Communication as the Missing Ingredient: The Role of an Educational Message on the Effective Utilization of the Nutri-Score

Bachelor Thesis

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Abstract

Background

With the rising numbers in obesity, front-of-packaging nutritional labels (FoPLs) are being studied and introduced in various countries. The most effective and prevalent option is the Nutri-Score. Nevertheless, more than half of the Dutch people don't recognize the label and a significant portion holds false beliefs about the information it provides.

Methods

Using an online survey (N = 150), this study investigated the effects of an educational video message on the knowledge of and effective utilization of the Nutri-Score. The latter was measured by having participants rank products based on their perceived healthiness. A randomized control trial with three conditions was used to measure the effects of the educational video and the Nutri-Score on its own.

Results

Being exposed to the educational message increased one's effective utilization of the label, on top of the benefit that the presence of the Nutri-Score on its own provided. Additionally, the educational message positively moderated the increase from current use of the label to intent to use it. The message did not impact one's knowledge of or attitude towards the Nutri-Score.

Conclusion

These findings suggest that the introduction of the Nutri-Score in a country should go paired together with an educational campaign on the label, so that the consumer is well informed on how to best use the label to their advantage and that subsequently the positive impact of the Nutri-Score can be maximized.

Keywords*:* Nutri-Score, Front-of-packaging Label, Educational Message, Communication, Effective Utilization

Contents

Introduction

Unhealthy dietary habits and weight levels have been increasing in European countries for the past decades. In 2014, Ng et al. published an extensive analysis showing that more than half of all adults in Western Europe are either overweight or obese, based on their body mass index (BMI). Within the Netherlands similar numbers can be seen, with the most recent numbers showing that half of the population is either overweight or obese (CBS, 2022). These substantial numbers are harmful for the individuals as well as for society at large, as people who are overweight are at a significantly increased risk of developing several chronic diseases and even of deceasing (Calle et al., 2000; Field et al., 2001). Although genetic factors can explain obesity on an individual level, research consistently shows one of the main causes to be excessive energy intake and unhealthy dietary choices (Romieu et al., 2017; Vadera et al., 2010; Schwingshackl et al., 2018). Therefore, already over 20 years ago the World Health Organization labelled obesity as a global epidemic (Ulijaszek, 2003). Since, the call for action against this obesity epidemic has only grown in significance.

With this current rise in obesity levels and nutrition-related chronic diseases, new ways of encouraging healthy consumer behavior are constantly being developed. One of these methods, front of package (nutritional) labelling (FoPL), is currently being studied and introduced in various countries (Katsarova, 2023). One label especially, the Nutri-Score, has gained serious traction, with seven European countries being already actively engaged in the label, including Spain, Germany, France, and the Netherlands (Santé publique France, 2022). Additionally, the administration of the European Union is currently working towards introducing a universal and mandatory nutritional labelling system, for which the Nutri-Score label is a likely candidate (Katsarova, 2023; Laaninen, 2020). The Nutri-Score is thus taking the position as the preferred FoPL scheme within Europe.

This study will focus on the Dutch and German populations. Both countries have already introduced the Nutri-Score on a voluntary basis. As this research will sample from the Dutch and German consumer market, this paper will refer to sources focusing on populations

from these two countries where relevant and possible. Yet, the expectation is that the results of this research will be applicable outside of these countries.

The Nutri-Score (Figure 1) aims to aid consumers in being able to quickly compare the nutritional value of food products from *the same product category* by using a traffic light colour-coded letter scale system ranging from A – E (Chauliac, n.d.). The score is determined by the difference between negative and positive components (Santé publique France, 2023). Negative components are the amounts of energy, sugar, saturated fat, and salt, while positive components are the amount/presence of fruit, nuts, fibre, protein, legumes, and vegetables. This is based on a standardized amount of 100 gr / 100 mL of the product. It therefore aims for an easy and fair comparison between all products within a category.

Figure 1

Front of package labelling scheme the Nutri-Score

However, despite this current and growing interest in the Nutri-Score, several other FoPL schemes have already been introduced in the past and failed to reach similar goals. One prominent example of these labels, the Choice Logo (Figure 2), was introduced in the Netherlands. The logo, also known as the ‘Het Vinkje’ in Dutch, allowed consumers to compare within product categories as well. It came in two variants (Consumentenbond, n.d.); the green variant allowed consumers to differentiate healthier options for products within the Wheel of Five (Dutch: Schijf van Vijf), while the blue variant targeted all other products mainly meant as extras. The Wheel of Five (Figure 3) contains the Dutch dietary guidelines (RIVM, 2017), divided into five segments that each contain “food groups that contribute to health

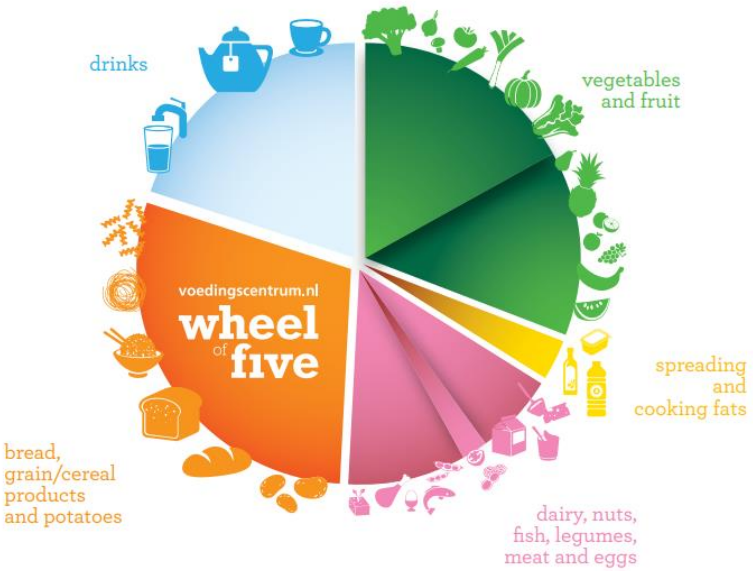
benefits or that provide essential nutrients" (pp. 1), and is commonly known among the Dutch population. It is therefore desirable that FoPL schemes align well with these already present guidelines, as the Choice Logo strived to do.

Figure 2

Previously introduced FOPL Choice Logo / Het Vinkje. Left: 'Het groene vinkje' (the green choice logo), Right: 'Het blauwe vinkje' (the blue choice logo).

Figure 3

The Wheel of Five, a Dutch nationally used dietary guideline scheme, showing the five segments proportionally in size to the recommended consumption amounts



However, the Choice Logo did not fail because of a significant misalignment nor due to its lack of scientific rigor. There was a lot of confusion around the logo and how to use it in combination with the Wheel of Five. After research showed that over 77% of consumers were unsure of what it meant exactly, the Consumentenbond (Dutch consumers association) started a campaign against the logo in 2016 (Van der Bent, 2016). In 2018, after much media coverage, the logo disappeared from all packaging. Nevertheless, many researchers and organizations, including the Consumentenbond, now encourage the use of the Nutri-Score or other FoPL schemes. Thus, to ensure a future success it is important to learn from past missteps, such as those from the Choice Logo.

Already, though, the Nutri-Score is receiving substantial criticism as well. A number of governments are even opposed to the adoption of the scheme, including the Italian, Czech, Hungarian, and Greek (Council of the European Union, 2020). They, in addition to many other organizations, argue that the Nutri-Score has several flaws. These include interference with national dietary guidelines of the country itself, confusing calculation and application of the label (e.g. comparison between products), and a lack of clear communication. This criticism is not only relevant in the aforementioned countries but in countries that have already adopted the Nutri-Score as well (Bundesministerium für Ernährung und Landwirtschaft, 2021; Consumentenbond, 2019; National Institute for Public Health and the Environment, 2020). The lack of communication especially seems to be a returning point in these papers, often seen to be overarching for the other comments and potentially even having the ability to limit the negative impact of the other criticism.

Clear and carefully constructed communication could thus play a significant role in the success of the Nutri-Score. This paper aims to provide more insight on what the impact of an educational message on the Nutri-Score could be. Previous research has already found the importance of such messages. Barthélemy et al. (2020) looked at the longitudinal effects of the introduction of the Nutri-Score on the awareness, attitude and purchase behavior. Their study ran over the period of one year and they found an especially significant increase during

the two month period a nation-wide educational campaign was running, impacting all measured variables positively.

Similar findings were recently highlighted by the German government in their study on the effects of an educational campaign on the Nutri-Score. The goal was to educate consumers and thus increase awareness, knowledge, and intent to use the label (Bundesministerium für Ernährung und Landwirtschaft, 2022). Significant increases for awareness, knowledge, and intent were found, with 73% of consumers noticing the Nutri-Score on products as opposed to 29% before the campaign. They concluded that the Nutri-Score contributes to health-conscious shopping and preventive health care, and that their campaign aided greatly in raising awareness among both consumers and manufacturers. However, the study did not take into account several potential underlying variables, such as the perceived credibility of their campaign. Furthermore, it only collected data on the intent to use the Nutri-Score and did not consider the impact on the actual *effective utilization* of it. Effective utilization of the Nutri-Score refers to the ability of the Nutri-Score to help people more easily identify healthier products.

A second important concept to highlight is the ‘educational messages’. The previous studies on educational messages mostly focus on educational campaigns specifically. This paper will view these terms to be (mostly) interchangeable. An *educational message*, like the one used by this study, has the aim of informing the public and with that potentially encouraging behavioral change. Such an educational message can then feature in a larger-scale *educational campaign*, which main difference is its further reach and longitudinal effects.

This paper aims to further the knowledge in the area of communication on the Nutri-Score. It investigates how an educational message can impact the effective utilization of the Nutri-Score and how other variables of interest can play a part. The main research question posed is: What effect does an educational message have on the knowledge on and effective utilization of the Nutri-Score?

Theoretical Framework

This section of the paper will provide a theoretical and literature basis and justification for the research. Firstly, a brief continuation on the relevance of the Nutri-Score and why it is the chosen FoPL scheme of this study. Next, the need of an educational message as well as the added value it can have by providing a counter for criticism and confusion will be shown. Afterwards, previous research and its limitations will be explored, in addition to stating potential moderating variables. Lastly, as an effective educational message is crucial to this research's validity, literature on designing an effective educational message will be analyzed. The hypotheses linked to the research questions will be presented at the relevant sections within the framework. At the end, all relevant variables and their hypothesized relations are shown in an overview (Figure 4).

Relevance of the Nutri-Score

Not only is the Nutri-Score scheme the preferred choice by many organizations and countries, its advantages are also grounded in scientific research. In a Dutch supermarket experiment, Van den Akker et al. (2022) compared the Nutri-Score with another popular FoPL scheme, the Multiple Traffic Light (MTL) label, and with products containing no label. Their results show that the Nutri-Score promotes the healthiest decision making, also noting that dieting and health conscious shopping did not moderate this. In another label comparison, Radovan et al. (2022) show that the presence of a FoPL scheme helps consumers choose the healthiest product, for which the Nutri-Score appears to be the more effective option compared to the Nutrinform system. Additionally, the Nutri-Score is found to have a positive impact on how well European consumers were able to judge the healthiness of a product, as well as it increasing the purchase intention for healthier products (De Temmerman et al, 2021). Ergo, the Nutri-Score is argued to be the most effective FoPL option currently available.

This is shown again in a report by the European Consumer Organization (BEUC), which also backs the Nutri-Score after publishing its report in which they provide a sound summary of scientific research on the Nutri-Score. They argue that these studies not only

show the effectiveness of the Nutri-Score and that it is the most effective label in getting consumers to make healthy food choices, but also that it is well backed and appreciated by scientists, organizations and consumers alike (BEUC, 2020). Similarly, Song et al. (2021), performing a systematic review and meta-analysis on 134 studies, also found positive relations between the Nutri-Score and selecting healthy products. The Nutri-Score thus has both the strongest scientific and social backing of all FoPL schemes. Additionally, it is the label of choice in the Netherlands and Germany, further embedding its position as the FoPL scheme employed in this research.

Based on previous research, having the Nutri-Score present on the front of packaging helps consumers more easily and accurately identify the healthiest options (BEUC, 2020; Song et al., 2021). In other words, the Nutri-Score can be *utilized effectively* by consumers. Nevertheless, it is important to test this within the particular setting of this study. Therefore, the following hypothesis has been formulated:

H1: The presence of the Nutri-Score enables one to more accurately identify healthier products (effective utilization of the label)

The need and potential effects of an educational message

Despite this societal and scientific backing, there is notable criticism on the scheme too. (Council of the European Union, 2020). The current lack of clear communication could be a significant factor in the potential success of the Nutri-Score by mitigating some of this criticism. However, to understand how the communication can help counteract the other two main points of critique, i.e. the misalignment with national dietary guidelines and the calculation of the Nutri-Score, this critique needs to be understood fully.

Firstly, the misalignment with national dietary guidelines of the country itself. In the Netherlands, several prominent health and consumers organizations (Consumentenbond, 2019; Gezondheidsraad, 2022; Voedingscentrum, n.d.) warn for confusing contradictions between the Nutri-Score and the Wheel of Five, with the Nutri-Score giving positive scores (A

or B) to products not recommended by the Wheel of Five (e.g. due to added sugars and salt). German consumer bonds have expressed similar concerns about the Food Pyramid (German: Ernährungspyramide) matching up with the Nutri-Score. These contradictions can lead to consumers being unsure of what products are recommended and fall within a balanced diet. Therefore, it is important that consumers understand the Nutri-Score should be used in combination with dietary guidelines as it gives information on what products are the healthier choice within a product category, *not* on what is healthy in general.

Secondly, the way the Nutri-Score is calculated and what products can be compared with each other can cause confusion, as shown by the Dutch Consumentenbond (2019) in their consumer research. The National Institute for Public Health and the Environment (2020) indicate that this confusion partially arises due to the Nutri-Score simply subtracting the total positive score from the total negative score. This can result in products with unrecommended added sugars or salts getting positive scores, as long as they contain enough healthy components.

Furthermore, Donini et al. (2023) point out that this directive approach of the Nutri-Score, i.e. presenting the product healthiness with one simple score, can thus be too simple in representing the nutritional value, leading to distorted or confusing scores. Additionally, a less heard critique is that the calculation is always done based on 100 mg / mL of the product, rather than realistic portion sizes (Council of the European Union, 2020). This means that products usually consumed in smaller quantities can get penalized heavily, argued by some to be undeservingly. Informing consumers about how the Nutri-Score is calculated and why (e.g. because the manufacturer of a product can set the portion size) can therefore help them in their understanding of the Nutri-Score as well as amplify the label's credibility.

Based on this criticism, a well-constructed educational message could aid consumers in their understanding of the Nutri-Score and its calculation, helping them apply it correctly and effectively. This need for more communication on the calculation and overall details of the Nutri-Score is present within the Dutch population as well, as observed in research by the Consumentenbond (2019). They find that this communication should then also come from a

trustworthy source. Furthermore, communication on how to effectively use the Nutri-Score on its own and in combination with the Wheel of Five is needed too (Gezondheidsraad, 2022; The National Institute for Public Health and the Environment, 2020). Accordingly, it is important that awareness is raised on how consumers can employ the Nutri-Score to their benefit effectively, for which an educational message could be used.

That such communication is currently lacking is shown best in the research by Van Duist (2022). She shows that only 56% of Dutch consumers recognize the Nutri-Score. Furthermore, less than half of consumers think that it says something about the healthiness of a product (47%), while a significant portion unjustly think it gives information about the safety (28%) and impact on the climate (22%) of a product. Especially among elderly and lower educated people the logo is perceived as more confusing or it is simply not known. After being informed on it, however, people are generally positive towards the introduction of the logo (Consumentenbond, 2019; Van Duist, 2022). Lastly, the product categories can lead to confusion too. Consequently, all of this emphasizes that although the logo is not void of other criticism, a major component of its potential success revolves around informing the public adequately.

Based on the limited knowledge among the population (Van Duist, 2022) and the identified lack of communication (Consumentenbond, 2019), it can logically be expected that an intervention such as an educational message on the Nutri-Score will increase the knowledge people have of it and positively impact the effective utilization of the label. Therefore, the following hypotheses have been formulated:

H2a: An educational message increases the knowledge one has of the Nutri-Score, both in general and with regards to its product categories

H2b: An educational message positively impacts one’s effective utilization of the Nutri-Score

Still, to ensure the best results, the quality of this educational message is essential. Therefore, it is important to construct this on the basis of previously successful methods, while also not repeating mistakes made in the past. Consequently, the shortcomings and missteps of the aforementioned FoPL scheme Choice Logo can provide a good basis of what *not* to do. The Choice Logo was communicated via TV and newspapers advertisements (Fygi, 2013), which resulted in almost 90% of the people being aware of the logo.

However, the main reason it was perceived as confusing was not ignorance on its existence, rather it was that the presence of the logo did not have much value as people's attitude towards the logo was relatively negative. This was partly due to companies having to pay heavily to get the logo on their products (Consumentenbond, 2016), limiting the amount of products to compare between. Furthermore, the logo was owned by consumer goods manufacturers Unilever and Campina, together with a marketing agency (NOS, 2016). Both these facts discredited the independence of the logo notably among consumers. The Consumentenbond (2019) shows that consumers expect the Nutri-Score to be communicated by a trustworthy independent party. Thus, although almost everyone knew about the Choice Logo, it was perceived as unfair, uncredible, and unclear (Van der Bent, 2016). The Nutri-Score, on the other hand, is being developed and updated by an independent scientific committee and can be adopted for free by producers (Santé publique France, 2023). It could therefore be important for consumers that they are aware there is no major conflict of interest.

Thus, the attitude of the consumer towards a FoPL scheme can determine how likely they are to use it. In the case of the Choice Logo, it was perceived to be untrustworthy and unreliable, impacting the effectiveness of the logo negatively (Consumentenbond, 2016; Van der Bent, 2016). By communicating about the Nutri-Score's operations and its relative neutrality, one can expect the Nutri-Score to be regarded more positively. The following hypothesis has been formulated:

H3: An educational message positively impacts one's attitude towards the Nutri-Score

These expected effects were found in the previously discussed past studies on the Nutri-Score as well. In fact, the study done by the German government (Bundesministerium für Ernährung und Landwirtschaft, 2022) shows that educational and informative messaging on the Nutri-Score can have a positive impact on a national scale in the 'real world'; their post-campaign survey found major increases in support (23% increase), awareness (44% increase), and intent to use. Similar findings were reported by Barthélemy et al. (2020), finding the effects of an educational campaign on the Nutri-Score while studying the French population. Therefore, the potential correlations found in this study, such as the expectations formulated in hypothesis H2a and H3, can be expected to be true for grander and wider-reaching campaigns out in real-life settings as well.

On top of an educational message having the ability to positively impact knowledge and attitude, Barthélemy et al. (2020) and the Bundesministerium für Ernährung und Landwirtschaft (2022) both reported increased intent to use by the consumer. However, it is noted that measuring intent (self-reported) will always come with an inherent bias and thus it will only play a limited role in the final outcome of this study. Nevertheless, the following hypothesis has been formulated:

H4: An educational message positively impacts one's intent to use the Nutri-Score

Moderating variable: healthiness of current dietary choices

Besides the expected effects of the Nutri-Score on knowledge, attitude, and utilization, it is important to have an overview of what other underlying variables could play a (moderating) role. This can help identify the groups on which an educational message can be expected to have a stronger or a more limited impact. In 2019, Van Rijn et al. noted that information campaigns are most effective on those who are the least knowledgeable and those who have a more apathetic world view. The survey by Van Duist (2022) suggests that least knowledgeable group on the Nutri-Score consists of the elderly and lower-educated. The Bundesministerium für Ernährung und Landwirtschaft (2022) also found one of their core

target groups in the overweight and obese, characteristics which show correlations with lower-education (Devaux et al., 2011). One can thus expect the lower-educated to experience the most benefit of an educational message.

With regards to age, however, Barthélemy et al. (2020) showed that over the period of a year (not specifically focusing on a communication campaign) the biggest increase in awareness and attitude towards the Nutri-Score was among the younger generations, rather than the elderly. Similar findings were reported by Bollinger et al. (2022). An explanation for this disparity could be that in general older people are found to hold a larger interest in nutrition and have diets of higher quality (Grunert & Wills, 2007; Marques-Vidal, 2015). Therefore, they are more likely to choose healthier options to start with and care less for the presence of a FoPL scheme. A communicative message could potentially bridge this gap between age groups and thus help younger people make healthier consumption choices too with them using the nutritional label to their advantage.

Thus, as older people in general have more healthy dietary patterns (Grunert & Wills, 2007; Marques-Vidal, 2015), it can be expected that although they are less knowledgeable on the Nutri-Score specifically (Van Duist, 2022), their interest in maintaining a healthy diet still allows them to more accurately identify and choose the healthiest products. In this study that will therefore make their effective utilization seem higher too. Younger people on the other hand will benefit more from the presence of the Nutri-Score, especially if they are educated on how it works and how to employ it by an educational message. Furthermore, those who are lower-educated are expected to experience more benefit from the educational message as well. The impact of demographic characteristics, such as age and education level, will be discussed in an exploratory analysis. With regards to researching the impact of current dietary choices, the following hypothesis has been formulated:

> H5: An educational message's effect is moderated negatively by the healthiness of one's current dietary patterns

Literature on designing an effective communicative message

As this study relies on an educational as its main stimulus, it is crucial that the message contains characteristics of an effective informational, educational, and even persuasive message as identified in previous research. The aim is to construct a message optimal in educating recipients about the Nutri-Score, and with that increase the effective utilization of the Nutri-Score. The following section will focus on different aspects that can increase a message's likelihood of positively impacting a recipient.

To gain a full understanding of how communication can be utilized effectively, it is beneficiary to be conscious of the constructs and concepts at the basis of these strategies. When employing a campaign to change behavior for the good of society, social marketing is often referred to. Social marketing is defined by Andreasen (1994, p.110) as "the adaptation of commercial marketing technologies to programs designed to influence the voluntary behavior of target audiences to improve their personal welfare and that of the society of which they are a part". Social marketing can be used to construct an effective behavior-change encouraging campaign. With regards to the Nutri-Score, the principles of social marketing can thus be used to add a call-to-action component, expanding the scope of the educational message from simply informing consumers about the Nutri-Score to encouraging them to actively use it. This would strengthen the expectation of H4.

Building on the construct of social marketing with a literature overview, Helmig and Thaler (2010) identified two general categories of relevant independent variables that influence the effectiveness of social marketing. Firstly, the general campaign characteristics; they state that nation-wide campaigns are generally sufficient in behavior change, rather than more specifically targeted campaigns. Also, mass media campaigns, especially those using audio channels, showed the highest levels of behavior change. Interactive elements contributed to an increase in knowledge and better attitude change as well.

Secondly, framing determinants, which consisted of the five main components: focus, direction, tonality, time horizon, and content. The most interesting components for this study are the focus and the content. Firstly, namely self-focused messages seem to contribute

positively in the context of self-betterment messages, this includes presenting a person who is similar to the target group and one can thus relate to. Secondly, the effectiveness of the content is highly dependent on the goal. In general adding a some form of a description of the desired behavior is recommended as it provides a ‘how’ for participants.

Thus, by applying the principles of social marketing, a good educational and influencing message ideally meets several requirements. It need not necessarily be adapted for specific audiences, meaning that a general message can still be effective for the majority of recipients. Furthermore, messages that stimulate more senses appear to have a greater effect too. Video messages provide a medium that can be easily widely applied while still accessing multiple channels of sensory interaction. The significantly better impact video messages have compared to other mediums was found by the German government as well (Bundesministerium für Ernährung und Landwirtschaft, 2022) in their study observing their campaign on the Nutri-Score specifically.

The importance of including a ‘how’ for recipients is demonstrated again by Park et al. (2020). In their experimental study, Park et al. (2020) show that an effective public information campaign needs to match in construal-level and entity distance. They argue that the most effective message is one that is concrete and specific. Focusing on low-level construal (i.e. ‘how) rather than high-level construal (i.e. ‘why’) and emphasizing proximal distance, e.g. close family, or local community, rather than distant entities such as a national or global level. Hence, an educational message can best focus on what benefits the topic, i.e. the Nutri-Score, can bring to an individual’s life and how these benefits can be reached. In this specific case, examples of how this can be done are focusing on the benefits the Nutri-Score can have on the healthiness of the individual’s diet and their family’s, as well as how it can help them identify the healthiest option.

A final requirement for a strong educational message is the perceived credibility, which has been briefly touched upon already in relation to consumers expecting a trustworthy source to communicate about the Nutri-Score (Consumentenbond, 2019). Literature confirms that both source and message credibility are related to the impact a message can have. In their

literature review aiming to conceptualize and define credibility and its measures, Hanimann et al. (2023) suggest the use of a dual model distinguishing between source and message credibility. The source credibility mainly depends on the expertise, trustworthiness, and to a lesser extent attractiveness. Message credibility relies on the perceived information accuracy, objectivity, validity, and reliability. Furthermore, Andersson et al. (2019) found that all source credibility characteristics have a positive and significant effect on the message credibility. Thus, perceived credibility of the source is crucial for an effective and persuasive message, as it impacts the final credibility of the message.

Source expertise is best achieved when one believes the source can make valid assertations and claims based on the source being knowledgeable in the focal domain (Roobina, 1990). The same study's overview summarizes that trustworthiness refers to how honest a source is perceived to be when providing the information, especially if the source seems genuine in wanting to inform or persuade the receiver for the good of the recipient. In addition, the trustworthiness is increased significantly in the presence of expertise. More recent studies found these definitions hold up in the modern media landscape (Andersson et al., 2019; Hanimann et al., 2023). Lastly, Susmann and Wegener (2022) point out that a source's credibility can suffer if the source is perceived to have a vested interest.

Thus, an (educational) message is perceived as most credible when the message's content is objective and accurate, and even more so when the source is credible. Therefore, the source should be an independent party with no direct vested interest, yet should still have expertise in the topic domain and communicate the information with genuine interest of the recipient. Examples for this study are the Voedingscentrum or Consumentenbond in the Netherlands and the Bundeszentrum für Ernährung or Stiftung Warentest in Germany. These sources have the reputation of an independent organization informing the public about consumer goods and dietary advice as well as being known to communicate in the interest of the consumer.

Thus, both the source and the contents of a message have an effect on the perceived credibility of the message (Hanimann et al., 2023; Roobina, 1990). Good perceived credibility can then positively impact the effectiveness of a message (Andersson et al., 2019). The effectiveness of the educational message is expected to be dependent on the perceived credibility of the message. Perceived credibility will therefore be used as a manipulation check for the educational message, in addition to being a part of the following hypothesis:

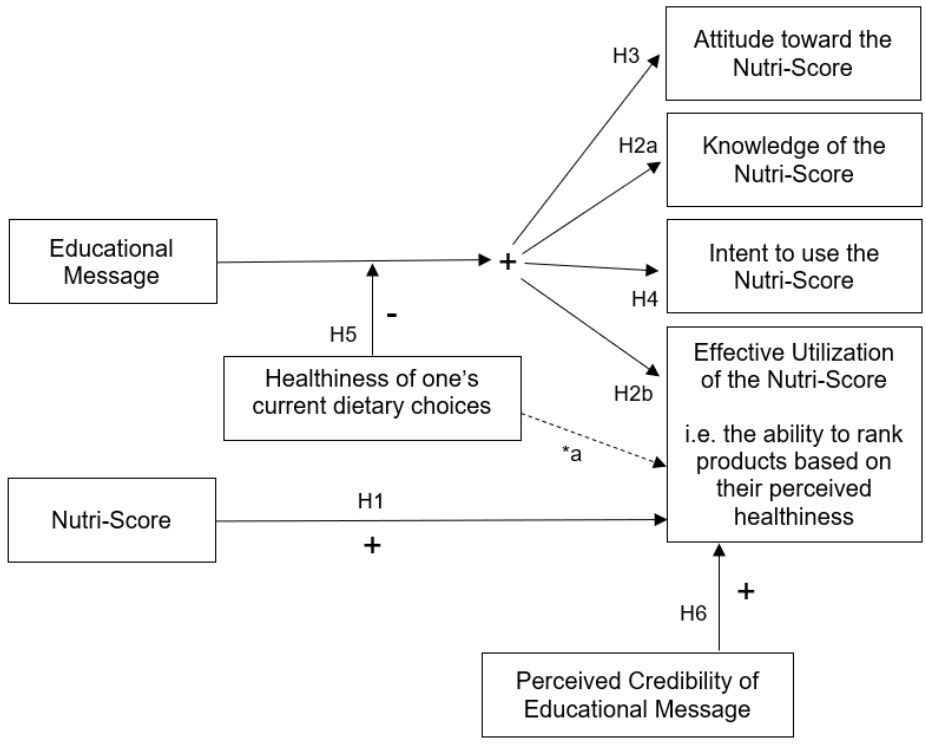
H6: The perceived credibility of the educational message positively impacts the effective utilization score

Variables overview

Figure 4 summarizes the relevant variables identified and their expected relations.

Figure 4

An overview of all the relevant variables and how they are hypothesized to be interact



**a:* those with a healthier diet can be expected to be better at identifying healthier products, which with this study's design will appear as an improved effective utilization of the Nutri-Score

Methods

This core aim of this research is to observe the impact that an educational message can have on effective utilization of the Nutri-Score. The study was conducted using an online survey (Appendix F) and employed a randomized control trial with three conditions. To measure effective utilization, participants were asked to rank several consumption products based on their perceived healthiness. The educational message was in the form of a short video specifically constructed for this study based on the criteria discussed in the theoretical framework.

In the survey, participants were randomly assigned one of the three conditions in the randomized control trial. In the first condition, participants were exposed to the educational message and the Nutri-Score was present on the packaging of the products presented to them. In the second condition, participants did *not* see the educational message, but they did see the Nutri-Score. The third and last condition included neither the educational message nor the Nutri-Score. These three conditions will be referred to as the Educational Message group, Nutri-Score group, and control group respectively.

Participants

The participants recruited for this sample were mainly based on a convenience sample, with most being either personally associated to the researcher or sought out by the researcher either in person or through social media. The last set of participants was recruited using the online platform SurveyCircle (https://www.surveycircle.com/nl/), resulting in a total of 176 participants. The data collection of the study was conducted between the 10th of May 2023 and the 30th of May 2023. Neither the researcher nor any other party has the possibility or knowledge to identify any of the participants using the response data. Ethical approval for this study was acquired on the 9th of May and was issued by the ethics committee of the University of Twente.

There were two participation criteria for this study. Firstly that the participant was at least eighteen years old and secondly that their country of residence in the past three years

had to be either the Netherlands or Germany for at least one year. This ensured all participants have had relatively equal exposure to the Nutri-Score. Conducting the study using an online survey allowed for the sampling of more participants, thus increasing the validity of the study. It is expected this will not harm the quality of the research.

To ensure that the underlying assumptions are met, several checks were done on the core model of the study. The core model is the impact of the presence of an educational message on the Nutri-Score on the *effective utilization*, i.e. one's performance in rank-ordering products based on their perceived healthiness. The assumption tests performed included checking the independence of residuals, whether the residuals are normally distributed, and the equal variance. Independence of residuals was also checked in combination with several other potentially relevant variables, such as gender and country of residence. In general, the assumption checks showed positive results. However, three outliers were found.

Of these outliers, one was extremely low while the other two performed exceptionally well. After further inspection, it was decided to remove the extremely poorly performing outlier from the dataset. Although this participant did complete the survey, they had not interacted with either of the product ranking assignments, hence they scored a 0. Additionally, their open comment at the end of the survey suggested no serious participation in the survey. The well performing outliers were kept as it is likely they were simply knowledgeable on the topic of the Nutri-Score and nothing suggested otherwise.

Responses that were incomplete, did not give their informed consent, or did not meet the participation requirements were removed. This resulted in a total of 150 valid responses that were used in the final analysis. The detailed division of the characteristics of these participants over the three conditions can be seen in Table 1. Chi-square tests were conducted to examine the distribution of participants across the three conditions per characteristic, the results can be seen in the table. The analyses revealed no significant differences in the distribution of participants among the conditions.

Table 1

Demographic characteristics of the participants

Sample Characteristics	Educational message group		Nutri-Score group		Control group		Full sample		Chi-Squared
	n	%	*n*	%	*n*	%	*n*	%	χ^2
Age group									χ^2 (4, N=150) = 2.94, p = .57
18 - 35	37	24.7%	38	25.3%	44	29.3%	119	79.3%	
35 - 50	1	0.7%	5	3.3%	3	2.0%	9	6.0%	
50+	8	5.3%	7	4.7%	7	4.7%	22	14.7%	
Educational level									χ^2 (4, N=150) = 1.45, p = .84
High school or lower	5	3.3%	9	6.0%	10	6.7%	24	16.0%	
Bachelor's degree	32	21.3%	31	20.7%	34	22.7%	97	64.7%	
Master's degree or higher	7	4.7%	9	6.0%	9	6.0%	25	16.7%	
Country of Residence									χ^2 (2, N=150) = 3.33, p = .19
Netherlands	40	26.7%	36	24.0%	41	27.3%	117	78.0%	
Germany	6	4.0%	14	9.3%	13	8.7%	33	22.0%	
Gender									χ^2 (4, N=150) = 4.00, p = .41
Male	17	11.3%	16	10.7%	24	16.0%	57	39.7%	
Female	28	18.7%	34	22.7%	30	20.0%	92	61.3%	
Other	1	0.7%	0	0.0%	0	0.0%	1	0.7%	

Note. N = 150 (*n* = 46 for condition 1, 50 for condition 2, and 54 for condition 3)

Procedure

Before starting with the survey, participants were informed about the general goal of the study and were asked to indicate their informed consent to the study. The survey then started by informing about demographic characteristics. The participant was asked to enter their age and country of residence. If they met the participation requirements, their gender and

highest enrolled or completed education was asked for too. Next, participants were asked whether they recognize the Nutri-Score logo when shown. The then following set of questions focused on their current dietary choices. After this, participants were randomly assigned to one of the three previously described conditions.

Those in the Educational Message group were asked to watch the video. The participants in the other two groups were immediately asked to start with the experiment section of the survey, where they were asked to rank-order products based on their perceived healthiness (i.e. the effective utilization was measured). Participants in the Educational Message group completed the experiment after watching the video as well. After completion, all participants were asked to indicate how well they thought they performed in the experiment. Then, those in the Educational Message group were asked how they perceived the educational message by indicating the credibility.

Afterwards, all participants were asked about their knowledge of and attitude towards the Nutri-Score, in addition to them indicating their *current use* of the Nutri-Score as well as their *intention to use* it in the future. At the end of the survey participants could indicate whether they would like to be informed about the results of the study, which requires them to leave their email. To ensure the promised participant's privacy, the email addresses were removed from the analyzed dataset. Lastly, participants got a debriefing containing the context and purpose of the study where they could also request once more for their data to be removed.

Experimental design (effective utilization)

In the survey participants were randomly assigned to one of the three conditions. After exposure to the educational message (or not), all participants were asked to rank products based on their perceived healthiness, putting the product they perceived to be the healthiest on the first place and then continue with less healthy products. This measures the effective utilization of the Nutri-Score. The products were shown in the form of images featuring the products from a front-of-view perspective. Each participant was asked to rank products in two rounds, with each round having six products. The first round included products that all originate

from the same product category according to the Nutri-Score system and are thus comparable with each other using the Nutri-Score and will be referred to as the *same-category assignment*. The second round comprised of products from three different product categories, i.e. the *different-category assignment*. This tested the participant's awareness of how the Nutri-Score can and cannot be applied. Both assignments measure effective utilization of the Nutri-Score.

The products shown to the participants were products from real brands with their brand name and identification removed. Consequently, participants should have limited to no brand associations. Additionally, this design choice allowed for nutritional value of products to not be arbitrary but instead match up to what one can find in a grocery store. The product category chosen for the same-category assignment were breakfast cereals products (Figure 4; Appendix A). For the participants viewing products with a Nutri-Score label present, i.e. the Educational Message group and the Nutri-Score group, two of the six products still contained no Nutri-Score label. This tested how well they are able to place products without a Nutri-Score between products with a Nutri-Score, just like one would have to do in an actual supermarket.

Figure 4

Three of the six products shown in the same-category assignment; All six products can be seen in Appendix A.

Note. Participants in the control group will see the same products without the Nutri-Score

The different-category assignment featured six products belonging to three different product categories, thus having two products per product category (Figure 5; Appendix B). These three product categories have an inherent ranking in healthiness to them, while the two products within the category are different in healthiness too as determined by the Nutri-Score. Thus, as some unhealthier options contain a better Nutri-Score than the healthier product in a different category (i.e. a pizza with Nutri-Score B versus a whole grain cracker with Nutri-Score C), this tested the participant's knowledge of the fact that the Nutri-Score is only applicable within a product category. All six products shown contained a Nutri-Score for participants in the Educational Message group and the Nutri-Score group, while no Nutri-Score was present for those in the control group.

Figure 5

Three of the six products shown in the different-category assignment. All six products can be seen in Appendix B.

Note. Participants in the control group will see the same products without the Nutri-Score label

Lastly, the participants did not have the possibility to view any other part of the packaging, e.g. to view the detailed nutritional label. This design choice was made based on in-store behavior of consumers. Research by Temminghoff & Van Vlerken (2013) shows that most individuals do not use this information during day-to-day grocery shopping, with over two

thirds of all Dutch consumers never reading (36%) the label or using it for less than half of their purchases (39%). Additionally, for those that do read the labels the expiration date is the most viewed, only 72% of those who read additional information focus on the nutritional values. Thus, to prevent participants of analyzing products based on these labels only for the purpose of this experiment, the aforementioned restrictions had been applied.

For the analysis, the results of the two assignments were converted into a score. For each exact correctly positioned item, participants received 100 points for their score. If the item was one position away from its correct position, 70 points were awarded, while 30 points were awarded for placing the item two places too far. No points were given for further deviations from the correct position. This meant that the maximum points able to be achieved was 600 for each of the assignments, and thus a maximum of 1200 for both assignments together. From here on, this total score will be referred to as the *effective utilization score*. Those in the control group also got an effective utilization score, despite not actually utilizing the Nutri-Score. Their effective utilization score showed their ability to rank products solely based on the packaging itself. In the analysis, both the presence of the Nutri-Score as well as the presence of the educational message were analyzed using dummy variables.

Educational message (stimulus)

The educational message used was a short video constructed specifically for this study. As highlighted in the theoretical framework, the perceived credibility of the video's source could be crucial for its effectiveness. In addition, because this study samples from both Dutch and German populations, it is important both are familiar with the message's source as well. Thus, the video promotes itself as a collaboration between the most prominent Dutch and German consumer organizations: the Consumentenbond and the Stiftung Warentest.

The contents of the video, with a length of 1:58 seconds, can be divided into three sections. Firstly, it establishes what the Nutri-Score is. Then, it shows how the Nutri-Score is calculated. Lastly, it presents how the Nutri-Score can be used by the consumer. In addition to screenshots of the video, the full script used to narrate the video can be found in the

appendix (Appendix C). The video was not only constructed based of the criteria found in the theoretical framework, but took further inspiration from previously released educational videos on the Nutri-Score from the Belgian (FOD Volksgezondheid, 2019) and German (BMEL, 2020) governments.

To ensure that this stimulus has the desired characteristics and function, i.e. informing with credibility, a pre-test was done on May 9, 2023. This pre-test was done with a focus group consisting of three participants, who met the same requirements as participants for the final study (Appendix D). Additionally, all participants were studying in the field of Communication Science and thus have (partial) expertise on the components of a good communicational message. The feedback was positive and no subsequent changes were made.

Survey measures

To measure the remaining variables of interest of this study, different types of scales and items were used. These will be discussed in this section.

Measuring knowledge of and attitude toward the Nutri-Score

To measure the consumer's *knowledge* a scale was used. The scale employed was based on a translated and adapted version of the scale used in Van Duist's (2022) research on knowledge and attitude towards the Nutri-Score among Dutch consumers. This scale uses a four-point Likert scale (completely disagree – completely agree) and also allows participants to indicate if they do not know. To ensure consistency throughout the survey, the scale was adapted to be a 5-point Likert scale ranging from (Definitely false – Definitely True). The option "I don't know" remained. Items used in this scale were "The Nutri-Score logo provides insight on how healthy or unhealthy a product is for consumers in general" and "The Nutri-Score gives insight into how safe a product is".

Additionally, to measure the participants knowledge of the Nutri-Score and how to employ it with regards to *product categories*, two questions focusing on this from Van Duist's (2022) study were translated and used in this study too. For these, participants simply indicated whether the statement was true, false, or if they did not know. The first statement

was "Using the Nutri-Score logo can help you see how good or bad a product is compared to another similar product, for example comparing one soda with another soda", and the second statement was "Using the Nutri-Score logo can help you see how good or bad a product is compared to a different type of product, for example comparing yoghurt with a bag of chips".

To measure the participant's *attitude* towards the Nutri-Score, a custom scale was made, in addition to a general question asking the participant whether the image they have of the Nutri-Score is positive or negative (5-point Likert scale: Extremely negative – Extremely positive; I don't know / No opinion). The custom scale included four items, two of which were reversed, and showed acceptable reliability (.67). Items included "The Nutri-Score is a good addition in supermarkets" and "The Nutri-Score should be avoided, as the nutritional information on the back of packages is more complete". It used the same 5-point Likert scale as the knowledge scale, except for including a "no opinion" option.

Measuring healthiness of current dietary choices

To measure healthiness of current dietary choices, a scale developed by Dutta-Bergman (2005) was used. The scale includes 10 items and was adapted to use a five-point Likert scale to be in line with the previously used scales. Items used in this scale were "I am concerned about how much sugar I eat" and "I try to avoid foods that have additives in them". The original scale showed high reliability (.89) and good reliability was also found in this study, boasting a Cronbach's alpha of .80. These statements were presented before the Educational Message group was exposed to the stimulus.

Measuring perceived credibility of the educational message

To measure the construct of perceived credibility, a new scale with five items was made. The message's inherent perceived credibility has already been measured and found to be positive in the pre-test. The aim of this measure is to see how the perceived credibility of the educational message for a participant can potentially affect the impact the message has on them. To ensure consistency throughout the survey, a five-point Likert scale (Strongly disagree – Strongly agree) was employed. Questions used were "The organizations behind

the video are knowledgeable on the topic” and “The video's content is objective”. The scale showed good reliability (.85).

Results

This section will elaborate on the analyses performed after the cleaning and preparing of the dataset. The next section will present the analyses done based on the hypotheses. In some cases, additional post-hoc analyses were performed because of the results found. These will be stated accordingly and all reported p-values for the post-hoc analyses have been adjusted by applying the conservative Bonferroni correction.

Hypotheses analyses

The hypotheses analyses have been subdivided per hypothesis. At the end, an overview of the hypotheses and whether they were rejected or not is provided.

H1: The presence of the Nutri-Score enables one to more accurately identify healthier products (effective utilization of the label)

Using linear regression analysis, the presence of the Nutri-Score in itself was *not* found to have a significant impact on one's ability to accurately rank-order the products with regards to their perceived healthiness in the same-category assignment ($\beta = 22.3$, $SE = 15.9$, $p = .162$). However, a positive effect was found for the different-category assignment ($\beta = 58.9$, $SE = 20.1$, $p = .004$, 95% CI [19.2, 98.7]). This partially confirms the expectations of hypothesis H1 that the presence of the Nutri-Score positively influenced the effective utilization score.

H2A: An educational message increases the knowledge one has on the Nutri-Score, both in general and with regards to its product categories

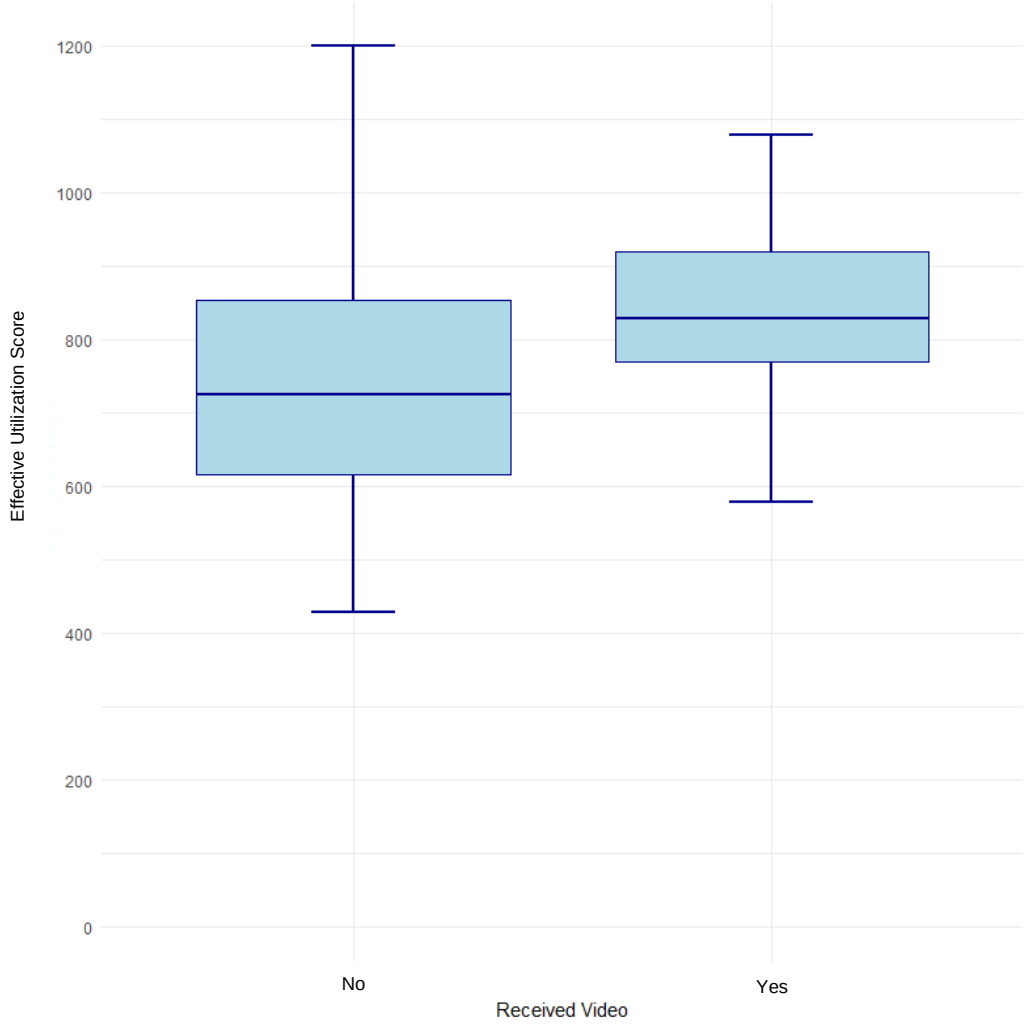
To check for H2A, the relation between having consumed the educational message (or not) and the knowledge the participant has on the Nutri-Score was analyzed. Contrary to expectations, no significant effect was found on knowledge of the Nutri-Score ($\beta = 0.182$, $SE = 0.482$, $p = .707$). The same is true for the participant's knowledge of the correct application of the Nutri-Score related to the different product categories specifically, which did not get significantly impacted by the educational message's presence either ($\beta = 0.148$, $SE = 0.097$, $p = .127$). Hypothesis H2A can be rejected.

H2B: An educational message positively impacts one's effective utilization of the Nutri-Score

In line with H2B, a positive and significant effect was found for the educational message's impact on the effective utilization score of participants (β = 106, SE = 29.0, p < .001, 95% CI [48.6, 163]). This effect can be seen in Figure 6. Performing an analysis of variance (ANOVA) showed more detailed results (F(1, 148) = 14.4, p < .001), with Group 1 getting the highest average score (M = 853, SD = 136), then Group 2 (M = 768, SD = 190), and lastly Group 3 having the lowest average performance score (M = 727, SD = 159).

Figure 6

The effect of the presence of an educational message on the effective utilization score



H3: An educational message positively impacts one's attitude towards the Nutri-Score

Testing for H3, no significant effect was found for the presence of the educational message on the attitude one has towards the Nutri-Score (β = 0.085 , SE = 0.138, p = .540). This contradicts the expectations and hypothesis H3 is thus rejected.

H4: An educational message positively impacts one's intent to use the Nutri-Score

No significant effect was found for being in the Educational Message group to positively impact the intent to use the Nutri-Score (β = 0.246 , SE = 0.168, p = .15), contrary to the expectations of H4. However, further post-hoc analyses did find a positive increase from current use to intent to use (β = 0.658, SE = 0.0535, t = 12.3, p < .001, 95% CI [0.553, 0.764]), which was present among all groups. Additionally, the presence of the educational message acted as a strong interaction effect on this correlation between current use and intent to use (F(1, 144) = 18.8, p < .001). This interaction effect was *not* observed for the presence of the Nutri-Score alone. Thus, H4 is partially rejected as the educational message only positively impacts the increase from current use to intent to use and not intent to use directly.

H5: An educational message's effect is moderated negatively by the healthiness of one's current dietary patterns

The interaction between having been in the Educational Message group (or not) and healthiness of current dietary choices is not found to be significant (F(1, 146) = 0.388, p = 0.534). In fact, after performing a post-hoc analysis the underlying impact of healthiness of current dietary choices on the effective utilization score (i.e. the ability to identify healthier products) was not found to be significant either (F(1, 148) = 0.585, p = .445). Thus, hypothesis H5 is rejected, as no moderation effect was found.

H6: The perceived credibility of the educational message positively impacts the effective utilization score

For H6, a positive correlation was observed between the perceived credibility of the educational message and the effective utilization score (β = 89.6, SE = 38.7, t = 2.31, p = .026, 95% CI [11.3, 168]). Thus, hypothesis H6 is confirmed as someone who perceived the educational message to be more credible, achieved a better effective utilization score.

Assignment analyses

For the two assignments, participants got a maximum of 600 points each. Thus, the two assignments together formed the effective utilization score (max. 1200 points). However, the assignments can tell us more than just the overarching effective utilization score one got. First of all, performing an ANOVA showed that a better score in the same-category assignment positively correlates with the score in the different category assignment ($F(1, 148) = 9.62$, $p < .01$). On average, participants performed better in the same-category assignment ($M = 421$, $SD = 93.6$) than they did in the different-category assignment ($M = 358$, $SD = 121$). The two assignments will be analyzed separately in this section.

Firstly, the same-category assignment consisted of six breakfast cereal options. However, for those participants who got to see the Nutri-Score on products (i.e. those not in the control group) there were still two products that did not contain a Nutri-Score. This tested whether products with the Nutri-Score were more accurately ranked than those without the label. To see whether this was true, the most likely and the mean position of each product as indicated by participants in the Educational Message group and the Nutri-Score group, in addition to its correct position according to the Nutri-Score, were calculated. The same was done for those in the control group, i.e. those who did not see the Nutri-Score. These tables can be viewed in the appendix (Appendix E). The results show that those who saw the Nutri-Score were still able to correctly place the products that did not show the Nutri-Score. Those in the control group misjudged more products.

Secondly, the different-category assignment contained six products from three different product categories. The results of this assignment can thus not only provide insight on how close they got to the correct result overall, but also how well participants realized that the Nutri-Score can only be used to compare within a product category. Similar overview tables were created (Appendix E). The results show that all groups struggled with understanding the applicability of the Nutri-Score fully when it came to the product categories, but overall those who saw the Nutri-Score and/or the educational message performed better than those in the control group.

Exploratory analyses

The following sections will present some of the relevant exploratory analyses that were performed after the hypothesis testing. These analyses were done firstly to better explain the results found, especially with regards to the hypotheses that were rejected, but secondly to further explore some of the data that was not directly related to a hypothesis, such as the demographic characteristics. The latter will be shown first. All the reported p-values are adjusted according to the Bonferroni correction.

One relevant findings both relate to the healthiness of one's current dietary choices. A positive correlation between one's age and their current healthiness of dietary choices was observed when performing a linear regression analysis ($\beta = 0.01$, $SE = 0.003$, $t = 2.46$, $p = .015$, 95% CI [0.00191, 0.0176]). The same was true for education level, with those having enjoyed a higher education generally being more concerned with the healthiness of their diet ($\beta = 0.202$, $SE = 0.0862$, $t = 2.35$, $p = .020$, 95% CI [0.0332, 0.373]). No other relevant results were found.

Next, as neither knowledge of nor the attitude toward the Nutri-Score were impacted by consuming the educational message, further exploratory analyses were done using these variables. The results of a linear regression analysis showed that knowledge of the Nutri-Score and effective utilization score are *not* correlated in the Educational Message group ($\beta = 7.23$, $SE = 7.41$, $p = .334$), while *they are* in the Nutri-Score group ($\beta = 24.4$, $SE = 8.60$, $p < .01$, 95% CI [7.13, 41.7]) and control group ($\beta = 23.7$, $SE = 8.20$, $p < .01$, 95% CI [7.27, 40.2]). Additionally, and interestingly, performing an ANOVA shows that the mean knowledge does *not* significantly differ per group ($F(1, 148) = 0.039$, $p = 0.843$). This indicates that all the groups are similar in their knowledge of the Nutri-Score, yet for those who did *not* watch the educational message this knowledge also helped them perform better. Furthermore, one's knowledge of the Nutri-Score was strongly correlated with their attitude toward the label ($\beta = 0.859$, $SE = 0.245$, $t = 3.50$, $p < .001$, 95% CI [0.374, 1.34]). Thus, it can be argued that the more knowledgeable one is on the Nutri-Score, the more favorable their image of the nutritional label is.

However, it appears that viewing the educational message somehow mitigates the effects of attitude toward and knowledge of the Nutri-Score on the effective utilization of the label. Therefore, analyses were done to evaluate what the relationship of perceived credibility of the educational message is with knowledge of and attitude toward the Nutri-Score is. A positive and significant effect was found for perceived credibility on both attitude ($p < .001$) an knowledge ($p < .01$). As perceived credibility has an effect on the effective utilization score but knowledge and attitude do not in the Educational Message group, the effect cannot be the other way around. Thus, perceived credibility of the educational message impacts both attitude and knowledge positively, as well as the effective utilization score.

Hypothesis overview

The table below summarizes the findings regarding the hypotheses, showing whether they were found to be true, partially true, or whether they were rejected.

Table 2

Overview of the results regarding the hypotheses

Hypothesis	Result	Elaboration
H1: The presence of the Nutri-Score enables one to more accurately identify healthier products	Partially confirmed	The presence of the Nutri-Score only had a significant effect on the different-category performance score.
H2A: An educational message increases the knowledge one has on the Nutri-Score, both in general and with regards to its product categories	Rejected	NA
H2B: An educational message positively impacts one's effective utilization of the Nutri-Score	Confirmed	NA
H3: An educational message positively impacts one's attitude towards the Nutri-Score	Rejected	NA
H4: An educational message positively impacts one's intent to use the Nutri-Score	Partially rejected	The hypothesis as formulated is rejected, however a positive effect was found for the educational message on the *increase* from current use to intent to use.
H5: An educational message's effect is moderated negatively by the healthiness of one's current dietary patterns	Rejected	NA
H6: The perceived credibility of the educational message positively impacts the effective utilization score	Confirmed	Perceived credibility is also found to positively impact the attitude towards and knowledge of the Nutri-Score.

Discussion

This section will discuss the research conducted and interpret the results, especially with regards to the theoretical framework and previous research conducted. In addition to that, the implications of the results, the limitations of the study, and suggestions for future research are considered. This study's novel addition was to research how an educational message can impact the *use* of the Nutri-Score, in addition to analyzing variables such as awareness and knowledge. In summary, being exposed to the educational message helped people more accurately rank-order products based on their healthiness, on top of the benefit of the presence of the Nutri-Score itself. Additionally, the educational message also positively moderated the increase from current use to intent to use. However, the effects of the educational message were limited in other regards, as this study found no effects one's knowledge of or attitude toward the Nutri-Score.

Interpretation of results

Most of the findings seem to indicate that the educational message in this study did *not* play an informing or educative role, as it had no impact on knowledge nor attitude, which contrasts findings of previous studies (Barthélemy et al., 2020; Bundesministerium für Ernährung und Landwirtschaft, 2022). Instead, the educational message is argued to impact the participant's awareness of and trust in the Nutri-Score, and that these two variables take over the role that knowledge and attitude were hypothesized to have. Several findings support this argumentation. Mainly, the fact that the presence of the Nutri-Score by itself only *partially* improves a participant's ability to rank order the products based on their perceived healthiness, while the effective utilization of the label becomes significantly better after exposure to the educational message despite knowledge and attitude not being impacted by the message.

Furthermore, this argumentation is in line with the other findings of previous studies where educational campaigns on the Nutri-Score were found to increase awareness significantly (Barthélemy et al., 2020; Bundesministerium für Ernährung und Landwirtschaft, 2022). However, this also highlights a limitation of this study as it did not directly measure

awareness of the Nutri-Score nor did it ask participants whether they used / trusted on the Nutri-Score during the experiment, which makes it difficult to provide concrete evidence for this argumentation. Future research should take variables such as awareness and trust in the Nutri-Score into account to uncover the full relations between the variables and an educational message.

Nevertheless, this increased awareness of and trust in the Nutri-Score would also explain why in the Nutri-Score group (i.e. those who did not see the educational message) those who were more knowledgeable on the Nutri-Score and those who held a more favorable attitude towards it performed better, while those in the Educational Message group saw no benefit of being more knowledgeable. Thus, instead of the knowledge of those in the Nutri-Score group *directly* influencing their ability to use the Nutri-Score accurately, it can be argued that it made them more aware of the Nutri-Score and trust in it when ranking the products.

This awareness of and trust in the Nutri-Score that the educational message can generate can then also be argued to make one more convinced of the benefits of the Nutri-Score. This is supported by the presence of the educational message positively impacting the increase from current use of the Nutri-Score to intent to use it in the future. In fact, Ma et al. (2017) in their analysis of sustainability logos show that perceived usefulness and ease of use, together with perceived credibility of the logo and initial intention to purchase the product, all positively impact the use of the label. Other studies, not specifically focusing on labels, also show how perceived usefulness is linked to trust and that both positively impact the intention to purchase an item (Chinomona, 2013; Harrigan et al., 2021). Therefore, with the findings of this study, it is likely that in the case of the Nutri-Score the perceived usefulness, ease of use, and trustworthiness of the logo impact the use of the logo positively.

Another important variable is the perceived credibility. Previous research suggested that the more credible a message and especially its source are perceived to be, the more effective the message is in achieving its goals (Andersson et al., 2019; Hanimann et al., 2023; Roobina, 1990). The importance of credibility was found in this study too as perceived credibility was positively correlated with the effectively utilization score as well as positively

impacting attitude and knowledge. This impact on effective utilization of the Nutri-Score could potentially originate from a better awareness and trust, two variables that have been argued to be present. Again, more research would be needed to confirm the role of these variables.

Whereas perceived credibility played a bigger role than hypothesized, a variable that had a less significant impact was the healthiness of the current dietary choices. Those who indicate to follow a more healthy diet were not better at judging the nutritional value of a product based on the front of the packaging nor where they less knowledgeable on the Nutri-Score either. An explanation could be that such individuals are more used to comparing the more detailed nutritional information on the packaging when viewing new products, rather than just compare them with the front of the packaging. Because of them valuing a healthy diet more it is likely that as they are more knowledgeable on the topic, they have less need to use other nutritional guidelines or labels, such as the Nutri-Score.

However, the educational message did achieve all of its results. Especially with regards to understanding how the Nutri-Score should be used with different product categories and then also being able to apply that knowledge is still a source of confusion. The assignment analysis showed that although the educational message helped, in general participants performed worse in the different-category assignment. Therefore, it can be argued that more specific communication is needed on the topic or that perhaps changes to the Nutri-Score design might be beneficial. One such design that could help with the Nutri-Score's product categories in particular could include the category a product belongs to, thus making it clear what products are comparable.

Limitations

This study aimed to measure the various effects as accurately as possible, however, still came with some limitations. The most prominent limitations might be that this research cannot make any claims on the longitudinal strength of the effects found. As the educational message focuses on educating and persuading, this could lead to major differences with the real-life outcome if a similar campaign message were to be used, with all effects potentially

dwindling over time. Previous research on the Nutri-Score and campaigns have found that the effects on variables such as awareness and intent to use indeed lose their impact over time. However, a significant increase compared to before being exposed to educational messages still remained even after months passed by (Barthélemy et al., 2020; Bundesministerium für Ernährung und Landwirtschaft, 2022). Thus, it can be expected that the effects found in this study would not vanish fully over time either.

Another limitation is that participants might consume the educational message with more focus than they normally would, as now they were specifically asked to do so for a study. This could amplify the effects on the performance score especially compared to what they would be in a real-world scenario. Additionally, participants could potentially answer certain questions in a socially desirable manner or in a way that makes them appear ‘better’. This relates particularly to the questions informing about the dietary behavior. However, these limitations, at worst, amplify the effects found and do not alter the direction of them. They cannot be counteracted in a more reliable manner for a study of this limited scale either.

The sampling method employed could ground concerns too, as it was largely based of convenience sampling for the researcher with most participants thus being university students. A particularly interesting potential section of the sample, the elderly and the lower-educated, were significantly underexposed in this study and thus no strong claims can be made on differing effects among different demographical groups. However, as demographic characteristics were already theorized to have only a minor part in the study, this uneven distribution in the sample should not cause any serious harm to the reliability. Furthermore, the chi-squared tests did not show any reason for concern either.

Next, the product images used in this image were real-life products with their branding removed. They also contained their actual Nutri-Score. However, no further comparisons between the nutritional values of the products were done. Simply put, this study makes claims on the ability of the Nutri-Score to help people eat more healthy, assuming the Nutri-Score’s algorithm is a good measure of nutritional value. Although this is not a limitations on the outcomes of this study, it should be taken into account when assessing the results.

Lastly, the different-category assignment aims to measure one's knowledge of how the Nutri-Score can only be applied within a product category. The intention was to have three product categories that are distinct from each other in nutritional benefit. However, such a claim will always carry a degree of subjectivity with it. Between the product categories of yoghurt / vanilla custard and the crackers was not as clear as a delineation as could have been, potentially leading to some participants performing worse in the different-category assignment than their actual ability would indicate. Therefore, when interpreting results it is most reliable to focus more on comparing the pizza category to the yoghurt / vanilla custard and the crackers category, instead of comparing the two latter categories.

Implications

The findings of this study show the impact and importance of an educational message on the Nutri-Score. This is in line with conclusions drawn in previous studies (Barthélemy et al., 2020; Bundesministerium für Ernährung und Landwirtschaft, 2022). Thus, although the Nutri-Score on its own can be an effective tool, the public needs to be well-informed about its purpose and application to ensure maximum benefit. Consequently, this study suggests that governments should not only actively consider officially adopting the Nutri-Score, but accompany its introduction with a nation-wide educational campaign.

Such a campaign should originate from a credible and trustworthy source, such as a consumer organization or the government. The educational message should focus on how the Nutri-Score can be used and what it informs people about. Moreover, the introduction of the Nutri-Score and campaign on it should ideally work well together with the already present dietary guidelines. The end goal is to introduce the Nutri-Score in a manner so that its application and use is clear.

Lastly, currently many countries have introduced the Nutri-Score on a voluntary basis, meaning that manufacturers and producers of products can choose whether they want to display the Nutri-Score on their products. However, the findings of previously conducted research suggest that a mandate on the Nutri-Score might lead to better results (Barthélemy

et al., 2020). This study finds that the Nutri-Score lacking on some products is not too harmful for its impact, however it also still underlines the importance of having the Nutri-Score present on as many packages as possible. Introducing such a mandate would allow consumers to compare all products more fairly and evenly.

Future research

Both the limitations of this research as well as its findings lead to new avenues that can be explored. There are three main suggestions for potential directions and ideas for future research that will be brought forward in this section. Firstly, it is recommended they include more outcome variables, such as awareness of the Nutri-Score, previous already existing knowledge of the Nutri-Score, trust in the label, and how much they actually used the Nutri-Score when rank-ordering products, perhaps by using eye-tracking. Furthermore, future research should ideally combine this with various types of educational campaign messages that use different types of mediums rather than just a video, such as what was done in the study of the Bundesministerium für Ernährung und Landwirtschaft (2022).

Secondly, future research is ideally performed in a physical setting. The Nutri-Score is designed to work in a supermarket for people doing their daily groceries, an environment and scenario that are difficult to mimic in a research setting. However, even then consumers might select more healthy products when they know they are being observed. Therefore, another possibility for future research is to not directly recruit participants, but rather uses the purchase records of a supermarket. Although this makes assessing the effects of an educational message more difficult, this could still be achieved by introducing such a campaign only regionally. These research designs can then show potential effects of the Nutri-Score and educational campaigns in a real-life setting.

Lastly, the results from the different-category assignment showed that the different product categories of the Nutri-Score can still cause confusion. Despite people understanding how it works in theory, the accurate application in practice appears to be lacking. Therefore, a suggestion is that future research experiments with slight altercations to the design of the

Nutri-Score. Perhaps adding a text that shows what product category that specific product belongs to, thus instantly making it clear what products are comparable, could be beneficial.

Conclusion

This study confirms that the Nutri-Score can help consumers more easily and accurately identify healthier products. Supporting the introduction of the Nutri-Score with an educational campaign that teaches consumers about what the Nutri-Score is and how they can effectively adopt it for their benefit, amplifies the effects that the Nutri-Score has significantly. Not only does an educational message help consumers to understand and use the Nutri-Score better, it also positively impacts the increase from current use to intent to use the label. Future research could look into several additional variables (e.g. awareness and *actual use* of the Nutri-Score), further explore variables used in this study (e.g. attitude toward and knowledge of the Nutri-Score), and investigate what roles these variables play in the effectiveness of different types of educational campaign messages. All in all, this study suggests that the Nutri-Score is introduced in combination with an educational campaign, as it a tool in the fight the obesity epidemic.

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Appendix A

Products shown to participants in the first round

The below Figure 5 shows the products shown to the participants in the first round of the experiment. The products shown here are as they are shown to participants in the Educational Message and the Nutri-Score groups, i.e. those seeing the Nutri-Score. Participants in the control group will see the same products but without the Nutri-Score. Nevertheless, even for participants not in the control group, two of the products showed contained no Nutri-Score label, as explained in the methods section. These products are shown at the end of Figure 5 and have a Nutri-Score of B and D respectively. During the experiment, all products were presented with their name as well.

Figure 6

All six products shown in the first round; all products belong to the same product category

Appendix B

Products shown to participants in the second round

The below Figure 6 shows the products shown to the participants in the second round of the experiment. The products shown here are as they are shown to participants in the Educational Message and the Nutri-Score groups, i.e. those seeing the Nutri-Score. Participants in the control group will see the same products but without the Nutri-Score. There are three different product categories, all with an inherent different healthiness to them, and two products within each category, one of which is healthier than the other. During the experiment, all products were presented with their name as well.

Figure 6

All six products shown in the first round; three different product categories containing two products each

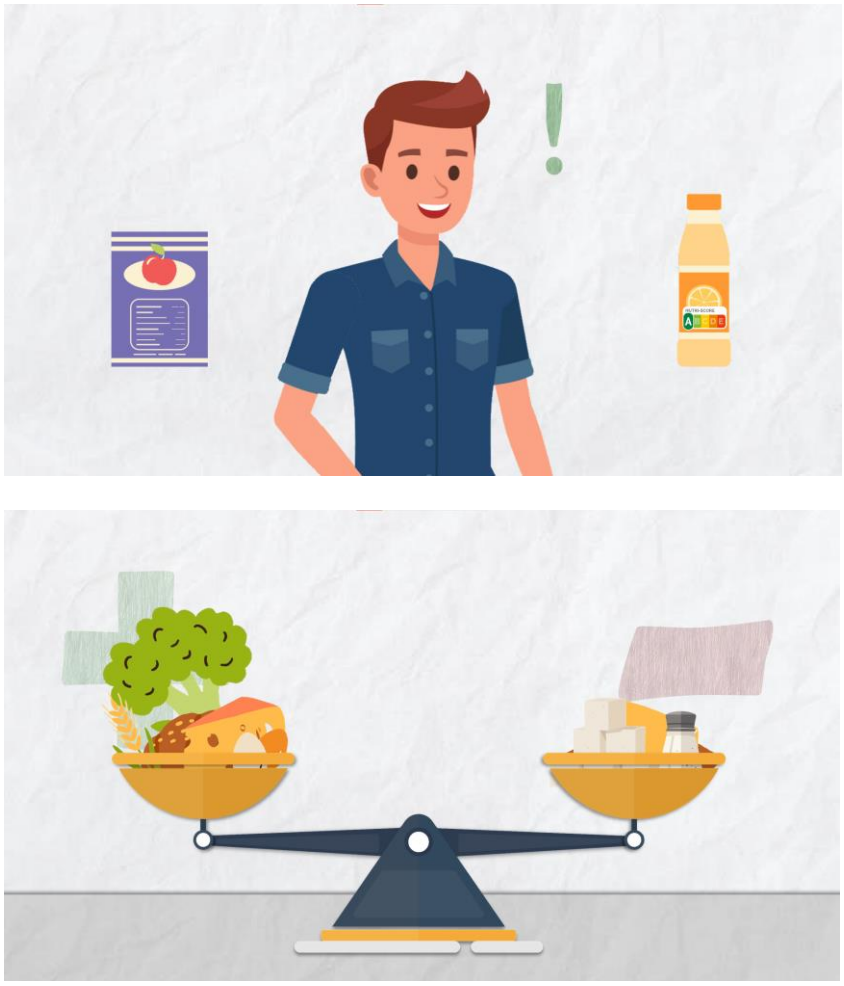
Appendix C

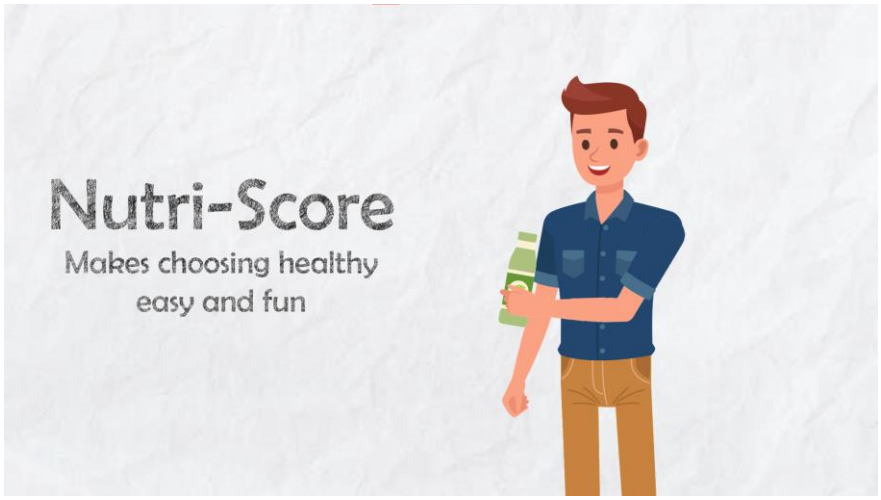
Screenshots and script of the educational video message

As the educational message is in a video format, the whole video cannot be shown in this paper. However, the below Figure 7 shows screenshots of the video. The video has a length of 1:58 seconds. The video formatting, as well as its contents, was not only based of the scientific requirements found in the theoretical framework, but was also heavily inspired by the educational videos on the Nutri-Score made by the Belgium (FOD Volksgezondheid, 2019) and German (BMEL, 2020) governments. The full script for the video can be found below the screenshots of the video. The full video can be watched on YouTube: https://youtu.be/xoy58HeZUCs

Figure 7

Screenshots of the educational video message





Script Nutri-Score

"This is the Nutri-Score. The Nutri-Score is a label that can be found more and more on the front of packaging, to inform consumers better about the nutritional value of consumption products.

What is the Nutri-Score?

The Nutri-Score is an easy to understand label using a traffic light system. The green A-score is the healthiest option, while products with a red E-score are best consumed in limited amounts. With the Nutri-Score (.) you no longer need to compare the products using the nutritional information on the back. Now, this can all be done in one glance.

How is the Nutri-Score calculated?

The Nutri-Score is calculated using a scientifically developed algorithm. It awards points for positive components, such as fibers, protein, fruits and vegetables, while points are deducted for unhealthy components, such as calories, saturated fats, sugar, and salt. The score is calculated per 100 grams or milliliters, and not per portion. This allows for a fairer comparison, as the portion size is set by the manufacturer.

How do I use the Nutri-Score?

When using the Nutri-Score, be aware you can only compare within a product category. This means that you can compare a milk with another milk, and a pizza with another pizza. But you cannot compare the Nutri-Score of a pizza with that of a milk.

This also means that a pizza can also get a positive Nutri-Score. This does not mean that it is a healthy product, but it *is* a healthier option if you want to eat a pizza. If you want to know more about what products fit a balanced diet, please consult your national dietary guidelines.

(Conclusion – this header is not spoken aloud in the video)

So, next time you go grocery shopping, look out for the Nutri-Score on products and improve the quality of your diet. With the Nutri-Score, eating healthy becomes easy and fun.

This video was made as a collaboration between the Dutch Consumentenbond and the German Stiftung Warentest”

Appendix D

Pre-test study design and participant demographics

To ensure anonymity of the three participants in the pre-test, their exact demographics will not be shared as this might put them at risk of being identified. All three participants were between the age of 20 and 30, were residents of the Netherlands, and all of them were males. Furthermore, all participants were part of the bachelor Communication Science which can be argued delivers feedback of higher quality as they are more knowledgeable on what makes a good communicative message. However, this also leads to a worse distribution with regards to the education level compared to the full sample, which will be more diverse.

The pre-test took place in a focus group setting, where all three participants were brought together and were shown the video without having been given too much information beforehand. Then, they were asked to comment on the video's informative abilities and its perceived credibility. Afterwards, they were given a debriefing about the video and were asked to give more targeted feedback. All participants were positive about the video and no subsequent changes were made.

Appendix E

Detailed results of assignment analyses

Below the survey flow is displayed (Figure 8). The following pages include the full survey as shown to the participants. The survey was made using the online software Qualtrics.

Table 2

Results of the same-category assignment for those who saw the Nutri-Score

Product	Most likely position	Mean position	Correct position
Honing Ringen Cereal	1	1.67	1
Granola Nuts Cereal	2	3.73	2 / 3
Cornflakes Cereal	3	3.71	2 / 3
Unicorn Froot Loops Cereal	4	4.60	4
Fruit'n Fibre Cereal	5	5.12	5 / 6
Trêsor Choco Nut Cereal	6	3.09	5 / 6

Table 3

Results of the same-category assignment for those in the control group

Product	Most likely position	Mean position	Correct position
Honing Ringen Cereal	1	1.58	1
Trêsor Choco Nut Cereal	2	2.37	5 / 6
Cornflakes Cereal	3	3.48	2 / 3
Granola Nuts Cereal	4	3.52	2 / 3
Fruit'n Fibre Cereal	5	5.25	5 / 6
Unicorn Froot Loops Cereal	6	5.62	4

Table 4

Results of the different-category assignment for those who saw the Nutri-Score

Product	Most likely position	Mean position	Correct position
Low fat yoghurt	1	1.67	1
Whole grain crackers	2	2.64	3
Pizza salami	3	4.23	6
Seeds and pips crackers	4	3.27	4
Pizza cheese and tomato	5	5.29	5
Vanilla Custard	6	4.80	2

Table 5

Results of the same-category assignment for those in the control group

Product	Most likely position	Mean position	Correct position
Low fat yoghurt	1	2.42	1
Whole grain crackers	2	2.88	3
Vanilla Custard	3	4.44	2
Seeds and pips crackers	4	2.52	4
Pizza salami	5	4.21	6
Pizza cheese and tomato	6	5.33	5

Appendix F

Full survey used during this study

Below the survey flow is displayed (Figure 8). The following pages include the full survey as shown to the participants. The survey was made using the online software Qualtrics.

Figure 8

Full survey flow logic

1. Show block: *Informed Consent (1 Question)*
    - If "*Yes, I consent to participate in this study*", then continue at point *2*
    - If "*No, I do not want to participate in this study*", then **end survey**
2. Show block: *Participation Requirements (2 Questions)*
    - If "*I have not lived in one of these two countries for more than one year*", then continue at point 3
    - If answer to *"What is your age in years (e.g. 25)*" is less than "*18*", then continue at point 3
    - Else, continue at point 4
3. Show block: *Cannot participate (1 Question)*
    - If "*I have entered the previous question wrong and would like to return*", then return to point 2
    - If "*I do not meet the participation requirements and would like to end the survey*", then **end survey**
4. Show block: *Demographics (2 Questions)*
5. Show block: *Recognition of Nutri-Score (1 Question)*
6. Show block: *Healthy Eating (1 questions)*
7. Randomizer – 1 of the following sequences (a to c) is shown at random with an even distribution of participants among the three
    a. Show block: *Educational Message (0 Questions)*

Show block: *Experiment 1 Nutri-Score (1 Questions)*

Show block: *Experiment 2 Nutri-Score (1 Questions)*

Show block: *Perceived Performance (1 Question)*

Show block: *Perceived Credibility (1 Question)*

Show block: *Knowledge NS (3 Questions)*

Show block: *Attitude, use and intent (4 Questions)*

Show block: *Open comment 1 (2 Questions)*

Then, **end survey**

b. Show block: *Experiment 1 Nutri-Score (1 Questions)*

Show block: *Experiment 2 Nutri-Score (1 Questions)*

Show block: *Perceived Performance (1 Question)*

Show block: *Knowledge NS (3 Questions)*

Show block: *Attitude, use and intent (4 Questions)*

Show block: *Open comment 2 (2 Questions)*

Then, **end survey**

c. Show block: *Experiment 1 No Nutri-Score (1 Questions)*

Show block: *Experiment 2 No Nutri-Score (1 Questions)*

Show block: *Perceived Performance (1 Question)*

Show block: *Knowledge NS (3 Questions)*

Show block: *Attitude, use and intent (4 Questions)*

Show block: *Open comment 3 (2 Questions)*

Then, **end survey**

Start of Block: Informed Consent

You are being invited to participate in a study. This study is being done as a bachelor thesis project by Robbert Schmeetz from the Faculty of Behavioural, Management and Social Sciences at the University of Twente. This study will be conducted in English. Please make sure you feel comfortable enough in your English level when proceeding, if you understand these paragraphs well, you will understand the rest of the study as well.

The purpose of this research study is to investigate information about products in supermarkets, and will take you approximately 10 minutes to complete. The data will only be used for the researcher's Communication Science bachelor thesis. To the best of my ability your answers in this study will remain confidential. I will minimize any risks by anonymizing the data and storing the data in a secure location.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to leave out any questions, except for this informed consent and the participation requirement checks. I believe there are no known risks associated with this research study. If you wish for your data to be removed, you can quit the study before the end, or you can request for your data to be deleted at the end of the study. For further information or questions about the study, please contact me via email: r.schmeetz@student.utwente.nl

- ○ Yes, I consent to participate in the study
- ○ No, I do not want to participate in the study

End of Block: Informed Consent

Start of Block: Participation Requirements

The following two questions will check whether you meet the participation requirements. Therefore, answering these questions is required.

*

What is your age in years? (e.g. 25)

_____

In the past three years, have you lived in either the Netherlands or Germany for at least one year? If you have lived in both, please indicate in what country you lived the longest over the past three years.

- ○ I have lived in the Netherlands
- ○ I have lived Germany
- ○ I have not lived in one of these two countries for more than one year

End of Block: Participation Requirements

Start of Block: Cannot participate

You cannot participate in this survey because you do not meet the participation requirements. To participate, you have to be at least 18 years old and have lived in either the Netherlands or Germany for one year in the past three years. I still want to thank you for your time and willingness to participate!

If you think you have entered the previous question wrong, please indicate that here and you will be returned to the previous question.

- ○ I have entered the previous question wrong and would like to return
- ○ I do not meet the participation requirements and would like to end the survey

End of Block: Cannot participate

Start of Block: Demographics

What is your gender

- ○ Male
- ○ Female
- ○ Non-binary / Other
- ○ Prefer not to say

What is the highest level of education you have completed or that you are currently enrolled in? If your educational level is not included, please choose the option you believe is most similar

- ○ Without any degree
- ○ Primary school
- ○ High school
- ○ Bachelor's degree
- ○ Master's degree
- ○ Further education (e.g. PhD, Professor)
- ○ Other, namely: _____

End of Block: Demographics

Start of Block: Recognition of Nutri-Score

Please indicate if you recognize the above shown logo

- I do not recognize the logo
- I recognize the logo but don't know where it is used
- I recognize the logo and know where it is used

End of Block: Recognition of Nutri-Score

Start of Block: Healthy eating

The following statements are about your current diet choices. Please answer based on the choices you generally make when shopping in the grocery store or when ordering food.

Please indicate to what extent you agree or disagree with the following statements

	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree
I try to avoid foods that are high in fat	○	○	○	○	○
I try to avoid foods that are high in cholesterol	○	○	○	○	○
I try to avoid foods with a high salt content	○	○	○	○	○
I am concerned with how much sugar I eat	○	○	○	○	○
I make a special effort to get enough fiber in my diet	○	○	○	○	○
I use a lot of low calorie or calorie reduced products	○	○	○	○	○
I try to select foods that are fortified with vitamins or minerals	○	○	○	○	○
I am careful about what I eat in order to keep my weight under control	○	○	○	○	○
I try to avoid foods that have additives in them	○	○	○	○	○
I am concerned about getting enough calcium in my diet	○	○	○	○	○

End of Block: Healthy eating

Start of Block: Educational Message

Please watch the video below carefully and with the sound turned on. If possible, watch the video in full-screen mode as well, this can be done by clicking the YouTube logo in the bottom right of the video (note: this will take you to YouTube). The video is 2 minutes long, therefore you cannot continue to the next page until this time has passed.

[VIDEO: EDUCATIONAL MESSAGE NUTRI-SCORE]

End of Block: Educational Message

Start of Block: Experiment 1 Nutri-Score

Below you will see six different types of breakfast cereal options. The next question will ask you to rank these products based on how healthy you perceive them to be.

Put the product you think to be the healthiest on the first spot, the second healthiest product on the second spot, and so on until the least healthiest product, which you put on the sixth and last place.

Please take your time to look at each product. **Take note of the products name displayed <u>below</u> each product**

If you are viewing the image on mobile, note that you can zoom in or turn your phone sideways (landscape mode) to get a better view of the images

You cannot continue to the next page until at least twenty seconds have passed.

Trésor Choco Nut Cereal

Unicorn Froot Loops Cereal

Cornflakes Cereal

Honing Ringen Cereal

Granola Nuts Cereal

Fruit'n Fibre Cereal

Below you see the **names** of the products shown above. Please make sure you know what name belongs to what product. Then, please rank the products based on how healthy you believe them to be, with first place (i.e. at the top) being the healthiest product and last place (i.e. at the bottom) being the least healthy. You can move the products by dragging and dropping them.

_____ Trêsor Choco Nut Cereal
_____ Unicorn Froot Loops Cereal
_____ Cornflakes Cereal
_____ Honing Ringen Cereal
_____ Granola Nuts Cereal
_____ Fruit'n Fibre Cereal

End of Block: Experiment 1 Nutri-Score

Start of Block: Experiment 2 Nutri-Score

Below you will see six new different types of food products. The next question will ask you to rank these products based on how healthy you perceive them to be.

Put the product you think to be the healthiest on the first spot, the second healthiest product on the second spot, and so on until the least healthiest product, which you put on the sixth and last place.

Please take your time to look at each product. **Take note of the products name displayed <u>below</u> each product**

If you are viewing the image on mobile, note that you can zoom in or turn your phone sideways (landscape mode) to get a better view of the images

You cannot continue to the next page until at least twenty seconds have passed.

Pizza Salami

Whole Grain Crackers

Low-Fat Yoghurt

Seeds and Pips Crackers

Vanilla custard

Pizza Cheese & Tomato

Below you see the **names** of the products shown above. Please make sure you know what name belongs to what product. Then, please rank the products based on how healthy you

believe them to be, with first place (i.e. at the top) being the healthiest product and last place (i.e. at the bottom) being the least healthy. You can move the products by dragging and dropping them. _____ Pizza Salami

_____ Vanilla Custard
_____ Seeds and Pips Crackers
_____ Pizza Cheese & Tomato
_____ Low-Fat Yoghurt
_____ Whole Grain Crackers

End of Block: Experiment 2 Nutri-Score

Start of Block: Perceived Performance

The previous two assignments asked you to rank products based how healthy you believed them to be. Looking at both assignments together, how well do you think you did? I believe I completed the previous assignments...

- ○ Very poorly
- ○ Poorly
- ○ Neither poorly nor well
- ○ Well
- ○ Very Well

End of Block: Perceived Performance

Start of Block: Perceived Credibility

Think back to the video you watched. Please indicate to what extent you agree with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The organizations behind the video are knowledgeable on the topic	○	○	○	○	○
The source of the video is credible	○	○	○	○	○
The intentions behind making the video seemed genuine	○	○	○	○	○
The video's content is objective	○	○	○	○	○
The video's content and source are trustworthy	○	○	○	○	○

End of Block: Perceived Credibility

Start of Block: Knowledge NS

Below you see the Nutri-Score once again. The next questions will be about the Nutri-Score logo.

To what extent do you believe the following statements on the Nutri-Score to be true or false?

	Definitely false	Probably false	Neither true nor false	Probably true	Definitely true	I don't know
The Nutri-Score logo provides insight into how safe a product is	○	○	○	○	○	○
The Nutri-Score logo can help someone more easily compare products with each other	○	○	○	○	○	○
The Nutri-Score logo can help someone make better consumption choices	○	○	○	○	○	○
The Nutri-Score logo provides insight on how healthy or unhealthy a product is for consumers in general	○	○	○	○	○	○
The Nutri-Score provides insight into how good or bad a product is for the climate and environment	○	○	○	○	○	○

Page Break

Please indicate whether you think the next statement is true:
"Using the Nutri-Score logo can help you see how good or bad a product is compared to another similar product,

for example comparing one soda with another soda"

- ○ True
- ○ False
- ○ I don't know

Please indicate whether you think the next statement is true:
"Using the Nutri-Score logo can help you see how good or bad a product is compared to a different type of product, for example comparing yoghurt with a bag of chips"

- ○ True
- ○ False
- ○ I don't know

End of Block: Knowledge NS

Start of Block: Attitude, use and intent

Please indicate to what extent you agree with the following statements about the Nutri-Score

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	No opinion
The Nutri-Score is a good addition in supermarkets	○	○	○	○	○	○
The Nutri-Score should be avoided, as the nutritional information on the back of packages is more complete	○	○	○	○	○	○
The Nutri-Score is difficult to use	○	○	○	○	○	○
The Nutri-Score can help any consumer to make healthier food choices	○	○	○	○	○	○

How positive or negative is the image you have of the Nutri-Score?

- ○ Extremely Negative
- ○ Somewhat negative
- ○ Neither positive nor negative
- ○ Somewhat positive
- ○ Extremely positive
- ○ I don't know / No opinion

I currently use the Nutri-Score when shopping groceries

- ○ Never
- ○ Sometimes
- ○ About half the time
- ○ Most of the time
- ○ Always

I intend to use the Nutri-Score when shopping groceries in the future

- ○ Never
- ○ Sometimes
- ○ About half the time
- ○ Most of the time
- ○ Always

End of Block: Attitude, use and intent

Start of Block: Open comment 1

The goal of the study you just participated in is to research the effects of an educational video message on people's use and knowledge of the Nutri-Score. You were part of the first condition, meaning you did watched the video and you saw products with a Nutri-Score on them. Other participants were asked to rank products with a Nutri-Score on them but without watching the educational video, or were asked to rank products without a Nutri-Score on them.

I would like to be informed about the results of this study

- ○ Yes, my email is: _____
- ○ No

Please leave any further comments, questions, and remarks in the text box below. If you wish for your data to be deleted, indicate that below too. Please click 'Next' to end the survey and submit your entry.

_____

End of Block: Open comment 1

Start of Block: Open comment 2

The goal of the study you just participated in is to research the effects of an educational video message on people's use and knowledge of the Nutri-Score. You were part of the second condition, meaning you did not watch the video, but you did see products with a Nutri-Score on them. Other participants were also asked to watch a short educational video on the Nutri-Score, or they were asked to rank products without a Nutri-Score on them.

I would like to be informed about the results of this study

- ○ Yes, my email is: _____
- ○ No

Please leave any further comments, questions, and remarks in the text box below. If you wish for your data to be deleted, indicate that below too. Please click 'Next' to end the survey and submit your entry.

_____

End of Block: Open comment 2

Start of Block: Experiment 1 No Nutri-Score

Below you will see six different types of breakfast cereal options. The next question will ask you to rank these products based on how healthy you perceive them to be.

Put the product you think to be the healthiest on the first spot, the second healthiest product on the second spot, and so on until the least healthiest product, which you put on the sixth and last place.

Please take your time to look at each product. **Take note of the products name displayed <u>below</u> each product**

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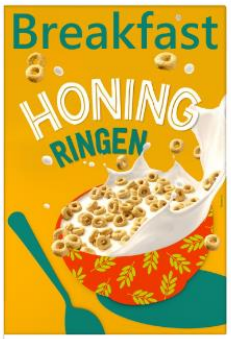

Honing Ringen Cereal

Granola Nuts Cereal

Fruit'n Fibre Cereal

Trêsor Choco Nut Cereal

Unicorn Froot Loops Cereal

Cornflakes Cereal

Below you see the **names** of the products shown above. Please make sure you know what name belongs to what product. Then, please rank the products based on how healthy you believe them to be, with first place (i.e. at the top) being the healthiest product and last place (i.e. at the bottom) being the least healthy. You can move the products by dragging and dropping them.

_____ Trêsor Choco Nut Cereal
_____ Unicorn Froot Loops Cereal
_____ Cornflakes Cereal
_____ Honing Ringen Cereal
_____ Granola Nuts Cereal
_____ Fruit'n Fibre Cereal

End of Block: Experiment 1 No Nutri-Score

Start of Block: Experiment 2 No Nutri-Score

Below you will see six new different types of food products. The next question will ask you to rank these products based on how healthy you perceive them to be.

Put the product you think to be the healthiest on the first spot, the second healthiest product on the second spot, and so on until the least healthiest product, which you put on the sixth and last place.

Please take your time to look at each product. **Take note of the products name displayed <u>below</u> each product**

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Pizza Salami

Whole Grain Crackers

Low-Fat Yoghurt

Seeds and Pips Crackers

Vanilla custard

Pizza Cheese & Tomato

Below you see the **names** of the products shown above. Please make sure you know what name belongs to what product. Then, please rank the products based on how healthy you believe them to be, with first place (i.e. at the top) being the healthiest product and last place (i.e. at the bottom) being the least healthy. You can move the products by dragging and dropping them.

_____ Pizza Salami
_____ Vanilla Custard
_____ Seeds and Pips Crackers
_____ Pizza Cheese & Tomato
_____ Low-Fat Yoghurt
_____ Whole Grain Crackers

End of Block: Experiment 2 No Nutri-Score

Start of Block: Open comment 3

The goal of the study you just participated in is to research the effects of an educational video message on people's use and knowledge of the Nutri-Score. You were part of the third condition, meaning you did not watch the video and you also only saw products without a Nutri-Score on them. Other participants were asked to watch a short educational video on the Nutri-Score and/or were asked to rank products with a Nutri-Score on them.

I would like to be informed about the results of this study

○ Yes, my email is: _____

○ No

Please leave any further comments, questions, and remarks in the text box below. If you wish for your data to be deleted, indicate that below too. Please click 'Next' to end the survey and submit your entry.

_____

End of Block: Open comment 3