

An Investigation of the Perception, Experiences, and Use of the Nutri-Score for Consumers

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Abstract

To prevent lifestyle-related diseases, consumers must opt for healthy food choices. Front-of-package (FOP) logos can help the consumer in doing so. Since 1 January 2024, the Nutri-Score is the official food logo in The Netherlands. This FOP logo causes both positive and negative effects of the Nutri-Score that can be explained by six mechanisms. Whilst plenty of research has been done about the positive effects of the Nutri-Score, these effects were based on clinical research. Therefore, generalisable research is lacking. The current research focuses on qualitative research by using focus groups to determine the perceptions, experiences, and intended use of the Nutri-Score by consumers. 25 individuals took part in four different focus groups on Nutri-Scores. Four focus groups were held with different participants: namely lower educated participants (n=7), students (n=7), co-habituating participants (n=8), and higher educated participants (n=6). From these focus groups, it became clear that most consumers are confused by the Nutri-Score as they were (a) unaware that the Nutri-Score compares products within a food category and (b) they do not know what these categories are exactly. Most consumers did not have the intention to use the Nutri-Score, however, some participants stated that they plan to use the Nutri-Score to compare unhealthy products with one another. To relieve some of the confusion, it is important that the government provides more information about the Nutri-Score and its categories.

Lifestyle-related diseases, such as cardiovascular disease (CVD) and diabetes mellitus type 2 (T2DM), have become more prevalent over the past few decades (Stender et al., 2007). This might be because fast-food options are prominently present in current society and easily accessible to most people (Vaida, 2013). Consequently, the consumption of unhealthy ‘highly processed foods’ has increased in the past decades (Talukdar, & Lindsey, 2013). CVD and T2DM are highly associated with physical inactivity and poor nutrition, such as high doses of processed food (Mellendijk et al., 2015). Thus, treatment of these diseases should include lifestyle changes, with a specific focus on healthy and nutrient-dense food. Rather than treatment, it is even more important to reduce the prevalence of such nutrition- and lifestyle-related diseases, prevention is key. Nutrition should be used as a preventative tool for such diseases (Kromhout et al., 2016). “Food has the power to heal us. It is the most potent tool we have to prevent and treat many of our chronic diseases.”, says Doctor Mark Hyman¹ (Hyman, 2016). Thus, it is important that consumers opt for healthy food choices.

To help the consumer in doing this, front-of-packaging (FOP) labels have been designed. These are labels on the front of a package that give limited, simple, and visible information about critical nutrition elements (Kelly, & Jewell, 2019). A study by Becker et al. (2015) showed that consumers are more inclined to reply to simpler labels than the nutritional information at the back, of their decision-making. Therefore, FOP labels represent a promising means to decrease the prevalence of nutrition and lifestyle-related diseases (Mejean et al., 2014). FOP labels are country-specific, yet a global study by Egnell et al (2018) revealed that in each country there is a positive effect of placing an FOP label on a

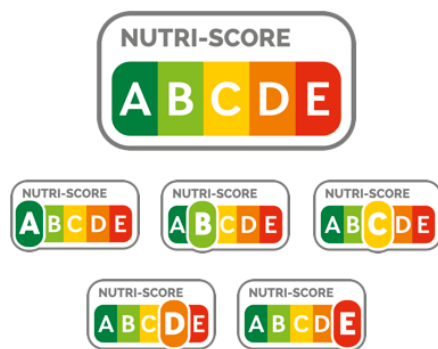
¹ Mark Hyman is a family physician in The United States and author of ‘Eat Fat, Get Thin’ (2016).

product as it influences the thoughts, feelings, and some behaviours (e.g., purchase intention) of the consumer (Ares et al., 2018; Findling et al., 2018). One of the FOP labels is the Nutri-Score² (See Figure 1), which was developed to help the consumer compare products at a glance (Egnell et al., 2018).

The Nutri-Score is an FOP nutrition label with a graded colour-coding based on a five-colour scale (from dark green to red) linked to letters, from A to E (Hercberg et al., 2021). ‘A’ reflects the highest nutritional quality and ‘E’ the lowest (Julia, & Hercberg, 2017). The calculation of the Nutri-Score is based on the nutritional properties of the food; it is based on five categories (1) energy value (e.g., calories), (2) saturated fatty acids, (3) sugars, (4) sodium, and (5) fibre and proteins.

Figure 1

Graphic of the Nutri-Score



Note. Image: Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021. In the public domain.

² Future references to the Nutri-Score in this report, refer to the European Nutri-Score. This is the Nutri-Score that is in The Netherlands.

Products with a ‘bad’ Nutri-Score (E) often have a high sugar content, as well as many saturated fatty acids, a high sodium percentage, and a high calory density per 100g or 100 mL (e.g., energy drinks; Ter Borg et al., 2021). Foods with a ‘good’ nutritional score (A) often contain many fibres and have a high protein content (e.g., wholewheat bread, or unprocessed nuts).

Due to its bright colours, the Nutri-Score intends to grasp the attention of the consumer (Bossuyt et al., 2021). The colourful visual design of the label acts on a visceral level, warning of unhealthy foods with a bright red signal and guiding the consumers’ choices to a healthier product with a soothing green colour³ (DeLong, & Martinson, 2013). In many countries green represents ‘Go’ or ‘Good’, whereas red often represents ‘Stop’ or ‘Wrong’ (Waller, 1988). This is why the Nutri-Score can act as a booster for consumer self-control in situations of temptation (Haua, & Langeb, 2023).

The Nutri-Score aims to inform consumers, in a simple understandable way, of the overall nutritional value of a product (Julia, & Hercberg, 2017). By providing this information, the Nutri-Score hopes to enable the consumer to make healthier choices at the point of purchase through a simple comparison of products. A secondary aim of the Nutri-Score is to encourage manufacturers to improve the nutritional composition of their products through redesigning their products and making healthier alternatives. If consumers are more likely to purchase products with a favourable Nutri-Score, the manufacturer will want to

³ Green has been found to be a soothing colour (De Long, & Martinson, 2013, O’Connor, 2011). And green is a colour that people tend to associate with healthy products (Luo et al., 2019).

ensure that their products get a ‘good’ Nutri-Score to keep their sales up (Julia, & Hercberg, 2017).

On June 11, 2023, the Dutch government announced that the Nutri-Score will be the official food-choice-logo⁴ per January 1, 2024. The food-choice-logo is aimed to help consumers make healthier choices to reduce obesity in The Netherlands (RIVM, 2023). The Dutch government has made the choice to implement the Nutri-Score based on several research studies that have been performed on the effect of implementation. In such studies, the effectiveness of the Nutri-Score was compared to either no label or to other FOP labels on consumers’ choices (Ducrot et al., 2016; Egnell et al., 2019). The results of these studies show that the presence of the Nutri-Score improves the overall nutritional quality of purchased products by the general population (Crossetto et al., 2020; Julia, & Hercberg, 2017). Yet, the improvement of nutritional quality in food due to the Nutri-Score became specifically clear in people with low socio-economic status (Vargas-Meza et al., 2019). Therefore, many European countries have chosen to use the Nutri-Score as their official FOP label, to increase the consumption of healthy products (Dréano-Trécant et al., 2020).

Currently the Nutri-Score, as an FOP label, is effective in attracting a consumer’s attention and decreasing the time needed to comprehend the information on the nutritional facts about the product on the back of the package (Bix et al., 2015). The placement of the label on the front of the package allows the consumer to easily access the information in the supermarket (Becker et al., 2015). The Nutri-Score as an FOP label can persuade the

⁴ A food-choice-logo is the description that the Dutch Government uses for an FOP logo (RIVM, 2023).

consumer to buy a product with a good score. The Nutri-Score can easily be used in comparing products based on their healthiness (Egnell et al., 2020). Consequently, consumers tend to accurately evaluate the perceived healthiness of the product (Newman et al., 2016). However, each of these studies done about the Nutri-Score has been done in a laboratory setting and therefore it may not be accurate to the choices that consumers make in their daily life. It is uncertain how valid these studies are on an everyday basis. Therefore, it is important to look at the positive elements that the Nutri-Score can bring and wonder whether consumers benefit from these elements. Because most studies have been done in a controlled setting, it is far from certain that the Nutri-Score has a positive effect on the purchase behaviour, perception, experience, and use of the Nutri-Score of the consumer.

Despite the clear benefits in a laboratory setting, several experts have expressed their concerns about making the Nutri-Score mandatory, as the Nutri-Score has some flaws. These concerns can be categorised into ‘societal issues’ and into a ‘knowledge gap’.

Societal Issues

Nancy te Hoven⁵ expresses her concern about a halo-effect and the Nutri-Score amongst consumers, she says: “You cannot compare cheese to olive oil or to fruit, but a lot of consumers do not know that the Nutri-Score gives advice within a food group. Therefore, it is important that the government gives proper information about the Nutri-Score, before making implementation mandatory.”. In the current scoring system, it is possible that a pizza gets an A or B score, whilst cheese gets a D or an E score, this may cause confusion. More than that,

⁵ Nancy te Hoven is a dietician and owner of the company Health & Co.

the government claims that the Nutri-Score is a tool that can be used to assess the overall health of a food product, however, the algorithm that the Nutri-Score uses is based on food categories. The communication about the Nutri-Score from the government to the consumer is imperfect.

A study by Bossuyt et al. (2021) showed that consumers find it difficult to place products within a Nutri-Score group if they have the ingredients and nutritional information available. For example, Diet Coke can have a Nutri-Score of B and consumers experienced some confusion when they saw this as Diet Coke ‘zero of everything’ (0.2 calories, 0 fats, <0,1 carbohydrate, 0 fibres, 0 proteins, and 0,1 salt). By substituting one element (e.g., sugar) with another element (e.g., sweeteners) manufacturers can improve the Nutri-Score of any food. Therefore, a Diet Coke has a better Nutri-Score than a pineapple for example, due to the pineapple’s high sugar content. The confusion that the Nutri-Score might cause, can be seen as a societal issue, yet it is often overlooked when the Nutri-Score is discussed.

The last societal issue related to confusion is that the Nutri-Score does not consider methods of cooking, additives, colourants, and endocrine disrupters when determining the Nutri-Score (Srouf et al., 2023). Consequently, French fries, that have an extremely high fat ratio, get a Nutri-Score of ‘A’ because the fries are scored the way that they are sold – which is frozen and unprepared (BEUC, 2023). Moreover, the Nutri-Score does not differentiate between artificial fibres and added fibres. Added fibres are often processed. With the current algorithm of the Nutri-Score, there seems to be no benefit for using natural fibres compared to artificial ones, this leads to a favour for ultra-processed products compared to natural products (Srouf et al., 2023). This can be a confusing message to send to the consumer as highly processed foods are not healthy.

Besides confusion, another concern might be the overconsumption of products that score an A, maybe pizza with an A score (Hercberg et al., 2021). In the current algorithm, producers and companies can adjust their products easily to get an A-score, without necessarily improving its healthiness which might be misleading the consumer (Hau, & Langeb, 2023). This might defeat the purpose of the Nutri-Score as manufacturers might not see the need to improve the algorithm of their products to become healthier.

Knowledge Gap

Although these societal concerns have been raised, there has been little to no research done about the downsides of the Nutri-Score. Whilst the choice to make the Nutri-Score the official food choice logo in The Netherlands is based on the positive results of several experiments, there is little research done about the experiences of the consumers regarding the Nutri-Score.

Previous studies have based their results on quantitative research methods in a clinical and controlled setting in a laboratory and these results have been generalised to show that there are overall more benefits of the Nutri-Score than drawbacks for consumers. These studies often did not focus on the possible downsides of the Nutri-Score, but rather focussed on the positive effects of the score. For example, a study by Egnell et al. (2020) showed that consumers find it easiest to rank products based on their healthiness if these products have a Nutri-Score label. However, this was done in a clinical setting where the participants were asked to purposefully rank the products, these results are generalised to the real-life purchases in supermarkets. Yet, one can wonder whether consumers adhere to these results if they do their daily or weekly groceries. It might be the case that consumers do use the Nutri-Score to make their purchases, but that is unclear; the consumers' perceptions and interpretations of

the Nutri-Score are unknown. It is dubious whether these results can be generalised to the day-to-day setting because when a consumer does their daily shopping there are several elements that influence the choice of a food product (e.g., the music played in a supermarket can have an impact). This clearly shows that there is a knowledge gap regarding consumers' perceptions, opinions, experiences, and use of the Nutri-Score in the currently done research about the Nutri-Score. It is unknown how consumers perceive, experience, and use the Nutri-Score in a non-clinical setting.

Nutri-Score in Advertisements

Advertisements can have an impact on the choices that a consumer makes when purchasing food. The Nutri-Score is mostly presented in an FOP nutrition label and often the other methods of communication (e.g., social media or advertising) are often overlooked (Hercberg et al., 2021). However, more people order their groceries online and they do not go to the supermarket nowadays (Duffy et al., 2022). Therefore, it might be useful to use online advertisements to show the Nutri-Score of a product. By showing the Nutri-Scores in an online app such as the Albert Heijn⁶ app, consumers can still compare products at a glance (see example in figure 2). People come across advertisements daily, when they use their smartphones (on social media) or when they commute to work (at bus stops or gas stations; Story, & French, 2004; Adams et al., 2011; Marino et al., 2021).

⁶ Albert Heijn is a supermarket in The Netherlands, they also offer services to order groceries online.

Figure 2

Example of an Online Nutri-Score



Note. Image from Albert Heijn. In the public domain.

Food advertisements that the consumer might see, usually do not contain a Nutri-Score. However, the use of this might be useful as previous studies have shown that purchase intention is influenced by the presence of a Nutri-Score (Vandevijvere, & Berger, 2021). Consumers were more likely to purchase a food product if there was a positive Nutri-Score available. Seeing a Nutri-Score in an advertisement might influence the consumer to purchase a product with a healthy score. Moreover, consumers often do not have a lot of time or do not spend a lot of time in the supermarkets. Therefore, they might be less affected by the Nutri-Scores as an FOP label as there are many other stimuli (Shin, & Park, 2023).

Consumers want to receive information as quickly as possible. Humans have limited cognitive resources. On the one hand, low-load tasks, such as watching television, take up a small portion of the cognitive capacity. On the other hand, high-load tasks such as reading a book, take up a larger space of cognitive capacity (Lattimore, & Maxwell, 2004). Doing

groceries in a supermarket and having to read the FOP labels takes up more cognitive capacity than watching an advertisement online or on television. If too much information is presented at once, the cognitive resources might be insufficient and therefore it becomes more difficult for an individual to process and understand that information (Lang et al., 2007).

Advertising significantly improves consumers' purchase intentions (Dash et al., 2021). Consumers are often influenced by marketing activities when it comes to purchase intention (Dash et al., 2021). Advertisements are usually used by manufacturers for marketing purposes and for highlighting claimed benefits of their products (Dash et al., 2021). When an individual sees an advertisement for a product, they are more likely to purchase it if they engage with the advertisement (Findling et al., 2018). Research done in Australia showed that frequent television viewing with unhealthy advertisements is associated with a positive attitude towards junk food and consequently a higher junk food consumption (Dixon et al., 2007). That same research shows that if advertisements about nutritious foods were shown on television, this would lead to positive attitudes and beliefs concerning these foods. Accordingly, the consumption of these healthy foods would increase. That shows that individuals can be influenced through advertising.

Using the Nutri-Score in advertisements can be a resource to provide nutrition information. The Nutri-Score is then a cognitive product attribute that helps consumers evaluate the advertisement and brand. Moreover, in an advertisement, the Nutri-Score can be used to communicate that a product is 'healthy'. It is not common to include an FOP label as a message in an advertisement (Shin, & Park, 2023). Yet, various other types of informational messages about nutrition are placed in an advertisement (e.g., "30% more protein" or

“contains 50% less sugar”; Zwier, 2009). These informational messages have been proven to be effective in persuading the consumer to purchase these products (Hwang et al., 2016). Using the Nutri-Score to show the healthiness of a product, might be useful in providing information to the consumer as well (Ikonen et al., 2019). It is unknown whether presenting the Nutri-Score in food advertisements has an impact on a consumer’s perception, experience, and the use of the Nutri-Score. Moreover, it is not known whether presenting the Nutri-Score in an advertisement has an impact on a consumers’ purchase intention.

Study Aims

Because most studies regarding the Nutri-Score have been performed in a controlled clinical setting, they may not be generalisable. Therefore, this report aimed to explore the experiences, attitudes, and perceptions of the consumer with a Nutri-Score by using qualitative study methods. A secondary aim was to find out the effectiveness of the medium of presentation of the Nutri-Score in the purchase intention of the consumer. The FOP nutrition labelling was compared to advertising of a product and presenting the Nutri-Score in that advertisement. These methods were compared to explore the effect that these forms of communication have on the perceived healthiness of the product and the intention of purchasing the products. Moreover, the perceived effect on the intention to use the Nutri-Score by consumers was determined. Based on these aims, the following research question was addressed:

How do consumers perceive and use the Nutri-Score?

To answer this, the following sub-questions have been established:

- a. How does the score of the Nutri-Score affect the perceived healthiness of the product?

- b. How does the consumer perceive the usefulness of the Nutri-Score?
- c. How does the score of the Nutri-Score influence the purchase intention of the consumer?
- d. How does advertising with a Nutri-Score influence purchase intentions in comparison to advertising without a Nutri-Score?

Theoretical framework

To meet the aims of this study, it is important that the benefits and the drawbacks of Nutri-Score use are established. Research shows the positive effects of the Nutri-Score. There are several health benefits of the Nutri-Score and there are mechanisms that explain these benefits. Contrary, there are mechanisms behind the drawbacks of the Nutri-Score.

The Benefits of the Nutri-Score

Several research studies have been done about the Nutri-Score. Many governments, including the Dutch government, have performed independent research on the effects of FOP labels. In The Netherlands, the government performed quantitative research where they asked consumers to choose the healthiest product. They were presented with three different logos on the products (*Nutri-Score, Traffic Lights, and Keyhole*). The results of the different logos were compared to each other. It showed that when a Nutri-Score is presented on a product, the consumer makes the healthiest choice 54% of the time, whereas if there was no logo, they would make a healthy choice 45% of the time (RIVM, 2019).

Another study asked participants to choose the healthiest cereal when presented with six different cereals in three different conditions (*Nutri-Score, Multiple Traffic Light (MTL) label, or no label control condition*; Van Akker et al., 2022). Participants were shown a product with a relatively good label score and selected their desired serving size. The results

show that the Nutri-Score promotes the choice of the healthiest cereal. Dieting behaviour and health-conscious shopping did not moderate this effect, and the labels did not affect serving size selection (Van den Akker et al., 2022).

These studies are related to the first mechanism; consumers tend to be more likely to purchase a product if it has a good Nutri-Score on it (RIVM, 2019). The Nutri-Score as an FOP label can persuade the consumer to buy a product with a good score (RIVM, 2019). Whilst some FOP labels have been shown to be difficult for consumers to understand, the Nutri-Score however is easy to understand and it can help consumers towards healthier food choices (Crosetto et al., 2020).

Additionally, research shows that the beliefs about nutritional quality and the effect on healthiness of the product are perhaps more important than the factual nutritional quality and health effects in determining an individual's food choices (Sheperd et al., 1995). Additionally, previous research found that consumers appreciate the FOP label more than the nutritional information on the back of a packaging, as the graphics and colours of an FOP label seem easier to understand (Grunert, & Willis, 2007). Consequently, the second mechanism caused by the Nutri-Score is that consumers do not look at the nutritional information on the back as much if an FOP label is available (Graham et al., 2015).

The third mechanism is that the Nutri-Score increases the intention to purchase a product. The Nutri-Score can easily be used in comparing products based on their healthiness (Egnell et al., 2020). Consequently, consumers tend to positively evaluate the perceived healthiness of the product if a product has a 'C' score or better (Newman et al., 2016). Moreover, the presence of a Nutri-Score can help in attracting products to the consumer, increasing the intention to buy (Van den Akker et al., 2022). According to Findling et al.

(2018) the presence of an FOP label, increases the purchase intention of a product, as it helps the consumer to evaluate nutritional quality. Besides, it was shown that more purchases are made with products that have a 'B' score, than products that are labelled with a 'C' score (Jürkenbeck et al., 2022). The Nutri-Score makes making healthier food choices easier at the time of purchase. Consumers in the EU perceive products with a 'good' Nutri-Score as healthier than scores with a 'bad' Nutri-Score (Jürkenbeck et al., 2022). These scores offer the potential to boost sales of healthy products, without affecting sales of unhealthy products (De Temmerman et al., 2021). Moreover, if restaurants place the caloric intake of their food on the menu, it is likely that the consumer is steered to a low-caloric product (Van Epps et al., 2016). It seems that the same effect occurs with Nutri-Scores, as consumers tend to purchase more products with a positive Nutri-Score.

Whilst these benefits can help the consumer to have a healthier diet if the consumer uses the Nutri-Score as a tool to help them choose their groceries, it is unsure whether the Nutri-Score can achieve this if the consumer does not use the Nutri-Score when doing their food shopping or uses it differently than originally intended.

Drawbacks

Besides the many positive effects that have been researched on the Nutri-Score, some experts have also expressed their concerns. Certain mechanisms can occur, causing negative effects regarding the Nutri-Score.

Doctor Reed⁷ stated that the Nutri-Score is prone to a health halo-effect, for example, a green smoothie might be considered healthy but only if it is drunk in moderation (Her, & Seo, 2017). By replacing ingredients such as sugar with sweeteners, a product such as Coca-Cola Light might have a positive B score (Hau, & Lange, 2023). Yet these drinks do not contain (m)any healthy nutrients (Chung et al., 1999). Another example can be apple sauce, which gets an A score because of its high fruit content and because it is placed in a sauce category. However, apple sauce does not contain as many vitamins and fibres as an unprocessed apple, also an A score (O'Neil et al., 2009). In such cases, the first mechanism – a health-halo effect can occur. Moreover, consumers might overestimate the healthiness of a product and purchase a lot of products with an 'A' score without thinking critically about whether that product meets the nutritional needs of the individual.

A second mechanism is that the consumer might not consume all necessary nutrients if they solely focus on the Nutri-Score. The Nutri-Score is not a substitute for public health recommendations. Even if an individual consumes solely green-labelled (A or B) products, they might still not consume all the nutrients that their body needs (Te Borg et al., 2021). The Nutri-Score focuses on individual products, whereas nutritional recommendations focus on the consumption of large food groups (e.g., vegetables or legumes). For some of these food groups a quantitative frequency of consumption is needed; the Nutri-Score alone does not account for this frequency. Therefore, the Nutri-Score should be used as a complementary

⁷ Doctor Reed is a paediatric dietician and spokesperson for the Academy of Nutrition and Dietetics. For more than 20 years, she has treated infants, children, and teens with selective eating issues as well as those with complex medical problems that require tube feeding.

tool in steering the consumer towards a healthier diet and the Nutri-Score should be presented as such (Te Borg et al., 2021). However, the consumer might not be aware of this.

The choice to pick the Nutri-Score as the official food choice logo from January 1st, 2024, is based on the experiments performed by several researchers, as mentioned above (RIVM, 2019). However, little research has been done on how the consumers perceived the Nutri-Score and what their attitudes and behaviour are towards this FOP label. The same research by the RIVM (2019) that showed that consumers tend to pick the healthier option in 54% of the cases if a Nutri-Score is presented on the product, also shows that only 33% of their participants found the Nutri-Score easy to understand (67% found it difficult). Therefore, it is essential that more research is done on the understanding of the Nutri-Score and the perceived trustworthiness in the eyes of the consumer. Thus, this paper performed a qualitative study about the perceptions of the consumer and the consumer was asked about their grocery habits and whether they use the Nutri-Score.

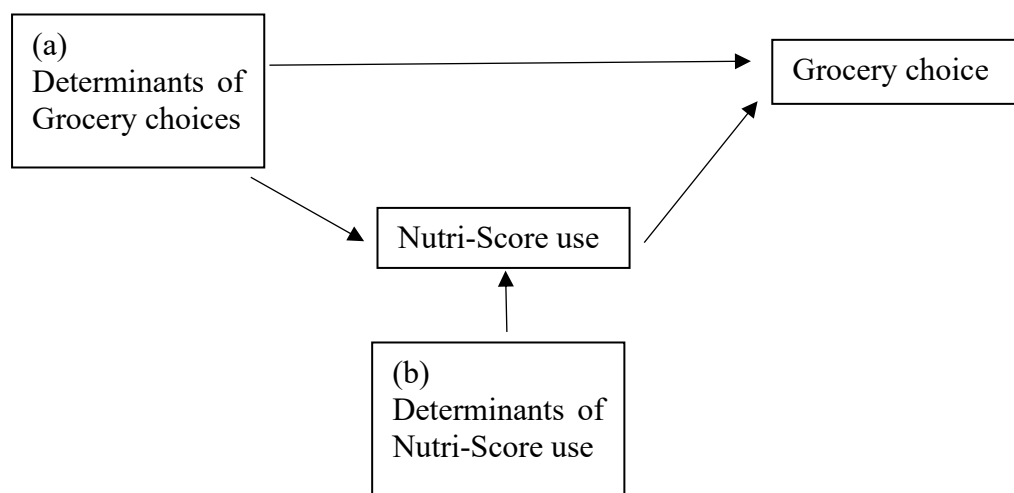
Determinants of Grocery Choices

Nutri-Score use is influenced by two determinants, namely (a) determinants of grocery choices and (b) the determinants of Nutri-Score use. As for (a), when a consumer has the goal of consuming healthy foods, they might value the Nutri-Score more and they might actively look at the Nutri-Score. However, as for the other determinants the Nutri-Score may not be of as much value. As for (b), the Nutri-Score must be perceived as a useful tool in the eyes of the consumers for it to be used. Besides being useful, it must be seen as reliable. If these determinants are not met, the consumer might be less inclined to make use of the Nutri-Score.

Once the determinants of Nutri-Score use have been met, the benefits and the drawbacks of the Nutri-Score in daily life can be shown. Then the effect on grocery store choices can be researched, see figure 3 for an overview.

Figure 3

Theoretical Framework



Note. This theoretical framework gives a simplified overview of what influences the grocery choice purchases of consumers.

Research shows that the following elements are most often considered when doing groceries – Determinants of grocery choices:

1. *Brand:* Consumers might be familiar with a certain brand and therefore they might have trust in that brand and its products. Trust is an important topic in influencing consumers because it can create and maintain successful long-term relationships between a company and its consumers (Pop et al., 2022). Trust has a positive effect on purchase decisions (Hanaysha, 2022). Moreover, brand familiarity can contribute to a

consumer's purchase decision as consumers are more likely to purchase a product if they are familiar with the brand (Smith et al., 2017; Laroche et al., 1996). Besides, consumers keep purchasing the same products from a brand if they had positive experiences with that product from that brand before (Park, & Stoel, 2005).

2. *Health*: More and more research has been done about the positive effects of healthy food. Healthy food is important to prevent certain lifestyle-related diseases (e.g., cardiometabolic diseases; Kromhout et al., 2016). Food with high nutritional values, meaning high contents of fibre, vitamins, and minerals; influences purchase intentions (Wee et al., 2014). Marketing of health benefits of foods may increase the consumption of healthy foods (Darian, & Tucci, 2011).
3. *Finances*: As produce has become more expensive due to inflation after the Ukrainian and Russian war, more consumers have become aware of the money they spend on their groceries (Rabbi et al., 2023). These continuing increasing prices are an aftermath of the COVID-19 pandemic, and they have an impact on the income and the fixed expenses of any household within Europe (Grunert et al., 2023). Because prices of for example gas have increased, financial reasons are one of the most mentioned reasons for consumers to choose one product over another (Bojkovska et al., 2014).
4. *Necessity*: Some people make a grocery list of all the things they need, whereas others step into the store and go with their gut feeling of what they want to eat that week or day. Meal planning has become more popular over the past decade, but there are also individuals who find it much more convenient to do their groceries every day (Hayes et al., 2021). Some people only want to purchase produce that they absolutely need to cook for the week, whereas others might purchase products because they might feel

like consuming them later. Whether a consumer perceives a product as necessary, influences the purchase behaviour of that consumer.

5. *Convenience*: Consumers have various times to spend on their cooking during the week. One might have an hour to chop fresh vegetables, whereas another might need to quickly get a meal together. This determines the purchase choices of a consumer (Imtiyaz et al., 2021). The former might purchase fresh vegetables and meat, whereas the latter might purchase prechopped products (Van Boxstael et al., 2014).
6. *Quality*: The quality of a product is often mentioned as a reason for consumers to purchase a product. They might purchase bread from the baker rather than a supermarket because the baker provides ‘a better quality’. There is an effect of product quality on purchasing decisions, as consumers tend to purchase a product more if the perceived quality is high (Aeni, 2020).
7. *Environmental reasons*: Global warming has been a reoccurring topic over the last few years as it has become a big concern for researchers. To prevent this effect, many countries have set up some rules and guidelines to reduce their contribution to global warming (e.g., using paper bags instead of plastic bags; Van der Ree et al., 2019). Moreover, the consumer has also become more informed about the effects of global warming, and they may have altered their purchasing behaviour. An example of this is the protein shift, where consumers tend to purchase more plant-based forms of protein rather than animal-based products because of sustainability reasons (Barik, 2020). Sustainable behaviour has an influence on consumers’ purchases in the food industry. If a consumer is more focused on sustainability, they might perhaps maintain a vegetarian diet or purchase more organic products (e.g., Nunez-Cacho et al., 2020). Positive and negative sustainability-related information on a packaging or on social

media will influence the consumers' intention to purchase sustainable products (Saeed et al., 2019). Environment-friendly products are found to be more reasonable by the consumer to respect the environment (Bulut et al., 2022).

8. *Recommendations*: Humans are a social species, and we often live in societies with other individuals. They often conform to the socially accepted behaviour that occurs in a group (Fekadu, & Kraft, 2002). According to several theories, humans adhere to social norms, and these refer to what is commonly approved or what is commonly done within a society or group (Banerjee, & Ho, 2020). These social norms also have an impact on one's consumer behaviour. Products that are recommended by other consumers are therefore purchased more often (Lin, & Niu, 2018).

These determinants of why someone chooses to purchase certain grocery items have an impact on the actual purchase decisions of the consumer, see figure 2. Namely, if someone has the goal to be sustainable (determinant 7), they might purchase solely sustainable food items. Besides the determinants of grocery choices, the Nutri-Score also influences the grocery choices of consumers.

Methodology

To explore the consumers' experiences, attitudes, and perceptions regarding the Nutri-Score, this research used focus groups to gain these insights. Focus Groups are a qualitative research method where a group of individuals get together and talk about a specific topic (Smithson, 2008). The group discussion is led by a moderator and an interactive discussion where everyone can share their thoughts, opinions, and attitudes towards a certain topic is started (Morisson-Beedy et al., 2001). The moderator makes sure everyone gets a chance to share their thoughts and keeps the conversation flowing. The sessions are often recorded so

that the researchers can listen back later. Focus groups are particularly useful for exploring participants' beliefs, feelings, and perceptions (George, 2013). As the current research aimed to look at the societal problem of possible confusion when using Nutri-Scores, focus groups were deemed useful.

To keep the participants interested in talking about the same topic for a longer time, the researchers can facilitate different manners of asking questions. For example, a game or a group statement can be used (e.g., "I always choose the healthiest option when doing my groceries"). The group interaction that occurs in focus groups, is part of the data used for the research. Sessions are conducted in a relaxed fashion with minimal intervention from the facilitator - at least at first. When looking at previous research, it became clear there were little to no focus groups done about the perception of the Nutri-Score, which makes this research relevant and new.

Participants and Recruitment

All individuals who participated in the focus groups were recruited through known connections. Some of the participants were coworkers, others were family members, and others were friends. No preconceived recruitment strategy was used to gather a diverse study population. Participants were eligible if they could speak Dutch, were older than 18, and met one of the criteria for one of the focus groups. All the participants of the focus groups of this study had a Dutch nationality. The aim was to have four different focus groups with 6 – 9 participants. 25 individuals took part in four different focus groups on Nutri-Scores. Each focus group had participants with a certain similarity. Four focus groups were held with different participants: namely lower educated participants (n=7), students (n=7), co-

habituating participants (n=8), and higher educated participants (n=6). Within these focus groups, several deductive themes were discussed.

Previously, little research was done about the perception of the Nutri-Score on individuals with a lower education. Yet Vargas-Meza et al. (2019) showed that the benefits of implementing a Nutri-Score are largest in that group. To expand their research, one of the focus groups consisted of individuals with a lower education (no higher education⁸, \geq vmbo-diploma⁹). The ages of this focus group varied from 30 to 55, they are millennials or Generation X. The group consisted of both males (n=3) and females (n=4).

The second focus group consisted of individuals with a higher education, students of a higher education (\geq HBO-study¹⁰). These participants had an age between 18 to 27, Generation Z. The participants of this group were females (n=6). This group was chosen because students often have less money to spend than working individuals, therefore they might have different grocery habits (Jacobs, & Canton, 2003). Moreover, the results could be compared to the results of the focus group with lower-educated individuals, as these groups have a great contrast.

The third group contained participants that are in a relationship and cohabitating with their partner. These participants were aged between 23 and 55, Generation Z, millennials, or Generation X. The group consisted of both males (n=2) and females (n=4). These participants

⁸ In this case, higher education refers to a diploma after high school. Thus, the participants solely have a high school diploma of VMBO-t or lower.

⁹ VMBO, voorbereidend middelbaar beroepsonderwijs is a period of education. There are four different types of this education: theoretical learning path, the basic vocational learning path, the framework focused vocational path, and the mixed learning path. This is the lower education that one can get in high school in The Netherlands.

¹⁰ HBO, hoger beroepsonderwijs, is a higher level of education that one can do after HAVO (hoger algemeen voorgezet onderwijs).

had a variety of education levels, some had an HBO diploma, some a university diploma, and others in this group had no diploma. This group was chosen as a control group as it contained at least one individual who could also be placed in the other three focus groups.

The last focus group consisted of individuals with a higher education (\geq HBO-study). These were participants between the ages of 30 and 55, making them millennials or Generation X. All participants in this group were parents of one or more children. This group was chosen as a contrast to the group of lower-educated people. Moreover, the individuals within this group all had a child(ren) and therefore this group is also different from the student group in which no one had a child.

Each focus group criteria had been chosen based on income and occupation. Students have a whole different income than parents who work and have a higher education. Moreover, parents often focus on different elements when doing their groceries than couples that just started living together. The diversity of the different focus groups gave a large perspective on how the Nutri-Score is perceived in the eye of the consumer. In contrast to the higher-educated participants, there was a group of lower-educated participants. Moreover, most students either lived on their own or lived with their parents, which is in contrast to the cohabitating group.

Data Collection

All focus groups were held in November or December 2023, before the Nutri-Score became the official food logo in the Netherlands. The focus groups were all held at my house, to provide a comfortable and open setting for the participants to communicate. Each of the focus groups was recorded and then transcribed by the author. Moreover, notes of the important things said during the focus groups were made.

There were deductive themes that were determined beforehand. Based on these themes, the questions were formed. Each theme was chosen because it could contribute to an answer to the research questions. The participants were asked about their grocery shopping process because this shows what the participants value most when doing their grocery shopping, some participants mentioned that they choose a certain supermarket because the prices are low, and others choose a supermarket based on its location. This question was an opening to the determinants of grocery choices. The participants were asked to rank eight determinants based on what they find most important when doing their groceries. These determinants influence both the Nutri-Score use, as well as the grocery choices of the participants. The participants were also asked about their previous experiences with the Nutri-Score as this may have an influence on the perception of the Nutri-Score. To elaborate on their experiences, the participants were asked to discuss how they perceived the Nutri-Score. Moreover, the participants were asked to evaluate how accurately they find the Nutri-Score's current scores of eight different products. The aim of this question was again to have an overview of how the Nutri-Score is perceived by the participants. Moreover, this would either confirm or reject the research done by Bossuyt et al. (2021) that stated that consumers find it difficult to place products within a certain food group. Finally, the participants were asked how they were influenced by advertisements in their daily lives and whether the Nutri-Score would persuade them to purchase a product.

Data Analysis

The transcripts and notes of each focus group were coded, and the data was collected. During the coding phase, a distinction was made between different reoccurring themes that the participants talked about (e.g., the grocery shopping process). There were some preset themes that were spoken about because the participants were asked about these themes (e.g.,

the determinants of grocery choices), these were deductive codes. However, there were also themes that reoccurred even though there was no question related to this theme (e.g., confusion regarding the categories of each food item), also known as inductive codes. Several quotations, both individual responses as well as group interactions, related to the coded themes were highlighted in the transcripts and thereafter included in the report. Then the relationship between the different themes was determined. By doing so, the research questions could be answered.

The second step was to view the collected data. For the rankings regarding the determinants of grocery shopping, the average importance of each of the motivations was calculated for each group. The results of the different focus groups were then compared to each other. Moreover, the accuracy of the estimated Nutri-Scores was calculated per focus group. These results were put in different tables and later included in the research report.

In table 1, a focus group guide is given.

Ethical Considerations

Prior to the focus groups, participants were provided with an explanation of the study's aim, and its voluntary and confidential nature, and were then asked to sign the Informed Consent form (See Appendix A). Anonymity was ensured. Transcripts were anonymised by removing all possible identification of participants. Only the author(s) had access to the files.

Table 1

Focus Group Guide

Duration	Introduction Steps	Comments and Materials
-----------------	---------------------------	-------------------------------

15 min	I will bring the participants to the room that I will hold the focus groups in, and I will provide them with coffee, water, or tea and some cake and some snacks. This will provide a comfortable environment.	Since the focus group is at my house, other drink options are available.	
	Have small talk until all participants have arrived. Get a sense of who might be shy and might need extra encouragement to speak up if I do not know the participant very well.	Make sure that small talk is not about the topic of the focus group as we will talk about that later.	
	I will briefly introduce myself and I will introduce the topic of my research, namely the Nutri-Score. Mention: a. I am a student in Wageningen University Research, and I am doing my master thesis. b. What the Nutri-Score is and show a picture and an example of a product with a Nutri-Score (See appendix C).	Ask if there are any questions after the explanation of the Nutri-Score.	
	Mention how long the focus group will take, it will take about 90-120 minutes. Mention that participants are free to grab more drinks and snacks and that everyone can speak freely, there are no right or wrong answers.		
	Ask participants if they agree with that their data will be processed and used for this research. Inform the participants that their data will be remained anonymous. Ask the participants to sign a consent form. Start recording and note taker starts notes.	Distribute consent forms and pens to the participants (See appendix A). Make sure to have enough pens available.	
	Let the participants introduce themselves. To make it more fun, let the participants grab their keys and explain what each key or keychain is for. This will give them something to talk about rather than having static introductions. If the participants are already all familiar with each other, I will ask them a question to break the ice (e.g., what would be the first thing you'd do if you were invisible for a day?). Also ask for their names, their age, their housing situation, and whether they are the main provider of their meals and if they are the ones that do their groceries.		
RQ/ SQ	Time Indication	Questions for the focus group discussion	Attention points moderator

Introduction			
	15 min	1. Describe your grocery shopping process. a. Where? How often? When? What do you pay attention to? Do you have a list, or do you grab what you need?	
	5 min.	2. How long does it usually take for you to do your groceries?	
	10 min.	3. Group assignment. What is important to you when doing groceries? Rank the following things in order. Price, health, brand, necessity, convenience, quality, recommendations, and environment.	This will be an ice breaker. Print a picture of the different things that the participants can rank (see appendix B).
	5 min.	4. Can you tell me about any previous experience you have had with the Nutri-Score? a. Was it a pleasurable experience? Why?	Show an image of the Nutri-Score (see appendix C)
	10 min.	5. What do you think about the Nutri-Score? a. Can you explain how it works?	
Nutri-Score for healthy products			
	25 min.	6. Group Assignment Can you score the following products with a Nutri-Score? What would you score these products? Reveal the answers and let the participants reflect upon the results with the following questions. 7. Do you think that the Nutri-Score accurately represents the healthiness of a food product? a. Yes? Why? Can you think of circumstances where this is the case? b. No? Why not? I will have a few items of a Nutri-Score that might not be obvious from appendix D at hand (e.g., a pizza with a B-score). To make the focus group more interactive I will let them taste the pizza or crisps.	Show images of different food items (See appendix D a&b). Make sure that these items do not have a Nutri-Score on them.
	15 min.	8. Write down any benefits or dislikes that you can think of when you think about the Nutri-Score. If I notice that the participants are not as focused anymore, I will ask them to describe one benefit	Provide participants with pens and paper.

		<p>that they wrote down without saying the word that they wrote down (e.g., if health is a benefit, they can say products you buy to lose weight.... and the other participants must guess health). I will go around till all benefits and dislikes have been discussed between the participants. They would have to explain why they wrote them down.</p> <p>I will probably have a list of benefits and dislikes of the Nutri-Score with me (See appendix E). If the participants find it difficult to list some of them, I will ask their opinions about them. <i>Possible question: What do you think about X, how can that be a benefit?</i></p>	Make sure I keep appendix E on hand.
10 min.	9.	How do you use the Nutri-Score when doing your groceries? Why? Why not?	
Nutri-Score in advertisements			
10 min.	10.	How do any advertisements in the supermarket affect your grocery shopping? a. Are you more likely to purchase products if they have a discount?	
20 min.	11.	What do you consider reasons for you to purchase a product after you have seen an advertisement?	
10 min.	12.	How likely would you be to purchase the products after you have seen the advertisements in figure 3? a. Which one appeals to you the most? b. Why?	
10 min.	13.	Individual assignment. Rank the different products shown from healthiest to unhealthiest (see appendix F).	Make sure to have enough copies.
Concluding Remarks			
10 min.	14.	Do you look at the Nutri-Score any different now than you did before we started this focus group? a. Why?	
5 min.	15.	Do you have any additional remarks or comments? Stop recording and stop making notes	
5 min.	16.	What did you think of the focus group?	

Results

Focus Group Process

To gather the results of this research, focus groups were held. All focus groups were held at my home, to create an open environment and the participants were encouraged to respond to each other and speak for as long as they wanted. The shortest focus group was the focus group with lower-educated participants, and it took one hour and twelve minutes. The longest focus group was the focus group with cohabitating participants, and it took one hour and fifty-one minutes. The other two focus groups took around an hour and thirty-seven minutes. During the focus groups the participants were encouraged to speak freely and, in the evaluation, participants indicated that they felt they could say anything. As a base for each focus group, the focus group guide from Table 1 was used. No adjustments were made; however, I did notice that for question 8 most benefits and dislikes had been mentioned in the discussion before. Moreover, question 13 often became more of a group discussion rather than an individual assignment because participants were quick to respond to each other's answers, which was encouraged. Because the participants were mostly friends and family, there were few cancellations. Yet, in the focus group with students, there was one cancellation, luckily, I could find another student to join the research that same day. The person who cancelled participated in the cohabiting group later. The participants all enjoyed the focus groups.

Deductive and Inductive Themes

From the focus group guide (Table 1), there were several deductive themes that were established. These themes led to different results between the focus groups. In the following section, each of these themes will be discussed and the results per group will be discussed.

Moreover, from the focus groups there were also inductive themes that came forward. Each deductive or inductive theme is associated with a different research question.

The Grocery Shopping Process

As far as grocery shopping goes, the participants had various processes they went through. Some participants did their grocery shopping online and had it delivered to their house (n=5). The delivery services that were used were Picnic and Albert Heijn. The former was often chosen due to their sustainable methods and their prices, whereas the latter was chosen based on the quality of their products.

“There is a reason I order my groceries from Picnic; they deliver their products in a sustainable manner¹¹”. “For me, it is important that I receive the highest quality of products and I find that Albert Heijn delivers that.”.

The other participants did their grocery shopping in-store (n=23). The stores that were mentioned were Jumbo, Albert Heijn, Aldi, and Lidl¹². The reasons for opting for these stores were diverse, but the main motives were financial reasons, quality, and the location of the supermarkets.

“I always go to the Albert Heijn because they have the best quality of products, and they have the exact products I want. If my girlfriend goes to Jumbo because that store is closer to our home, I will do my own groceries later that day at Albert Heijn.”. “I always go to Jumbo because that is the

¹¹Each of the quotes used in this report has been translated from Dutch. The literal words that were used are not provided in this report, however, the essence of the sentences was captured as best as possible.

¹² It must be noted that all participants, but one, live in Noord-Brabant. Therefore, the grocery store options might vary from other parts of The Netherlands (e.g., a Dirk is not available in Noord-Brabant).

cheapest store and it is close by, although I am lucky because each major supermarket is close by.” “I do my groceries every day and the Jumbo and Lidl are on my way from home to work, so I always make a quick stop there.”.

In general, no conclusions can be made about the differences in the grocery shopping process within the subgroups. However, what can be said is that all students did their grocery shopping in-store rather than online. In the other groups, there was at least one person who ordered their groceries online.

As far as time spent on doing groceries goes, the participants mentioned various times. Some participants spend as little as 10 minutes in the grocery store each day whereas others spend several hours doing their groceries.

Participant A: “I love doing the groceries, I sometimes spend hours in the store making sure I have everything I need.”

Participant B: “What? Hours? How is that even possible?”

Participant A: “I love walking down every aisle and looking at the different products. I also don’t make a list of what I need, so sometimes I have to walk back and forth in the store. But I love doing it that way.”

Participant C: “Wow, that’s so different from me... I only spend 10 minutes in the store, I grab what I need and check out at the self-register thing because the cashier doesn’t work fast enough. I want to be as quick as possible.”

Within this, there were no clear differences between the sub-groups.

Motives for Purchasing a Food Item

Based on the eight most mentioned motives to purchase a food item, the determinants of grocery choices, the participants were asked to rank which they find most important when they purchase their food. In this ranking, 1 is the most important and 8 was the least important, see results in Table 2-5.

Table 2

Importance Low Educated Participants

	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6	Person 7	Average (0.00)
Brand familiarity	2	5	5	1	8	6	2	4.14
Quality	1	2	4	2	2	3	1	2.14
Health	3	4	7	4	1	4	5	4
Necessity	4	6	3	6	6	1	3	4.14
Recommended by	6	7	6	5	7	7	6	6.29
Environment	8	8	8	8	4	8	4	6.86
Financials	5	1	1	7	3	5	7	4.14
Convenience	7	3	2	3	5	2	8	4.29

Quality was the most important motivation for the lower-educated participants to purchase a product. Most of the participants in this focus group could agree that the least important motivation was the environment, which was the least important for 6 of the participants.

Table 3*Importance Students*

	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6	Person 7	Average (0.00)
Brand familiarity	4	8	7	7	6	6	4	6
Quality	5	5	3	5	4	4	5	4.43
Health	2	1	2	3	1	2	3	2
Necessity	1	4	6	2	5	1	8	3.86
Recommended by	8	7	8	8	8	8	6	7.57
Environment	7	6	4	1	3	5	7	4.71
Financials	3	2	1	4	2	3	1	2.29
Convenience	6	3	5	6	7	7	2	5.14

Health was by far the most important for students. Almost every student (n=6) agreed that a recommendation from a friend or family member was not important. Brand familiarity seemed to not be important for the students either. Whereas financial reasons were an important motivation for the students to purchase or not to purchase a food item.

Table 4*Importance of Cohabiting People*

	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6	Person 7	Person 8	Average (0.00)
Brand familiarity	4	6	6	4	4	4	5	8	5.13
Quality	2	4	3	2	1	3	4	2	2.63
Health	5	3	2	5	5	2	3	1	3.25
Necessity	1	2	1	1	7	1	1	7	2.63
Recommended by	7	5	8	8	8	8	6	6	7
Environment	8	7	7	7	6	6	7	3	6.38
Financials	6	1	5	3	3	5	2	4	3.63
Convenience	3	8	4	6	2	7	8	5	5.38

For the cohabitating individuals, a recommendation from another individual was less important than the other determinants. Moreover, environmental factors were little motivation for this group to purchase a product. Quality, on the other hand, was the most important determinant in this focus group.

Table 5*Importance of Highly Educated People*

	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6	Average round
Brand familiarity	8	2	2	5	2	3	3.67
Quality	1	4	4	1	1	2	2.17
Health	5	6	5	3	5	4	4.67
Necessity	3	1	1	2	6	1	2.33
Recommended by	6	8	6	8	8	5	6.83
Environment	7	7	7	7	7	8	7.17
Financials	2	3	8	6	4	6	4.83
Convenience	4	5	3	4	3	7	4.33

Quality and necessity were the most important factors for the higher-educated focus group to purchase a product. Contrary, the environment was not important for the individuals in this group, as they all scored it either as the least important or the second to least important determinant.

The average importance for each of the motivations was calculated for each sub-group and these results are depicted in figure 4. This figure shows that there are some clear differences within each sub-group. A clear difference is that the quality was very important for each sub-group, but least important for students. Moreover, financial reasons were the second most important determinant of grocery choices for students, whereas for the other sub-groups, it was less important.

“I do not want to spend hundreds of euros on my groceries each week, but I also want to make sure that I purchase good products”. “I am still studying, so I do not have a full-time job. Therefore, I really must pay attention to which products I buy.”.

As far as health goes, this was the most important motive for students to purchase a food item, yet it was important in the other groups as well.

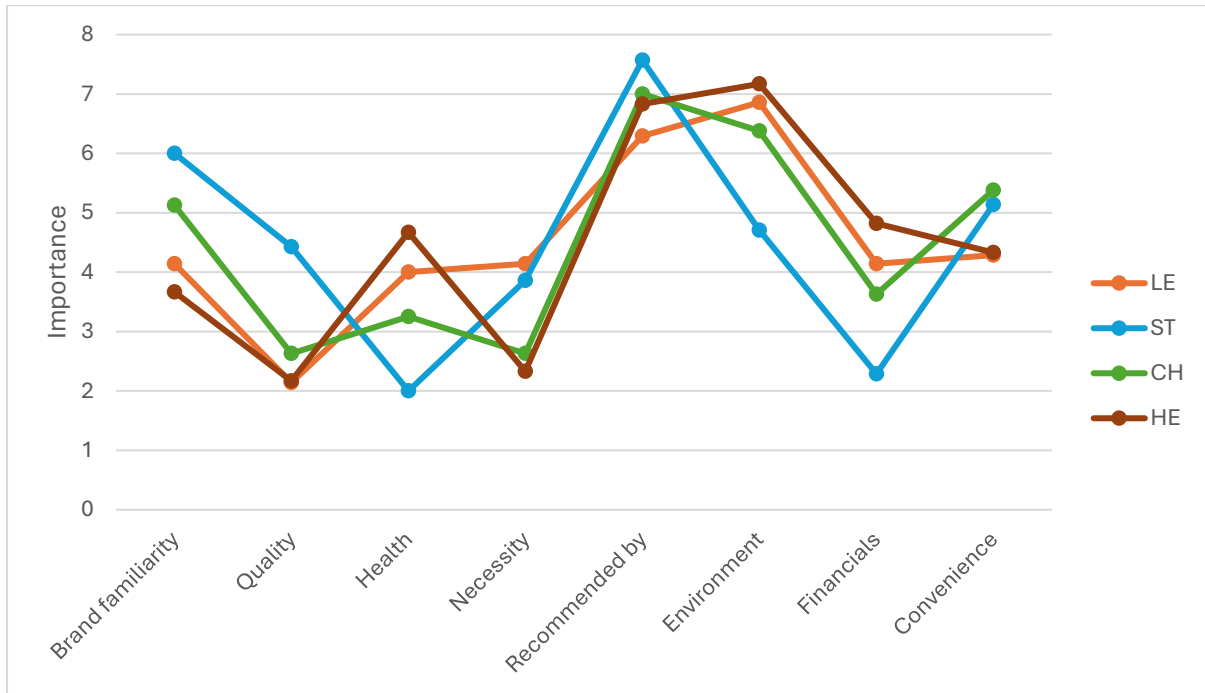
“I find it super important to eat healthy as I want to make sure I get enough nutrients to keep me energised and full.” “Healthy food is super important; it is okay to have a cheat meal once in a while, but I try to eat healthy 90 per cent of the time.”

The same goes for sustainability. Figure 4 shows that the subgroups, except for students, do not consider sustainability as a clear motivation for purchasing a food item. The students listed the environment in their top 5 most important motives.

“I have had several sustainability classes at school, and they really opened my eyes. “The meat industry is such a big contributor to global warming. I stopped eating meat years ago and now I also try to focus on as many biological products as I can find. However, I must say that I am lucky because I have a biological farmer close by, I know it is not as easy for everyone else.”.

Figure 4

Important when Purchasing a Food Product in each Subgroup.



Note. Ranking of the average importance of what consumers value when purchasing a product within each subgroup; Lower educated participants (LE), Students (ST), Co-habiting participants (CH), and Higher educated participants (HE). With 0 being the most important and 8 being the least important.

Experiences regarding the Nutri-Score

Apart from one participant, all participants had seen the Nutri-Score prior to the focus group, and they knew what it was. However, when the participants were asked to explain what the Nutri-Score was, there were only a few participants that could give an accurate description, see Table 5. The participants who did not know exactly what the Nutri-Score entailed (n=24), thought that the Nutri-Score compared all products with one another and that

a product with an ‘A’ is automatically healthy. When the participants were asked to give a description of how the Nutri-Score works, one participant said: “I think the Nutri-Score compares products with each other and then determines which products are healthy or not. If a product has an ‘A’ it is a healthy product and if the product has a ‘D’, it is unhealthy”. However, the Nutri-Score compares products within a certain category (e.g., oils or meat replacers) and this was not known to everyone.

Table 5

Individuals who knew how the Nutri-Score Works

	Lower Educated	Students	Co- habituating	Higher Educated
That knew (n=)	0	1	1	2
Were unaware (n=)	7	6	7	4

Most participants stated that they did not make use of the Nutri-Score before the focus group. “I have seen the Nutri-Score plenty of times on products, however, I never thought to actually look at it and adjust my purchases accordingly.”, said one participant.

Perceptions of the Nutri-Score

The participants learnt that the Nutri-Score has a fixed algorithm that tests the amount of sugar, fat, fibre, sodium, and protein. To test whether they deem the scores by the Nutri-Score algorithm as logical, the participants were asked to score certain products. In table 6 these scores are depicted.

Table 6*Given Nutri-Score by Subgroups Compared to Actual Nutri-Score*

	Lower Educated	Students	Co- habituating	Higher Educated	Correct Answer
Coca Cola zero	<i>B</i>	C	C	<i>B</i>	B
Applesauce	D	D	D	C	A
Pizza tonno	C	D	<i>B</i>	C	B
Kaasstengels	<i>E</i>	<i>E</i>	<i>E</i>	D	E
Frozen French fries	C	B	C	A	A
Olive oil	A	A	A	A	C
Chocolate Cruesli	E	D	E	D	C
Paprika crisps	<i>C</i>	<i>C</i>	D	<i>C</i>	C
Accuracy (%)	37.5	25	25	37.5	100

Note. The correct answers are marked in italics.

Within each subgroup, most given scores were not aligned with the Nutri-Score that these products have. For example, apple sauce contains a lot of sugar and therefore most participants thought it was a product with a ‘bad’ Nutri-Score. However, apple sauce falls within the category ‘Sauces’ and it is thus compared with mayonnaise, ketchup, and other sauces. Therefore, it has a ‘good’ Nutri-Score, namely A-score. This does not automatically mean it is a healthy product, yet this score caused some confusion among the participants.

Participant A: “You cannot compare apple sauce with mayonnaise, these should not be in the same category; I would never place apple sauce in the sauce category.”

Participant B: “Apple sauce contains so much sugar, I don’t understand how apple sauce can get an ‘A’, just because of the category the product is in. These categories are not clear at all.”

Participant C: “I agree! I was in the Albert Heijn last week and I knew we were going to talk about the Nutri-Score today, so I decided to have a look at

the scores. I saw that chicken breast gets a worse Nutri-Score than breaded chicken breast, I was so confused. I now realise that it's because of the category they fall in, but I really don't agree with that."

For frozen French fries the cooking method is not considered. Therefore, French fries are solely potatoes and thus they also have an A-score. This was also considered weird to the participants as French fries contain a lot of fat once they are prepared. "French fries fall into the fried category, and I honestly do not understand how it can be an 'A', French fries are greasy." A final example was chocolate Cruesli, which falls within the category of breakfast cereals, and is compared to sugary cornflakes such as Honey Loops. Thus, even though Cruesli contains high amounts of sugar, it contains less sugar than other cereals. This also raised some questions among the participants. "These categories don't make sense, very sugary or unhealthy products get good Nutri-Scores just because of the category they are in. Who even determines these categories?".

Table 6 shows that the categories in which each product falls are not always clear. Moreover, to find the category in which each food item falls is not that easy. With a simple 'Google search' one cannot find it. This seems to be one of the bigger frustrations regarding the Nutri-Score.

"I think, to make the Nutri-Score successful, it should be clear in which category each product falls. They should make a sign in the supermarket next to the label or product description, something like; wholewheat pasta, falls in the category grains together with rice and other pastas."

Accuracy of the Nutri-Score

As far as the perceived accuracy of the Nutri-Score goes, most participants agreed that the Nutri-Score does not seem accurate because the categories of each food item are not clear. Moreover, some participants stated that companies can easily adjust their products to increase the Nutri-Score by for example using sweeteners rather than adding sugar. This does not necessarily increase the healthiness of a product as some sweeteners are not easily digested by the human body (O'Donnell, & Kearsley, 2012; Hodoniczky et al., 2012). "You can easily use sweeteners instead of sugar and increase your Nutri-Score as simple as that, but sweeteners are just as bad as sugar, it doesn't make sense that this is allowed."

Moreover, additives such as colourants and E-numbers are not considered in the Nutri-Score algorithm, yet these are not healthy elements of a food item. This raised some scepticism among some participants. "If I had a food company I would add a lot of E-numbers to make sure my products last longer, this way I can decrease the amount of sugar I add and I would get a higher Nutri-Score, this system is rigged."

The Nutri-Score in Advertisements

When the participants were asked whether they look at advertisements often, they all answered no. However, upon further questioning they realised that they are influenced by advertisements on their social media accounts and television every day "Okay yes I see advertisements so many times a day, I thought I was numb to them but maybe subconsciously I am still influenced by them.". However, this influence often goes unnoticed. Each participant was asked how they would feel if the Nutri-Score became mandatory in advertising. Most participants seemed sceptical about the positive effects of the Nutri-Score as they found it confusing "A product is not necessarily healthy when it gets a high Nutri-

Score, so I wonder what the Nutri-Score says if the categories are not clear either. It is a confusing system.”. Some participants even stated that they believed that in the long-term all food items would get an A or a B score because companies will adjust their products in such a manner that would increase their score.

“If companies keep adjusting their products to conform to the Nutri-Score, eventually every product will get an ‘A’ or ‘B’ score. But then the Nutri-Score will end up saying nothing about the product at all.”.

This would result in that the Nutri-Score would have no purpose anymore. Due to this scepticism, most participants were not a fan of making the Nutri-Score in advertisements mandatory. “The Nutri-Score is a flawed system; I don’t think we should make it bigger than it already is.”.

After comparing the images in Appendix F, it became apparent that if participants are presented with the same product where one product has an A-score and the other an E, most participants pick the A score. However, some participants stated that they want to pick a product that they think is tastier and therefore they would pick the product with an E-score.

Participant A: “To me, ice cream is an indulgent product, I love the creaminess that the fat provides and if ice cream has an ‘A’ that would throw me off because I would think that it would not contain any of the things that I love about ice cream”.

Participant B: “I agree, but if I tried the ice cream with an A-score and I liked it, then I would still pick that over the one with an ‘E’.”

In advertising these results are different. Most participants would pick the product with an E-score because they think that the woman in the image seems to enjoy the product more. The participants view ice cream as an indulgent product and therefore they want to pick the product that they would enjoy most. There were no significant differences between the subgroups in terms of which product in Appendix F they were more likely to purchase.

Discussion

This research aimed to do a qualitative study regarding the perception of the Nutri-Score in the eyes of a consumer. Therefore, the following research question was established: “How do consumers perceive and use the Nutri-Score?”, with several sub-questions. (A) How does the score of the Nutri-Score affect the perceived healthiness of the product? (b) how does the consumer perceive the usefulness of the Nutri-Score? (c) how does the score of the Nutri-Score influence the purchase intention of the consumer? and (d) how does advertising with a Nutri-Score influence purchase intentions in comparison to advertising without a Nutri-Score? To answer these questions, four different focus groups were held; a focus group with lower-educated participants, a focus group with students, a focus group with higher-educated participants, and a focus group with cohabitating participants.

In this discussion, the answers to the research questions will be discussed and analysed. After that, the results will be compared to previously done research and the contributions of this current research will be discussed. Moreover, some practical recommendations will be provided and then the strengths and limitations of this research will be discussed.

Answers Research Questions

There seems to be confusion amongst consumers about how the Nutri-Score works exactly. Most consumers seem to believe that the Nutri-Score compares all products with

each other, which is false. Once consumers learn that the Nutri-Score compares products within a certain category, they seem to be more sceptical about the usefulness of the Nutri-Score. Some consumers call it a hoax, whereas others say that the Nutri-Score does not say anything about the product because a product can still be unhealthy even if it has a Nutri-Score of 'A'. Thus, overall, the Nutri-Score is perceived as confusing and unnecessary by consumers. This seemed to be the case for all four subgroups in the focus groups.

Moreover, most consumers agreed that the Nutri-Score did not improve the perceived healthiness of a product because it is unclear to which other products a product is compared. Apple sauce, for example, is compared to mayonnaise and therefore it gets an A-score despite the number of sugars and lack of fibres in that product. The categories were confusing for all subgroups. Furthermore, all subgroups mentioned that they find the Nutri-Score subjective because companies can easily adjust the Nutri-Score of their product without necessarily changing the healthiness of that product. Besides, the Nutri-Score does not consider methods of cooking, additives, and colourants and this influences the healthiness of a product. Therefore, the Nutri-Score did not alter the perceived healthiness of a product for all participants. However, some consumers (in the cohabitating and higher-educated group) were planning on using the Nutri-Score to compare different unhealthy products with each other to determine the least unhealthy product out of the unhealthy ones. These consumers (n=3) stated that the Nutri-Score did not say anything about the healthiness of a product, but it did say something about how 'bad' an unhealthy product is.

Even though health was an important motivator for all subgroups; lower educated participants (4), students (2), cohabitating participants (3.25), and higher-educated participants (4.67), the Nutri-Score did not influence the purchase behaviour of the

participants. The Nutri-Score does not influence the purchase intention for most consumers, although there were a few exceptions in the cohabitating and higher-educated participants who were planning to compare unhealthy products with one another based on their Nutri-Scores. The purchase intention of the consumers might not be altered based on the Nutri-Score because consumers do not view the Nutri-Score as useful or accurate. This was the case in all subgroups.

Advertising with a Nutri-Score influences the consumer's perceptions of a product. If consumers are presented with the same product where one product has an A-score and the other an E, most participants pick the A score. However, some participants stated that they want to pick a product that they think is tastier and therefore they would pick the product with an E-score. In advertising these results are different. Most participants would pick the product with an E-score because they think that the woman in the image seems to enjoy the product more. The participants view ice cream as an indulgent product and therefore they want to pick the product that they would enjoy most. There were no significant differences between the subgroups.

Comparison to Other Studies

The results of this study are contradictory to many other studies that have been done previously. According to RIVM (2019), consumers were influenced to purchase a product if that food item contained a Nutri-Score. However, from the focus groups in this study, it became clear that consumers were not more or less likely to purchase a product once a Nutri-Score was present on a product. Furthermore, Van den Akker et al. (2022) stated that consumers were more attracted to a product if it had a 'good' Nutri-Score and that consumers were more likely to buy that product. However, this current research shows that that is untrue.

Moreover, Grunert & Willis (2007) concluded that the Nutri-Score is easy to understand. Whilst that is true to a certain extent, most consumers are confused by the category placements of each product. That is after the consumers have been made aware of the fact that there are categories within the Nutri-Score, as most participants did not know this. Furthermore, according to Graham et al. (2015), consumers did not have to look at the nutritional facts about a product as much anymore if a Nutri-Score was present. However, the participants in this study stated that they were sceptical about the Nutri-Score as a product that can get an 'A' or B-Score whilst being an unhealthy product. Therefore, they mentioned that they would still be looking at the nutritional information on the back of a product, regardless of the Nutri-Score. In line with this, Te Borg et al. (2021) expressed their concern that consumers might not consume enough nutrients that their body needs if they turn solely to the Nutri-Score. Yet, currently, this does not seem to occur as the consumers that participated in this research have a critical mind. Additionally, Jürkenbeck et al. (2022) researched that consumers perceived products with a 'good' Nutri-Score as healthier than other products. However, the participants of this study mentioned that their perceptions regarding the healthiness of a product are not affected by the Nutri-Score as manufacturers can easily alter their scores without improving the healthiness of their products.

Even though this study is contradictory to the studies mentioned above, this study is in line with some of the results from RIVM (2019) as they found that only 33% of consumers found the Nutri-Score easy to understand. From the focus groups held in this study, this was confirmed as most consumers seemed to be confused by the Nutri-Score.

All in all, there are many factors that contribute to a consumer's purchase decisions. In most studies done previously, the consumers opted for the product with the best Nutri-Score

because all the other factors played no part in their decision as those studies were done in a clinical setting. However, from this study, it became clear that other factors weigh more than the Nutri-Score in purchasing decisions. Consumers are hardly influenced by the Nutri-Score when purchasing a product.

Practical Recommendations

From the results of this study, a few practical recommendations can be formed. The focus groups were conducted in November and December 2023, since then more information about the Nutri-Score has spread in the news in The Netherlands. To remove the scepticism that seems to occur with the Nutri-Score, there are other practical implementations. It seems that most questions regarding the Nutri-Score are related to the unclarity regarding the categories of each product. It is unclear to consumers in which category some products fall and therefore they do not know which products are compared to one another. Consequently, the trust of consumers regarding the usefulness of the Nutri-Score is affected. A possible solution can be to provide more information regarding the Nutri-Score and the product category in the supermarket itself.

In Figure 5, an example of this is provided with the Eco-Score. Instead of the Eco-Score, the same can be placed in supermarkets with the Nutri-Score. In that case, consumers can scan a QR code with information about how the Nutri-Score works. Moreover, next to each item, the category of that product can be displayed. In this example, it could be as depicted in Figure 6. This way, the consumer can easily find out in which category each product falls and to which other products it is compared. Another practical solution can be to develop an application in which consumers can see the categories of products and easily compare them.

Figure 5

Example of Nutri-Score in Supermarkets



Note. This image shows an example of how the Eco-Score was implemented in the supermarkets in The Netherlands during trial research. The Nutri-Score can be implemented in a similar manner where consumers can scan a QR-code with information about the Nutri-Score in the supermarket. Image from ©EvMi In the public domain.

Figure 6

Example of Nutri-Score Category Information



Future Studies

More information regarding the category of the products would release most of the confusion regarding the Nutri-Score. In a future study, it could be possible to hold a pilot in a supermarket where each product has the system displayed in Figure 6. That study could hold focus groups regarding the perceptions regarding the usefulness and clarity of the Nutri-Score. Moreover, one can study how this display influences the purchase behaviour of the consumers.

Another study that can be done is researching how the Nutri-Score can influence consumers' choices in different environments (e.g., a restaurant). All studies that have been done have been done either in a clinical setting or in a makeshift supermarket that mimics the regular supermarket. However, no studies have been done on the possible effect the Nutri-Score can have in a different setting than the supermarket.

Moreover, as for advertising a quantitative study can be done about the effect the Nutri-Score can have once it is displayed in an advertisement. In this study, the consumers were asked in a focus group whether they were more likely to purchase a product with a certain Nutri-Score 'A' or 'D' and this concluded that consumers seem to not be influenced by the Nutri-Score. However, that is subjective as the participants also stated that they are mostly not influenced by advertisements in life. Yet, upon further questioning, this changed. To help with this, a quantitative study can give more insight.

A final study can be about the impact of the Nutri-Score on lifestyle-related diseases. As mentioned in the introduction, cardiometabolic diseases have become more prominent in this society. Healthy food and exercise are strongly associated with these diseases. The Nutri-Score can help the consumer to make healthy choices. A longitudinal study of how Nutri-

Score implementation influences consumer consumption, perceptions, and behaviour over time, can give insight into the potential impact of the Nutri-Score on public health outcomes. This study took place when the Nutri-Score was just about to become the official food logo in The Netherlands and therefore most consumers stated that the Nutri-Score did not influence their purchasing behaviour. However, with a longitudinal study, one can research whether the Nutri-Score does change purchasing behaviour in time as more awareness of the Nutri-Score will be raised over time.

Strengths and Limitations

Previous research was done on the effects of the Nutri-Score, these were mostly done in a clinical and controlled setting. This research is the only research about the Nutri-Score where focus groups were used as a method to determine the perceptions of consumers. Moreover, it is one of the few research projects done in a non-clinical setting and therefore it is strong research, and it is of value in the research done about the Nutri-Score. Furthermore, the analysis of this research consists of both a descriptive and a quantitative analysis and therefore it is strong.

It should be noted that the focus groups of this research were held in November and December 2023. This was before the Nutri-Score became mandatory in The Netherlands. Since then, more and more information about the Nutri-Score has spread throughout several news stations. I have helped with this as well, as I have been on several radio stations and have made a video for the NOS. The results in Table 5 would perhaps look different now than they did in 2023. More consumers have become aware of how the Nutri-Score works. Yet the confusion regarding the categories and the scepticism remains, as consumers have mentioned this since January 2024.

A limitation of this research was that most participants knew me and each other. This was done because this leads to a homely atmosphere and therefore participants might be willing to share their honest opinions. However, this could also have a negative effect where the participants might solely give answers that would please the researcher and the rest of the group. These socially desirable answers that may have been given should be considered.

Moreover, each participant, except for one, lived in Noord-Brabant (South in The Netherlands). And even the participant that did not live in Noord-Brabant, grew up in Brabant and moved North when they were an adult. This can be a limitation as the results from the study might not reflect the whole of The Netherlands.

Conclusion

Despite the many positive effects shown in research about the Nutri-Score, the Nutri-Score is not always viewed as positive in the eyes of the consumer. First, most consumers are unaware of how the Nutri-Score works, the Nutri-Score compares food items within a certain category, yet most consumers think the Nutri-Score compares all food items with each other. Second, the Nutri-Score is confusing for consumers because consumers are unaware of the different categories for each food group. Because this is unclear, some of the current scores are not logical for consumers. Therefore, some consumers find the Nutri-Score a hoax and others might find the Nutri-Score irrelevant or nugatory. Consequently, most consumers state that they are unwilling and not planning on using the Nutri-Score to influence their grocery store purchases.

Appendix A: Consent Participation Focus Group.

Consent participation focus group for MME Consumer Studies research.

- I,, voluntarily agree to participate in this research study into consumers perceptions, experiences, and use about the Nutri-Score.
- I have been informed about this research into my perception, experiences, and use of the Nutri-Score, by the student researcher (Rowan Bergen), who is conducting this focus group in the context of her master thesis ‘An Investigation of the Perception, Experiences, and Use of the Nutri-Score in Consumers’.
- I have been informed about the purpose of this focus group and my contribution, which is intended to collect data into the topic of the Nutri-Score.
- I had the opportunity to ask questions about the research and my participation.
- I understand that my participation is voluntary, that I can refuse participation, and I can withdraw (or refuse to answer any question) from the study at any time and I understand that I can withdraw permission to use data from my contribution to the focus group within one week after the focus group was conducted, in which case the material will be deleted.
- I agree to my interview being audio-recorded and analysed for Rowan’s MSc thesis.
- I understand that I will not benefit directly from participating in this research.
- I understand that all information I provide for this study will be treated confidentially.
- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by not mentioning my name and disguising any details of my contributions to the focus group which may reveal my identity or the identity of people I speak about.
- I understand that disguised extracts from my focus group may be quoted in the final report in this thesis for Wageningen University Research – Master Management and Economics, Consumer Studies.
- I understand that signed consent forms and original audio recordings will be retained in password-protected folders at local servers of Wageningen University Research until August 2025 and will only be used by the student researcher and the academic supervisor in the context of this course.

Student researcher: Rowan Bergen

Academic supervisor:

Email: rowan.bergen@wur.nl

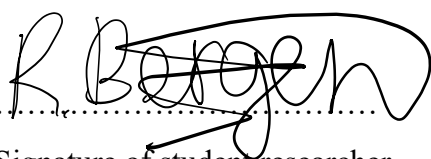
Email: bob.mulder@wur.nl

.....

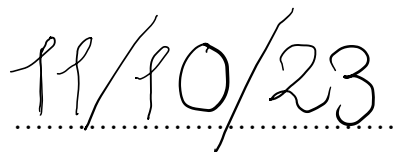
Signature of participant

.....

Date (dd/mm/yyyy)

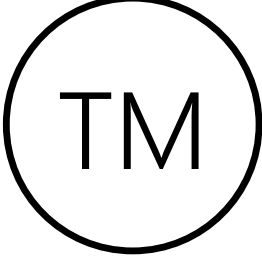
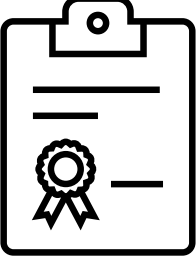

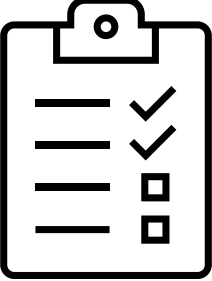
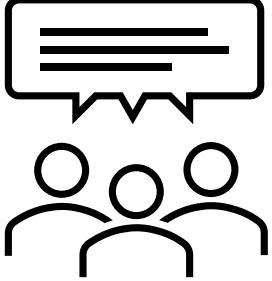
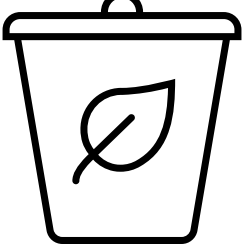
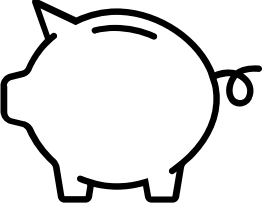



Signature of student researcher



Date (dd/mm/yyyy)

Appendix B: Table Ranking the Reasons to Purchase a Product

 <p>Brand familiarity Merk bekendheid</p>	 <p>Quality Kwaliteit</p>
 <p>Health Gezondheid</p>	 <p>Necessity Of je het nodig hebt</p>
 <p>Recommendations Aangeraden door...</p>	 <p>Environment Milieu</p>
 <p>Financials Geldredenen</p>	 <p>Convenience Gemak</p>

Appendix C: Images of the Nutri-Score

NUTRI-SCORE











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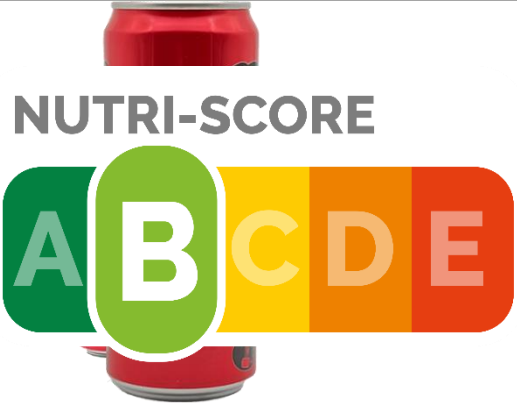
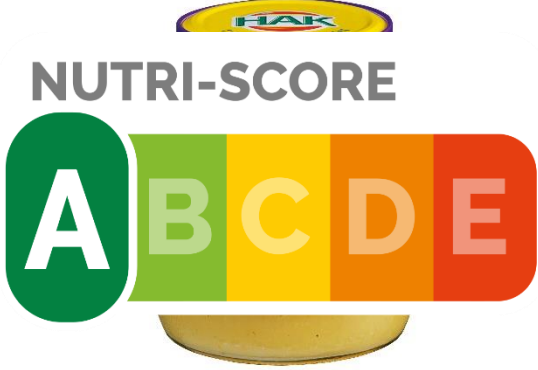

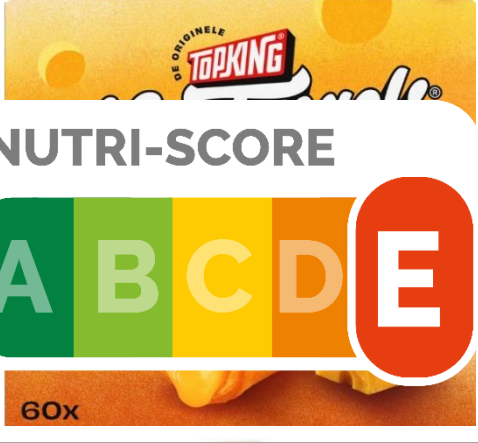

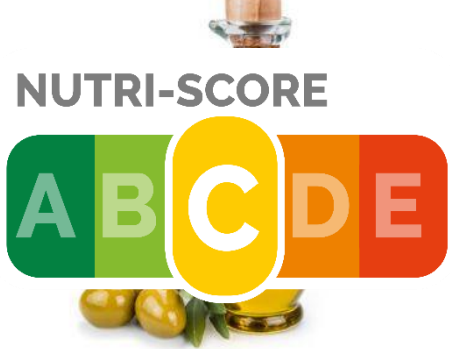
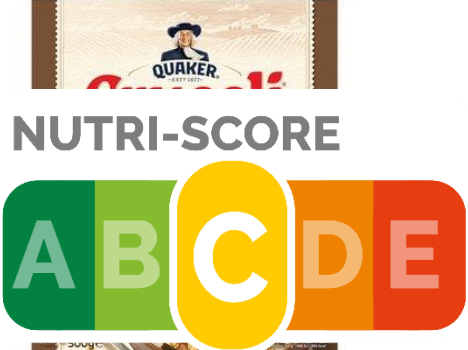



©Dominos

Appendix D-a: Products to be Scored by the Participants

Appendix D-b: Products that the participants must give a Nutri-Score to - Results

 <p>NUTRI-SCORE</p> <p>A B C D E</p>	 <p>NUTRI-SCORE</p> <p>A B C D E</p>
 <p>NUTRI-SCORE</p> <p>A B C D E</p>	 <p>NUTRI-SCORE</p> <p>A B C D E</p>
 <p>NUTRI-SCORE</p> <p>A B C D E</p>	 <p>NUTRI-SCORE</p> <p>A B C D E</p>
 <p>NUTRI-SCORE</p> <p>A B C D E</p>	 <p>NUTRI-SCORE</p> <p>A B C D E</p>

Appendix E: Possible Likes and Dislikes of the Nutri-Score

This is an overview for the moderator to easily guide the conversation and perhaps bring new topics into the discussion.

Benefits:

- Consumers find it easier to choose the healthiest options as the Nutri-Score can easily be used in comparing products based on their healthiness.
- The Nutri-Score has been proven to be more effective in making healthier food choices than other front-of-pack labels (e.g., traffic light system or Keyhole).
- The overall nutritional quality of purchased products by the general population is increased if a Nutri-Score is present.
- If a Nutri-Score is present, the overall sugar intake of consumers is reduced because depending on the initial perceived healthiness of a product, the Nutri-Score can prevent a health-halo effect caused by sugar claims.
- The Nutri-Score is easy to understand, and it is more appreciated than the nutritional information on the back of a packaging.

Disadvantages:

- It can be confusing as it is not clearly communicated to the consumer that the Nutri-Score is provided per food category and NOT a score for overall healthiness.
- The Nutri-Score does not consider methods of cooking which results into that French fries (high in fat) for example still get a Nutri-Score of A – this might be confusing.
- The Nutri-Score does not look at additives, colourants, and endocrine disrupters when determining the score.
- In the Nutri-Score there is no difference between artificial fibres and added ones. This leads to a favour for ultra-processed products compared to natural products.
- By substituting one element (e.g., sugar) with another element (e.g., sweeteners) manufacturers can improve the Nutri-Score of any food. Therefore, a diet coke has a better Nutri-Score than a pineapple for example, due to the pineapples high sugar content.
- The Nutri-Score is often only present on the healthy products as brands can still refuse to put a Nutri-Score on their products.

Appendix F: Purchase Intention of Ice Cream with or without Nutri-Score



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