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Master Thesis

Ecolabels in the market of red meat – Is it effective?

"What effect does issuing a third-party certificated ecolabel have on purchase intention of red meat products and do ecolabel credibility and environmental concern moderate it?"

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Nina Veflen

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Acknowledgments

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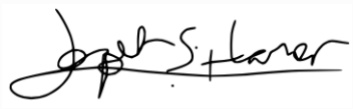
This thesis represents the end of an era of five continuous years at BI Norwegian Business School. We look back at an enjoyable, educational, and engaging time full of ups and downs. Enjoy the reading!



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Abstract

This study examines the effect of third-party certified (TPC) ecolabels on the purchase intention of red meat products. In addition, the moderating effect of ecolabel credibility and environmental concern were investigated. Data from 105 Norwegian young adults were collected through a quantitative survey. The results demonstrated that TPC ecolabels have an overall positive effect on purchase intention of red meat products. Further, Antibiotic labeled products yielded the highest purchase intention, while products containing an eco-score label yielded the lowest purchase intention. Moreover, the findings revealed that highly perceived credible ecolabels did not have a greater impact on purchase intention compared to lower credible ecolabels. In addition, only a few results suggested that environmentally concerned consumers had a higher purchase intention for ecolabeled products compared to environmentally unconcerned consumers. To summarize, it can be decisive for red meat producers to choose appropriate ecolabels to enhance their customers' purchase intention. However, this study suggests that the labels do not necessarily need to be third-party certified, nor targeted at an environmentally concerned customer base.

1.0 Introduction

Red meat consumption in Europe has been undergoing significant changes in recent years, especially regarding red meat (European Commission, 2021). The rising interest in social benefits (e.g., biodiversity and sustainability), as well as the increasing concerns about more ethical food production methods, provide red meat producers with the opportunity to compete through differentiation (Dudinskaya et al., 2021). However, social benefits tend to be embedded in credence cues that consumers struggle to evaluate before or even after consumption, given the lack of expertise and practical abilities (Fernqvist & Ekelund, 2014). Because of this, meat producers must find alternative ways to communicate and signal such benefits.

The use of ecolabels has been an increasingly popular method in the meat sector, despite a tarnished image (Lazzarini, Visschers & Siegrist, 2018; Dudinskaya et al., 2021). Lazzarini et al. (2018) found that ecolabels can marginally enhance consumers' accuracy in selecting environmentally friendly food products. However, Dudinskaya (2021) highlighted a higher willingness to pay for other labels (e.g., meat origin) than a carbon footprint label. Apostolidis & McLeay (2019) uncovered different effects of ecolabels within certain consumer groups, identifying both geographical and socio-demographic differences. In Norway, the majority of consumers agree with the fact that certification labels are an essential tool in making informed food choices. Two out of three consumers claimed they were affected by labels when making food choices in the grocery store (Heidenstrøm, Jacobsen, & Borgen, 2011).

Several well-known brands in the Norwegian market are now using ecolabels on their products in order to communicate their health and sustainability benefits. Orkla's brand "Naturli" contains a self-declared low carbon footprint label, while Toro has their version of a carbon footprint label on its pre-packaged dinners. Nortura launched the label "47% Bioplast", signaling the reduced use of fossil material on many of their products to limit the overall carbon emission (Nortura, 2018). Other international players have issued their own ecolabels, like Mondelez's "Cocoa Life" and Kellogg's "Sustainable Packaging." Although brand-owned ecolabels indicate potential benefits such

as competitive advantage, the effects of these labels differ. Some literature argues that brand-owned ecolabels can be equally effective as other independent third-party certifications, especially when issued by well-known brands associated with responsibility and trustworthiness (Bougherara & Piguet, 2009; Dekhili & Achabou, 2014). However, others have found that consumers perceive self-declaration labeling as less favorable than third-party certifications, since self-declarations are less credible due to the lack of a guarantee from an external assurance (Horne, 2009; Thøgersen, 2000).

Previous research has found positive impacts of third-party certificated ecolabels on purchase intention in different categories of food (Dangi, Gupta & Narula, 2020; Mazurek, 2019). Other studies show how ecolabels, in general, may guide consumers' decision-making process (Teas & Agarwal, 2000). This research suggests that third-party certifications might positively affect the purchase intention, also in the market of red meat products. However, the labeling information demanded by the consumers in the meat industry is connected to the origin of the meat, nutritional information, and, especially for beef consumers, the system of production (Bernués, Olaizola & Corcoran, 2003). Nevertheless, labeling should be done with precaution in an emission-associated industry. Choosing the suitable type of ecolabel can be decisive not to weaken the overall perception of meat and high emissions, but instead increase the overall purchase intention. In addition, there are also reasons to believe that the credibility of the ecolabel will moderate the impact of the ecolabel. Previous research found that a majority of ecolabels on food products fall short in providing a credible quality assurance scheme (Nilsson, Tuncer & Thidell, 2004).

As meat producers suffer from the new consumer tendencies, they need to better understand how they can affect consumers with various types of labeled information. In this thesis, we present a study in cooperation with Gilde, investigating the effects of three new ecolabels on purchase intention, moderated by the ecolabel credibility and environmental concerns. These effects were tested on three products within the category of red meat: sausages, tenderloin, and beef.

As a result, we are studying the following research question:

"What effect does issuing a third-party certificated ecolabel have on purchase intention of red meat products and do ecolabel credibility and environmental concern moderate it?"

2.0 Literature review

2.1 Ecolabels

Ecolabels are defined as a "sustainability measurement directed at consumers, intended to make it easy to take environmental concerns into account when shopping" (Global-Ecolabelling, 2022). Another definition is "any symbol appearing on product packaging that seeks to inform consumers that a particular product is in some significant way less harmful to the environment than purchase alternatives" (Tang, Fryxel & Chow, 2004, p. 87)

Ecolabels' function is to inform consumers of the environmental quality of goods, the production process, and the quality of the products' hidden attributes (Brécard, 2014). Because consumers cannot verify these green attributes directly, they must trust signals such as ecolabels to authenticate the claims (Atkinson & Rosenthal, 2014). Therefore, ecolabels may guide consumers' decision-making by reducing their risk perception (Teas & Agarwal, 2000; Brach, Walsh & Shaw, 2018). On the other hand, information overload and cognitive biases may mislead consumers and limit the effectiveness of food labels in providing information on credential attributes (Apostolidis & McLeay, 2019).

2.2 Categories of Environmental Labeling

There are different categories of environmental labeling (Gruére, 2013). Product labeling can be either voluntary or mandatory, depending on the regulations for the product category (Horne, 2009). In addition, the labels can be separated into first- and third-party certifications (US EPA, 1998). First-party certification is typically performed by marketing managers on their company's behalf to promote the positive attributes of their products (Rubik & Frankl, 2017). On the other hand, third-party certification is carried out by independent sources that award products with labels based on certain environmental criteria (Rubik & Frankl, 2017). Because consumers can question the validity of the information companies provide, third-party certifications assure an objective evaluation of the product's attributes. Through this method, certifications help firms form credible claims (Golan, Kuchler, Mitchell, Greene & Jessup, 2001).

The International Organization for Standardization (ISO, 2019) has identified three broad types of voluntary labels, with ecolabeling fitting under the strongest Type I designation. Type I is a voluntary, multiple-criteria-based, third-party program that awards a license. This license authorizes the use of environmental labels on products indicating the overall environmental preferability of a product within a particular product category, based on life cycle considerations (ISO 14024:2018). Type II consists of informative environmental self-declaration claims or symbols regarding products made by retailers likely to benefit from the claim without an independent third-party certification (ISO 14021:2016). Type III labeling is primarily intended for use in business-to-business communication. It provides quantified environmental data for a product under pre-set categories of parameters set by a third party (ISO 14025:2006). Ecolabels have traditionally been classified as a type I label because they have been determined independently by a neutral third party to meet specific, transparent environmental criteria (Global Ecolabelling, 2019). However, a rise of self-declared ecolabels in recent years demonstrates the growth of type II labels.

Today, there are approximately 460 ecolabels in use worldwide, with over 120 different types labeled on food and beverage products (Morrison, 2021). No ecolabel covers it all. Therefore, the authors have chosen a selection for the research based on relevance to the meat industry. First, as the rising interest in health benefits affects the way consumers purchase food (Shan et al., 2017), a differentiation label communicating such benefits has emerged in terms of an Antibiotic label. Second, the increased amount of plastic waste is damaging the planet and its ecosystems, resulting in the development of bioplastics (Jungblut, 2022). Therefore, labels to communicate the usage of this packaging are referred to as Bioplastic labels. Third, the climate crisis is forcing food producers to rethink how they communicate their product life cycle, as resource limitation is a crucial problem in reversing climate changes (PwC, 2022). As a result, carbon footprint labels with eco-scores based on the product life cycle have been developed.

These types of labels are limited investigated, especially in the market of red meat, which is why it makes them interesting to research for both theoretical and managerial reasons.

2.2.1 Antibiotic Labels

As bacteria and diseases spread due to climate changes, more antibiotics will be used, thereby intensifying the problem of antibiotic resistance (WHO, 2020). To help diminish the development of resistant bacteria, the medical community is attempting to reduce unnecessary and excessive usage of antibiotics. One of the targets is to limit the use of antibiotics for enhancing animal growth and promoting feed efficiency in the production of food for animals (Centner, 2016). Research shows that Norway has the lowest usage of antibiotics in its food production per kg compared to 30 other European countries (2,9 mg/kg) (Nortura, 2017). Nortura is one of the largest food producers in Norway, with core competencies in meat production. Nonetheless, no labeling of the low antibiotic usage is to be found on the Norwegian market. A study in the US found that companies can profit from labels such as "Raised without antibiotics" in the category of poultry (Bowman, Marshall, Kurchler & Lynch, 2016) and that consumers are willing to pay a premium for the attributed label (Heng, Peterson & Li, 2016).

Figure 1: Antibiotic Label

2.2.2 Bioplastic Labels

According to European Bioplastic (2022), *plastic material* is defined as bioplastic if it is either biobased, biodegradable, or has both attributes. Unlike other packaging materials, conventional plastic has been found to pose threats to human-, animal-, and ecosystem health (Asselt, Yefan, Soh, Gao & Morgan, 2020). Due to their similar appearance, bioplastic products cannot be easily distinguished from conventional plastic products. The usage of independent

and internationally respected labels for bioplastic products is influential for consumers to acquire transparent and correct information and safeguard the positive impression of bioplastics (European-Bioplastic, 2022). In 2018, Nortura launched its own bioplastic label, "47% bioplast". The product packages with this label have a reduced amount of fossil raw material and cause the firm to reduce their carbon emission by 387 tons every year (Nortura, 2018). There are also organizations in Europe that provide certifications and corresponding labels based on EU standards of bio-based carbon content (European Bioplastic, 2022). An American study revealed that warning labels on plastic packaging reduce consumers' willingness to pay (Asselt et al., 2020). However, there is limited research on how such labels affect consumers' purchase intention.

Figure 2: Bioplastic Label

2.2.3 Carbon Footprint Labels

A *carbon footprint label* is a label developed to fulfill the function of making the purchasing decision safer on the basis of environmental information about the products represented as environmental costs (Mazurek, 2019). The purpose of this ecolabel is to simplify the comparison of products within the same product category and to encourage consumers to enclose environmental costs of production, usage, or end-of-life in the decision-making process (Mazurek, 2019). There are several labels of this type. One is made by The Carbon Trust, while another is made recently by Foundation Earth, an initiative from a group of food manufacturers and retailers. The labeling system considers farming, processing, packaging, and transport. It evaluates the product's environmental damage based on carbon (49% weighted), biodiversity loss (17%), water usage (17%), and water pollution (17%) (Coyne, 2021). The impact of these types of labels varies across consumer groups. Research shows that the label has low

overall attribute importance in the market of meat products compared to the kind of meat, fat content, and price. Only a tiny percentage of a consumer segment identified as "meat reducers" tend to be driven by carbon footprint labels (Apostolidis & McLeay, 2019). It is reasonable to assume that this is because of the high emission reputation of the meat industry. A recent study discovered that meat accounts for about 60% of all greenhouse gasses from food production (Milman, 2021). Nonetheless, the overall eco-impact of meat products ranges from B to D, based on the available evidence, where Vagyu burgers received a D, and pork sausages received a B in the British market (Wood, 2021). There is currently a lack of research regarding such eco-scores on purchase intention.

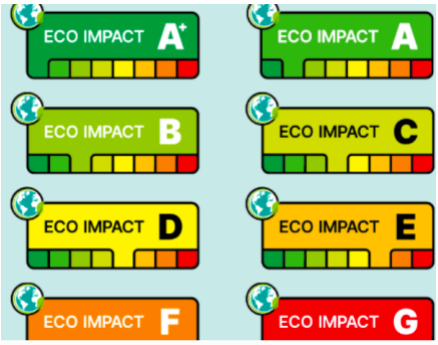


Figure 3: Eco-Score Label

2.3 Purchase Intention

Purchase intention is defined as «the subjective inclination that consumers have towards a product» (Fishbein & Ajzen, 1975). It is a complex process related to consumer attitudes, behavior, and perceptions and can be an effective tool to predict the buying process (Gosh, 1990). Furthermore, consumers can be affected by internal and external motivations during the buying process (Gogoi, 2013). Consumers use different elements to form a general evaluation of product quality (Krystallis & Ness, 2003). In general, a brand consists of a name and a symbol. Packaging, in its new function, operates as the representative of the brand, and through this position, it can be used as the carrier of advertising messages and purchase motivational instruments. Deng (2009) has researched the visual element of food purchase and confirmed that attitudes toward visual packaging impact perceived product value. Similarly, the research by Bigoin-Gagnan and Lacoste-Body (2018) found that packaging

and the visual aspect including labels of food packaging have a significant effect on purchase intention.

2.3.1 Purchase Intention and Ecolabels

As the world's population increasingly becomes aware of environmental- and health problems, organizations have started utilizing the advantage of the green era in advance of more sustainable and healthy products and services. Ecolabels have thus become a significant factor in the field of more sustainable marketing (Heidenstrøm et al., 2011) and help organizations differentiate their products and services in the mind of the consumer (Bougherare & Piquet, 2009). The primary intent of an ecolabel is to deliver information about the product so that the consumers can make green purchase decisions (Thøgersen, 2000). Several studies state that ecolabels are often a helpful tool for consumers when they purchase food because the packaging is the most appealing element which initially persuades a consumer in a purchase process (Amos, Pentina, Hawkins & Davis, 2014; Tang et al., 2004). In Europe, almost 50% of the individuals questioned by the European Commission stated that ecolabeling plays a significant part in their purchase decision (European Commission, 2009). Similarly, in France, the French Institute of Public Opinion found that 91% of the respondents state that labels help guide their purchases (Malleray, 2019). As a result, the first proposed hypothesis becomes:

H1: Third-Party Certificated (TPC) Ecolabels has a positive impact on purchase intention

2.4 Ecolabel Credibility

The number of ecolabels has increased, but the success of ecolabeling schemes has been mixed (Dangi et al., 2020). The ability to distinguish between different logos may not lead to their usability in the decision process (Bond, Thilmany & Bond, 2008). Although many purchase decisions are made in-store, a limited time and low motivation to read labels while shopping, especially if they are found too confusing, may result in superficial processing of information rather than a more detailed analysis (Dangi et al., 2020). The label's credibility can be a decisive factor affecting the purchase intention.

Brach et al., 2018 demonstrated that consumers must perceive a third-party certificated label as credible in order to reduce risk perceptions. Nevertheless, recent literature argues that brand-owned ecolabels can be equally convincing as other independent third-party certifications, particularly when issued by well-known brands associated with responsibility, competence, and trustworthiness (Bougherara & Piguet, 2009; Dekhili & Achabou, 2014). Other studies revealed that consumers usually infer environmental superiority and, as a result, higher quality in products identified by both organic and non-organic certificated labels due to their credibility (Lanero, Vázquez & Sahelices-Pinto, 2021). Furthermore, consumers' perceived ecolabel credibility, among other factors, positively affects the green purchase intention, and the higher the perceived credibility of ecolabels, the higher the green purchase intention (Cai, Xie & Guilar, 2017). However, these effects are yet to be investigated in the market of meat products. Therefore, the proposed hypothesis becomes:

H2: TPC ecolabels perceived as highly credible have a greater positive impact on purchase intention compared to ecolabels perceived as less credible

2.5 Environmental Concern

Environmental concern is defined as "an evaluation of, or an attitude towards facts, one's own behavior, or others' behavior with consequences for the environment" (Fransson & Gärling, p.369, 1999). This definition refers to a specific attitude that directly determines intentions, but also a broader, general attitude or value orientation. There are four distinguished value orientations (Stern, 1992). Accounting for the first, environmental concern represents the New Environmental Paradigm (NEP). In the second value orientation, environmental concern refers to anthropocentric altruism, emphasizing that consumers care for the environment primarily because of their belief of a degraded environment that poses a threat to people's health. Therefore, it is not a danger to the environment but a threat to the well-being of individuals that is of major concern (Van Liere & Dunlap, 1978). In the third value orientation, environmental concern represents self-interest. It is highlighted that perceived personal threats generated by environmental damage are an essential factor

underlying environmentally responsible behavior (Baldassare & Katz, 1992). The final orientation assumes that environmental concern is a function of in-depth causes, like post-materialistic values or underlying religious beliefs (Stern, 1992). Furthermore, research shows geographical and demographical differences in consumers' overall concern for the environment (Sen & Saijo, 2008; Bak, 2018).

2.5.1 Environmental Concern, Ecolabels, and Purchase Intention

Environmental concern has a significant positive impact on purchase intention toward green products (Maichum, Parichatnon, Peng, 2017). However, the role of environmental concern in ecolabeling and purchase intention is not thoroughly investigated. One study failed to find a mediating effect of environmental concern between consumers' understanding of ecolabels and eco-conscious buying behavior (Hameed & Waris, 2018). Nevertheless, Xie, Bagozzi & Grønhaug (2015) argue that consumers with high engagement for a sustainable environment are more likely to support companies' green initiatives. In addition, they have a more significant purchase intention toward environmentally friendly products (Hartmann & Apaolaza-Ibanez, 2012). Ecolabeling of consumer products has traditionally targeted people who want to choose environmentally friendly products supported by their environmental concerns (Ward & Phillips, 2008). However, these labels are yet to be investigated in the tarnished meat industry, where distinguishing between high and reduced-emission products can be challenging. Thus, the hypothesis becomes:

H3: Environmentally concerned consumers have a higher purchase intention for ecolabeled products compared to environmentally unconcerned consumers.

2.6 Processed- and Unprocessed Red Meat Products, and The Effect of Different Ecolabels

The researched products in this thesis follow the categorization of processed and unprocessed red meat products. *Processed meat* is defined as products usually made of red meat that is cured, salted, or smoked to improve the durability of the food and/or to improve color and taste, often containing a high

amount of minced fatty tissue (e.g., sausages) (Rohrmann & Linseisen, 2015). Consumers often perceive these products as unhealthy (Grasso, Brunton, Lyng, Lalor, & Mnahan 2014). Therefore, most research investigates how increased health benefits can change the consumer perception of such products, like lower levels of salinity, fat content, and nitrite, as well as applications of plant-based derivatives substituting some of the meat content (Shan et al., 2017; Hung, Theo & Verbeke, 2016). Studies have also compared empowered meat consumers' and anti-consumer preferences for sustainability labels, but without using processed meat as test products (Apostolidis & McLeay, 2019). On the other hand, unprocessed meat is preserved without the addition of high levels of salt and chemical preservatives (e.g., pork tenderloin) (Micha, Michas, Mozaffarian, 2012). Nonetheless, its CO2 emission constitutes a significant threat to global warming (Milman, 2021). Research claims that for each kilogram of beef produced, 36 kg of carbon dioxide is released into the atmosphere (Pointing, 2022). Given these facts, the eco-scores discussed in the ecolabel section will range from B and lower, which will most likely affect the overall purchase intention compared to the other ecolabels. Although bioplastic labels are limited research in the context of purchase intention, there are reasons to believe that the impact of this label will be greater compared to moderate eco-score labels. The majority of respondents in a European study expressed concern about problems related to plastic waste and demonstrated a positive sentiment towards using bioplastic materials (Filho et al., 2021). In addition, the consumer's willingness to pay a premium for antibiotic labels and health benefits in general (Shan et al., 2017) suggests that this label will also have a greater impact on purchase intention than the eco-score label. Accordingly, the proposed hypothesis becomes:

H4: The eco-score label has a lower effect on purchase intention compared to bioplastic- and antibiotic labels

2.7 Overview of Hypotheses

H1: *Third-Party Certificated (TPC) Ecolabels has a positive impact on purchase intention*

H2: *TPC ecolabels perceived as highly credible have a greater positive impact on purchase intention compared to ecolabels perceived as less credible*

H3: *Environmentally concerned consumers have a higher purchase intention for ecolabeled products compared to environmentally unconcerned consumers*

H4: *The eco-score label has a lower effect on purchase intention compared to bioplastic- and antibiotic-labels*

2.8 Conceptual Model

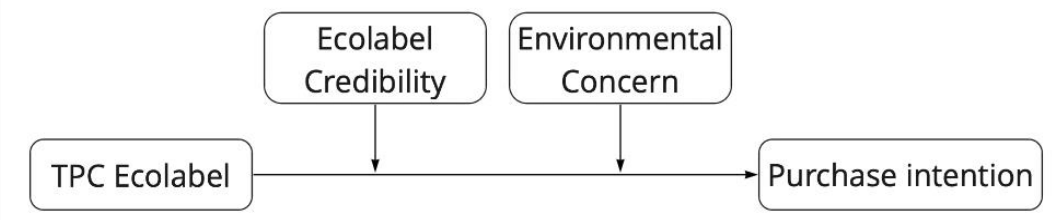


Figure 4: Conceptual Model

3.0 Methodology

This part includes a detailed explanation of the methods used to collect and analyze the data. We will discuss the sample and data gathering process, and explain the survey design and scale development. An online survey was conducted to test the proposed model. The purpose was to evaluate the relationship between the different third-party certificated ecolabels on purchase intention, moderated by the ecolabel credibility and environmental concern. Therefore, we conducted a survey-based experiment designed through a self-administered questionnaire.

3.1 Sample and Data Collection

Participants were mainly recruited online through personal networks. The non-probability convenience sample does not represent any definable population but can be used for exploratory research to generate ideas or insights (Malhotra, 2010). The sample was primarily Norwegian young adults, as Gilde was curious about the young adult segment. In addition, this sample is appropriate because young people are most concerned with sustainable consumption (Nordahl, 2019). We also screened out consumers who did not eat meat during the week. As previous research shows the difference in ecolabel preferences between different consumer segments based on meat consumption habits (Apostolidis & McLeay, 2019), we could filter on this with a meat consumption question at the beginning of the survey. Furthermore, we screened out consumers with no responsibility for purchasing groceries because they would not have enough experience to judge labels and products in general.

Web-based surveys, in general, have a number of advantages in terms of ease of administration, data collection, and storage, resulting in financial and time savings (Nair, Adams & Mertova, 2011). Further, the respondents can contribute on their own devices from wherever they are, thus collecting more participants for the survey. However, there are several disadvantages to the

usage of web-based methods for survey collection. Low response rates, participant bias, limitations in types of data collected, and practical survey administration issues all impact the use of online survey data collection (Rice, Winter, Doherty & Milner, 2017). Because of the exploratory intention of this thesis, as well as restricted resources, we determined that the benefits exceed the disadvantages discussed.

The size of the sample is essential for getting accurate results and running the study successfully (Qualtrics, 2022). The minimum viable sample size for the Norwegian population (5.379 million, 2020) with a 95% confidence interval and 5% error margin is 385 people, using the following formula:

$$\frac{(z\ scores)^2 stddev(1-stddev)}{(Margin\ of\ error)^2} = \frac{(1.96)^2 * 0.5(0.5)}{(0.5)^2} \approx 385$$

However, the studies' sample size depends on second- and third-level breakdowns, where 1000 respondents usually work as the rule of thumb.

Nonetheless, this number is only an indication, and since we used a convenience sample for this research, the sample is not generalizable to the whole Norwegian population. Data collection for the research was done in the second week of April 2022. The survey was created and distributed through the online questionnaire software Qualtrics, and the survey length was roughly 4-5 minutes.

3.1.1 Ethical & Privacy Considerations

In accordance with the Norwegian National Committee for Research Ethics, a part at the beginning of the questionnaire asked the participant to agree to data collection (Forskningsetikk, 2019). The participants were informed that they have their privacy protected at all times and that their answers would be anonymous. This included demographic questions and other information collected in the questionnaire. The data was collected and handled by internal BI policies for collecting, storing, analyzing, and sharing data (BI, 2022).

3.1.2 Data Cleaning

The full dataset consisted of 125 respondents. However, the dataset contained a considerable number of respondents with incomplete data. Based on a minimum requirement of 100 respondents and the time limit, we decided to keep respondents with a 90% completion rate. Thus, we were left with 105 respondents and deleted the rest from the dataset due to the inadequate completion of the survey. This sample size is small but sufficient to conduct our analysis and test the hypotheses satisfactorily.

We utilized the arithmetic mean imputation to handle missing values in the dataset. This method allows us to replace missing values on a variable with the arithmetic mean of all available cases. It produces a complete dataset, yet it reduces the data's variability as the technique ascribes values around the center of the distribution (Enders, 2010). Nonetheless, biased estimates will not occur if the missing values account for less than 10% of the subjects (Eekhout et al., 2014), which we facilitated in our dataset. Therefore, we assessed mean imputation as a suitable technique for handling missing values.

3.2 Sample Descriptive

The overall sample (n = 105) was equally distributed among females (49.5%) and males (49.5%), with young individuals between 20-29 years (91%). The sample had an average meat consumption of 4.6 days a week and a mean overall environmental concern of 4.85 out of 7. They perceived all the ecolabels' credibility as moderate, with mean scores ranging from 4.33 to 5.10 on a 1-7 point Likert scale. The purchase intention was measured with a choice model. Accordingly, these means are irrelevant to this research. The full descriptive statistics are presented in table 1.

Respondents	N = 105							
Age	20-29	30-50	51+	Mean	Std.dev			
	91.4%	4.8%	3.8%	26.3	6.22			
	(n=96)	(n=5)	(n=4)					
Gender	Male	Female	N/A					
	49.5%.	49.5%	1%					
	(n=52)	(n=52)	(n=1)					

Variable	Question	Mean	Std.dev	Variable	Question	Mean	Std.dev
Environmental Concern	Environmental concern	4.85	1.336	Ecolabel credibility	Trust	4.57	1.216
	Human interference	5.27	1.242	Antibiotic Label	From recognized experts	4.71	1.063
	Human damaging	5.71	1.191		Good intentions	5.10	1.079
	Climate catastrophe	5.65	1.263		Tests before issuing	4.80	1.164
	Governmental rules	5.24	1.341	Bioplastic Label	Trust	4.79	1.124
	Personal sacrifices	5.29	1.261		From recognized experts	4.77	1.012
	Plants	5.53	1.152		Good intentions	4.95	1.113
	Ocean	5.92	1.007		Tests before issuing	4.70	1.093
	Animals	5.48	1.557	Eco-score Label	Trust	4.33	1.174
	Myself	4.28	1.596		From recognized experts	4.51	1.169
	My health	4.42	1.714		Good intentions	4.68	1.252
	My future	4.92	1.530		Tests before issuing	4.53	1.144
	All people	5.23	1.436				
Purchase intention	Tenderloin	2.34	.989				
	Sausages	2.45	1.065				
	Beef	2.89	.836				

Table 1: Descriptive Statistics

3.2 Survey Design

The survey-based experiment was conducted with and without different ecolabels on three types of meat products. Within each three product categories, each product represented four distinct outcomes. Three products contained an ecolabel, while one product did not contain any ecolabel.

Figure 5: The Selected Products, Each Including one of the Tested Ecolabels

The research model's constructs were operationalized using existing measurement scales to measure the independent, moderating, and dependent

variables: TPC ecolabels, ecolabel credibility, environmental concern, and purchase intention. Previous studies were used to ensure acceptable reliability of the chosen scales, but adaptations were made to fit the context of the study.

3.2.1 Questionnaire Development

The questionnaire started with introducing the thesis and mandatory ethical considerations, including GDPR respect. In the next section, participants were asked screening questions regarding meat consumption habits and the purchase of groceries. Respondents who did not eat meat during a week or had no responsibility for purchasing groceries were not of interest for our survey and therefore screened out. Further, they were asked thoroughly about their concern for the environment before they were asked about their first impression of the three chosen ecolabels. In the next section, the participants were presented with four pictures of the same meat product, and they had to choose which they were most likely to buy. Three pictures of the product contained an ecolabel, while one did not contain any ecolabel. This was repeated for three different meat products (Figure 6). In the following section, each ecolabel was presented again, where the respondents had to answer questions regarding the labels' credibility. Finally, general demographic questions were asked. To control for order bias, we randomized the order of labeled/unlabeled products and ecolabels presented to the participants (Malhotra, 2010). We also strived to make the transitions easy, to guide the respondents to change their train of thought by having the same order of questions under each product (Malhotra, 2010).

Figure 6: The Choice Model Set of Products with and without Ecolabels

3.2.2 Scale Development

We utilized modifications of established measurement scales to measure the variables in order to operationalize the constructs. The development of the scales was conducted in compliance with previous studies, which ensured an acceptable level of reliability. Nevertheless, they were adapted and slightly adjusted for the context of our study. Further, the Likert scale was used to measure questions related to environmental concern and ecolabel credibility, where 1=Strongly Disagree and 7=Strongly Agree for some items, and 1=Not concerned and 7=Highly Concerned for other items (Table 2).

The survey also contained two sections with different measures of environmental concern to map consumers' perception of the term thoroughly. Concern about ecological damage (Dunlap, Van Liere, Mertig & Jones (2000) and concern about pollution (Weigel & Weigel, 1978) were combined in one

section for convenience. The second section was Schultz's (2001) measurement of biospheric, egoistic, and social-altruistic concerns. Every item was translated to Norwegian because of the study's sample. The items can be found in table 2.

We used Larceneux's (2001) scale of label credibility and translated them for our study. In addition, we included an open-ended question where we asked about the first impression of the three different ecolabels. The items can be found in table 2.

VARIABLE	SCALE	MEASUREMENT	REFERENCE
ENVIRONMENTAL CONCERN	Likert scale (1-7) 1 is "Strongly disagree" and 7 is "Strongly agree"	When humans interfere with nature it often produces disastrous consequences	Dunlap et al (2000)
		Humans are severly abusing the environment	Dunlap et al (2000)
		If things continue on their present course, we will soon experience a major ecological catastrophe	Dunlap et al (2000)
CONCERN ABOUT POLLUTION	Likert scale (1-7) 1 is "Strongly disagree" and 7 is "Strongly agree"	The federal government will have to introduce harsh measure to halt pollution since few people regulate themselves	Weigel & Weigel (1978)
		I'd be willing to make personal sacrifices for the sake of slowing down pollution even though the immidiate results may not seem significant	Weigel & Weigel (1978)
BIOSPHERIC CONCERN	Likert scale (1-7) 1 is "Not concerned" and 7 is "highly concerned"	Plants, marine life, animals	Schultz (2001)
EGOISTIC CONCERN		Me, my health, my future	Schultz (2001)
SOCIAL-ALTRUISTIC CONCERN		All people, children	Schultz (2001)
ECOLABEL CREDIBILITY	Likert scale (1-7) 1 is "Strongly disagree" and 7 is "Strongly agree"	I can trust what the ecolabel says	Larcneux, 2001
		The ecolabel comes from an organization or recognized experts	Larcneux, 2001
		The organization that gives this ecolabel has good intentions	Larcneux, 2001
		The organizations has passed some serious test before issuing the ecolabel	Larcneux, 2001

Table 2: Scale Development of Environmental Concern and Ecolabel Credibility

In order to measure the sample's purchase intention for the different products, we utilized choice modeling, where the respondents had to choose only one of the four presented products they would most likely buy (table 3).

CONDITION	PRODUCT
1 WITH ANTIBIOTIC LABEL 2 WITH ECO-SCORE LABEL 3 WITH BIOPLASTIC LABEL 4 WITHOUT ECOLABEL	
1 WITH ANTIBIOTIC LABEL 2 WITH ECO-SCORE LABEL 3 WITH BIOPLASTIC LABEL 4 WITHOUT ECOLABEL	
1 WITH ANTIBIOTIC LABEL 2 WITH ECO-SCORE LABEL 3 WITH BIOPLASTIC LABEL 4 WITHOUT ECOLABEL	

Table 3: Experiment Manipulation and Choice Model of Ecolabels and Purchase Intention

4.0 Analysis

Prior to the hypothesis testing, confirmatory factor analysis was conducted to confirm the established construct validity and internal reliability of the moderating variables (*Section 4.1*). The correlation of the measurements and the Cronbach's alpha of the items forming the scales were analyzed to secure appropriate variables for the hypothesis testing. In addition, a text analysis was performed to investigate if there was any relationship between a general understanding of the ecolabels and the ecolabel credibility.

For the hypothesis testing, we extracted descriptive statistics and conducted logistic regressions and paired sample t-tests. The descriptive statistics provided frequencies, means, and percentages, indicating whether we could confirm or reject our hypotheses. The paired sample t-test was conducted to highlight differences in mean ecolabel credibility scores, which was crucial for H2. Finally, logistic regressions were conducted for the first three hypotheses to investigate the ecolabels' impact on purchase intention and the moderating effect of ecolabel credibility and environmental concern for each product. All the relevant SPSS (version 28.0.1.0) output is in the appendix.

4.1 Factor Analysis

A confirmatory factor analysis was conducted based on the adopted scales used for environmental concern and ecolabel credibility. The purpose was to reduce the number of variables and extract fewer explanatory factors to make them easier to interpret. In addition, we confirmed the high internal reliability of the researched scales used in our survey and thereby established construct validity.

Alpha coefficients were utilized to confirm the internal reliability of the scales used for our moderating variables. Environmental Concern based on Dunlap et al. (2000) and Weigel & Weigel's (1978) measurement equals a coefficient alpha (α) of = 0.797. Based on Schultz's (2001) measurement scales, environmental concern equals α = 0.852. Ecolabel credibility based on

Larceneux' (2001) measurement scales equal $\alpha = 0.850$ for the antibiotic label, $\alpha = 0.829$ for the bioplastic label, and $\alpha = 0.893$ for the eco-score label. Furthermore, we analyzed the scales of all measures within environmental concern and ecolabel credibility, which equaled $\alpha = 0.884$ and $\alpha = 0.912$. This is perceived as acceptable because a coefficient alpha of 0.6 or less usually indicates unsatisfactory internal consistency reliability (Malhotra, 2010).

Furthermore, construct validity and factor extraction were investigated. The questions measuring ecolabel credibility: *ecolabel trust (Q1), from a trustworthy organization (Q2), good intentions (Q3),* and *conducted tests (Q4)* (Table 2), were on a 7-point Likert scale and therefore handled as continuous variables to capture their correlations (Malhotra, 2010). When analyzing the correlation matrix for each ecolabel (Table 4), there is a desirable correlation between most of the variables measuring ecolabel credibility (> 0.5).

Antibiotic label Credibility			*Condition 1/3*	
	Q1 Trust	Q2 Organizations	Q3 Intentions	Q4Tests
Q1 Trust	1.000	.671	.596	.517
Q2 Organizations	.671	1.000	.603	.638
Q3 Intentions	.596	.603	1.000	.521
Q4 Tests	.517	.638	.521	1.000
Plastic label Credibility			*Condition 2/3*	
	Q1 Trust	Q2 Organizations	Q3 Intentions	Q4Tests
Q1 Trust	1.000	.668	.584	.417
Q2 Organizations	.668	1.000	.588	.484
Q3 Intentions	.584	.588	1.000	.557
Q4 Tests	.417	.484	.557	1.000
Carbon label Credibility			*Condition 3/3*	
	Q1 Trust	Q2 Organizations	Q3 Intentions	Q4Tests
Q1 Trust	1.000	.770	.774	.561
Q2 Organizations	.770	1.000	.713	.655
Q3 Intentions	.774	.713	1.000	.585
Q4 Tests	.561	.655	.585	1.000

Table 4: Correlation Matrix for Ecolabel Credibility

For each ecolabel, we found it convenient to extract one separate variable to measure credibility. The credibility measure for each ecolabel had a high KMO Measure of Sampling Adequacy (KMO = 0.805, 0.776, and 0.808), where Bartlett's test of Sphericity was significant ($p < 0.001$) (appendix 1). Further,

we found that each credibility measure extracted one factor with an Eigenvalue above 1 (Kaiser's rule), and the initial Eigenvalue explained 69.4% of the variance for antibiotic label credibility, 66.4% of the variance for the bioplastic label credibility, and 75.9% of the variance for the eco-score label credibility. The analysis was therefore continued with the three variables: antibiotic label credibility, bioplastic label credibility, and eco-score label credibility.

The questions measuring environmental concern were based on different scales originating from different interpretations of the term. The questions for the first section, *disturbing nature (Q1), human damage (Q2), climate catastrophe (Q3), government measures (Q4), and personal sacrifice (Q5)* (Table 2), were measured on a 7-point Likert scale and therefore handled as continuous variables to capture their correlations (Malhotra, 2010). We found it convenient to extract one variable from the first section measuring the term. This was confirmed with a high KMO Measure of Sampling Adequacy (KMO = 0.777) and the significant Bartlett's test of Sphericity ($p < 0.001$). Further, one factor was extracted based on Eigenvalues above 1, and the initial factor explained 56% of the total variance (Appendix 2). We continued with this variable and named it *EC_Climate_Concern*.

The other section to measure environmental concern was adopted from Schultz (2001) and combined biospheric, egoistic, and social-altruistic concerns. *Plants (Q1), oceans (Q2), animals (Q3), myself (Q4), health (Q5), future (Q6), and humanity (Q7)* (Table 2), were also measured on a 7-point Likert scale and handled the same way as the previous variables. In this matter, two variables were extracted to measure the term. The KMO was 0.804, with a significant Barlett's Test of Sphericity ($p < 0.001$). Moreover, two factors contained an Eigenvalue above 1, which explained 54% and 18% of the total variance (Appendix 3). We performed a principal component analysis with a varimax procedure to minimize the number of variables with high factor loadings (Malhotra, 2010), which consequently enhances the distinction and

interpretation of the factors for the term. The analysis also highlights the correlation between the constructs, which is appropriate for the creation of new variables (Table 5). The first variable consists of components of humanity concerns, while the second consists of biospheric concerns. We continued with these variables and named them *EC_Consequences_Ego* and *EC_Consequences_Bio.* All variables from the factor analysis were extracted with regression scores for maximal validity (DiStefano, Zhu & Mîndrilã, 2009).

Rotated component matrix[a]	Component	
	1	2
Q1 Plants	.304	.801
Q2 Oceans	.180	.795
Q3 Animals	.124	.852
Q4 Myself	.864	.193
Q5 Health	.882	.171
Q6 Future	.878	.231
Q7 Humanity	.510	.461

*Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

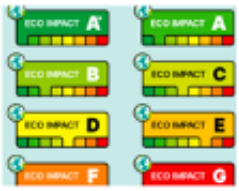
Table 5: Rotated Component Matrix for Schultz's (2001) Measure of Environmental Concern

4.2 Text Analysis

Text analysis was performed to obtain an overview of the respondents' unbiased understanding of the ecolabels. In addition, the purpose was to investigate if there was any correlation or causal relationship between the understanding and trust toward the ecolabels. Therefore, we asked the following question for each label:

"Describe briefly what it means when a product has this label. We want your opinion."

The answers were separated into two categories for the analysis of the answers: "Understood" and "Not understood." The criteria for categorizing the answer as understood was if the respondent used somewhat correct words connected to the label. The output for each label is shown in table 6.



	Understood	Not understood		Understood	Not understood		Understood	Not understood
Count	76	29		62	43		75	30
Percentage	72.3%	27.7%		59%	41%		71.4%	28.6%

Table 6: Respondents' Understanding of Each Ecolabel

A correlation test was conducted to quantify the strength of the linear relationship between understanding of the label and trust toward the label. A linear regression was conducted to predict the value of trust toward the label based on the understanding.

There was a significant but weak positive correlation between understanding the Bioplastic label and trust toward the label. The Pearson correlation coefficient was 0.214 ($p < 0.05$). For the other labels, there was a non-linear relationship with a Pearson coefficient of -0.087 for the Antibiotic label and -0.061 for the Eco-score label ($p > 0.05$) (Attachment 1.1)

Furthermore, a linear regression was conducted for each label to investigate the causal relationship between the understanding and trust toward the ecolabels. The dependent variable was trust toward the label, while the independent variable was a dummy variable where the values were represented as 1=understood and 0=not understood. For the antibiotic label and eco-score label, the regression coefficient for understanding of the label were negative and not significant ($B = -0.237$, $p = 0.383$) ($B = -0.144$, $p = 0.538$). However, for the bioplastic label, the regression coefficient for understanding the label was positive and significant ($B = 0.542$, $p = 0.028$). This suggests that consumers who understood the bioplastic label will have a 0.542 higher mean

score in trust toward the ecolabel compared to those who did not understand it. The output for the linear regressions can be found in attachment 1.2.

4.3 Descriptives

Descriptive statistics were extracted to provide useful information about the variables in the dataset and locate patterns or potential relationships between the variables. The objective is to organize, present and summarize data to help confirm or reject our hypotheses (Malhotra, 2010). Frequencies, percentages, and means were the main descriptive statistics for this purpose.

4.4 Paired Sample t-test

To confirm or reject the second hypothesis, paired sample t-test was conducted to test for differences in the means of the paired samples. In our example, paired t-tests could determine if the respondents differ in their credibility towards the different ecolabels (Malhotra, 2010). Mean differences in ecolabel credibility are crucial to compare higher credible with lower credible ecolabels.

4.5 Logistic Regression

The logistic regression was developed as a tool to forecast a mathematical-statistical model with a probability of the two or more events the researchers are seeking (Malhotra, 2010). These events are described thoroughly for each hypothesis in the next section. Different logistic regressions were conducted to confirm or reject H1: *TPC ecolabel has a positive impact on purchase intention*, H2: *Higher perceived credible ecolabels have a greater positive impact on purchase intention compared to lower perceived credible ecolabels,* H3: *Environmentally concerned consumers have a higher purchase intention for products with ecolabels compared to environmentally unconcerned consumers.* Furthermore, several cut-off values ranging from 0.25 to 0.85 were tested to balance the false positive and false negative rates and minimize the number of mistakes made by the model (Soureshjani & Kimiagari, 2012).

Nonetheless, the differences were small, and the overall predictive percentage of the models was mostly similar regardless of the cut-off value.

We performed a Receiver Operating Characteristic (ROC) analysis with sensitivity and specificity metrics to assess how well the data fits a logistic regression. The analysis was performed with the three products of interest. The ROC curve highlights that the variables stretch to the left corner of the three plots, meaning that the model fits well in predicting the purchase of a product with or without a label based on the variables tested (Grigoryev, Lobzin & Skripchenko, 2016) (Appendix 4).

5.0 Results

The following section consists of each hypothesis presented with a summary of the descriptive statistics and logistic regression results. In addition, testing of H2 consists of a paired sample t-test. Finally, each hypothesis is confirmed or rejected based on the available evidence.

5.1 Hypothesis 1

5.1.1 Descriptive Statistics

First, a frequency distribution was extracted to obtain an overview of the most preferred ecolabel within each product category. Then, the number of responses and the counts in percentage terms for each chosen product were calculated to investigate if products with ecolabels are more preferred than products without ecolabels, and if there are differences between the ecolabels. Table 7, 8, and 9 show the frequency distribution of purchase intention for tenderloin, sausages, and beef with and without ecolabels.

Purchase intention Tenderloin

		Frequency	Percent	Valid Percent	Cumulative percent
Valid		31	29.5	29.5	29.5
		15	14.3	14.3	43.8
		51	48.6	48.6	92.4
	Without label	8	7.6	7.6	100.0
	Total	105	100.0	100.0	

Table 7: Purchase Intention for Tenderloin

In the case of tenderloin, 92.4% answered that they are most likely to buy the product with an ecolabel. 7.6% answered that they are most likely to buy the product without any ecolabel.

Purchase intention Sausages

		Frequency	Percent	Valid Percent	Cumulative percent
Valid		31	29.5	29.5	29.5
		11	10.5	10.5	40.0
		48	45.7	45.7	85.7
	Without label	15	14.3	14.3	100.0
	Total	105	100.0	100.0	

Table 8: Purchase Intention for Sausages

In the case of sausages, 85.7% answered that they are most likely to buy the product with an ecolabel. 14.3% answered that they are most likely to buy the product without any ecolabel.

Purchase intention Beef

		Frequency	Percent	Valid Percent	Cumulative percent
Valid		13	12.4	12.4	12.4
		4	3.8	3.8	16.2
		70	66.7	66.7	82.9
	Without label	18	17.1	17.1	100.0
	Total	105	100.0	100.0	

Table 9: Purchase Intention for Beef

In the case of beef, 82.9% answered that they are most likely to buy the product with an ecolabel. 17.3% answered that they are most likely to buy the product without any ecolabel.

The distribution frequency tables show a clear preference for ecolabels. For all three products, over 80% preferred the product with an ecolabel. The most popular ecolabel was the antibiotic label, chosen over 45% of the times for each product. The least popular ecolabel was the eco-score label, chosen under 15% of the times for each product. These numbers indicate that H1 potentially can be confirmed.

5.1.2 Logistic Regression

The binary logistic regression for H1 was conducted with purchase intention of the product with an ecolabel (all three ecolabels combined) represented one value (1), and purchase intention of the product without an ecolabel represented the other value (0).

5.1.2.1 Purchase Intention for Tenderloin

Despite not being interested in the predictors in the model for the first hypothesis, we seek to use the best-fitted model for prediction accuracy. The model with predictors provides a better fit of the model relative to the null model (chi-square 26.447, $p < 0.003$) (attachment 2.1). The correct overall percentage of the prediction model is 90.5%, with a cut value of 0.75 (Table 10). The model has a 92.8% prediction accuracy of purchase intention for tenderloin with ecolabels. With the high prediction accuracy and model fit for the data, we can conclude a significant preference for ecolabels for the tenderloin product.

H1 is confirmed for the tenderloin product - ecolabels have a positive impact on purchase intention.

Classification Table[a]

			Predicted		
			Dummy_Tenderloin		Percentage
	Observed		.00	1.00	Correct
Step 1	Dummy_Tenderloin	.00	5	3	62.5
		1.00	7	90	92.8
	Overall Percentage				90.5

a. The cut value is .750

Table 10: Classification Table for the Tenderloin Product

5.1.2.2 Purchase Intention for Sausages

In the case of sausages, the model with predictors does not provide a better fit of the model relative to the null model (chi-square 9.894, $p < 0.450$) (attachment 2.2). Nonetheless, the correct overall percentage of the initial prediction model is 85.7%, with a cut value of 0.75 (Table 11). The model has a 100% prediction accuracy of purchase intention for sausages with ecolabels, but 0% prediction accuracy for the 15 who choose sausages without ecolabel.

Nonetheless, there is still a high prediction accuracy and model fit for the data, and we can conclude a significant preference for ecolabels for the sausages. H1 is confirmed for the sausage product - ecolabels have a positive impact on purchase intention.

Classification Table[a]

			Predicted		
			Dummy_Sausages		Percentage
	Observed		.00	1.00	Correct
Step 1	Dummy_Sausages	.00	8	7	53.3
		1.00	11	79	87.8
	Overall Percentage				82.9

a. The cut value is .750

Table 11: Classification Table for the Sausage Product

5.1.2.3 Purchase Intention for Beef

In the case of beef, the model with predictors provides a better fit of the model relative to the null model (chi-square 36.231, $p < 0.001$) (attachment 2.3). Again, although we are not interested in the predictors, in this case, we seek to use the best-fitted model for prediction accuracy. The correct overall percentage of the prediction model is 83.8%, with a cut value of 0.75 (Table 12). The model has an 87.4% prediction accuracy of purchase intention for beef with ecolabels. With the high prediction accuracy and model fit for the data, we can conclude a significant preference for ecolabels for the beef product.

H1 is confirmed for the beef product - ecolabels have a positive impact on purchase intention.

Classification Table[a]

			Predicted		
			Dummy_Beef		Percentage
	Observed		.00	1.00	Correct
Step 1	Dummy_Beef	.00	12	6	66.7
		1.00	11	76	87.4
	Overall Percentage				83.8

a. The cut value is .750

Table 12: Classification Table for the Beef Product

Based on the descriptive statistics and the logistic regressions performed on each product category, we can conclude that ecolabels have an overall positive impact on purchase intention, regardless of the type of meat. H1 is confirmed.

5.2 Hypothesis 2

5.2.1 Descriptive Statistics and Paired Sample t-test

To test the second hypothesis, we first conducted a descriptive analysis of the measures of ecolabel credibility for the different labels (Table 13). The mean scores of credibility measures are relatively moderate, ranging from 4.33 to 5.10. However, the mean differences between the ecolabels are different. Several paired sample t-tests were conducted to investigate differences in means of credibility between the ecolabels. The measure we used was the mean trust towards the ecolabel. The mean trust toward the antibiotic label is 0.219 ($p < 0.05$) lower than the Bioplastic label and 0.238 ($p < 0.05$) greater than the eco-score label. The eco-score label is 0.457 ($p < 0.05$) lower than the bioplastic label (Appendix 5). These results highlight a significant difference in mean trust toward the ecolabels and that the bioplastic label has the highest mean, while the eco-score label has the lowest mean.

Descriptive Statistics

		N	Minimum	Maximum	Mean	Std. Deviation	Variance
Antibiotics Label	Trust	105	1	7	4.57	1.216	1.478
	Org trust	105	1	7	4.71	1.063	1.129
	Good intentions	105	3	7	5.10	1.079	1.164
	Testing before	105	1	7	4.80	1.164	1.354
Bioplastic Label	Trust	105	1	7	4.79	1.124	1.263
	Org trust	105	1	7	4.77	1.012	1.024
	Good intentions	105	2	7	4.95	1.113	1.238
	Testing before	105	2	7	4.70	1.093	1.195
Eco-score Label	Trust	105	1	7	4.33	1.174	1.378
	Org trust	105	1	7	4.51	1.169	1.368
	Good intentions	105	1	7	4.68	1.252	1.567
	Testing before	105	1	7	4.53	1.144	1.309

Table 13: Descriptive Statistics of Credibility Toward TPC Ecolabels

5.2.2 Logistic Regression

Further, to test the impact of ecolabel credibility on purchase intention, we followed the same formula as H1, where the dependent variable in the logistic

regression was binary: purchase intention of product with an ecolabel (all three ecolabels combined) represented one value (1), and purchase intention of the product without an ecolabel represented the other value (0). Furthermore, we investigated the unstandardized beta coefficients and their effect on the dependent variable to test the moderating effect of ecolabel credibility. The main unstandardized betas accounting for ecolabel credibility were the factors made in the factor analysis, one for each ecolabel. They are log-odds units, and the logistic regression formula becomes:

$$log(p/1-p) = b0 + b1*x1 + b2*x2 + b3*x3 + b3*x3+b4*x4.$$

We performed logistic regressions for each product, controlling for demographic variables, and the main output is found in appendix 6.

For Tenderloin the equation becomes:

$$log(p/1-p) = -4.719 + age*0.629 + gender*-2.391 + education*-1.197 + antibioticlabel\_credibility*0.310 + bioplastic\_credibility*-0.320 + ecoscore\_credibility*-0.176.$$

For Sausages the equation becomes:

$$log(p/1-p) = -2.590 + age*0.165 + gender*-0.593 + education*0.381 + antibioticlabel\_credibility*-0.283 + bioplastic\_credibility*0.154 + ecoscore\_credibility*0.431$$

For Beef the equation becomes:

$$log(p/1-p) = 2.738 + age*0.028 + gender*-0.633 + education*-0.277 + antibioticlabel\_credibility*0.297 + bioplastic\_credibility*-0.024 + ecoscore\_credibility*0.105$$

Nonetheless, the unstandardized betas for all variables accounting for credibility were not significant ($p > 0.05$). In addition, the overall model with predictors was only significant for tenderloin (chi-square = 14.95, $P < 0.05$), while it was not significant for sausages and beef (chi-square = 7.06 & 4.48, $P > 0.05$).

Although the mean perceived ecolabel credibility for the variables measuring the credibility factors is significantly different, they have no significant effect on purchase intention for ecolabeled products. Therefore, H2 is rejected. High-perceived credible ecolabels do not have a greater positive impact on purchase intention compared to lower perceived credible ecolabels.

5.3 Hypothesis 3

5.3.1 Descriptive Statistics

When testing the third hypothesis, we first extracted descriptive statistics. The descriptive statistics show the frequency (N) of chosen ecolabels within each product category, and the mean score of overall environmental concern. For every product category, the mean overall concern was lowest where consumers chose no labeled products. The mean overall environmental concern is greater for consumers choosing the ecolabeled products. However, there are differences in the N as a result of varying preferences for each ecolabel, causing the mean scores to be interpreted with caution. The output is shown in table 14.

Environmental Concern

How concerned are you with the environment?

Tenderloin	Mean	N	Std. Deviation
BioPlastic	5.26	31	.514
EcoScore	5.00	15	1.732
Antibiotic	4.73	51	1.372
NoLabel	3.75	8	1.909
Total	4.85	105	1.336
Sausages			
BioPlastic	5.03	31	1.278
Ecoscore	5.18	11	1.401
Antibiotic	4.81	48	1.331
NoLabel	4.33	15	1.397
Total	4.85	105	1.336
Beef			
BioPlastic	5.54	13	.877
Ecoscore	6.50	4	.577
Antibiotic	4.99	70	1.042
NoLabel	3.44	18	1.653
Total	4.85	105	1.336

Table 14: Descriptive Statistics of Environmental Concern and Chosen Ecolabel.

5.3.2 Logistic Regression

Consequently, we followed the same logistic regression formula as in H2. However, to investigate the moderating effect of environmental concern on purchase intention, the prediction variables used in the regression were the factors of environmental concern made in the factor analysis. In addition, an overall non-factor variable measuring environmental concern was included, as well as demographic variables. The logistic regression formula is the same but with different log-odds units. The main output is found in appendix 7.

For Tenderloin the formula becomes:

$$log(p/1-p) = -6.077 + age*0.59 + gender*-2.722 + education*-0.825 + FactorClimateConcern*-0.191 + FactorClimateEgo*0.415 + FactorClimateBio*0.694 + OverallConcern*0.506.$$

For Sausages the formula becomes:

$$log(p/1-p) = -3.230 + age*0.141 + gender*-0.253 + education*0.452 + FactorClimateConcern*0.082 + FactorClimateEgo*0.165 + FactorClimateBio*0.284 + OverallConcern*0.137.$$

For Beef the formula becomes:

$$log(p/1-p) = 1.532 + age*0.43 + gender*-0.478 + education*-1.227 + FactorClimateConcern*1.099 + FactorClimateEgo*-0.407 + FactorClimateBio*0.025 + OverallConcern*0.850.$$

The overall model with predictors was significant for Tenderloin and Beef (chi-square = 23.26 & 32.63, $P < 0.05$), while it was not significant for Sausages (chi-square = 8.30, $P > 0.05$). Most of the environmental concern prediction variables were not significant. However, for Beef, the factor for climate concern (B = 1.009) and the non-factor variable measuring environmental concern (B = 0.850) were significant ($P < 0.05$). Because the factor variable is standardized with a mean of 0 and standard deviation of 1, the interpretation of the coefficient is that an increase in 1 standard deviation in climate concern is associated with a 300% (e^{β} = 3.00) increase in the odds of

purchase intention for ecolabeled beef, everything else held constant. This highlights that environmental concern increases the purchase intention for ecolabeled beef products.

Despite a tendency toward higher overall mean scores of environmental concern where the participants chose ecolabeled products, the logistic regressions do not provide an overall significant moderating effect of environmental concern on purchase intention. Therefore, we reject H3. We did not find sufficient statistical evidence to confirm that environmentally concerned consumers have a higher purchase intention for ecolabeled products compared to environmentally unconcerned consumers.

5.4 Hypothesis 4

5.4.1 Descriptive Statistics

To test the fourth and last hypothesis, we extracted descriptive statistics. The numbers show the frequency (N) of chosen ecolabels within each product category. The bioplastic label was chosen 31 times for the tenderloin, 31 times for the sausages, and 13 times for the beef, which constitutes 75 times in total. An overall of 23%. The eco-score label was chosen 15 times for the tenderloin, 11 times for the sausages, and four times for the beef, which constitutes 30 times in total. An overall of 9%. The antibiotic label was chosen 51 times for the tenderloin, 48 times for the sausages, and 70 times for the beef, which constitutes 169 times in total. An overall of 54%. No label was chosen eight times for the tenderloin, 15 times for the sausages, and 18 times for the beef, constituting 41 times in total. An overall of 13%. The output is presented in table 15.

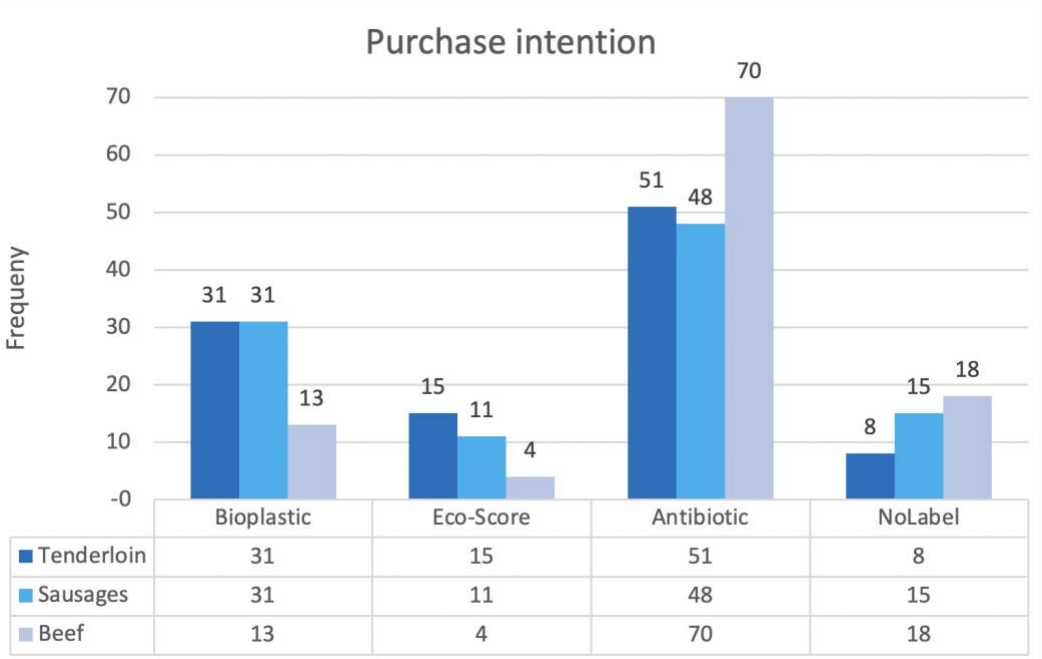


Table 15: Purchase intention for the different ecolabels within each product category.

The numbers show a clear tendency. The eco-score label is chosen the fewest times, while the antibiotic label is chosen over 50% of the times. In addition, the bioplastic label was also chosen more times than the eco-score label. Based on these descriptive statistics, we can confirm that the eco-score label has a lower effect on purchase intention compared to the bioplastic- and antibiotic labels. H4 is confirmed.

5.5 Summary of Results

Hypothesis	*Variables*	*Results*
H1	Third-Party Certified (TPC) Ecolabels has a positive impact on purchase intention	Supported
H2	TPC ecolabels perceived as highly credible have a greater positive impact on purchase intention compared to ecolabels perceived as less credible	Not supported
H3	Environmentally concerned consumers have a higher purchase intention for ecolabeled products compared to environmentally unconcerned consumers	Not supported
H4	The eco-score label has a lower effect on purchase intention compared to bioplastic- and antibiotic-labels	Supported

Table 16: Summary of Results

6.0 Discussion

The considerable changes in consumers' red meat consumption are forcing food production companies to rethink how they communicate eco-friendliness in an already emission-associated industry. In response, several third-party certificated ecolabels have been issued in different countries and for different product categories. Previous research has found positive but various effects of consumer responses to such ecolabels (Lazzarini et al., 2018; Dudinskaya et al., 2021). Moreover, it is unclear which effect these ecolabels will have in the red meat industry, which ecolabel will generate the strongest purchase intention, and which factors might moderate the effect. As a result, the following research question was developed:

"What effect does issuing different third-party certificated ecolabels have on purchase intention of red meat products and do ecolabel credibility and environmental concern moderate it?"

Our research provides insight into which effect TPC ecolabels have on purchase intention for different categories of red meat, revealing that the overall effect is strongly positive but not moderated by either the ecolabel credibility or environmental concern. However, different ecolabels have different effects on purchase intention.

First, the findings show that issuing a TPC ecolabel has an overall significant positive effect on purchase intention. This applies to all three meat products, where ecolabeled products were chosen considerably more than no labeled products. Nonetheless, the effect varies based on the ecolabel. For example, the antibiotic labeled products were chosen over 50% of the times for each product category, while the eco-score labeled products were preferred fewer times than no labeled products for two of the product categories. These findings indicate that issuing the right ecolabel can be crucial for increasing the intended purchase intention. The results also support earlier findings highlighting that

ecolabels have a positive effect on purchase intention in various product categories but with different degrees of influence.

Further, the results show that neither ecolabel credibility nor environmental concern has a moderating effect on purchase intention. The credibility toward the different ecolabels was moderate and slightly different but did not affect the purchase intention. Furthermore, despite findings demonstrating that environmental concern does not have an overall moderating effect on purchase intention, one of the factor variables had a significant effect within the product category of beef. This indicates that environmental concern can potentially impact purchase intention, depending on the product category within the meat sector. Therefore, a more comprehensive range of meat products should be investigated to possibly highlight this moderating effect. Nonetheless, the results do not support earlier findings that indicate moderating effects of ecolabel credibility and environmental concern on purchase intention.

In accordance with our first and last hypothesis, the ecolabels had a significant positive effect on purchase intention, but their effect varied. These hypotheses were derived from previous research stating that ecolabeling plays a significant part in consumers' purchase decisions (European Commission, 2009), but with various effects depending on the label (Dudinskaya et al., 2021; Bowman et al., 2016). Our study confirms the importance of such labels in the purchase decision process and that it seems to be a helpful tool for consumers wanting to make environmentally friendly choices. Nonetheless, fitting the appropriate label to the right product category can be crucial. Going beyond what was found in earlier studies, our study highlights that the antibiotic label has the most positive significant impact on purchase intention for a range of meat products. This could be connected to the fact that consumers tend to prefer health benefits when choosing such products (Shan et al., 2017), and the low content of antibiotics represents such benefits. Previous research already highlights that companies can profit from this type of label (Bowman et al.,

2016), which our study confirms, particularly in the meat sector. Moreover, the results of the study show a clear preference for this label compared to an eco-score label. These results are not surprising based on Dudinskaya's (2021) research on the low preference for carbon footprint labels, and that meat products account for almost 60% of all greenhouse gasses from food production (Milman, 2021), resulting in moderate or low eco-scores. Although the study shows a low consumer preference for an eco-score label with moderate or low eco-scores, transparency from food producers through labeling can be beneficial in the long term. By utilizing eco-scores on different types of products where higher scores potentially can be achieved, the brand attitude or preference can be enhanced, thereby increasing the brand value.

Furthermore, the fourth hypothesis included the assumption that bioplastic labels are more preferred than eco-score labels. This was also confirmed. Previous research revealed that warning labels on plastic packaging reduce consumers' willingness to pay (Asselt et al., 2020). However, our study indicates that bioplastic packaging signaled by bioplastic labels can potentially increase consumers' willingness to pay, especially in a society where the reduction of conventional plastic is receiving attention. In addition, the findings showing that an unbiased understanding of this label led to a higher trust toward the label indicates that the introduction of new ecolabels should be easy to understand in order to build trust.

Contrary to our second hypothesis, higher perceived credible ecolabels did not have a greater positive impact on purchase intention compared to lower perceived credible ecolabels. Although studies have shown that the higher the perceived ecolabel credibility, the higher the purchase intention for green products (Cai et al., 2017), this was not the case for our study. One explanation might be that all the labels were perceived to be approximately on the same credibility level. Credibility scores at each end of the scale could potentially have highlighted this effect to a greater extent. Further, previous research was

conducted on primarily green products, while our study focused on meat products. As a result of the emission-associated product category, this effect could have been overshadowed by the fact that consumers struggle to see the link between ecolabels and meat products. Nonetheless, for the bioplastic label, we discovered that consumers who understood this ecolabel had a higher mean score in trust toward the ecolabel. This label also yielded the highest overall mean score in trust, compared to the other ecolabels. These findings imply that having an unbiased understanding of a label might lead to increased trust, which could be a critical aspect in future label introductions.

Further, our third hypothesis was also rejected. Environmentally concerned consumers did not have a higher purchase intention for ecolabeled products compared to environmentally unconcerned consumers. Previous research showed that environmental concern did have a significant impact on purchase intention toward green products (Maichum et al., 2017). Nonetheless, our factor variables accounting for environmental concern were mainly not significant predictors of purchase intention. Our sample consisted mainly of moderately and evenly matched environmentally concerned consumers in a segment of young adults. With a larger sample size and a more comprehensive range of scales measuring this variable, it could have been easier to compare groups and potentially confirm the hypothesis. Despite this, we found a significant impact of environmental concern increasing purchase intention for ecolabeled beef. This indicates that different product categories yield different effects on purchase intention, making it interesting to investigate further.

6.1 Theoretical Implications

Going beyond what was found in earlier studies, this research contributes to the marketing research literature by illustrating that the purchase intention for TPC ecolabeled meat products is strongly positive. However, the effect is not moderated by either the credibility of the ecolabel or the individuals' environmental concern. Consequently, ecolabeled products might need to draw

synergies from other visual and product-related marketing communication efforts to enhance the purchase intention.

The study's findings reveal general differences with recent studies claiming that environmentally concerned people have a higher purchase intention for green products (Maichum et al., 2017). Following these findings, we should have uncovered a significantly greater purchase intention for higher environmental concern individuals compared to environmental unconcerned consumers for the ecolabeled products. However, the results show no significant difference in purchase intention moderated by environmental concern.

Further, the findings also contradict recent literature claiming that the higher the perceived credibility of ecolabels, the higher the green purchase intention (Cai et al., 2017). Based on this, we hypothesized that higher credible ecolabels would generate higher purchase intention compared to low credible ecolabels. Nonetheless, the results show no difference in purchase intention moderated by ecolabel credibility.

6.2 Managerial Implications

Our results indicate that ecolabels contribute to a higher purchase intention toward different products. However, issuing such labels should be done with precaution by managers or other decision-makers in a company in order to capitalize on it.

First, choosing the right ecolabel for the right product is important. Our research highlights that meat producers with low usage of antibiotics in their products can benefit from issuing antibiotic labels and increase the purchase intention for such products. Nonetheless, although the antibiotic label had the greatest impact on increasing the purchase intention in all the categories of meat products, other ecolabels could yield a higher effect on different product

categories. Food producers can benefit from bioplastic or eco-score labels depending on the eco-score, the connection between the product and the label, or the consumers' preferences.

Further, products with low eco-scores might not be profitable in isolation in the short term. Within some categories, these products were less preferred than those without ecolabel. However, this type of transparency from food producers can build trust between consumers and the company, thereby enhancing the brand attitude, which can generate more profit in the long term. It can also reinforce the desired brand identity, further building bridges to new communication efforts or product categories in specific directions. Over time, this allows for a natural repositioning of the brand with new points of parity. Although this allows more robust income opportunities, it is also an essential corporate social responsibility statement. Therefore, regardless of which ecolabel one decides to introduce, it is vital to be aware of the integral part it can play and the bigger measures that potentially can be implemented within the company.

One could also argue for the ethical aspect regarding ecolabels. Despite this study emphasizing the monetary gains that could be generated from different ecolabels, managers are responsible for overcoming potential information asymmetries of their products and showing transparency for the products' life cycles. In cases where ecolabels do not exclusively communicate beneficial gains of the product, such ethical issues should be considered alongside profit maximization to be a company taking part in the fight against the climate crisis.

7.0 Limitations and Future Research

Our findings have a number of implications for marketing literature and practice. However, the study was not without limitations. The absence of generalizability of our findings is crucial to recognize because it may affect and create opportunities for further research. The limitation and future research will be discussed in the following two sections.

7.1 Limitations

First, the generalization of the results is a significant limitation of the study due to the small sample size and self-selection bias. The thesis consisted of a small convenience sample (n = 105), where most participants were relatively young. A larger sample size could have enhanced the prediction accuracy of our logistic regression model, leading to more reliable results. Nevertheless, as young people are more engaged in sustainable consumption (Nordahl, 2019), it is vital to investigate their purchase intentions toward ecolabeled products. Considering the lack of generalizability to a larger population, the authors ensured high validity and reliability regarding products, labels, items, and scales. Still, the study's exploratory nature produces valuable insights and facilitates future research (Malhotra, 2010, p.104).

Further, the comparison of the labels in this study could be interpreted as unfair. As the products were only given eco-scores of C and D, we speculate that these scores signal something negative compared to the other two ecolabels, which could have affected the results in terms of purchase intention. The eco-score label could potentially be more preferred with an eco-score of A. However, after discussions with Gilde, this was not a realistic score for the chosen meat products. This was also mentioned in the discussion part (section 6.0), where we suggested that ecolabels should be adapted to the product category.

Moreover, none of the tested labels in the research are introduced on the Norwegian market, and the respondents may not have had the necessary information to fully understand the labels, as shown in section 4.2. Ecolabels familiar to Norwegian consumers could have provided different results, as we uncovered that a higher understanding of the label leads to higher trust in one of the cases (Section 4.2). With a pre-study, we could have researched these issues and avoided misunderstandings that could affect the main survey (Hassan, Schattner & Mazza, 2006). Nonetheless, new labels are continuously introduced on products, and a thorough understanding of these labels rarely occurs. Therefore, it should be in the label's nature to be easy to understand in settings where information overload and cognitive biases can mislead consumers and limit the effectiveness of ecolabels (Apostolidis & McLeay, 2019).

Another limitation is the measurement scale regarding purchase intention, which could have been approached differently. Instead of choosing a choice model, a Likert scale (1-7) would give the authors the option to see the differences in means of the purchase intention. Such means for each ecolabeled product could have provided different results compared to frequencies, where consumers are forced to choose one of the four products. In addition, one could argue that having the choice between three ecolabeled products and one product without any ecolabel is unfair in terms of the majority of ecolabels. This could have generated an exaggerated purchase intention toward ecolabeled products.

7.2 Future research

After acknowledging the study's limitations, the authors uncovered areas that should be addressed in future research. For example, investigating a more comprehensive range of meat products could enhance the prediction of how third-party certificated ecolabels impact the purchase intention with the moderating effect of environmental concern and ecolabel credibility.

As the moderating effect of ecolabel credibility was moderate and evenly matched between the ecolabels, it can be interesting to investigate if adding a brand-owned label would have yielded different results. We speculate that consumers would not be able to separate brand-owned ecolabels from TPC ecolabels and that such labels would have achieved similar credibility scores. However, this would be interesting to research a wider range of ecolabels, as well as other types of labels. It is possible that from a consumer perspective, it does not matter if the label is brand-owned or third-party certified.

Moreover, research that focuses on the change in purchase intention before and after introducing a new TPC ecolabel on a product could be highly sought after by the marketing literature and practical fields within marketing. The authors did not assess the sample's perspective on ecolabels prior to the chosen ecolabels' introduction, so we could not determine whether the ecolabel explicitly or implicitly influenced the participants. From a product design perspective, exploring how consumers respond to TPC ecolabels when placed in different formats and contexts, such as in various promotional campaigns and other advertising activities, would be interesting.

Furthermore, rather than focusing on a single brand, as in this study (Gilde), it may be valuable to investigate the TPC ecolabel on various brands, as well as the impact of the chosen ecolabels on other meat products and product categories. To obtain a broader insight into the introduction of TPC ecolabels, future research also may want to take a more qualitative approach, such as conducting focus group interviews with a range of consumers to gain knowledge of their perceptions of ecolabels in particular. The fact that an unbiased understanding of labels led to a higher trust toward the label indicates that the introduction of new ecolabels should be easy to understand in order to build trust. Therefore, future research should address how ecolabels could be designed to be understandable and thereby build trust.

To summarize, ecolabels are here to stay. Nevertheless, there are still uninvestigated areas in the body of literature to determine whether they can positively respond to the challenges they address in order to maximize their potential and demonstrate their effectiveness fully.

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9.0 Appendix

9.1 Factor Analysis Output - Ecolabel Credibility

Correlation Matrix, KMO and Bartlett's Test of Sphericity and Total Variance Explained.

Antibiotic Label Credibility Factor

Correlation Matrix[a]

		Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Jeg kan stole på øko-merkingen	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Øko-merket kommer fra en organisasjon eller troverdige eksperter	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen som sender ut denne øko-merkingen har gode intensjoner	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen har utført ulike tester før de begynte å bruke øko-merkingen
Correlation	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Jeg kan stole på øko-merkingen	1.000	.671	.596	.517
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Øko-merket kommer fra en organisasjon eller troverdige eksperter	.671	1.000	.603	.638
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen som sender ut denne øko-merkingen har gode intensjoner	.596	.603	1.000	.521
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen har utført ulike tester før de begynte å bruke øko-merkingen	.517	.638	.521	1.000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.805
Bartlett's Test of Sphericity	Approx. Chi-Square	177.295
	df	6
	Sig.	<.001

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.776	69.391	69.391	2.776	69.391	69.391
2	.509	12.716	82.107			
3	.420	10.501	92.608			
4	.296	7.392	100.000			

Extraction Method: Principal Component Analysis.

Bioplastic Label Credibility Factor

Correlation Matrix[a]

		Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Jeg kan stole på øko-merkingen	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Øko-merket kommer fra en organisasjon eller troverdige eksperter	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Organisasjonen som sender ut denne øko-merkingen har gode intensjoner	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Organisasjonen har utført ulike tester før de begynte å bruke øko-merkingen
Correlation	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Jeg kan stole på øko-merkingen	1.000	.668	.584	.417
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Øko-merket kommer fra en organisasjon eller troverdige eksperter	.668	1.000	.588	.484
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Organisasjonen som sender ut denne øko-merkingen har gode intensjoner	.584	.588	1.000	.557
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? – Organisasjonen har utført ulike tester før de begynte å bruke øko-merkingen	.417	.484	.557	1.000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.776
Bartlett's Test of Sphericity	Approx. Chi-Square	157.715
	df	6
	Sig.	<.001

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.655	66.374	66.374	2.655	66.374	66.374
2	.626	15.662	82.036			
3	.395	9.887	91.923			
4	.323	8.077	100.000			

Extraction Method: Principal Component Analysis.

Eco-score Label Credbility Factor

Correlation Matrix[a]

		Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Jeg kan stole på øko-merkingen	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Øko-merket kommer fra en organisasjon eller troverdige eksperter	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen som sender ut denne øko-merkingen har gode intensjoner	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen har utført ulike tester før de begynte å bruke øko-merkingen
Correlation	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Jeg kan stole på øko-merkingen	1.000	.770	.774	.561
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Øko-merket kommer fra en organisasjon eller troverdige eksperter	.770	1.000	.713	.655
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen som sender ut denne øko-merkingen har gode intensjoner	.774	.713	1.000	.585
	Hvor enig eller uenig er du i følgende påstander om dette øko-merket? - Organisasjonen har utført ulike tester før de begynte å bruke øko-merkingen	.561	.655	.585	1.000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.808
Bartlett's Test of Sphericity	Approx. Chi-Square	255.967
	df	6
	Sig.	<.001

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.036	75.902	75.902	3.036	75.902	75.902
2	.490	12.254	88.156			
3	.278	6.952	95.108			
4	.196	4.892	100.000			

Extraction Method: Principal Component Analysis.

9.2 Factor Analysis Output - Environmental Concern.

KMO and Bartlett's Test of Sphericity and Total Variance Explained.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.777
Bartlett's Test of Sphericity	Approx. Chi-Square	167.423
	df	10
	Sig.	<.001

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.799	55.973	55.973	2.799	55.973	55.973
2	.827	16.534	72.507			
3	.630	12.608	85.115			
4	.454	9.084	94.199			
5	.290	5.801	100.000			

Extraction Method: Principal Component Analysis.

9.3 Factor Analysis Output - Environmental Ego & Bio

KMO and Bartlett's Test of Sphericity and Total Variance Explained.

KMO and Bartlett's Test

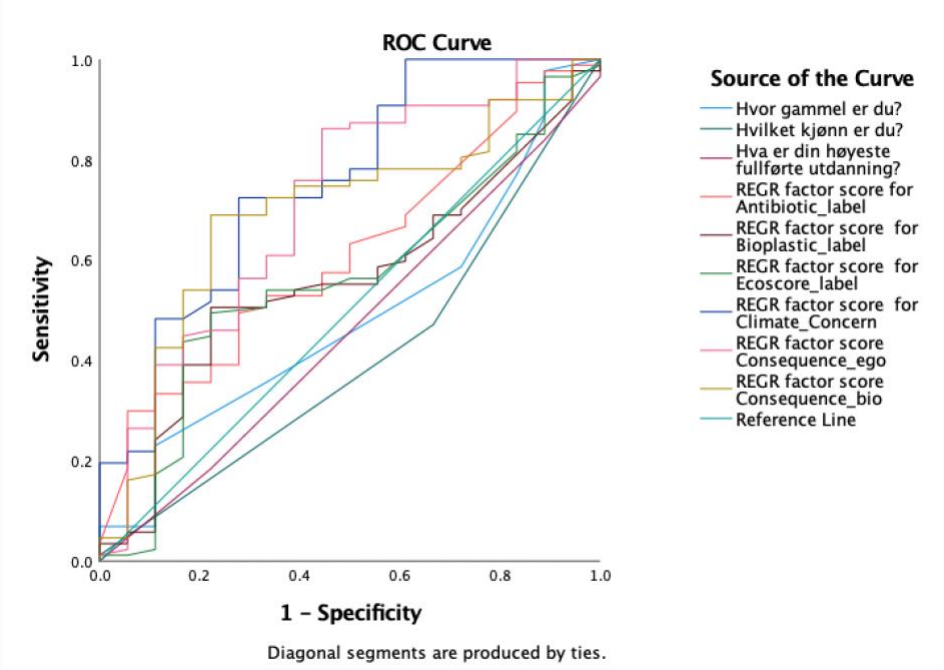
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.804
Bartlett's Test of Sphericity	Approx. Chi-Square	361.412
	df	21
	Sig.	<.001

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.775	53.929	53.929	3.775	53.929	53.929
2	1.253	17.904	71.833	1.253	17.904	71.833
3	.701	10.011	81.844			
4	.459	6.553	88.397			
5	.359	5.131	93.528			
6	.249	3.554	97.082			
7	.204	2.918	100.000			

Extraction Method: Principal Component Analysis.

9.4 ROC Curve



9.5 Paired sample t-test

Ecolabel Trust

Paired sample T test

	Paired Differences							Significance	
				95% Confidence Interval of the Difference					
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
Pair 1 Antibiotics & Plastics	-.219	1.101	.107	-.432	-.006	-2.040	104	.022	.044
Pair 2 Antibiotics & Eco-score	.238	1.070	.104	.031	.445	2.280	104	.012	.025
Pair 3 Eco-score & Plastics	-.457	1.264	.123	-.702	-.213	-3.707	104	<.001	<.001

9.6 Logistic Regression Tenderloin - Ecolabel Credibility

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	14.952	6	.021
	Block	14.952	6	.021
	Model	14.952	6	.021

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Hvor gammel er du?	.629	.307	4.204	1	.040	1.875
	Hvilket kjønn er du?	-2.391	1.118	4.571	1	.033	.092
	Hva er din høyeste fullførte utdanning?	-1.197	.816	2.149	1	.143	.302
	REGR factor score for Antibiotic_label	.310	.528	.346	1	.557	1.364
	REGR factor score for Bioplastic_label	-.320	.539	.353	1	.552	.726
	REGR factor score for Ecoscore_label	-.176	.507	.121	1	.728	.839
	Constant	-4.719	6.450	.535	1	.464	.009

a. Variable(s) entered on step 1: Hvor gammel er du?, Hvilket kjønn er du?, Hva er din høyeste fullførte utdanning?, REGR factor score for Antibiotic_label, REGR factor score for Bioplastic_label, REGR factor score for Ecoscore_label.

9.6 Logistic Regression Sausages - Ecolabel Credibility

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	7.059	6	.315
	Block	7.059	6	.315
	Model	7.059	6	.315

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Hvor gammel er du?	.165	.147	1.265	1	.261	1.179
	Hvilket kjønn er du?	-.503	.576	.761	1	.383	.605
	Hva er din høyeste fullførte utdanning?	.381	.464	.676	1	.411	1.464
	REGR factor score for Antibiotic_label	-.283	.429	.436	1	.509	.754
	REGR factor score for Bioplastic_label	.154	.407	.143	1	.705	1.167
	REGR factor score for Ecoscore_label	.431	.378	1.300	1	.254	1.538
	Constant	-2.590	3.607	.516	1	.473	.075

a. Variable(s) entered on step 1: Hvor gammel er du?, Hvilket kjønn er du?, Hva er din høyeste fullførte utdanning?, REGR factor score for Antibiotic_label, REGR factor score for Bioplastic_label, REGR factor score for Ecoscore_label.

9.6 Logistic Regression Beef - Ecolabel Credibility

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	4.482	6	.612
	Block	4.482	6	.612
	Model	4.482	6	.612

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Hvor gammel er du?	.028	.057	.238	1	.625	1.028
	Hvilket kjønn er du?	-.633	.545	1.350	1	.245	.531
	Hva er din høyeste fullførte utdanning?	-.277	.456	.369	1	.544	.758
	REGR factor score for Antibiotic_label	.297	.374	.633	1	.426	1.346
	REGR factor score for Bioplastic_label	-.024	.374	.004	1	.950	.977
	REGR factor score for Ecoscore_label	.105	.319	.108	1	.742	1.110
	Constant	2.738	2.284	1.438	1	.230	15.460

a. Variable(s) entered on step 1: Hvor gammel er du?, Hvilket kjønn er du?, Hva er din høyeste fullførte utdanning?, REGR factor score for Antibiotic_label, REGR factor score for Bioplastic_label, REGR factor score for Ecoscore_label.

9.7 Logistic Regression Tenderloin - Environmental Concern

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	23.263	7	.002
	Block	23.263	7	.002
	Model	23.263	7	.002

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Hvor gammel er du?	.590	.323	3.325	1	.068	1.803	.957	3.398
	Hvilket kjønn er du?	-2.722	1.656	2.702	1	.100	.066	.003	1.688
	Hva er din høyeste fullførte utdanning?	-.825	1.003	.676	1	.411	.438	.061	3.131
	REGR factor score for Climate_Concern	-.191	.438	.189	1	.664	.827	.350	1.951
	REGR factor score Consequence_ego	.415	.555	.559	1	.455	1.514	.510	4.491
	REGR factor score Consequence_bio	.694	.471	2.169	1	.141	2.002	.795	5.044
	Hvor bekymret er du for miljøet?	.506	.373	1.843	1	.175	1.659	.799	3.444
	Constant	-6.077	7.253	.702	1	.402	.002		

a. Variable(s) entered on step 1: Hvor gammel er du?, Hvilket kjønn er du?, Hva er din høyeste fullførte utdanning?, REGR factor score for Climate_Concern, REGR factor score Consequence_ego, REGR factor score Consequence_bio, Hvor bekymret er du for miljøet?.

9.7 Logistic Regression Sausages - Environmental Concern

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	8.292	7	.308
	Block	8.292	7	.308
	Model	8.292	7	.308

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Hvor gammel er du?	.141	.137	1.069	1	.301	1.152	.881	1.505
	Hvilket kjønn er du?	-.253	.598	.179	1	.673	.777	.241	2.507
	Hva er din høyeste fullførte utdanning?	.452	.478	.894	1	.344	1.571	.616	4.010
	REGR factor score for Climate_Concern	.082	.340	.058	1	.810	1.085	.558	2.111
	REGR factor score Consequence_ego	.165	.369	.199	1	.656	1.179	.572	2.431
	REGR factor score Consequence_bio	.284	.326	.760	1	.383	1.329	.701	2.519
	Hvor bekymret er du for miljøet?	.137	.263	.269	1	.604	1.146	.684	1.921
	Constant	-3.230	3.788	.727	1	.394	.040		

a. Variable(s) entered on step 1: Hvor gammel er du?, Hvilket kjønn er du?, Hva er din høyeste fullførte utdanning?, REGR factor score for Climate_Concern, REGR factor score Consequence_ego, REGR factor score Consequence_bio, Hvor bekymret er du for miljøet?.

9.7 Logistic Regression Beef - Environmental Concern

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	32.631	7	<.001
	Block	32.631	7	<.001
	Model	32.631	7	<.001

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Hvor gammel er du?	.043	.064	.442	1	.506	1.043	.920	1.183
	Hvilket kjønn er du?	-.478	.684	.488	1	.485	.620	.162	2.369
	Hva er din høyeste fullførte utdanning?	-1.227	.640	3.683	1	.055	.293	.084	1.026
	REGR factor score for Climate_Concern	1.099	.450	5.959	1	.015	3.001	1.242	7.251
	REGR factor score Consequence_ego	-.407	.412	.974	1	.324	.666	.297	1.493
	REGR factor score Consequence_bio	.025	.340	.006	1	.940	1.026	.527	1.995
	Hvor bekymret er du for miljøet?	.850	.309	7.580	1	.006	2.340	1.278	4.287
	Constant	1.532	3.328	.212	1	.645	4.628		

a. Variable(s) entered on step 1: Hvor gammel er du?, Hvilket kjønn er du?, Hva er din høyeste fullførte utdanning?, REGR factor score for Climate_Concern, REGR factor score Consequence_ego, REGR factor score Consequence_bio, Hvor bekymret er du for miljøet?.