention to in the future. Managers and policymakers can use the results of this study to act and strategise so that fewer (food) innovations will become a failure.

Keywords: *Consumer innovation resistance, consumer innovation adoption, plant-based meat substitutes, consumer attitudes, qualitative differences.*

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1. Introduction

Between 40 and 90 per cent of innovations fail on the market (Ram & Sheth, 1989; Gourville, 2006). Remarkably, organizations keep investing in the development of innovations (e.g., new products), only to find out that consumers resist them (Heidenreich & Spieth, 2014; Gourville, 2006). Sometimes, consumers even launch campaigns to protest against new products, such as genetically modified food (Kleijnen, Lee & Wetzels, 2009). Moreover, it is questionable whether there is a difference between resistance and non-adoption (consumers who do not use a new product). Understanding these differences can help to better prevent innovation failure.

There are several reasons why consumers do not accept innovations. For example, when consumers do not experience advantages when using a new product (Rogers, 2003) or when consumers overvalue an existing product over the new product (Tversky & Kahneman, 1991). Moreover, resistance to innovations is a major reason for an innovation to fail as consumers need to accept changes of the new product, such as price, design and performance before consumers accept new products (Claudy, Garcia & Driscoll, 2015; Heidenreich & Spieth, 2013; Heidenreich & Handrich, 2015).

Despite the significance of resistance, academia disagrees on what innovation resistance is and what it means (Huang, Jin & Cohlán, 2021). Some academics see resistance as a negative attitude that leads to rejection of the new product (e.g., Mani & Chouk, 2019). In comparison, others see resistance as a consumer's behaviour (e.g., Lee, 2020; Rieple & Snijders, 2018), such as the postponement of using a new product (Kleijnen et al., 2009). The literature does not show one precise way to conceptualize innovation resistance. Therefore, more research is needed to understand resistance better.

The academic disagreement intensifies as there is also confusion on innovation resistance and its differences with adoption (consumers who make use of a new product). This academic confusion can be classified into three perspectives. The first perspective includes academics stating that resistance and adoption are opposites (e.g., Mohamed, Bloem & Poiesz, 1997; Reinhardt, Hietschold & Gurtner, 2017). For example, they state that if a person does not adopt a new product, a person will resist the new product.

The second perspective argues that academics use the concepts of resistance and adoption interchangeably (e.g., Talke & Heidenreich, 2014; Talwar, Talwar, Kaur & Dhir, 2020). For example, they see resistance to innovation as a negative outcome of the adoption process in which consumers decide not to adopt the new product (Talke & Heidenreich, 2014).

Finally, the last perspective, states that resistance is qualitatively different from non-adoption (consumers who make no use of a new product) (e.g., Claudy et al., 2015; Kleijnen, Lee & Wetzels, 2009; Kuisma, Laukkanen & Hiltunen, 2007). This qualitative difference means that resistance is (partly) influenced (likely to be influenced) by different antecedents than non-adoption, suggesting that adoption and resistance are not opposites but qualitatively different concepts. For example, *“persons who adopt an electric vehicle may do so because of the environmental advantages, but it is unlikely that people resist electric vehicles because they want to harm the environment”* (Claudy et al., 2015, p. 529). Also, consumers who perceive environmental benefits as less important are probably not a reason to resist electric vehicles, which would be the case if resistance and adoption were opposites.

This study aims to grasp an understanding of the academic confusion on innovation resistance and its differences with adoption. Therefore, this study tries to understand innovation resistance better. Also, typical antecedents that hold for resistance or adoption are used to study the qualitative differences between resistance and adoption, suggesting that resistance antecedents do not influence adoption and vice versa. If these antecedents are qualitatively different, this study can argue that the concepts of resistance and adoption are not opposites. Consequently, academia moves forward in conceptualising innovation resistance and its perspective on adoption. As a result, the following research question is formulated.

To what extent are consumer innovation resistance and consumer innovation adoption qualitatively different concepts?

1.1 Relevance

The justification of this research is threefold. First, numerous research has been conducted on the successful adoption of innovations (e.g., Arts, Frambach, Tammo & Bijmolt, 2009; Azjen, 1995; Davis, 1989; Rogers, 2003). On the other hand, less research has been conducted on innovation resistance and researchers often ignored resistance triggers, despite its significance (Huang et al., 2021). As a result, this research contributes to the field of consumer innovation resistance and consumer innovation adoption by providing a better conceptualization of resistance and what the qualitative differences are between resistance and adoption.

Second, this research uses plant-based meat substitutes (henceforth PBMS) as an innovation for empirical research. PBMS are extracted from plants and are seen as green innovations as PBMS uses fewer natural resources (e.g., water, land and oil) compared to meat

production (He, Evans, Liu & Shao, 2020; Ottman, Stafford & Hartman, 2006; Tosnun, Yanar, Sezgin & Uray, 2021). Therefore, PBMS positively contribute to the environment. PBMS can help public policymakers and society as a whole, as PBMS positively contribute to societal challenges, such as food security and climate change (He et al., 2020; Zhuang, Luo & Riaz, 2021). Public policymakers can use the results of this study to develop future policies and reduce consumer resistance toward green innovations (especially PBMS). In addition, the more people adopt green innovations, the more benefits for the environment and society.

Third and last, organisations continuously develop innovations, as innovations help gain competitive advantage and survive long-term (Han, Kim & Srivastava, 1998). Nevertheless, most new products fail, which is a missed opportunity as resisted innovation cannot boost a company's future revenues or improve its position in the market (Castellion & Markham, 2013). Moreover, the development of new products costs time and money (Gourville, 2006). Results of this study can help organisations and managers better understand what innovation resistance is and how it is related to adoption. In addition, this study might also provide organisations and managers with more information on how to develop and introduce green innovations on the market, as this study uses PBMS. The development and introduction of green innovations on the market suggest the prospect of earning a competitive position, as applying green innovations improves the sustainability performance of corporations (Jin, Shahzad, Zafar & Suki, 2022). To conclude, organisations and managers can act and strategize appropriately so that fewer (green) innovations will become a failure.

1.2 Research outline

First, an overview of the literature and key elements of consumer innovation resistance and consumer innovation adoption will be provided in chapter 2. Besides conceptualizing innovation resistance and adoption, an overview of the literature and key elements will help develop hypotheses. Second, a quantitative survey is used to gather data on consumer innovation resistance and adoption in the context of PBMS. Third, multiple regression analyses are used to test the developed hypotheses. Fourth and last, the results of the analyses are discussed, and practical implications will be described, as well as limitations and further research.

2. Theoretical framework

This chapter provides an overview of the relevant theories and assumptions relating to the key concepts in this study, namely consumer innovation resistance and consumer innovation adoption. Next to conceptualising innovation resistance and adoption, hypotheses and a conceptual model are developed as a basis for the empirical study.

2.1 Consumer innovation resistance

Consumer innovation resistance is conceptualized differently in several studies (e.g., Heidenreich & Handrich, 2014; Lee, 2020; Mani & Chouk, 2018; Mani & Chouk 2019; Rieple & Snijders, 2018). Overall, academics distinguish mainly between attitudes and behaviours regarding innovation resistance, eventually resulting in consumers not using or resisting a new product. Table 1 overviews various conceptualizations of consumer innovation resistance in the scientific literature.

Table 1.
Conceptualizations of consumer innovation resistance.

Authors	Consumer innovation resistance is seen as
Heidenreich & Handrich (2014)	A generic predisposition.
Mani & Chouk (2019)	A negative attitude.
Lee (2020)	An intentional behaviour.
Rieple & Snijders (2018)	An actual behaviour.
Mani & Chouk (2018)	A combination of the above concepts.

Table 1 shows that academia see resistance as a predisposition, meaning that consumers resist innovations before the new product evaluation or differently said before a consumer decides to use or reject the new product. A generic predisposition is often unconsciously as consumers resist change and are satisfied with the current product (Heidenreich & Kraemer, 2016). As a result, resistance as a generic predisposition is seen as passive innovation resistance (Talke & Heidenreich, 2014). On the other hand, other academics see resistance as a negative attitude which results in consumers rejecting the new product while cognitively or physically dealing with it. To clarify, rejecting the innovation after buying or using it. This negative attitude is also seen as active innovation resistance (Talke & Heidenreich, 2014).

Besides passive innovation resistance and active innovation resistance, academics see resistance as a behaviour (e.g., Lee, 2020; Rieple & Snijders, 2018). This behaviour can take different forms of resistance. Forms can vary from 1) postponement, 2) rejection, and 3)

opposition (Kleijnen et al., 2009; Szmigin & Foxall, 1998). All three forms are seen as a response toward a new product and are based on a consumer's conscious choice. Postponement is seen as a consumer's behaviour to postpone using a new product. Rejection can be seen as a consumer's behaviour of not using a new product. The final form is a consumer's behaviour to oppose a new product resulting in, for example, consumers taking complaints against the organization that introduces this new product or protesting against the new product.

The attitudes and behaviours can also be used as a combination of how academics see resistance. I mean that resistance is seen as a combination of attitudes and behaviours that lead to resisting a new product. For example, “*Consumer innovation resistance is a form of reaction or negative attitude to new products and services that triggers change or upset the status quo*”, in which I see reactions as behaviours (Mani & Chouk, 2018, p. 781).

Definitions of consumer innovation resistance also differ as academics disagree on what consumer innovation resistance is (e.g., Bagozzi & Lee, 1999; Szmigin, & Foxall, 1998; Talwar et al., 2020). Also, this difference may partly confuse how academics see the relationship between resistance to adoption. I divide academia into three perspectives of resistance toward adoption. At first, resistance and adoption concepts are seen as opposites. Second, both concepts are seen as interchangeable, which means that both concepts can co-exist. To clarify the word 'interchangeable', I see academics sometimes argue that resistance is qualitatively different from adoption but still link the concept of resistance with being the same as non-adoption or leading to non-adoption. Lastly, concepts of resistance and adoption are seen as not being opposites. In other words, resistance is not the obverse of adoption but suggests that both concepts are qualitatively different. Table 2 provides an overview of resistance definitions and their perspective on adoption used among several academics.

Table 2.

Definitions of innovation resistance and the perspective on resistance versus adoption

Authors	Definition of innovation resistance	Perspective on resistance versus adoption	Argument
Mohamed, Bloem & Poiesz (1997)	<i>“The resistance offered by consumers to an innovation, because it poses potential changes from a satisfactory status quo or because it conflicts with their belief structure”</i> (Ram & Sheth, 1989, p. 6).	Opposites	They are implicitly considering resistance as simply non-adoption.

Peñaloza & Price (1993)	"To withstand the force or affect of", for example a new product (Peñaloza & Price, 1993, p. 123).	Opposites	They confuse resistance with a simple and more passive notion of non-adoption.
Talke & Heidenreich (2014)	"Passive innovation resistance as a negative outcome of the knowledge stage and active innovation resistance as a negative outcome of the persuasion stage" (Talke & Heidenreich, 2014, p. 896).	Interchangeable	Resistance to innovation can be viewed as a negative outcome of the adoption process.
Talwar et al. (2020)	"Unwillingness among consumers to try new innovations in the market" (p.1).	Interchangeable	Both rejection, postponement, and opposition are reactions to non-adoption and resistance.
Ram & Sheth (1989)	"The resistance offered by consumers to an innovation, because it poses potential changes from a satisfactory status quo or because it conflicts with their belief structure" (Ram & Sheth, 1989, p. 6).	Not opposites	Innovation adoption is not the polar opposite of innovation resistance. As a result, adopting innovation is contingent on the consumer's initial resistance being overcome.
Szmigin & Foxall (1998)	Innovation resistance is a response based on a conscious choice, consisting of rejection, postponement, and opposition.	Not opposites	They argue that rejection may explain non-adoption, implying that resistance and adoption are not opposites because resistance influences non-adoption.
Bagozzi & Lee (1999)	Innovation resistance is an outcome of negative emotions (e.g., fear and anger).	Not opposites	They argue that resistance is part of the adoption process, which happens throughout the process.

One of the first studies on innovation resistance defined consumer innovation resistance as "*The resistance offered by consumers to an innovation, because it poses potential changes from a satisfactory status quo, or because it conflicts with their belief structure*" (Ram & Sheth, 1989, p. 6). For example, consumers resisted wind turbines because of unobstructed views, which conflicts with the consumers' satisfactory status quo or beliefs (Gourville, 2006). Numerous studies regarding innovation resistance use the definition of Ram & Sheth (e.g., Claudy et al., 2015; Laukkanen, 2016; Mohamed et al., 1997; Reinhardt et al., 2017). Other academics see innovation resistance as anti-consumption and its manifestation as adverse outcomes of not using an innovation. This anti-consumption means that consumers are actively against consuming new products, services, technologies and lifestyles by making complaints,

protesting, or taking action against the organisation that introduces the innovation (Talke & Heidenreich, 2014). Again, another definition of innovation resistance is the unwillingness among consumers to try innovations in the market (Talwar et al., 2020). All in all, innovation resistance is defined differently among academics, and the perspective of resistance on adoption is also unclear, as seen in table 2. However, it is important to define and conceptualize consumer innovation resistance to answer the research question.

2.1.1 Definition and conceptualization of consumer innovation resistance

The tripartite model of attitude structure of Breckler (1984) can help to conceptualize consumer innovation resistance, as Huang et al. (2021) argues in a recent review on consumer innovation resistance. Attitude in this model is defined as “*A response to an antecedent stimulus or attitude object.*” (Breckler, 1984, p. 1191). This attitude refers to a response that is expressed by evaluating, for example, a new product. So, consumers will use the new product, or consumers will resist the new product based on their attitude. This attitude is expressed through the three attitude components; 1) affect, 2) cognition, and 3) behaviour. Attitude component affect implies feelings about a new product, such as good or bad. In addition, Castro, Zambaldi and Ponchino (2019) and Bagozzi and Lee (1999) argued that emotions (such as fear, anger, or sadness) could play an important role in the evaluation of resistance to resist a new product (Bagozzi & Lee, 1999). The second attitude component, cognition, implies beliefs and values about a new product. The last attitude component behaviour implies, for example, overt actions and intentions towards the new product (e.g., keeping the new product or not). These attitude components are not independent but influence each other, resulting in an attitude. Also, other academics conceptualize consumer innovation resistance as a negative attitude, which can be explained by the model of Breckler (Mani & Chouk, 2019; Huang et al., 2021). Figure 1 gives an overview of the attitude model of Breckler.

The above arguments made me conceptualize consumer innovation resistance with the attitude model of Breckler. This model looks promising in explaining a consumer's attitude to deciding to use a new product or resist a new product. Hence, this study uses the following definition of resistance;

Consumer innovation resistance is the degree to which a consumer resists a new product based on emotions, beliefs and behaviours.

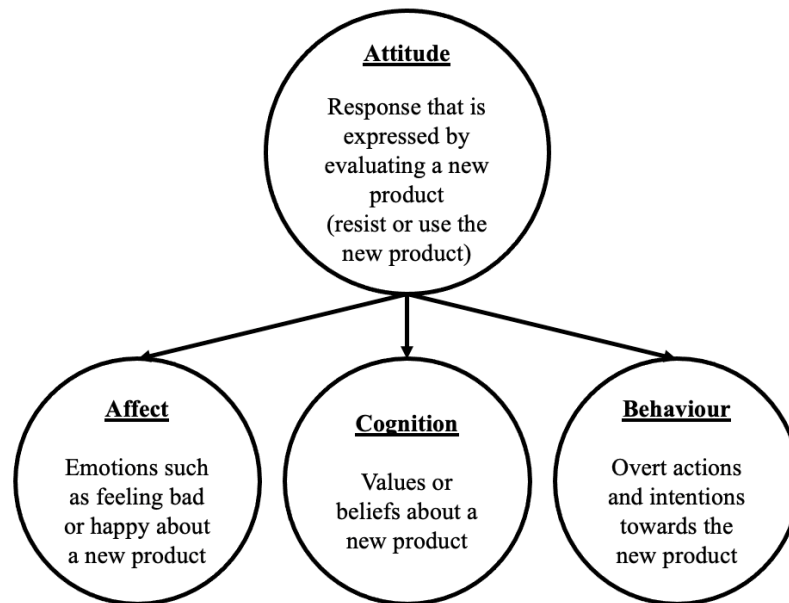


Figure 1. Overview of the attitude model of Breckler (1984).

2.2 Consumer innovation adoption

Compared with research concerning innovation resistance, much research has been conducted on consumers' successful adoption of innovations (e.g., Rogers, 2003; Davis, 1989; Azjen, 1991). Rogers can be seen as the founder of innovation adoption because most research about the adoption of innovations concerns his theories (e.g., Arts, Frambach & Bijmolt, 2011; Claudy et al., 2015; Kapoor, Dwivedi & Williams, 2014; Sun, Ding, Weng, Cheah & Cai, 2012). Rogers (2003, p. 177) defined innovation adoption as; "*A decision to make full use of an innovation.*" This definition implies an intention and behaviour as consumers decide to purchase a new product or not (Arts et al., 2011). Intention to adopt a new product refers to a consumer who desires to buy a new product soon. On the other hand, behaviour refers to the purchase of a new product (Rogers, 2003).

Other relevant theories explaining consumer innovation adoption are; the Technology Acceptance Model (Davis, 1989), the Theory of Reasoned Action (Fishbein & Azjen, 1975), and the Theory of Planned Behaviour (Azjen, 1985). These three theories have a lot in common as these models lead to a consumer's intention to buy a new product soon. The consumers' intention influences consumers' behaviour to purchase a new product. Thus, like Rogers' theory, all three models distinguish between intention and behaviour.

2.2.1 Definition and conceptualization of consumer innovation adoption

This study tries to understand if and how resistance and adoption differ. Therefore, I have also chosen to conceptualize consumer innovation adoption with the attitude model of Breckler (1984), as it makes the comparison easier. Moreover, the literature states that consumer innovation adoption also implies cognitive processes that lead to consumers' intentions and behaviours to decide to purchase a new product or not (Sun et al., 2021). Cognition and behaviour are also attitude components of the model of Breckler that, together with attitude component affect, lead to a consumer's attitude to use a new product or resist a new one. Hence, this study uses the following definition of adoption.

Consumer innovation adoption is the degree to which a consumer adopts a new product based on emotions, behaviors and beliefs.

2.3 Hypotheses to study the qualitatively difference between resistance and adoption

In total, this study uses 11 hypotheses in the context of PBMS. The first ten hypotheses test if the antecedents cause the difference between resistance and adoption. Therefore, this research uses two antecedents described explicitly in the literature as antecedents leading to PBMS resistance. On the other hand, this study uses three antecedents described explicitly in the literature as antecedents leading to the adoption of PBMS. I expect that the antecedents that specifically affect innovation resistance have a weaker and no effect on innovation adoption and vice versa. The eleventh hypothesis concerns both concepts of resistance and adoption and tests the difference between both concepts. Ultimately, the hypotheses are tested and show to what extent resistance and adoption qualitatively differ.

Perceived voluntariness (resistance antecedent)

Literature states that perceived voluntariness is one of the reasons for consumers to resist PBMS, as consumers may experience a lack of volitional control when deciding to resist PBMS (Michel, Hartmann & Siegrist, 2021). A consumer's decision can be negatively influenced when experiencing social pressure. For example, it is expressed when consumers are prone to altering their eating habits in response to what their family and friends do (Lea, Crawford & Worsley, 2006). This social pressure eventually makes consumers feel less voluntary in resisting PBMS (He et al., 2020; Zhuang, Luo & Riaz, 2021). To reflect this notion, I defined voluntariness as the consumer's degree of voluntariness in deciding to resist PBMS (Plouffe, Vandenbosch & Hulland, 2001). Consumers who perceive a low level of voluntariness are more likely to resist PBMS. Therefore, I expect a negative effect from perceived voluntariness on

resistance. Additionally, a high level of voluntariness is unlikely to be a reason for consumers to adopt PBMS. Therefore, I assume a different (weaker and no) effect from perceived voluntariness on adoption, suggesting that the concepts of resistance and adoption qualitatively differ.

H1a: Perceived voluntariness has a negative effect on resistance.

H1b: Perceived voluntariness has a different (weaker and no) effect on adoption.¹

Perceived unnaturalness (resistance antecedent)

The second antecedent used in this study that leads to innovation resistance is perceived unnaturalness. PBMS can be seen as unnatural products or processed foods, as PBMS uses high levels of salt and chemical preservatives (Hwang, You, Moon & Jeong, 2020). Besides being unnatural products, consumers perceive PBMS as products that contain elements that could be toxic, artificial, synthetic, and contrary to nature. In addition, some consumers are sometimes concerned that the production of PBMS is disadvantageous to society and the environment (Verbeke, Sans & Loo, 2015). Consumers, therefore, see PBMS as something that puts us further away from nature and relates it to ethical issues (Hwang et al., 2020). These statements reveal that eating PBMS is sometimes seen as negative and therefore not accepted by consumers. To reflect this notion, the study introduced the concept of perceived unnaturalness, defined as the degree to which PBMS are seen to contain unnatural elements (toxic, artificial and synthetic). Consumers that perceive PBMS as unnatural are more likely to resist PBMS. Therefore, I expect a positive effect from perceived unnaturalness on resistance. On the other hand, a low score perceived unnaturalness is unlikely to be a reason for consumers to adopt PBMS. Therefore, I assume a different (weaker and no) effect from perceived unnaturalness on adoption, suggesting that resistance and adoption are qualitatively different concepts.

H2a: Perceived unnaturalness has a positive effect on resistance.

H2b: Perceived unnaturalness has a different (weaker and no) effect on adoption.

Perceived environmental friendliness (adoption antecedent)

Consumers adopt PBMS for several reasons. One of the reasons to adopt PBMS is because PBMS positively benefit the environment, as traditional meat production processes are much less energy efficient than the growth and harvesting of plants used to produce PBMS

¹ In most studies it is unusual to advance null hypotheses. However, some studies use these null hypotheses, and academics state that it is legitimate to do (Abrahamson, 1997). I find null hypotheses necessary to use in this study, because this research tries to study the difference between resistance and adoption.

(Goldstein, Moses, Sammons & Birkved, 2017; Reijnders & Soret, 2003). Also, the production of regular meat requires high amounts of energy, land and water compared to PBMS, which is disadvantageous for the environment (Hwang et al., 2020). Moreover, consumers have noticed that meat production harms the environment, and research shows that consumers do not want to be related to this issue (Hwang et al., 2020). To reflect this notion, I introduced the concept of perceived environmental friendliness, defined as the degree to which consumers perceive PBMS based on their environmental desires, sustainability expectations, and green needs (Chen & Chang, 2012). Consumers that perceive PBMS as environmentally friendly are more likely to adopt PBMS. Therefore, I expect that perceived environmental friendliness positively affects adoption. On the other hand, a low perceived environmental friendliness score is unlikely to be a reason to oppose PBMS. As a result, I assume that perceived environmental friendliness has a different (weaker and no) effect on resistance, implying that resistance and adoption are qualitatively different.

H3a: Perceived environmental friendliness has a positive effect on adoption.

H3b: Perceived environmental friendliness has a different (weaker and no) effect on resistance.

Perceived animal welfare (adoption antecedent)

The second antecedent used in this study that leads to the adoption of PBMS is perceived animal welfare, as animal welfare is one of the drivers for consumers to use PBMS (Estévez-Moreno, Sepúlveda, Villarroel & Miranda-de La Lama, 2021; Tosnun et al., 2021). PBMS are seen as an alternative to regular meat as the meat industry is an area with severe concerns regarding the care of animals. For example, animals are often stressed because of bad treatment on farms, transport and slaughter (Fisher, Colditz, Lee & Ferguson, 2009; Grandin, 2014). Consumers are becoming more aware of the treatment and lifestyles of animals (He et al., 2020). Moreover, consumers also think that better animal welfare benefits health, which indicates food safety (Clonan, Wilson, Swift, Leibovici & Holdsworth, 2015). These arguments made consumers switch diets to eat less meat and adopt PBMS as an alternative to meat (Hagmann, Siegrist & Hartmann, 2019). To reflect this notion, this study introduced the concept of perceived animal welfare, defined as the degree to which the choice one makes supports animal protection and better animal treatment. Consumers who perceive animal welfare as important are more likely to adopt PBMS. Therefore, I expect that perceived animal welfare positively affects adoption. A low score of perceived animal welfare is unlikely a reason to resist PBMS.

H4a: Perceived animal welfare has a positive effect on adoption.

H4b: Perceived animal welfare has a different (weaker and no) effect on resistance.

Perceived healthiness (adoption antecedent)

Perceived healthiness is the last antecedent used in this study that leads to the adoption of PBMS. PBMS are, compared to regular meat, generally considered less disadvantageous for health. Most people overeat meat (especially red meat), leading to an increased risk of cancer, diabetes type 2 and heart disease (Micha & Mozaffarian, 2012; Sinha, Cross, Graubart, Leitzmann & Schatzkin, 2009). Moreover, farmers use hormones and medication to raise animals, which consumers perceive as being unhealthy, as consumers eat these meat products that also contain hormones and medication. Additionally, reducing meat consumption can already help improve a consumer's health. For example, cutting down meat to 70 grams, which was 90 grams, reduces the chance of diabetes and colorectal cancer between 3-12% (Aston, Smith & Powels, 2012). To reflect this notion, this study introduced the concept of perceived healthiness, defined as the degree to which consumers perceive PBMS as healthy. Consumers that perceive PBMS as being healthier are more likely to adopt PBMS. Therefore, I assume a positive effect from perceived healthiness on adoption. A low score of perceived healthiness is unlikely to be a reason to resist PBMS. Moreover, arguing that adoption and resistance are opposites leads to the following statement. Consumers would resist PBMS because they want to disadvantage their health, which is unlikely a reason to resist PBMS.

H5a: Perceived healthiness has a positive effect on adoption.

H5b: Perceived healthiness has a different (weaker and no) effect on resistance.

Resistance versus adoption

The last hypothesis used in this study concerns the two dependent variables, resistance and adoption. As described earlier, I decided to conceptualize both concepts with the attitude model of Breckler (1984), as academics argue that less is known about how the attitude model of Breckler affects resistance (Huang et al., 2021). It is also unclear if and how the concepts of resistance and adoption are related when using the attitude model. For example, it could be that when analysing the results, positive emotions would cause consumers to adopt PBMS. On the other hand, negative emotions could cause consumers to resist PBMS. This argument then states that both concepts are opposites, as positive emotions are the obverse of negative emotions. However, emotions do not necessarily have to be a reason to adopt or resist PBMS, as it is unclear what effect the model of Breckler would have on resistance and adoption. To clarify the before mentioned statement, when the analysis shows that emotions only cause consumers

to resist PBMS and not to PBMS adoption, I could argue that emotions are a reason for both concepts being qualitatively different. This argumentation of how emotions could affect resistance and adoption also holds for attitude component cognition (values and beliefs about PBMS) and attitude component behaviour (overt actions and intentions towards PBMS). Therefore, the following hypothesis is formulated.

H6: There is no or little relationship between resistance and adoption.

2.4 Conceptual model

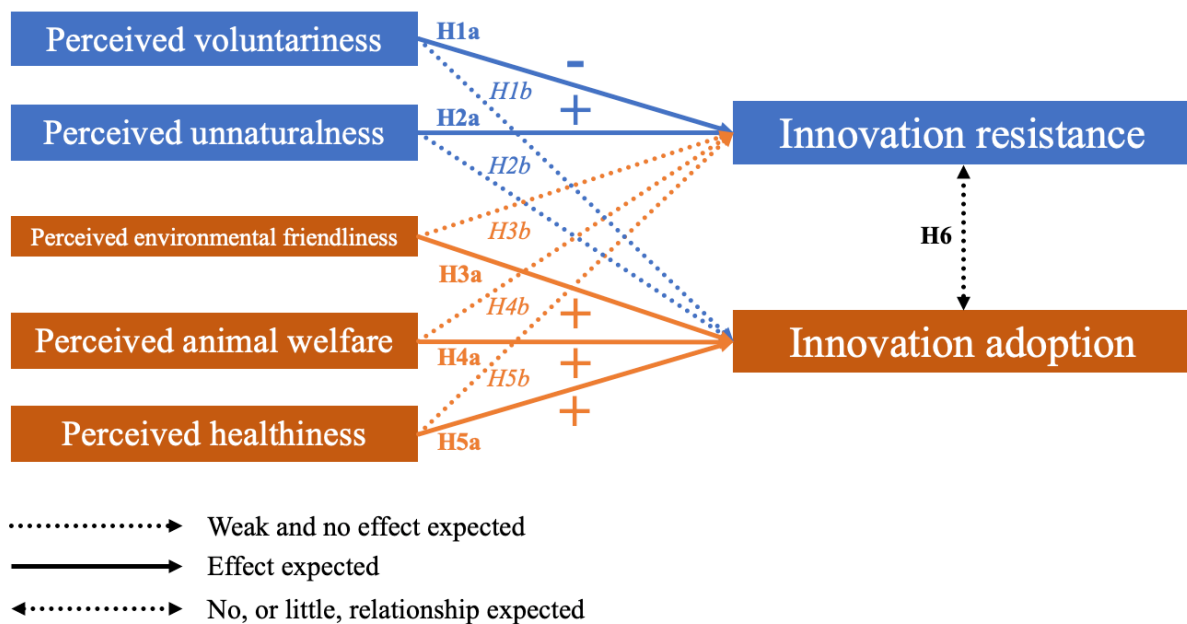


Figure 2. Conceptual model.

3. Methodology

Chapter 3 concerns the methodology of this study. First, the research design of this study is explained. Second, the innovation case used for this study is discussed. Third, the operationalization of the constructs is provided. Fourth, the two pilots and their outcomes are described. Fifth, the unit of analysis and the sample applied will be explained. Sixth, the data analysis procedure is provided. Seventh, the reliability and validity will be discussed. Last, the research ethics of the study will be reported.

3.1 Research design

This study uses a deductive research approach. Therefore, the following research question is formulated; *To what extent are consumer innovation resistance and consumer innovation adoption qualitatively different concepts?* Researchers from Radboud University and I joined forces and developed a quantitative survey, as we all studied the difference between innovation resistance and adoption. The data gathered via the survey will test the developed hypotheses, answering the research question. In addition, the literature showed that academics also successfully used surveys to study innovation resistance and adoption (Huang et al., 2021).

3.2 Suitableness of PBMS in this study

Section 1.1 already mentioned the importance of PBMS and its positive contribution to the environment and society. PBMS are suitable for studying the difference between innovation resistance and adoption, as literature shows PBMS are accepted by a large group of consumers and resisted by a large group of consumers. (e.g., Aston et al., 2012; Carlsson, Kataria & Lampi, 2022; Corrin & Papadopoulos, 2017; He et al., 2020; Lea et al., 2006; Tosnun et al., 2021; Pohjolainen, Vinnari & Jokinen, 2015). An innovation that is too broadly adopted or resisted is less suitable for this study, as we collect almost all information from a specific group of consumers and too little from the other group. Results may be unrepresentative, which makes it more challenging to make meaningful statements about the qualitative difference between innovation resistance and adoption. Therefore, PBMS are used in this study.

3.3 Measurement

3.3.1 Operationalization of the constructs

Designing the survey and collecting the data were done with other researchers from Radboud University. We used existing measurement items and scales to measure the antecedents for resistance and adoption. However, we changed the measurements' items to our

research's subject. For example, voluntariness to innovation resistance was measured with items Plouffe et al. (2001) and Moore and Benbasat (1991) scale to measure voluntariness of electronic innovations. However, we changed these measurements' items to our research's subject. For example, my use of an exact card is voluntary (Plouffe et al., 2001, p. 220) became consumption of meat alternatives is voluntary. This method of changing the items to our research subject also holds for all other antecedents. Table 3 shows an overview with one item example per construct. Thus, one original item is adjusted to the research's context. This study uses three items per scale for each antecedent on a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

Table 3.
Measurement examples of each antecedent.

Construct	Original item	Adjusted items with meat alternatives
Perceived voluntariness	My use of an exact card is voluntary (Plouffe, 2011, p. 220).	Consumption of meat alternatives is voluntary.
Perceived unnaturalness	Eating human-made meat is an unnatural practice that separates us further from nature (Hwang et al., 2020, p. 12).	Meat alternatives are processed, which causes authenticity loss of the product.
Perceived environmental friendliness	This mattress deserves to be labeled environmentally friendly (Gershoff & Frels, 2015, p. 101).	Meat alternatives deserve to be labeled environmentally friendly.
Perceived animal welfare	I choose food which has been produced in a way that minimizes cruelty to animals (Clonan et al., 2015, p. 2449).	By eating meat alternatives, I contribute less to animal cruelty.
Perceived healthiness	Enriched processed meat is healthier than conventional products (Shan, Henchion, De Brún, Murrin, Wall, Monahan, 2017, p. 190).	Meat alternatives are healthier than meat.

The measurement items for resistance and adoption are developed with the attitude model of Breckler (1984), as discussed in section 2.1.1. We developed three measurement items for each component of the Breckler model on a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7). Table 4 shows an item example per attitude component for resistance and adoption. In addition, Appendix I shows all measurement items for all antecedents and resistance and adoption.

Table 4.
Measurement examples of each attitude component.

Construct	Item examples with the attitude model of Breckler (1984)
Innovation Resistance	<p>Affect: I feel strong negative emotions about the consumption of meat alternatives.</p> <p>Cognition: I don't think that the consumption of meat alternatives is a good idea.</p> <p>Behavior: I will protest against the consumption of meat alternatives.</p>
Innovation Adoption	<p>Affect: Thinking about meat alternatives makes me feel glad.</p> <p>Cognition: I think meat alternatives are a good thing.</p> <p>Behavior: I intend to eat meat alternatives.</p>

3.3.2 The importance of control variables

This study uses control variables to enhance internal validity. Control variables can help establish a causal relationship between variables and group differences. One of the control variables used in this study is consumers' meat consumption in a week (meat consumption days per week). It could be that consumers that eat no (or less) meat in a week are more willing to use (adopt) meat alternatives instead of consumers that eat meat almost every day of the week and therefore resist meat alternatives more often.

The following control variables are used; 1) gender, 2) meat consumption days per week, 3) city, 4) occupation, 5) age and 6) perceived innovativeness. The scales for the first five control variables are self-developed and straightforward. In addition, except for control variables meat consumption and perceived innovativeness, dummy variables are created for the nonmetric control variables as this study uses analyses that require only metric variables.

Control variable perceived innovativeness is measured with the existing innovativeness scale of Hurt, Joseph and Cook (1977), which is based on a 7-point Likert scale (from strongly disagree (1) to strongly agree (7). Appendix I shows all measurement items for the control variables.

3.4 Pilot studies and final survey

Two pilot studies were conducted before collecting the data to increase the quality of the study. Both pilots included almost 30 respondents. Cronbach's alpha was used to measure the reliability of the constructs (Cronbach's alpha looks at the internal consistency between the items of a construct). According to Hair, Black, Babin and Anderson (2018), an acceptable

Cronbach's alpha should be higher than .700. Next to the Cronbach's alpha, respondents from the pilot studies also gave qualitative feedback to improve the survey qualitatively. For example, other words are used in an item better interpretable for respondents. The qualitative feedback can be found in appendix II.

3.4.1 Reliability of pilot studies I and II

In the first pilot study, constructs perceived voluntariness (.624), perceived environmental friendliness (.520) and perceived animal welfare (.620) have an alpha level lower than .700, as can be seen in table 5. In addition, qualitatively feedback from respondents argued that some of the items used to measure a construct were vague and not clear. Consequently, we changed some items constructs to strive for a better Cronbach's alpha. We did not include construct perceived healthiness in the first pilot study, as we strived for an even number of antecedents for both resistance (2) and adoption (2). We decided that constructs of perceived animal welfare and environmental friendliness were more important compared to perceived healthiness. However, qualitatively feedback from respondents in the first pilot study argued that they missed the perception of healthiness. Perceived healthiness was an important factor for these consumers to use PBMS. Therefore, the construct of perceived healthiness is applied in the second pilot study.

According to the second pilot study, all constructs have an alpha level above .700, except for perceived unnaturalness. A lower alpha level for the second pilot study was not expected as we did not change the items for the construct perceived unnaturalness. As a result, we decided to change the items (especially item one) for the final survey.

Table 5.

Reliability analysis first and second pre-test.

Constructs	# Items	First pre-test	Second pre-test
		α	α
Perceived voluntariness	3	.624	.778
Perceived unnaturalness	3	.809	.515
Perceived environmental friendliness	3	.520	.796
Perceived animal welfare	3	.620	.895
Perceived healthiness	3	-	.841
Innovation adoption	9	.901	.913
Innovation resistance	9	.834	.948

3.4.2 Final survey

The survey is held in Dutch as our unit of analysis is Dutch consumers older than 16 years. The items used to measure the construct are translated from English into Dutch, which can be seen in appendix I. The final survey can be found in appendix III.

3.5 Sample

3.5.1 Unit of analysis and simple random sampling

The unit of analysis for this study is Dutch consumers, 16 years and older, chosen as the population for the current study. The age range is selected as individuals younger than 16 years are to a greater extent influenced by parents' choices and opinions. Therefore, people younger than 16 are considered unsuitable for this study, as they must decide to resist or adopt PBMS by themselves. The data collection is being held in Dutch because most people living in the Netherlands speak Dutch. Even if most Dutch people can understand English, maybe some would have problems understanding the nuances that might be important for this study.

This study uses simple random sampling technique. This technique is also seen as probability sampling, which means that every person in the population has an equal chance of being selected for the sample (Taherdoost, 2016). Probability sampling has the greatest freedom from bias, which increases the quality of this study (Taherdoost, 2016). There are a few disadvantages to using simple random sampling, like all other methods. First, obtaining the sample is time-consuming if the units are geographically widely scattered (Ghauri & Gronhaug, 2005). We collected the data in three different cities in the Netherlands (Eindhoven, Nijmegen and Utrecht). We neutralized this disadvantage of scattered geographical places as we split up the data collection work. The second disadvantage of simple random sampling is lower precision, as this research studies the whole population (Malhotra & Birks, 2002). However, the control and demographic variables can help to make differences in groups, for example, when looking at age or consumers' meat consumption in days per week and if these groups have different results when looking at resistance and adoption.

3.5.2 Procedure of the data collection

This study aimed to obtain at least 200 respondents, as the sample size is essential to achieve statistical significance. Too-small sample size could have little statistical power, negatively influencing the significance level. In contrast, a too-large sample size (>400 respondents) could make the test too sensitive (Hair et al., 2018). The surveys were answered

in different cities in the Netherlands (Eindhoven, Nijmegen and Utrecht) from 24-25 May 2022 between 10:00 and 15:00. We used Qualtrics as an online survey tool to collect the data as it is easily transformable into a SPSS file. In Eindhoven, respondents were approached at the central train station, as all kinds of people (e.g., people that work, study or go on a trip) often travel by train. In Nijmegen, respondents were approached on the streets in the city centre and the largest train station in Nijmegen, as has also been done for the respondents in Utrecht. Respondents scanned a QR code from our telephone (and filled in the survey on their phone) or used our iPad (tablet) to fill in the survey anonymously. The survey consisted of 33 questions and six questions related to the control variables. The questions were divided by construct themes, which can be seen in appendix I. In total, the survey consisted of 39 questions. The duration of filling in the survey lay between 4-7 minutes.

3.5.3 Description of sample

In total, 306 respondents filled in the survey. However, 37 respondents did not finish the survey. Only 269 respondents successfully filled in the complete survey. Following the data cleaning method of Harris et al. (2018), these non-finished surveys are removed from the dataset. In addition, I deleted four other observations from the dataset. The first two observations are useless as two researchers filled in the survey to check if the questionnaire worked adequately. Next, I looked for outliers which can be seen as observations with extremely different values on a variable that is different from normal and can influence the results (Harris et al., 2018). I deleted two other observations via case-wise diagnostics and when looking manually. Ultimately, the sample consisted of 265 respondents.

3.5.4 Demographic variables

There are almost as many men (46.4%) as women (51.7%) in the sample, which is a good representation of the population as there are 8.648.031 men (49.7%) and 8.759.554 women (50.3%) living in the Netherlands on the 1st of January 2020 (Centraal Bureau voor de Statistiek, 2022). In addition, most of the respondents that filled in the survey were at that moment in Eindhoven (55.5%), followed by Nijmegen (32.1%) and Utrecht (12.5%). The sample was overrepresented by the age group of 15-30 years (78.5%). When looking at the occupation of the respondents, students were overrepresented (62.3%). This overrepresentation can be explained when looking at the data collection places, namely the train stations and the city centre, as students travel by train and study in the city. On average, people eat meat four

days a week, a normal representation of consumers in the Netherlands (Kloosterman, 2021). To conclude, this sample does not represent all Dutch consumers older than 16 years and is therefore not generalizable. Still, results can provide useful insight. Appendix IV shows an overview of all demographic variables.

3.6 Data analysis procedure

This study uses IBM SPSS Statistics 27 when analysing the data. Several multiple regression analyses are applied to test the developed hypotheses.

3.7 Construct reliability and validity

Table 6 shows this study's internal consistency (reliability) and convergent validity. All constructs have an alpha level higher than .700, except for perceived voluntariness (.606), perceived unnaturalness (.668) and innovativeness (.366). Besides reversing item 3 of perceived voluntariness, I decided to delete item 3 (*it is expected that I eat meat alternatives*). The decision to delete this item is based on feedback from respondents and my rational thinking, as they argued that the item was too vague and, therefore, hard to interpret. The deletion of item 3 caused the Cronbach's alpha to increase to .740.

I decided not to delete an item for perceived unnaturalness. This decision is based on literature and my rational thinking. Alpha levels between .600 and .700 are acceptable (Hair, 2009). In addition, perceived unnaturalness (.668) is closer to .700 than .600, so I decided not to delete an item for perceived unnaturalness.

I deleted item 1 for innovativeness (I must see other people using innovations before I consider them) and caused the Cronbach's alpha to increase to .640. I accepted this alpha level as it is between .600 and .700. Also, innovativeness is a control variable, which is less important than the antecedents.

Table 6.
Construct reliability and validity.

Construct	Original # Items	Cronbach's alpha	# Of items deleted	Cronbach's alpha	Percentage explained variance
		α		α	
Perceived voluntariness	3	.606	1	.740	80%
Perceived unnaturalness	3	.668	0		61%

Perceived environmental friendliness	3	.775	0		70%
Perceived animal welfare	3	.848	0		77%
Perceived healthiness	3	.836	0		76%
Innovation adoption	9	.958	0		75%
Innovation resistance	9	.922	0		74%
Innovativeness	3	.366	1	.640	60%

Factor analysis is applied to measure the discriminant and convergent validity, as seen in table 6. The convergent validity measures the one-dimensionality of the construct. It shows that the items correspond with the dimensional structure of that construct. When measuring the convergent validity, the percentage explained variance reports the explained variance of the first factor. All constructs have a percentage explained variance >50%, which is necessary to argue that the construct is one-dimensional (Harris et al., 2018).

3.8 Understanding the constructs with factor analysis

This research uses confirmatory factor analyses, as it is not the purpose of this study to create an underlying structure (exploratory factor analysis) but to see if the items of a construct are consistent with the understanding of that construct (explanatory). Before running a confirmatory factor analysis, a KMO-test and Bartlett's Test of Sphericity are required. The KMO-test should be .50 or higher, and the Bartlett's test of sphericity needs to be significant ($p < .05$) (Field, 2018; Williams, Onsman & Brown, 2010).

The first confirmatory factor analysis concerns the antecedents of resistance and adoption and showed a KMO = .789 and a significant Bartlett's Test of Sphericity (X^2 : 1780.660, $p < .000$). Accordingly, confirmatory factor analysis is applied. Therefore, I used principal axis factoring as the extraction method and direct Oblimin as the rotation method, as is done for all other factor analyses in this study. The communalities table shows that reversed item voluntariness 3 (.170) and reversed item innovativeness 1 (.039) have a low communality. The study uses a threshold of .25, which is an acceptable value cut-off point according to Eaton, Frank, Johnson and Willoughby (2019). A low communality for items voluntariness three and innovativeness one was expected as these items will be deleted because of a better Cronbach's alpha. Next, items of the construct environmental friendliness and the items of perceived animal welfare load on the same factor, which was not expected when looking at the literature. However, I decided to approach and use perceived environmental friendliness and perceived animal welfare separately, as literature makes a clear distinction between these constructs (e.g.,

He et al., 2020; Joshi & Kumar, 2015; Sadler, 2004; Tziva, Negro, Kalfagianni & Hekkert, 2020). Other items do not cross load with other factors, meaning that the items of that construct are consistent with the understanding of that construct. I expected this, as literature helped us develop and choose the antecedents for this study. In other words, the literature supports the antecedents we chose in this study (except for perceived environmental friendliness and perceived animal welfare that cross load).

The second confirmatory factor analysis concern both dependent variables (resistance and adoption). Again, the KMO = .952, which is higher than .50 and Bartlett's significant Test of Sphericity (X2: 4479.088, $p < .000$). Thus, factor analysis can be applied. All nine items of adoption load on factor 1. The same holds for the nine items of resistance that load on factor 2. However, the three items of resistance emotion and the three items of resistance cognition also load negatively on factor 1 (on which the nine adoption items loaded). Therefore, a factor analysis with only the nine items for resistance is applied to clarify this. The factor analysis with only the items for resistance showed that the three items for emotion and cognition load on the same factor. In addition, the three behaviour items for resistance load on factor 2. This shows that the construct of resistance is two-dimensional and is different from the construct adoption, which is one-dimensional as all the items load on one factor. As a result, this study will see resistance as a two-dimensional construct in further analyses consisting of 1) resistance emotion and cognition (henceforth resistance E+C) and 2) resistance behaviour (henceforth resistance B). Resistance as a one-dimensional construct is still included in further analyses to see whether there are differences between the two-dimensional construct of resistance. The two-dimensional construct has no different outcomes for internal consistency and convergent validity, as seen in table 7. Cronbach's alpha is still very high for resistance (E+C) and resistance (B). Also, the percentage explained variance is >50%. Appendix V shows an overview of the factor analyses.

Table 7.

Construct reliability and validity one-dimensional construct of resistance and two-dimensional constructs of resistance.

Construct	Original # Items	Cronbach's alpha	Percentage explained variance
Innovation resistance	9	.922	74%
Innovation resistance (E+C)	6	.908	69%
Innovation resistance (B)	3	.898	83%

3.9 Research ethics

It is crucial to restrict research ethics in this study because we conducted data from respondents. A short explanation highlighted the purpose of the study before respondents agreed to fill in the survey (informed consent). Next, a time indication (5 minutes) was given so that respondents knew approximately how much time was needed to complete the survey. A respondent who filled in the survey was free to stop whenever he or she wanted and not feel obligated to continue. Also, this study strived for anonymity, so the respondents' identities are anonymous, and the data gathered will be hidden from everyone else. Only the supervisor will have insight into the collected data.

4. Results

Chapter 4 represents the analyses conducted and shows the results. First, the descriptive analysis of the constructs is shown. Second, the multiple regression analysis results are shown, which tested the hypotheses for this study. Last, additional analyses are provided.

4.1 Descriptive analysis

Table 8 shows the means of the variables, standard deviations, and the correlations between the constructs. Moreover, table 8 gives us some sense of the relationships between the constructs. As discussed in section 3.8, resistance is seen as a two-dimensional construct and no longer as one-dimensional. Also, the correlation matrix gives a preliminary look at multicollinearity, one of the multiple regression analysis assumptions. Table 8 shows no multicollinearity in the data, as the correlations between the independent variables (voluntariness, unnaturalness, environmental friendliness, animal welfare and healthiness) are not substantial correlated ($r < .90$) (Field, 2018).

Table 8.

Correlation matrix and descriptive statistics.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
P. Voluntariness (1)	1								
P. Unnaturalness (2)	.015	1							
P. Environmental friendliness (3)	.124*	-.366**	1						
P. Animal welfare (4)	.082	-.250**	.570**	1					
P. Healthiness (5)	.071	-.431**	.539**	.425**	1				
Adoption (6)	.091	-.467**	.621**	.547**	.646**	1			
Resistance (E+C) (7)	-.115	.446**	-.540**	-.504**	-.452**	-.796**	1		
Resistance (B) (8)	-.177**	.338**	-.411**	-.371**	-.280**	-.489**	.665**	1	
Innovativeness (9)	.030	-.137*	.193**	.202**	.283**	.429**	-.391**	-.239	1
Mean	5.93	4.43	4.86	5.06	3.83	4.35	2.85	1.95	5.29
Standard deviation	1.18	1.15	1.26	1.47	1.21	1.48	1.37	1.28	.97

N = 265; * $p < .05$; ** $p < .01$; P. = Perceived.

Table 8 shows that the adoption antecedents, perceived environmental friendliness (.621**), perceived animal welfare (.547**), and perceived healthiness (.646**) positively and significantly correlate with adoption. The adoption antecedents negatively and significantly correlate with resistance (E+C) and resistance (B). The correlations between the adoption antecedents and resistance (E+C) correlate stronger compared to resistance (B).

Looking at the antecedents of resistance, perceived voluntariness (-.115) correlates negatively and insignificantly with resistance (E+C). Perceived voluntariness (-.177**) significantly and negatively correlates with resistance (B). Perceived unnaturalness correlates significantly and positively with both resistance (E+C) (.446**) and resistance (B) (.338**). The following can be said when looking at the correlation between the resistance antecedents and adoption. Perceived voluntariness (.091) correlates insignificantly and positively with adoption. Perceived unnaturalness (-.467**) correlates significantly and negatively with adoption.

Besides the correlation matrix, the descriptive statistics (mean and standard deviation) are provided. Table 8 shows that the means of the constructs are relatively high, except for health (3.83), resistance (E+C) (2.85), and resistance (B) (1.95). Thus, most respondents answered 'neutral' or 'agreed'. The standard deviation varies from .97 to 1.48, indicating differences among the respondents' answers.

4.2 Regression analysis

Multiple regression analyses are used to test the developed hypotheses in chapter 2.

4.2.1 Assumptions of multiple regression analysis

It is crucial to look at the five assumptions of multiple regression analysis before conducting the analysis. Appendix VI gives all details about the assumptions.

First, both the independent variables (antecedents) and the dependent variables resistance, resistance (E+C), resistance (B) and adoption, have to be metrically scaled (Hair et al., 2018). So, interval or ratio level. All measurement levels of the antecedents and dependent variables are of interval level, as a 7-point Likert scale is used for these constructs. In addition, for the non-metric control variables, dummy variables are created (see section 3.3.2). As a result, all variables are metrically scaled and therefore appropriate for multiple regression analysis.

Second, all variables need to be normally distributed. Possible consequences for correlation, linearity, and homoscedasticity will increase if there are no symmetrical distributions (Hair et al., 2018). The skewness and kurtosis values must lie between -3.0 and 3.0 (Hair et al., 2018). All construct values for the skewness and kurtosis lie between these values, except for perceived voluntariness, which has a kurtosis of 3.980. Therefore, P-P plots were used to see if the deviations were appropriate. The P-P plots of perceived voluntariness shows no disastrous deviations when using resistance as one-dimensional construct and

resistance (E+C), so the normality assumption is met for these constructs. P-P plot for resistance (B) does show some deviation, however it is not disastrous that I cannot use it for further analyses.

The third assumption concerns the linear relationship between the independent and dependent variables (Hair et al., 2018). This assumption is crucial, as a linear relationship is the foundation of multiple regression analysis. The assumption of linearity is met, as there are no disastrous signs of non-linearity when looking at the partial regression plots and residual scatterplots.

Fourth, the previously mentioned partial regression plot shows homoscedastic results, meaning that the data collected is unbiased and widespread. Thus, the assumption of homoscedasticity is met.

The last assumption concerns multicollinearity explained at the beginning of section 4.1. I have also looked at the VIF values to see if the independent variables correlate highly. The VIF values must be <10 (Hair et al., 2018). All VIF values are <10. As a result, all five assumptions of multiple regression are met.

4.2.2 Results of multiple regression analysis

Table 9 shows the eight multiple regression analyses used in this study. I also decided to use one-dimensional construct resistance to see if there are differences when looking at resistance (E+C) and resistance (B).

Table 9.
Overview of the eight multiple regression analyses.

Dependent variables	Multiple regression analysis
Innovation resistance	1. Effect of control variables on innovation resistance. 2. Effect of control variables, adoption antecedents and resistance antecedents on innovation resistance.
Innovation resistance (E+C)	3. Effect of control variables on two-dimensional construct innovation resistance (E+C). 4. Effect of control variables, adoption antecedents and resistance antecedents on innovation resistance (E+C).
Innovation resistance (B)	5. Effect of control variables on two-dimensional construct innovation resistance (B). 6. Effect of control variables, adoption antecedents and resistance antecedents on innovation resistance (B).
Innovation adoption	7. Effect of control variables on innovation adoption. 8. Effect of control variables, resistance antecedents and adoption antecedents on innovation adoption.

4.2.3 Hypothesis testing for resistance as one-dimensional construct

Table 10 shows the results of resistance. Model 1 with only the control variables significantly explained a proportion of the variance ($R^2 = .337$, $F(11,253) = 13.20$, $p < .001$). Model 2 included the main constructs and, as model 1, significantly explained a proportion of the variance ($R^2 = .540$, $F(16,248) = 20.35$, $p < .001$). Model 2 explains more proportion of variance compared to model 1.

Perceived voluntariness has an insignificant effect on resistance ($\beta = -.073$, $p > .05$), so hypothesis H1a is rejected. On the other hand, perceived unnaturalness has a significant and positive effect on innovation resistance ($\beta = .214$, $p < .001$), supporting hypothesis H2a.

Perceived voluntariness has an insignificant effect on adoption compared to resistance ($\beta = -.005$, $p > .05$). In addition, perceived voluntariness has a weaker effect on adoption than resistance. Therefore, hypothesis H1b is supported. Perceived unnaturalness has a weaker relation with adoption and is significant ($\beta = -.138$, $p < .001$). Therefore, hypothesis H2b is rejected, as the hypothesis stated not to affect adoption. Table 13 shows the effect on adoption on page 36.

Table 10.

Effect of perceived voluntariness, perceived unnaturalness, perceived environmental friendliness, perceived animal welfare, perceived healthiness and control variables on resistance.

	Model 1: Control variables resistance			Model 2: Main effects resistance		
	β	SE	p	β	SE	p
P. Voluntariness				-.073	.045	.090
P. Unnaturalness				.214***	.052	.000
P. Environmental friendliness				-.254***	.057	.000
P. Animal welfare				-.149**	.046	.007
P. Healthiness				-.001	.058	.991
Age						
30-45 years	-.017	.255	.778	-.003	.217	.948
45-60 years	.077	.258	.207	.074	.216	.149
60+ years	.014	.447	.825	.016	.379	.755
Gender						
Women	-.238***	.133	.000	-.187***	.113	.000
Gender Neutral	-.072	.516	.160	-.031	.434	.473
Other	-.040	1.039	.434	-.034	.870	.434
Occupation						
Working	-.115	.175	.115	-.136*	.149	.019
Retired	.028	.852	.643	.015	.718	.770
Other	.026	.530	.619	.006	.451	.895
Meat consumption	.313***	.530	.000	.167**	.031	.001
Innovativeness	-.281***	.068	.000	-.204***	.058	.000
R² (adjusted R²)		.337***			.540***	

$n = 265$; *** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.

4.2.4 Hypothesis testing for resistance (E+C) and resistance (B)

Table 11 shows resistance (E+C) results, and table 12 shows resistance (B). The results of the regression analysis indicate the following significant proportion of variance when looking at only the control variables for resistance (E+C) in model 3 with only the control variables ($R^2 = .364$, $F(11,253) = 14.72$, $p < .001$). The proportion of variance with the main constructs is also significant (model 4) ($R^2 = .553$, $F(16,248) = 21.41$, $p < .001$). For resistance behaviour with only the control variables (model 5) the proportion of variance is ($R^2 = .165$, $F(11,253) = 5.76$, $p < .001$) and with the main constructs ($R^2 = .306$, $F(16,248) = 8.27$, $p < .001$) (model 6), both significant.

Most interesting is the negative and significant effect of perceived voluntariness on innovation resistance (B) ($\beta = -.122$, $p < .05$), where perceived voluntariness has an insignificant effect on innovation resistance and resistance (E+C). As a result, hypothesis H1a is supported when using resistance (B). Perceived unnaturalness is positive and significant for both resistance (E+C) and resistance (B) but has for both concepts a weaker relation compared to one-dimensional construct resistance.

To summarise, seeing innovation resistance as a two-dimensional construct leads to one different outcome, as hypothesis H1a is supported when looking at resistance (B).

Table 11.

Effect of perceived voluntariness, perceived unnaturalness, perceived environmental friendliness, perceived animal welfare, perceived healthiness and control variables on innovation resistance (E+C).

	Model 3: Control variables resistance (E+C)			Model 4: Main effects resistance (E+C)		
	β	SE	p	β	SE	p
P. Voluntariness				-.042	.049	.319
P. Unnaturalness				.205***	.057	.000
P. Environmental friendliness				-.237***	.062	.000
P. Animal welfare				-.150**	.050	.006
P. Healthiness				-.021	.064	.712
Age						
30-45 years	-.036	.276	.535	-.016	.237	.750
45-60 years	.100	.280	.095	.100*	.236	.047
60+ years	.017	.485	.779	.020	.414	.693
Gender						
Women	-.227***	.144	.000	-.179***	.124	.000
Gender Neutral	-.082	.560	.102	-.042	.747	.319
Other	-.045	1.127	.374	-.036	.949	.400
Occupation						
Working	-.072	.190	.279	-.098	.162	.085
Retired	.021	.925	.714	.009	.783	.854
Other	.002	.575	.967	-.019	.492	.669
Meat consumption	.346***	.037	.000	.202***	.033	.000
Innovativeness	-.292***	.073	.000	-.215***	.063	.000

R ² (adjusted R ²)	.364***	.553***
<i>n</i> = 265; *** <i>p</i> < .001; ** <i>p</i> < .01; * <i>p</i> < .05; Reference categories dummies: 15-30 years, men, student.		

Table 12.

Effect of perceived voluntariness, perceived unnaturalness, perceived environmental friendliness, perceived animal welfare, perceived healthiness and control variables on resistance (B).

	Model 5: Control variables resistance (B)			Model 6: Main effects resistance (B)		
	β	SE	p	β	SE	p
P. Voluntariness				-.122*	.057	.021
P. Unnaturalness				.182**	.066	.002
P. Environmental friendliness				-.232**	.072	.001
P. Animal welfare				-.111	.058	.098
P. Healthiness				.043	.074	.542
Age						
30-45 years	.029	.294	.666	.024	.275	.693
45-60 years	.009	.298	.894	-.001	.273	.992
60+ years	.003	.517	.963	.004	.479	.954
Gender						
Women	-.205**	.153	.001	-.162**	.143	.004
Gender Neutral	-.033	.596	.565	.001	.549	.985
Other	-.021	1.201	.716	-.021	1.100	.687
Occupation						
Working	-.182*	.202	.018	-.186**	.188	.009
Retired	.035	.985	.606	.023	.908	.707
Other	.071	.612	.225	.057	.570	.294
Meat consumption	.168**	.039	.008	.052	.039	.398
Innovativeness	-.190**	.078	.001	-.133*	.073	.017
R ² (adjusted R ²)	.165***			.306***		
$n = 265$; *** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.						

4.2.5 Hypothesis testing for adoption

Table 13 shows the results of the multiple regression analyses for innovation adoption. Model 7, with only the control variables, significantly explains a proportion of the variance ($R^2 = .337$, $F(11,253) = 13.20$, $p < .001$). Model 8 with the main constructs explains more proportion of the variance ($R^2 = .540$, $F(16,248) = 20.35$, $p < .001$).

Perceived environmental friendliness positively and significantly explained adoption ($\beta = .248$, $p < .001$). Therefore, hypothesis H3a is supported. In addition, perceived environmental friendliness negatively and significantly affects resistance ($\beta = -.254$, $p < .001$). Perceived environmental friendliness negatively and significantly affects resistance (E+C) ($\beta = .237$, $p < .001$) and resistance (B) ($\beta = .232$, $p < .001$). Thus, hypothesis H3b is rejected.

Perceived animal welfare positively and significantly affect adoption ($\beta = .115$, $p < .001$); therefore, hypothesis H4a is supported. This antecedent has the weakest effect of the three adoption antecedents on adoption. Perceived animal welfare also loads significantly and

negatively on resistance ($\beta = -149.$, $p < .007$) and also on resistance (E+C) ($\beta = -.150$, $p < .006$). Therefore, hypothesis H4b is rejected. However, perceived animal welfare effects resistance (B) insignificantly and negatively ($\beta = -.111$, $p < .098$). Also, the effect of perceived animal welfare is weaker than the effect on adoption (although this difference is small). Therefore, hypothesis H4b is supported when looking at resistance (B).

Perceived healthiness positively and significantly affects innovation adoption; therefore, hypothesis H5a is supported ($\beta = .254$, $p < .001$). In addition, perceived healthiness insignificantly and negatively effects resistance ($\beta = -.001$, $p < .991$). When looking at resistance (E+C), perceived healthiness also affect resistance insignificantly and negatively ($\beta = -.021$, $p < .712$). Perceived healthiness effects resistance (B) insignificantly ($\beta = .043$, $p < .542$). As a result, hypothesis H5b is supported.

Table 13.

Effect of perceived voluntariness, perceived unnaturalness, perceived environmental friendliness, perceived animal welfare, perceived healthiness and control variables on innovation adoption.

	Model 7: Control variables adoption			Model 8: Main effects adoption		
	β	SE	p	β	SE	p
P. Voluntariness				-.005	.044	.881
P. Unnaturalness				-.138**	.051	.001
P. Environmental friendliness				.248***	.055	.000
P. Animal welfare				.115*	.045	.011
P. Health				.254***	.057	.000
Age						
30-45 years	.046	.286	.406	-.018	.213	.668
45-60 years	-.059	.290	.304	-.075	.212	.077
60+ years	-.007	.502	.899	-.025	.371	.563
Gender						
Women	.119*	.149	.019	.095*	.111	.012
Gender Neutral	.090	.579	.061	.042	.425	.236
Other	.011	1.167	.826	-.014	.852	.703
Occupation						
Working	.016	.197	.808	.083	.146	.081
Retired	.005	.957	.928	.005	.703	.894
Other	-.058	.595	.241	-.021	.442	.563
Meat consumption	-.443***	.038	.000	-.245***	.030	.000
Innovativeness	.312***	.076	.000	.199***	.057	.000
R ² (adjusted R ²)		.411***			.688***	

$n = 265$; *** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.

4.2.6 Hypothesis testing for resistance and adoption

The last hypothesis concerns both dependent variables and states that there is no or little relationship between the constructs. Table 14 shows the correlation matrix with constructs resistance, resistance (E+C), resistance (B) and adoption.

Resistance significantly and negatively correlates with adoption (-.756**). Resistance (E+C) and resistance (B) also correlate significantly and negatively with adoption. The correlation between resistance (B) and adoption (-.489**) is weaker compared to resistance and adoption (-.756**) and resistance (E+C) and adoption (-.796**). Therefore, hypothesis H6 is rejected when looking at the correlations between the dependent variables of resistance and dependent variable adoption.

Table 14.

Correlations matrix for the dependent variables; resistance, resistance (E+C), resistance (B).

	1	2	3	4
Resistance				
Resistance (E+C) (2)	.967**			
Resistance (B) (3)	.834**	.665**		
Adoption (4)	-.756**	-.796**	-.489**	

N = 265; ** *p* < .01

Besides this correlation matrix, the antecedents were used to study the difference between resistance and adoption. Perceived healthiness is the only construct that perfectly shows the difference between resistance and adoption, as perceived healthiness has a significant and positive relation with adoption and no (and a weaker) relationship with resistance (both hypotheses are supported). These results of perceived healthiness also hold when using resistance (E+C) or resistance (B). Also, the hypotheses for perceived animal welfare are supported (H4a and H4b), but only when resistance (B) is used. Thus, hypothesis H4b is rejected when using resistance or resistance (E+C). Therefore, perceived animal welfare does not show a perfectly difference between the dependent variables.

4.3 Control variables

This study uses control variables to enhance the internal validity of this study (as discussed in section 3.3.2). Interestingly, women have a positive and significant effect on adopting PBMS, as seen in table 13. Thus, women are more likely to adopt PBMS. Women also have a significant but negative effect on resistance, resistance (E+C) and resistance (B), meaning that women are less likely to resist PBMS (tables 10, 11 and 12).

Another interesting result is meat consumption per day a week, as this control variable has a positive and significant effect on resistance, resistance (E+C), and resistance (B). Thus, the more consumers eat meat weekly, the more likely they resist PBMS (see tables 10, 11 and 12). In addition, the effect on adoption is significant but negative, meaning that the more consumers eat meat, the less likely consumers would adopt PBMS (see table 13).

The last control variable that stands out is innovativeness, as this construct affects resistance, resistance (E+C), and resistance (B) significantly and negatively (see tables 10,11 and 12). So, the more consumers see themselves trying out new products, the less likely they will resist PBMS. In addition, the relationship between innovativeness and adoption is significant and positive, meaning that the more consumers see themselves trying out new products, the more likely they adopt PBMS (see table 13).

4.4 Meat consumption (additional analysis)

At this point of the study, only perceived healthiness perfectly shows the difference between all resistance constructs and adoption. Therefore, I decided to split up the consumer group of meat consumption days per week into two groups, as I expect differences in these two groups that may change the outcomes for the hypotheses and, therefore, can result in outcomes that better clarify the qualitative difference between resistance and adoption for other antecedents.

First, this study looks at the consumers who eat meat five days or less per week. Perceived environmental friendliness insignificantly and negatively affects resistance (B) ($\beta = -.106, p > .05$). Meaning that there is no relationship between perceived environmental friendliness and resistance (B). Therefore, hypothesis H3b is supported instead of rejected when not splitting up the group of meat consumption days per week (see model 9 in table 15). In addition, hypothesis H3a is still supported, meaning that perceived environmental friendliness significantly and positively affects adoption ($\beta = .260, p < .001$) (see model 11 in table 16). As a result, perceived environmental friendliness shows the qualitative difference between resistance (B) and adoption after splitting up the group of meat consumption days per week.

Table 15.

Effect of voluntariness, unnaturalness, environment, animal welfare, health and control variables on innovation resistance with meat consumption < 5 days per week and meat consumptions > 5 days per week.

	Model 1: Main effects resistance (B)			Model 9: Main effects resistance (B) with meat consumption = < 5 days per week			Model 10: Main effect resistance (B) with meat consumption > 5 days per week		
	β	SE	p	β	SE	p	β	SE	p
P. Voluntariness	-.122*	.057	.021	-.052	.071	.436	-.176	.123	.094
P. Unnaturalness	.182**	.066	.002	.201**	.072	.008	.258*	.162	.023
P. Environmental friendliness	-.232**	.072	.001	-.106	.077	.202	-.520**	.184	.002
P. Animal welfare	-.111	.058	.098	-.239**	.067	.002	.039	.117	.766

P. Healthiness	.043	.074	.542	.055	.078	.504	-.022	.161	.855
R ² (adjusted R ²)	.306*** n = 265			.130*** n = 203			.395*** n = 62		

*** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.

Table 16.

Effect of voluntariness, unnaturalness, environment, animal welfare, health and control variables on innovation adoption with meat consumption < 5 days per week and meat consumptions > 5 days per week.

	Model 8: Main effects adoption			Model 11: Main effects adoption with meat consumption = < 5 days per week			Model 12: Main effect adoption with meat consumption > 5 days per week		
	β	SE	p	β	SE	p	β	SE	p
Voluntariness	-.005	.044	.881	-.020	.068	.690	-.006	.081	.937
Unnaturalness	-.138**	.051	.001	-.143*	.068	.013	-.287**	.107	.002
Environment	.248***	.055	.000	.260***	.073	.000	.218	.121	.090
Animal welfare	.115*	.045	.011	.222**	.063	.000	.154	.077	.147
Health	.254***	.057	.000	.311**	.074	.000	.438***	.106	.000
R ² (adjusted R ²)	.688*** n = 265			.502*** n = 203			.616*** n = 62		

*** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.

Second, when looking at the group of consumers who eat meat more than five days per week. Perceived environmental friendliness insignificantly and negatively affects resistance (E+C) ($\beta = -.277, p > .05$), meaning that there is no relationship between these constructs. Therefore, hypothesis H3b is supported (see model 10 in table 17). Second, perceived animal welfare insignificantly and negatively affects resistance ($\beta = -.179, p > .05$) (see model 10 in table 18) supporting H4b. In addition, perceived animal welfare insignificantly and positively affects resistance (B) ($\beta = .039, p > .05$), resulting in supporting H4b as well (see model 10 in table 15). This means that perceived animal welfare does not affect resistance or resistance (B). However, hypotheses H3a ($\beta = .218, p > .05$) and H4a ($\beta = .154, p > .05$) are not supported (see models 11 and 12 in table 16) as perceived environmental friendliness and perceived animal welfare insignificantly affect adoption, meaning that there is no longer a relationship between these two antecedents and adoption. The outcomes for consumers who eat meat more than five days are different but do not show more qualitative differences between resistance and adoption.

Table 17.

Effect of voluntariness, unnaturalness, environment, animal welfare, health and control variables on innovation resistance with meat consumption < 5 days per week and meat consumptions > 5 days per week.

	Model 1: Main effects resistance (E+C)			Model 9: Main effects resistance (E+C) with meat consumption = < 5 days per week			Model 10: Main effect resistance (E+C) with meat consumption > 5 days per week		
	β	SE	p	β	SE	p	β	SE	p
P. Voluntariness	-.042	.049	.319	.009	.070	.878	-.090	.102	.379
P. Unnaturalness	.205***	.057	.000	.265***	.071	.000	.263*	.135	.018
P. Environmental friendliness	-.237***	.062	.000	-.243**	.076	.001	-.277	.153	.080
P. Animal welfare	-.150**	.050	.006	-.200**	.066	.004	-.279*	.097	.034
P. Healthiness	-.021	.064	.712	-.062	.077	.396	-.093	.134	.439
R ² (adjusted R ²)	.553*** n = 265			.319*** n = 203			.420*** n = 62		

*** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.

Table 18.

Effect of voluntariness, unnaturalness, environment, animal welfare, health and control variables on innovation resistance with meat consumption < 5 days per week and meat consumptions > 5 days per week.

	Model 1: Main effects resistance			Model 9: Main effects resistance with meat consumption = < 5 days per week			Model 10: Main effect resistance with meat consumption > 5 days per week		
	β	SE	p	β	SE	p	β	SE	p
P. Voluntariness	-.073	.045	.090	-.011	.064	.860	-.135	.091	.156
P. Unnaturalness	.214***	.052	.000	.266***	.064	.000	.289**	.119	.005
P. Environmental friendliness	-.254***	.057	.000	-.218**	.069	.004	-.407**	.136	.006
P. Animal welfare	-.149**	.046	.007	-.230**	.060	.001	-.179	.086	.140
P. Healthiness	-.001	.058	.991	-.028	.070	.706	-.056	.119	.617
R ² (adjusted R ²)	.540*** n = 265			.295*** n = 203			.500*** n = 62		

*** $p < .001$; ** $p < .01$; * $p < .05$; Reference categories dummies: 15-30 years, men, student.

Summarized, besides perceived healthiness perfectly showing the qualitative difference between resistance and adoption, perceived environmental friendliness also shows the difference when using resistance (B) as the dependent variable when looking at the group of consumers who eat meat five days or less per week. This group and resistance (B) as a dependent variable better show the qualitative difference between resistance and adoption, as two constructs now show the difference instead of only perceived healthiness before splitting the meat consumption group. Resistance (B), therefore, better shows the qualitative difference between resistance and adoption compared to resistance as a one-dimensional construct and resistance (E+C). Table 19 summarizes the outcomes.

Table 19.

Results when using the groups of consumers eating meat five or fewer days per week.

Construct	Outcome	Explanation
Perceived environmental friendliness	Shows the qualitatively difference between resistance (B) and adoption.	Perceived environmental friendliness shows the qualitatively difference between resistance (B) and adoption, as perceived environmental friendliness positively and significantly effects adoption, and has no (or a weaker relation) effect on resistance (B).
Perceived healthiness	Perfectly shows the qualitatively difference between all resistance constructs* and adoption	Perceived healthiness perfectly shows the qualitatively difference between all resistance constructs and adoption, as perceived environmental friendliness positively and significantly effects adoption, and has no (and a weaker) relationship with all three resistance constructs.

* = resistance, resistance (E+C), and resistance (B).

5. Conclusions

The last chapter concerns a general conclusion about the hypotheses and answers the research question. Also, the research results will be discussed when looking at the literature, and practical implications for managers will be given. Last, the limitations of this study will be discussed as directions for further research.

5.1 Conclusion

This study aims to answer the following research question: *To what extent are consumer innovation resistance and consumer innovation adoption qualitatively different concepts?* Eleven hypotheses were developed by theory and tested. It is important to look at the combination of the hypotheses (A and B together), as the combination shows if resistance and adoption qualitatively differ or not. Table 20 gives an overview of the results.

Perceived voluntariness and perceived unnaturalness were used as resistance antecedents to predict consumer resistance toward PBMS. Remarkably, perceived voluntariness does not have a relationship with resistance to and the adoption of PBMS. This relationship means that the degree to which consumers feel voluntary does not affect the resistance of PBMS or the adoption of PBMS, resulting in the rejection of hypotheses H1a and H1b. Surprisingly, perceived voluntariness has a relationship when only using resistance (B), which resulted in supporting hypothesis H1a. Thus, perceived voluntariness shows the qualitative difference between resistance (B) and adoption, as both hypotheses are supported. Therefore, I decided to reject hypothesis H1a partly. The second resistance antecedent, perceived unnaturalness, affects resistance (E+C) or resistance (B), meaning that consumers who perceive PBMS as unnatural are more likely to resist PBMS. This resulted in supporting hypothesis H2a. However, perceived unnaturalness does have a negative relationship with adoption, resulting in rejecting H2b. This negative relation means that the more consumers perceive PBMS as unnatural, the less likely it is for them to adopt PBMS. As a result, perceived unnaturalness shows resistance and adoption to be opposites.

Perceived environmental friendliness, perceived animal welfare and perceived healthiness were used as adoption antecedents to predict consumer adoption of PBMS. Perceived environmental friendliness has a positive relationship with adoption, meaning that consumers who perceive PBMS as environmentally friendly are more likely to adopt PBMS. This resulted in supporting hypothesis H3a. On the other hand, perceived environmental friendliness has a negative relationship with resistance, resistance (E+C) or resistance (B), meaning that consumers who perceive PBMS as environmentally friendly are unlikely to resist

PBMS and thus has resulted in the rejection of hypothesis H3b. Moreover, this outcome states that resistance and adoption are opposites. Perceived animal welfare also positively affects adoption, which resulted in supporting hypotheses H4a. The more consumers perceive PBMS as animal friendlier, the more likely they adopt PBMS. On the other hand, perceived animal welfare also has a negative relationship with resistance or resistance (E+C), resulting in rejecting hypothesis H4b and arguing that resistance and adoption are opposites. In other words, consumers who perceive PBMS as animal friendlier are less likely to resist PBMS. However, this relationship does not hold for resistance (B), which would make me support hypothesis H4b and argue that perceived animal welfare shows the qualitative difference between resistance and adoption. Therefore, I partly rejected hypothesis H4b as the relationship between perceived animal welfare and resistance (B) shows the qualitative difference between resistance and adoption. The last adoption antecedent concerns perceived healthiness and has a positive relationship with adoption, meaning that consumers who perceive PBMS as healthier are more likely to adopt PBMS, which resulted in supporting hypothesis H5a. Surprisingly, perceived healthiness does not have a relationship with resistance, resistance (B) or resistance (E+C), meaning that perceived healthiness does not influence consumers to resist PBMS, which results in supporting H5b. This outcome of both hypotheses H5a and H5b being true shows the qualitative difference between resistance and adoption.

Overall, resistance (B) better shows the qualitative difference with adoption compared to resistance or resistance (E+C). Perceived voluntariness, perceived healthiness and perceived animal welfare shows this qualitative difference between resistance (B) and adoption, as both hypotheses A and B are supported for these antecedents.

The last hypothesis (H6) concerns resistance and adoption and states that there is no, or little, relationship between both concepts. There is a strong and negative relation between resistance and adoption ($-.756^{**}$) that also holds for resistance (E+C) and adoption ($-.796^{**}$) when looking at the correlation matrix (table 14). The relationship between resistance (B) and adoption is weaker ($-.489^{**}$) compared to resistance or resistance (E+C). These results state that resistance and adoption are opposites as a higher form of resistance leads to a lower form of adoption, resulting in the rejection of hypothesis H6.

To conclude, consumer innovation resistance is, to a low extent, qualitatively different from adoption. Results show that at least one antecedent (perceived healthiness) shows the qualitative difference between all resistance constructs and adoption. Remarkably, three out of five antecedents (perceived voluntariness, perceived animal welfare and perceived healthiness) show the qualitative difference when only using resistance (B), meaning that resistance (B)

better shows the qualitative difference compared to resistance or resistance (E+C). Also, results show that resistance and adoption are opposites, as both concepts are negatively correlated, and antecedents of perceived unnaturalness, perceived environmental friendliness and perceived animal welfare (only for resistance and resistance E+C) show opposite results.

Table 20.

Hypotheses results.

Hypotheses	Hypotheses results when using resistance or resistance (E+C)	Hypotheses results when only using resistance (B)	Qualitative different
H1a: Perceived voluntariness has a negative effect on resistance.	Rejected	Supported	Partly different
H1b: Perceived voluntariness has a different (weaker and no effect) on adoption.	Supported	Supported	
H2a: Perceived unnaturalness has a positive effect on resistance.	Supported	Supported	No
H2b: Perceived unnaturalness has a different (weaker and no effect) on adoption.	Rejected	Rejected	
H3a: Perceived environmental friendliness has a positive effect on adoption.	Supported	Supported	No
H3b: Perceived environmental friendliness has a different (weaker and no effect) on resistance.	Rejected	Rejected	
H4a: Perceived animal welfare has a positive effect on adoption.	Supported	Supported	Partly different
H4b: Perceived animal welfare has a different (weaker and no effect) on resistance.	Rejected	Supported	
H5a: Perceived healthiness has a positive effect on adoption.	Supported	Supported	Yes
H5b: Perceived healthiness has a different (weaker and no effect) on resistance.	Supported	Supported	
H6: There is no, or little, relationship between resistance and adoption.	Rejected	Rejected	Rejected

5.2 Discussion

The meta-analysis of Huang et al. (2021) analysed 152 articles on consumer innovation resistance and showed key themes to investigate further. One of the critical elements for future research is the conceptualisation and operationalisation of innovation resistance (e.g., Mani & Chouk, 2018; Huang et al., 2021). This study has contributed to the conceptualisation of consumer innovation resistance and consumer innovation adoption with Breckler's attitude

model (1984). The factor analysis showed that adoption is seen as a one-dimensional construct. Interestingly, resistance is not seen as a one-dimensional construct as it consists of resistance (E+C) and resistance (B) after conducting the factor analysis. This does not align with academics who see resistance as a one-dimensional construct (e.g., Ram & Sheth; Sun et al., 2021; Talke & Heidenreich, 2014). However, some academics also see resistance with more dimensions, such as postponement, rejection and opposition (Kleijnen et al., 2009). When looking at the two dimensions of resistance, resistance (B) aligns with some of the literature discussed in chapter 2, as academics see resistance as an intentional or an actual behaviour (Lee & Snijders, 2018; Mani & Chouk, 2018). Remarkably, emotion and cognition items measured resistance and load on the same factor. This indicates an intertwining of these items and can be explained. For example, an item used for emotions: *“I feel angry about the consumption of meat alternatives”*, and an item for cognition: *“I have strong negative prejudices about meat alternatives”*, are very close to each other. By this, I mean that this negative prejudice is making the consumer angry simultaneously, which shows the intertwining and that the items of emotion and cognition are interrelated. Emotions and cognition causing resistance to innovations are also seen in some of the literature discussed in chapter 2 (Bagozzi & Lee, 1999; Castro et al., 2019, Sun et al., 2021). Overall, this research studied the qualitative differences between resistance and adoption. A difference is also seen in the conceptualisation of resistance and adoption, as resistance is two-dimensional and adoption one-dimensional. Interestingly, this difference in dimensionalities can argue that both concepts of resistance and adoption differ when using Breckler’s attitude model. Another contribution of this study to the literature is the operationalisation of resistance and adoption when using emotion, cognition and behaviour items. All of these items were self-developed in the context of this study and can be used by other academics that want to use this model of Breckler to study resistance and adoption. Academics only have to change the items to their research context.

This study also showed that innovation resistance and adoption could be seen as opposites, negatively and highly correlated concepts when conceptualized with the attitude model of Breckler (1984). However, both concepts being opposites in this study is not shocking, as this study uses the same attitude components for resistance and adoption. For example, an item for resistance was as follows: *“Replacing meat with meat substitutes is not at all in line with my beliefs”*, and for adoption: *“Replacing meat with meat substitutes is in line with my beliefs”*. These two items suggest that resistance and adoption are opposites.

This research also strived to use the most appropriate antecedents leading to innovation resistance and adoption of PBMS. The antecedents used for adoption in this study align with

the literature as they all affect adoption positively (e.g., Clonan et al., 2015; He et al., 2020; Hwang et al., 2020; Rogers, 2003). Resistance antecedent perceived unnaturalness also positively affected all resistance constructs and is in line with the literature (Hwang et al., 2020). The second resistance antecedent, perceived voluntariness, only showed a negative relationship with resistance (B), which aligns with academics who argue a negative relationship between perceived voluntariness and resistance (He et al., 2021; Plouffe, 2001). However, this relationship is not found when looking at one-dimensional construct resistance or resistance (E+C), which was not expected.

Perceived healthiness is the only antecedent that shows the qualitative difference between all resistance constructs and adoption. The construct positively affects consumers' adoption of PBMS and aligns with the literature (e.g., He et al., 2021; Marcus et al., 2022). Perceived healthiness has no relationship with all resistance constructs, which is interesting as PBMS are sometimes seen as unnatural products as PBMS contains high levels of salt and chemical preservatives, which results in consumers resisting PBMS (Hwang et al., 2020). However, perceived healthiness is no reason consumers resist PBMS, which aligns with the literature that states that resistance and adoption are different (Bagozzi & Lee, 1999; Ram & Sheth, 1989; Szmigin & Foxall, 1998). More antecedents show the qualitative difference between resistance and adoption when only looking at resistance (B). Resistance (B) is compared to resistance (E+C) more about taking actions. For example, an item of resistance (B) was: *"I will file a complaint against the consumption of meat alternatives"*, or *"I will protest against the consumption of meat alternatives"*, which is more about an act or reaction instead of having feelings (emotions) or thinking (cognition). In addition, discussed literature in chapter 2 showed that resistance could be seen as opposition to new products. This opposition can be expressed by consumers actively protesting against the introduction of new products (Kleijnen et al., 2009; Szmigin & Foxall, 1998). This form of resistance is also seen as active innovation resistance (Talke & Heidenreich, 2014), a negative attitude expressed by consumers rejecting a product while physically dealing with it. Resistance (B) can cause more qualitative differences with adoption, as resistance (B) is a more powerful way of resisting new products, as consumers need to decide to take action (e.g., protesting or complaining) instead of consumers that only have negative feelings about a new product or thinking that the new product is not in line with their values or beliefs. This difference in taking action could be the answer to why resistance (B) explains more qualitative differences compared to resistance and resistance (E+C). However, more research on the dimensionalities of Breckler's attitude model is needed to generalize the results.

Lastly, this study used additional analyses to see if different results occur when splitting up the consumer group of eating meat days per week. Perceived environmental friendliness also shows the qualitative difference between resistance and adoption when only looking at the consumer's group of eating meat five days or fewer per week and resistance (B). Consumers who perceive PBMS as environmentally friendly are likelier to adopt PBMS (e.g., He et al., 2021). On the other hand, perceived environmental friendliness has no relation to resistance (B) when consumers eat meat five days or fewer per week. This outcome was not expected, as I would argue that consumers who eat less meat are less likely to resist and use alternatives for meals, such as PBMS. Differences in groups that change results are also found in the literature. For example, animal welfare is perceived differently among consumer sociodemographic variables, such as age, gender, urban origin and educational level. Consumers with a higher educational level find perceived animal welfare more important than consumers with a lower educational level and therefore adopt PBMS more likely than consumers with a lower educational level (Estévez-Moreno et al., 2021).

5.3 Practical implications

Most innovative new products result in failures, which is not wanted as developing new products costs time and money (Gourville, 2006). Therefore, it would help managers if they know which and how antecedents influence resistance and adoption of innovations. This study helps managers (especially in the innovative food sector), as the results show how people decide to resist or use PBMS. For example, managers now know that perceived healthiness affects the adoption of PBMS, and that perceived healthiness does not affect resistance towards meat substitutes. In other words, people that perceive meat substitutes as being unhealthy do not lead to resistance against meat substitutes. This effect means that people who perceive meat substitutes as healthier are more likely to adopt meat substitutes. Perceived healthiness may have the same effect on other food innovations. This knowledge can help managers act and strategise so that consumers are more likely to adopt other food innovations without resisting the product. As a result, fewer food innovations will turn into failures, saving companies time and money (Gourville, 2006).

Next to managers, this study also helps public policymakers. The study helps policymakers as PBMS positively contribute to societal challenges, such as food security and climate change (He et al., 2020; Zhuang et al., 2021). PBMS can partly be a solution for the food industry looking for alternatives for meat, as more and more meat is demanded worldwide (Whitnall & Pitts, 2019). For example, this research shows that the more people perceive meat

substitutes as healthy, the more likely people to adopt PBMS. Public policymakers can communicate to people that meat substitutes are healthy. As a result, more people have become aware of the health benefits of using PBMS. Also, this study shows that innovation resistance is seen as a two-dimensional construct. Therefore, managers should pay attention to both cognition and emotion parts and behaviour parts, as these are two different dimensions. For example, policymakers could decrease the value-added tax on PBMS to counterattack resistance. This decrease in value-added tax could result in more happy consumers, which is part of resistance (E+C), leading to less resistance to PBMS. In addition, policymakers can counterattack resistance (B) by, for example, starting a campaign that provides consumers with information about all benefits of PBMS. This could result in consumers being less likely to hinder (which is a behaviour) organizations that produce and sell PBMS, as consumers are more aware of PBMS's positively benefits. However, more research is needed to validate these arguments.

5.4 Limitations and further research

All studies and research conducted by researchers experience limitations, like this study. First, the sample size is not representative, as the sample was overrepresented by the age-group 15-30 years (78.5%) and, logically, also by students (62.3%). This overrepresentation is not the result of the sampling method but refers more to the places we as researchers had chosen to collect the data. Further research should focus more on places where all groups are approximately equally present. For example, places such as hospitals, parks or even nursing homes when looking for older respondents. Because the sample is not representative, more focus must be paid to the differences between groups and the influence of the control variables. These should be re-examined in further research.

Second, only two resistance antecedents and three adoption antecedents are used in this study. However, as stated in the literature, more antecedents lead to consumer resistance and adoption (e.g., Mani & Chouk, 2018; Rogers, 2003). Future research should focus more on other antecedents that explain resistance and adoption (in the case of PBMS). For example, researchers state that more research is needed for possible resistance antecedents such as; ideology, ethical and moral considerations, habits and cross-cultural differences (e.g., Huang et al., 2021). Therefore, this study is limited as it uses only five antecedents, which need more research to generalise results better.

Third, an essential insight in this study is the conceptualisation of innovation resistance and its two-dimensional, which needs more attention in the future to generalise results in

conceptualising resistance with Breckler's attitude model (1984). Future research should also dive deeper into the dimensions that form resistance as a two-dimensional construct when using the attitude model of Breckler (1984). In contrast, innovation adoption is seen as a one-dimensional construct. What causes the attitude components emotion and cognition to be seen as one resistance construct, and what causes attitude component behaviour alone to be seen as one resistance construct?

Fourth, adoption antecedent perceived healthiness perfectly shows the difference between resistance and adoption in this study. However, more research is needed to generalise results and thus say that this difference is also seen when looking at other innovations (other than food innovations such as PBMS).

Fifth, this study has split the meat consumption group into two different groups. This split-up resulted in different outcomes for the developed hypotheses. It could be that group differences affect consumers' adoption and resistance differently. For example, this study shows that consumers who eat meat five or fewer than five days per week are less likely to resist PBMS compared to consumers who eat meat more than five days per week. However, future research should focus more on what these differences between groups mean and how they affect resistance and adoption.

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Appendix

Appendix I. Operationalization of the constructs

Construct	Definition	Operationalization (And original scale)	Original items	Adjusted English items to research context	Dutch items
Perceived voluntariness	The degree to which the choice one makes is under the individual's volitional control (Plouffe, 2001)	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	Consumption of meat alternatives is voluntary	Het eten van vleesvervangers is vrijwillig
			Although suggested to my business, using the Exact card system was not compulsory	Consumption of meat alternatives is not compulsory	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.	My superiors expect me to use a PWS	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.	Factors Affecting Consumers' Alternative Meats Buying Intentions: Plant-Based Meat Alternative and Cultured Meat (Hwang et al., 2020) Food Choice Questionnaire (FCQ) revisited. Suggestions for the development of an enhanced general food motivation model.	Eating human-made meat is an unnatural practice that separates us further from nature.	Meat alternatives are processed, which causes authenticity loss of the product	Vleesvervangers zijn bewerkt waardoor de echtheid van het product verloren gaat
			Contains no additives	Meat alternatives contain additives	Vleesvervangers bevatten smaakversterkers en andere toevoegingen
			Contains no artificial ingredients	Meat alternatives contain artificial ingredients	Vleesvervangers bevatten kunstmatige ingrediënten
Perceived environmental friendliness	The degree to which consumers evaluate green products based on their environmental desires, sustainability expectations, and green needs (Chen and Chang, 2012).	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), 97-110.	This mattress deserves to be labelled environmentally friendly	Meat alternatives deserve to be labelled environmentally friendly	Vleesvervangers verdienen het om gelabeld te worden als milieuvriendelijk
			To eat meat is disrespectful towards life and the environment	Purchasing meat alternatives is a good environmental choice	Het kopen van vleesvervangers is een milieuvriendelijke keuze
				A person who cares about the environment would be likely to buy meat alternatives	Een persoon die geeft om het milieu zou waarschijnlijk vleesvervangers kopen
Animal welfare	The degree to which the choice one makes is supporting animal protection and better animal treatment.	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	By eating meat alternatives, I respect the quality of life of animals	Door het eten van vleesvervangers respecteer ik de kwaliteit van leven van dieren
			Do you believe that farm animals can	Meat alternatives reduce animal threat	Door het eten van vleesvervangers lijden dieren minder

			feel pain and suffering?		
			I choose food which has been produced in a way that minimizes cruelty to animals	By eating meat alternatives, I contribute less to animal cruelty	Door het eten van vleesvervangers draag ik minder bij aan dierenleed
Perceived healthiness	Being perceived as high in nutrients, low in fat, and low in calories, in addition to being viewed as good for your body and globally healthy, in line with current dietary guidelines and lay understanding of healthiness.	Steptoe, A., Pollard, T. M., & 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. Factors that predict consumer acceptance of enriched processed meats (Shan et al. 2017).	Keeps me healthy Enriched processed meat is likely to have a beneficial impact on my health Enriched processed meat is healthier than conventional products	Meat alternatives keep me healthy Meat alternatives are likely to have a beneficial impact on my health Meat alternatives are healthier than meat	Vleesvervangers houden mij gezond Vleesvervangers hebben waarschijnlijk een voordelige impact op mijn gezondheid Vleesvervangers zijn gezonder dan vlees
Innovation adoption	An attitude, consisting of affect , cognition and behaviour , that causes consumers to adopt or reject an innovation	Model of Breckler 1984 (Tripartite model of attitude structure).		Cognitive: I think meat alternatives are a good thing Meat alternatives are in line with what I think I have a positive opinion about meat alternatives	Cognitie: Ik denk dat de vervanging van vlees door vleesvervangers iets goeds is De vervanging van vlees door vleesvervangers komt overeen met mijn overtuigingen Ik heb een positieve mening over de vervanging van vlees door vleesvervangers

			Behaviour: I intend to eat meat alternatives	Gedrag: Ik ben van plan om vleesvervangers te eten
			I intend to try out meat alternatives	Ik heb de intentie om vleesvervangers te proberen
			I will actively support the consumption of meat alternatives	Waar mogelijk zal ik de vervanging van vlees door vleesvervangers actief ondersteunen
			Affect: Thinking about meat alternatives makes me feel glad	Emotie: Ik verheug mij als ik denk aan de vervanging van vlees door vleesvervangers.
			Thinking about meat alternatives makes me feel happy	Het denken over de vervanging van vlees door vleesvervangers maakt me blij
			Thinking about meat alternatives makes me feel satisfied	Het denken over de vervanging van vlees door vleesvervangers stemt me tevreden
Innovation resistance	A negative attitude, consisting of affect, cognition and behaviour that causes consumers to resist an innovation	Model of Breckler 1984 (Tripartite model of attitude structure).	Affect: I feel angry about the consumption of meat alternatives	Emotie: Ik word boos als ik denk aan de vervanging van vlees door vleesvervangers
			I feel strong negative emotions about the consumption of meat alternatives	Ik voel negatieve emoties als ik denk aan de vervanging van vlees door vleesvervangers
			I fear the consumption of	Ik vrees de vervanging van

	meat alternatives	vlees door vleesvervangers
	Cognitive: I don't think that the consumption of meat alternatives is a good idea	Cognitie: Ik denk niet dat de vervanging van vlees door vleesvervangers een goed idee is
	The consumption of meat alternatives is absolutely not in line with what I think	De vervanging van vlees door vleesvervangers is totaal niet in lijn met mijn overtuigingen
	I have strong negative prejudices about meat alternatives	Ik heb sterke negatieve vooroordelen over vleesvervangers
	Behaviour: I will file a complaint against the consumption of meat alternatives	Gedrag: Ik ga een klacht indienen tegen de vervanging van vlees door vleesvervangers
	I will hinder the consumption of meat alternatives	Indien mogelijk zal ik de vervanging van vlees door vleesvervangers proberen tegen te houden
	I will protest against the consumption of meat alternatives	Ik ben geneigd om te protesteren tegen de vervanging van vlees door vleesvervangers
Control Variables		
Gender	What is your gender? Men/women/gender neutral/other	Wat is uw geslacht? Man/vrouw/gender neutraal/anders

Age			What age group are you in? 15-30, 30-45, 45-60, 60+	In welke leeftijdscategorie bevindt u zich? 15-30, 30-45, 45-60, 60+
Vegetarian			How many days do you consume meat? 0-7	Hoeveel dagen in de week eet u vlees?
Perceived innovativeness	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 must see other people using new innovations before I consider them	I must see other people using innovations before I consider them	Ik moet andere mensen een innovatie zien gebruiken voordat ik ze overweeg
		I enjoy trying out new ideas	I enjoy trying out innovations	Ik vind het leuk om innovaties uit te proberen
		I am receptive to new ideas	I am receptive to innovations	Ik ben welwillend tegenover innovaties
Work experience			What currently applies to you?	Wat is momenteel voor u van toepassing?
			<ul style="list-style-type: none">- Student- Working- Retired- Other, namely:	<ul style="list-style-type: none">- Student- Werkende- Gepensioneerd- Anders, namelijk:

Appendix II. Qualitatively feedback pilot studies I and II

Qualitative feedback before pilot studies I and II

- According to respondents of the first pilot, some of the sentences used in the survey were too vague. Therefore, we adjusted these incomplete sentences for the second pilot.
- The case 'Ga voor Groen' is too complicated and unrealistic for respondents and is therefore adjusted.
- We enhanced the consistency, all items in the survey concern the prompt in pilot 1.
- We transformed the word plant-based meat alternatives into meat alternatives, as this is easier to understand for respondents. In addition, the word plant-based can bias respondents at the beginning of the survey.
- We have added several pictures of meat alternatives so that respondents know what meat alternatives are.
- We fitted the dependent variables with the prompt, as this was not the case in the first pilot.
- We have changed construct social pressure into voluntariness.
- We have split construct perceived greenness to the environment and animal welfare, as we think both constructs are an essential factor for adopting meat alternatives. Also, literature distinctively describes these constructs.
- We have added control variables (e.g., eating meat in a week, consumer innovativeness).
- We had to consider where to collect the data (we were looking for several Dutch cities).
- We have put the prompt at the beginning of the survey instead of in the middle. All questions/items concern the prompt in pilot 1.

Qualitative feedback after pilot study I

- We have changed the prompt and added: "cafe/restaurant of your employer or school to replace all meat products". In this way, respondents are more familiar with the example given in the survey.

- We changed the first question/item of construct unnaturalness. From *"meat alternatives are too artificial and create a lesser degree of perceived authenticity"* to *"meat alternatives are processed, which causes authenticity loss of the product"*.
- The items for environmental friendliness are adjusted based on a new source concerning greenness.
- There are few adjustments to the self-developed items for adoption and resistance, but the context of the questions stays the same.

Qualitative feedback after pilot study II

- We adjusted item 2 of construct voluntariness and excluded the words "school" and "work" in the question.
- We adapted item 2 of construct unnaturalness. The word "highly processed" is replaced with "unnaturalness".
- We adjusted items of innovation adoption, as we first made it too strong, as people cannot always show the behaviour if not given the opportunity.

Appendix III. Final survey

Start of Block: Block 1

Q1 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
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0683895012

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

End of Block: Block 1

Start of Block: Default Question Block

Introduction Voor het beantwoorden van de volgende vragen, lees onderstaande situatie:
Stel dat het café/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)



Q7	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	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

vleesvervangers
proberen tegen
te houden (8)

9. Ik ben
geneigd om te
protesteren
tegen de
vervanging van
vlees door
vleesvervangers
(9)

☐ ☐ ☐ ☐ ☐ ☐ ☐

Q8 Wat is uw geslacht?

- ☐ Man (1)
- ☐ Vrouw (2)
- ☐ Genderneutraal (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)

Appendix IV. Demographic variables

Sample size	N	Percent	Mean
265			
Gender			
Men	123	46.4%	
Women	137	51.7%	
Gender neutral	4	1.5%	
Other	1	0.4%	
Meat consumption days per week			4
0	20	7.5%	
1	12	4.5%	
2	33	12.5%	
3	38	14.3%	
4	52	19.6%	
5	48	18.1%	
6	22	8.3%	
7	40	15.1%	
City			
Eindhoven	147	55.5%	
Utrecht	33	12.5%	
Nijmegen	85	32.1%	
Occupation			
Student	165	62.3%	
Working	94	35.5%	
Retired	2	0.8%	
Other	4	1.5%	
Age			
15-30 years	208	78.5%	
30-45 years	24	9.1%	
45-60 years	25	9.4%	
60+ years	8	3.0%	

Appendix V. Factor analyses

First confirmatory factor analysis with antecedents of resistance and adoption

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	1780.660
	df	153
	Sig.	.000

Communalities

	Initial	Extraction
Voluntariness_1	.429	.497
Voluntariness_2	.428	.730
Unnaturalness_1	.333	.349
Unnaturalness_2	.379	.508
Unnaturalness_3	.447	.676
Environment_1	.612	.460
Environment_2	.631	.473
Environment_3	.442	.398
Animal_1	.617	.652
Animal_2	.587	.650
Animal_3	.561	.607
Health_1	.584	.693
Health_2	.609	.689
Health_3	.520	.531
Innovativeness_2	.288	.461
Innovativeness_3	.312	.509
Rev_Voluntariness_3	.204	.170
Rev_Innovativeness_1	.090	.039

Extraction Method:

Principal Axis Factoring.

Pattern Matrix					
	1	2	3	4	5
Voluntariness_1		.696			
Voluntariness_2		.858			
Unnaturalness_1			.354		-.286
Unnaturalness_2			.703		
Unnaturalness_3			.800		
Environment_1	.442				
Environment_2	.542				
Environment_3	.439				.287
Animal_1	.762				
Animal_2	.823				
Animal_3	.849				
Health_1					.798
Health_2					.798
Health_3					.592
Innovativeness_2				.660	
Innovativeness_3				.688	
Rev_Voluntariness_3		.364			
Rev_Innovativeness_1					

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 12 iterations.

Total Variance Explained

Initial Eigenvalues				Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Factor	Total	% Of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.164	28.686	28.686	4.723	26.236	26.236	3.891
2	1.833	10.183	38.870	1.402	7.787	34.024	1.371
3	1.646	9.147	48.016	1.214	6.742	40.766	1.852
4	1.485	8.250	56.266	1.013	5.626	46.392	1.326
5	1.214	6.744	63.010	.740	4.112	50.504	3.272
6	.993	5.515	68.525				
7	.919	5.105	73.630				
8	.815	4.526	78.156				
9	.633	3.515	81.671				
10	.560	3.112	84.783				
11	.483	2.683	87.466				
12	.449	2.494	89.959				
13	.431	2.392	92.352				
14	.384	2.133	94.485				
15	.282	1.567	96.051				
16	.257	1.427	97.479				
17	.243	1.353	98.832				
18	.210	1.168	100.000				

Extraction Method: Principal Axis Factoring.

a. When Factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Second confirmatory factor analysis with dependent variables resistance and adoption

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.952
Bartlett's Test of Sphericity	Approx. Chi-Square	4479.088
	df	153
	Sig.	.000

Communalities

	Initial	Extraction
Adopt_cog_1	.758	.711
Adopt_cog_2	.655	.630
Adopt_cog_3	.834	.835
Adopt_beh_1	.715	.689
Adopt_beh_2	.678	.598
Adopt_beh_3	.704	.711
Adopt_emo_1	.807	.766
Adopt_emo_2	.844	.788
Adopt_emo_3	.815	.787
Res_emo_1	.670	.630
Res_emo_2	.705	.616
Res_emo_3	.602	.524
Res_cog_1	.578	.563
Res_cog_2	.740	.736
Res_cog_3	.587	.510
Res_beh_1	.720	.736
Res_beh_2	.705	.753
Res_beh_3	.671	.584

Extraction Method:

Principal Axis Factoring.

Pattern Matrix

	Factor	
	1	2
Adopt_cog_1	.779	
Adopt_cog_2	.820	
Adopt_cog_3	.854	
Adopt_beh_1	.802	
Adopt_beh_2	.684	
Adopt_beh_3	.829	
Adopt_emo_1	.935	
Adopt_emo_2	.981	

Adopt_emo_3	.951	
Res_emo_1	-.308	.579
Res_emo_2	-.416	.472
Res_emo_3	-.454	.364
Res_cog_1	-.477	.370
Res_cog_2	-.647	.307
Res_cog_3	-.525	.273
Res_beh_1		.865
Res_beh_2		.869
Res_beh_3		.794

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

- a. Rotation converged in 6 iterations.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% Of Variance	Cumulative %	Total	% Of Variance	Cumulative %	Total
1	10.853	60.294	60.294	10.539	58.548	58.548	9.942
2	1.926	10.702	70.997	1.629	9.049	67.597	6.715
3	.837	4.648	75.644				
4	.552	3.064	78.709				
5	.544	3.020	81.729				
6	.444	2.466	84.195				
7	.414	2.301	86.496				
8	.396	2.201	88.697				
9	.320	1.776	90.473				
10	.272	1.509	91.982				
11	.254	1.410	93.392				
12	.236	1.312	94.704				
13	.202	1.120	95.824				
14	.286	1.036	96.860				
15	.175	.972	97.832				
16	.155	.864	98.696				
17	.136	.757	99.453				
18	.098	.547	100.000				

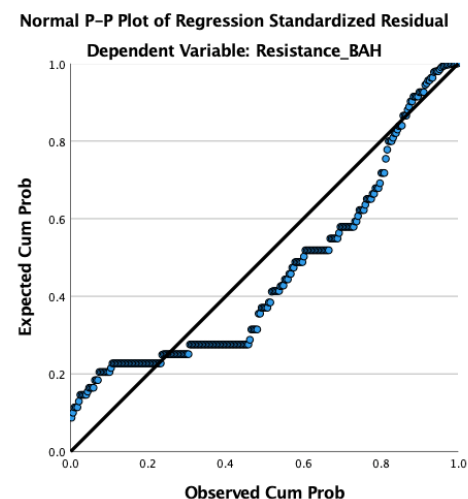
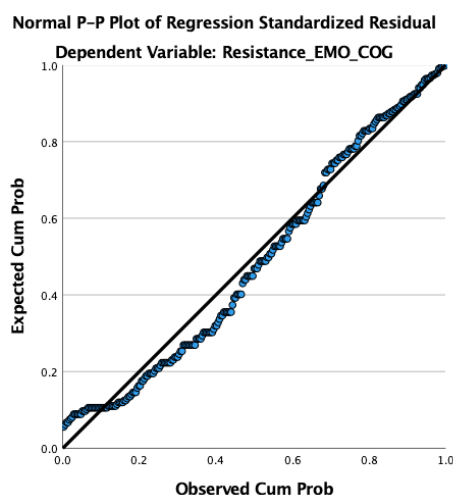
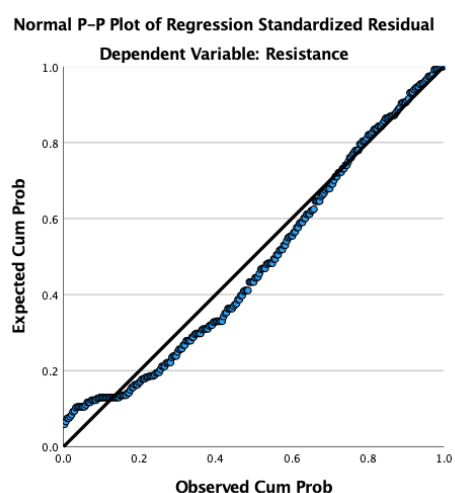
Extraction Method: Principal Axis Factoring.

- b. When Factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Appendix VI. Assumptions of multiple regression analysis

Assumption 2: normality

Descriptive statistics										
	N	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation	Variance Statistic	Skewness Statistic	Skewness Std. Error	Kurtosis Statistic	Kurtosis Std. Error
Voluntariness	265	1.00	7.00	5.9283	1.17927	1.391	-1.857	.150	3.980	.298
Unnaturalness	265	1.67	7.00	4.4264	1.14946	1.321	-0.88	.150	-.330	.298
Environment	265	1.00	7.00	4.8604	1.25672	1.579	-.903	.150	.773	.298
Animal welfare	265	1.00	7.00	5.0642	1.46583	2.149	-.754	.150	.076	.298
Health	265	1.00	7.00	3.8340	1.20818	1.460	-.022	.150	.405	.298
Adoption	265	1.00	7.00	4.3455	1.47561	2.177	-.158	.150	-.668	.298
Resistance	265	1.00	7.00	2.5514	1.23928	1.536	.791	.150	.335	.298
Resistance (E+C)	265	1.00	7.00	2.8497	1.37228	1.883	.491	.150	-.486	.298
Resistance (B)	265	1.00	7.00	1.9547	1.27642	1.629	1.688	.150	2.761	.298

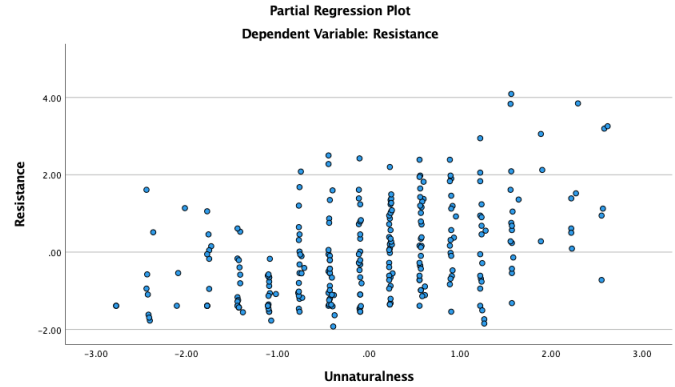
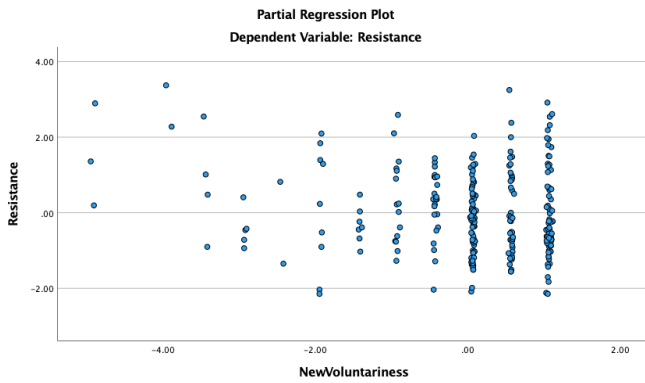


The above P-P Plots of Regression Standardized Residual concerns dependent variables resistance, resistance (E+C) and resistance (B) and perceived voluntariness as its kurtosis lies above 3.0.

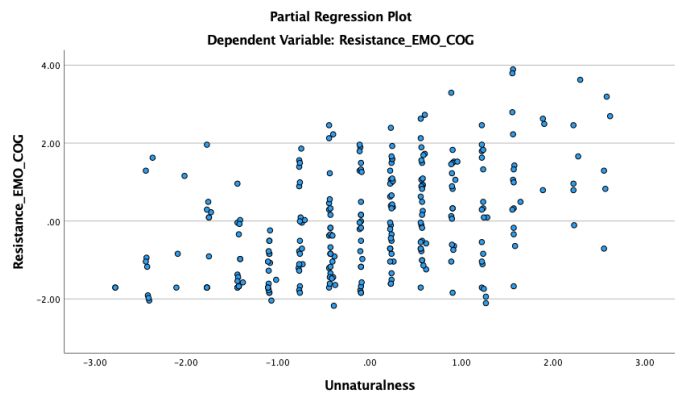
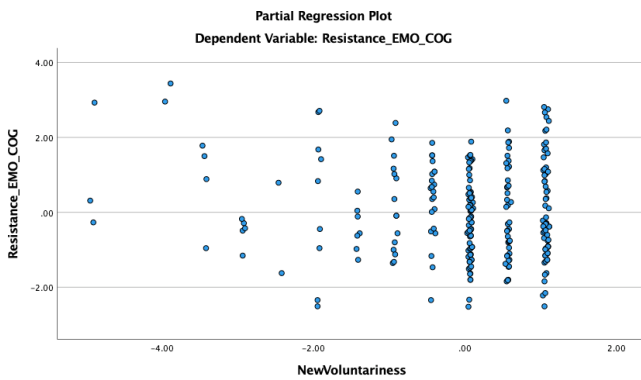
Assumption 3 and 4: linearity and homoscedasticity

Partial regression plots

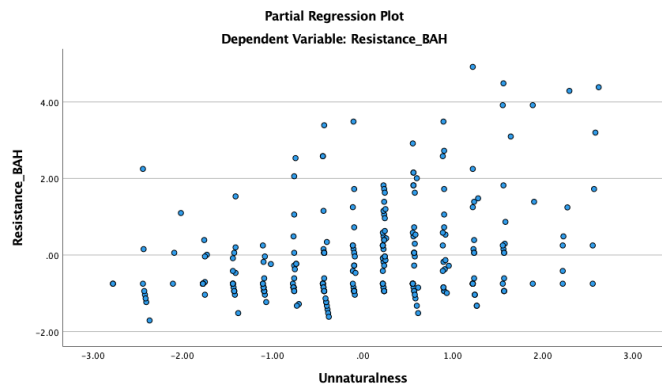
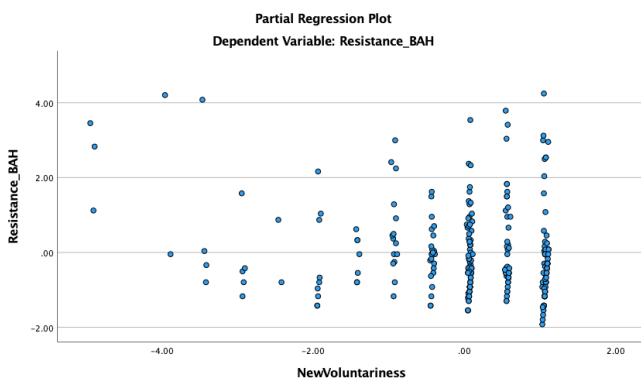
Resistance:



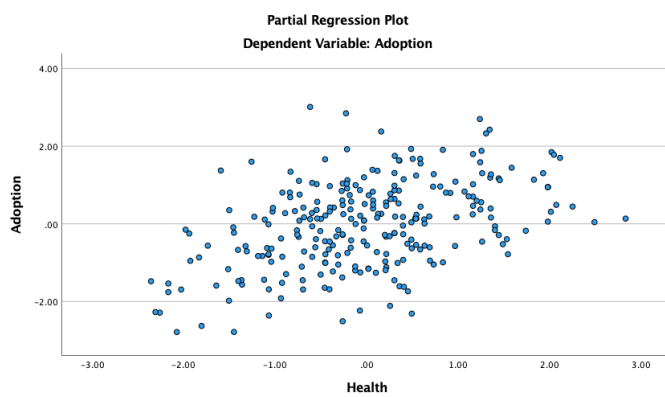
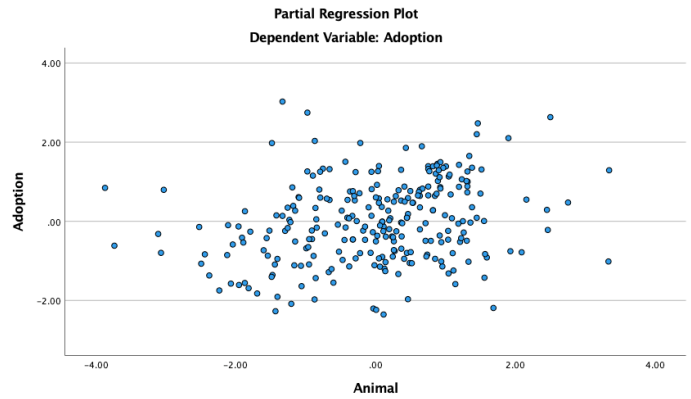
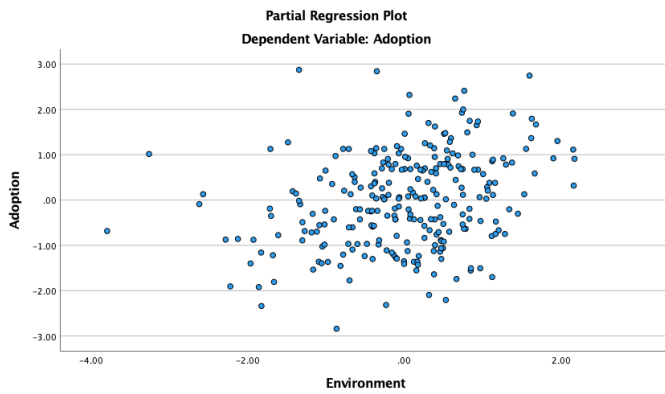
Resistance (E+C):



Resistance (B)

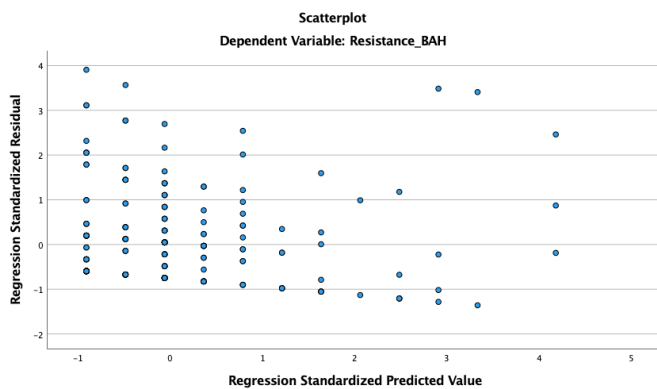
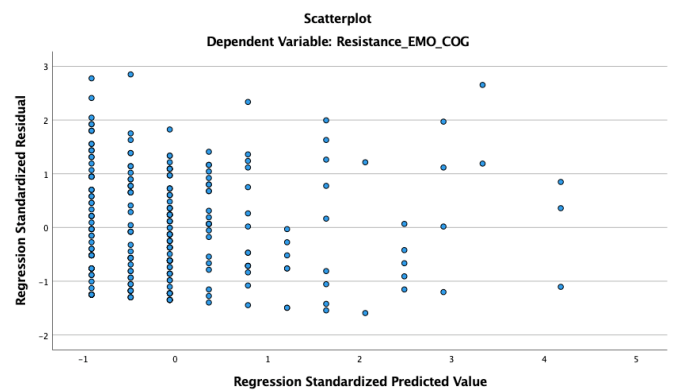
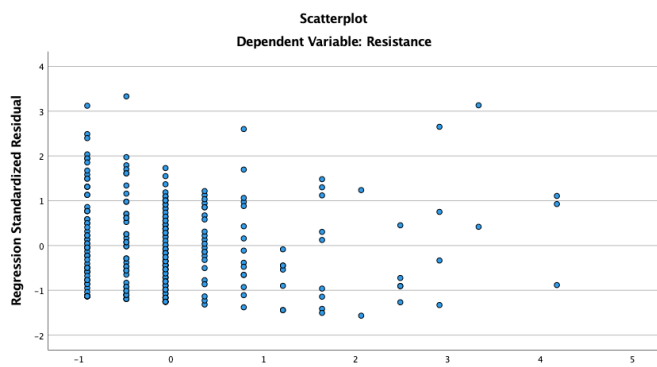


Adoption:

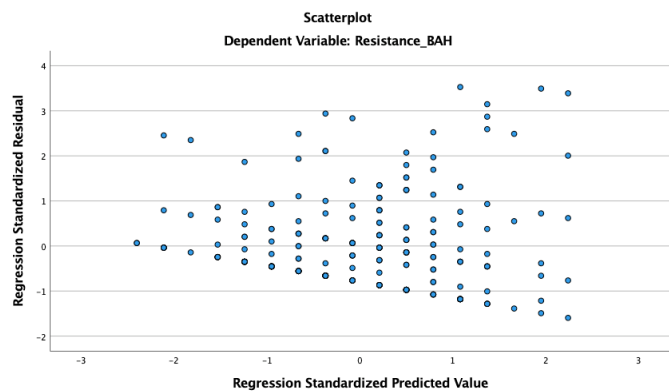
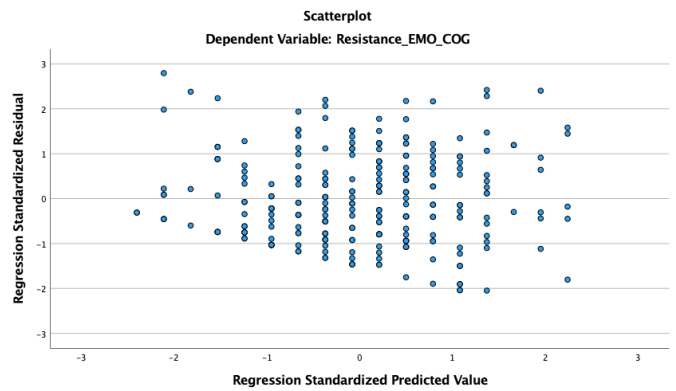
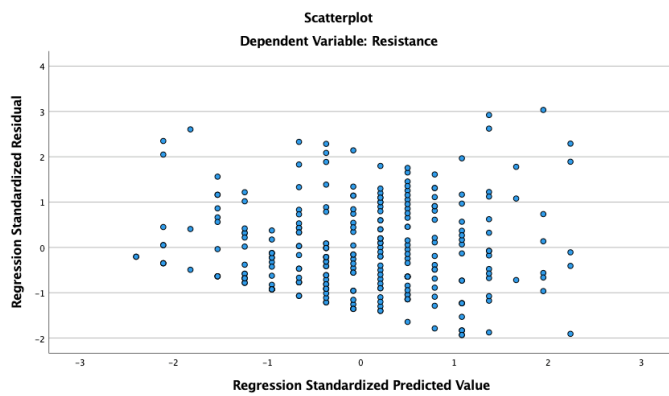


Residual scatterplots

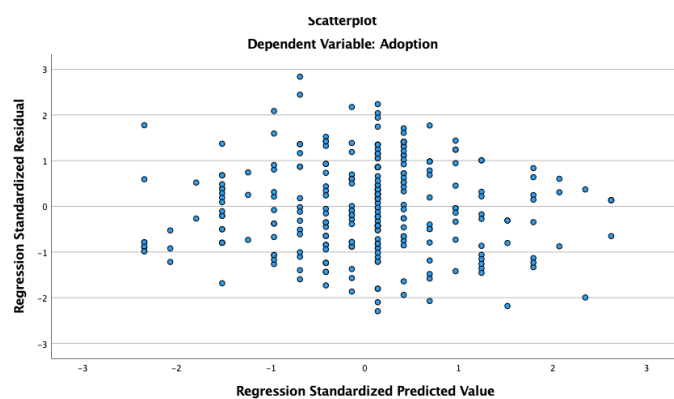
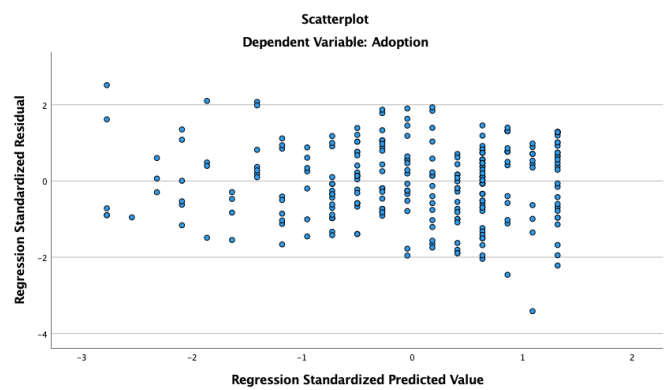
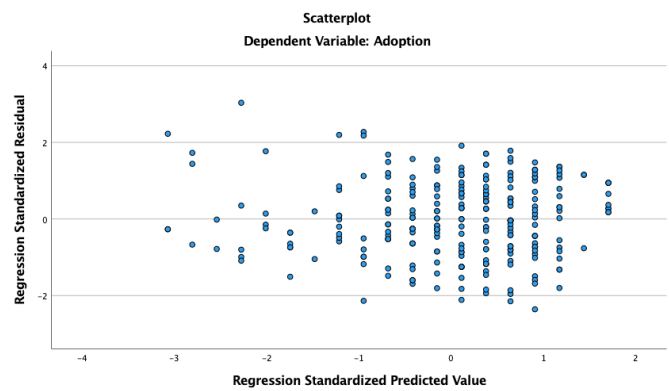
Resistance, resistance ($E+C$), resistance (B) and voluntariness:



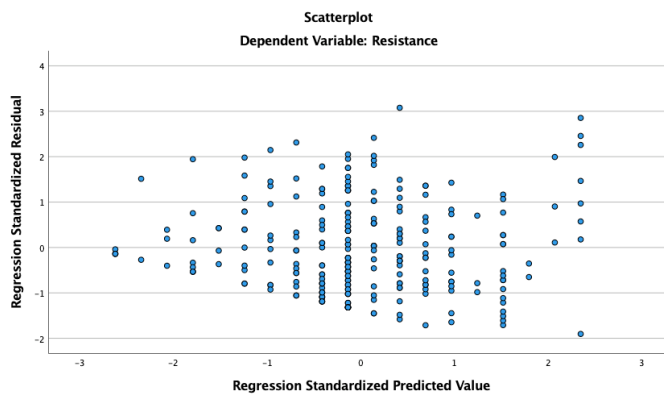
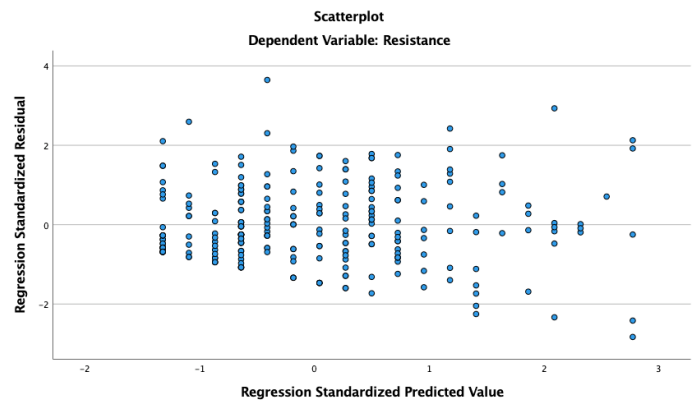
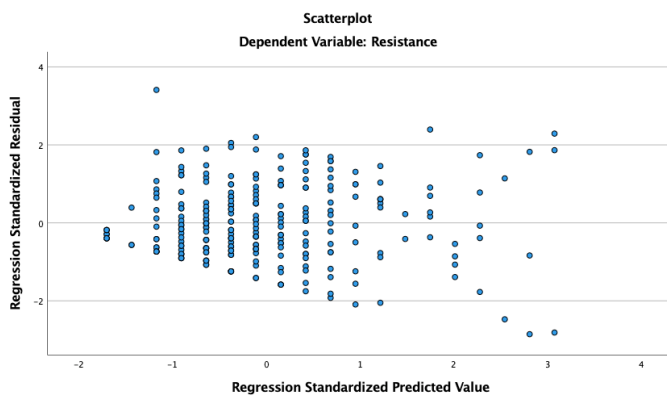
Resistance, resistance (E+C), resistance (B) and unnaturalness:



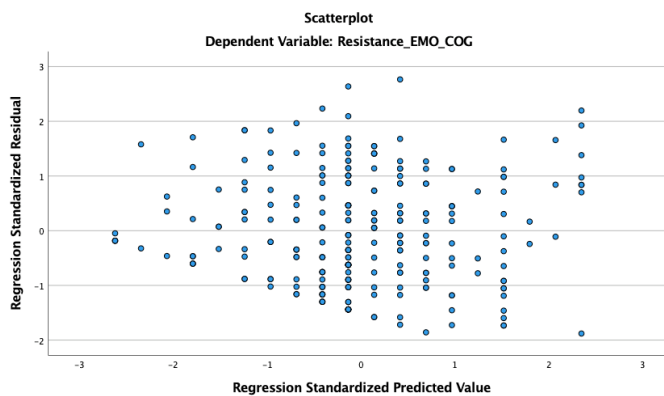
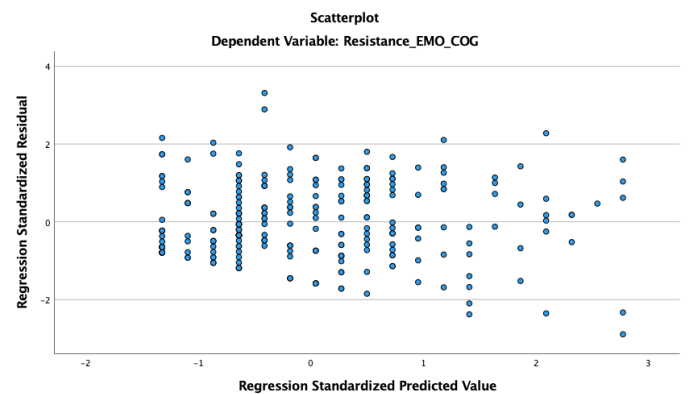
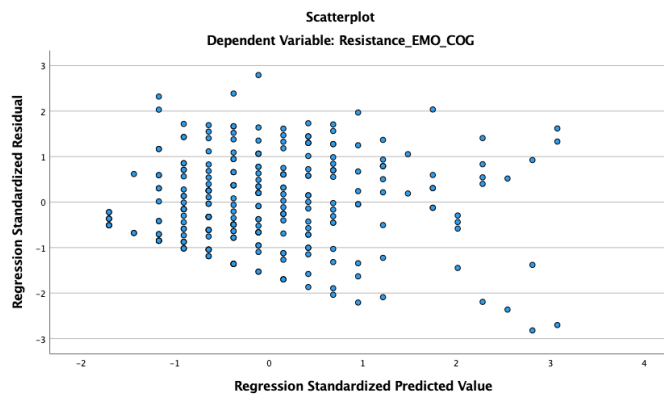
Adoption and perceived environmental friendliness (1), perceived animal welfare (2) and perceived healthiness (3):



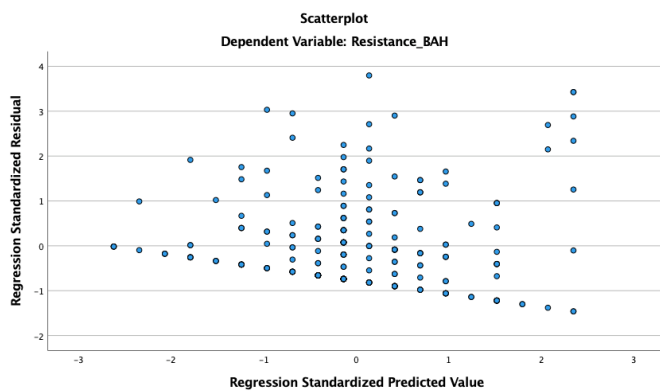
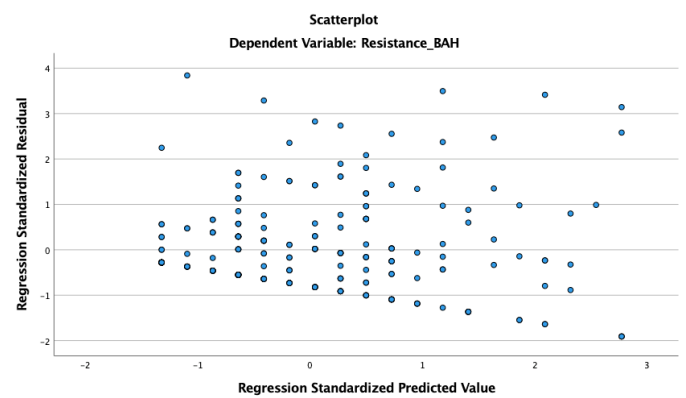
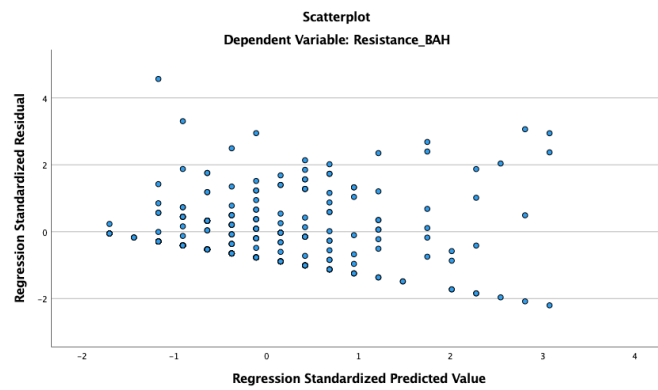
Perceived environmental friendliness, perceived animal welfare and perceived healthiness on resistance:



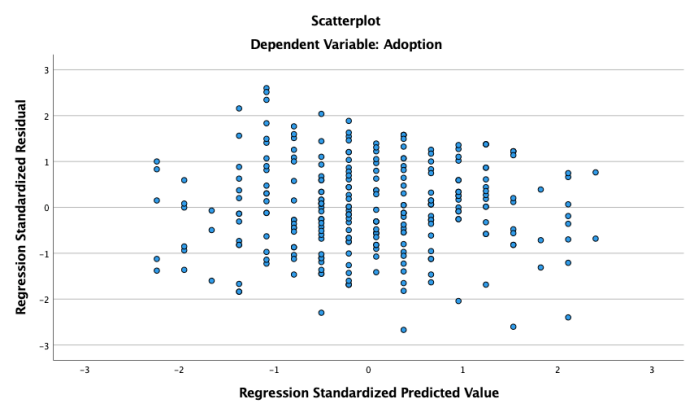
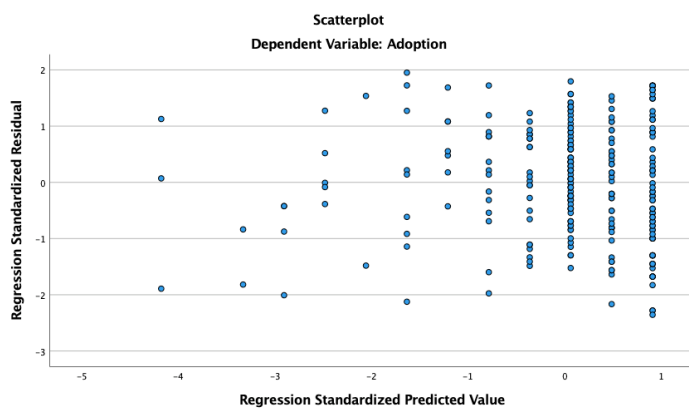
Perceived environmental friendliness, perceived animal welfare and perceived healthiness on resistance (E+C):



Perceived environmental friendliness, perceived animal welfare and perceived healthiness on resistance (B):



Perceived voluntariness and perceived unnaturalness on adoption:



Assumption 5: Multicollinearity

Model		Tolerance	VIF
1	P. Unnaturalness	.789	1.267
	P. Environmental friendliness	.554	1.806
	P. Animal welfare	.656	1.525
	P. Healthiness	.630	1.588

Dependent variable: P. Voluntariness

Model		Tolerance	VIF
1	P. Voluntariness	.984	1.775
	P. Environmental friendliness	.564	1.526
	P. Animal welfare	.655	1.452
	P. Healthiness	.689	1.016

Dependent variable: P. Unnaturalness

Model		Tolerance	VIF
1	P. Voluntariness	.989	1.012
	P. Unnaturalness	.807	1.240
	P. Animal welfare	.811	1.234
	P. Healthiness	.704	1.420

Dependent variable: P. Environmental friendliness

Model		Tolerance	VIF
1	P. Voluntariness	.980	1.021
	P. Environmental friendliness	.679	1.474
	P. Unnaturalness	.785	1.273
	P. Healthiness	.646	1.548

Dependent variable: P. Animal welfare

Model		Tolerance	VIF
1	P. Voluntariness	.980	1.020
	P. Environmental friendliness	.614	1.628
	P. Animal welfare	.673	1.486
	P. Unnaturalness	.860	1.163

Dependent variable: P. Healthiness