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FROM LABEL TO TABLE

An Experimental Study of How Front-of-Pack Labeling Can Be Used to Promote Healthier Consumer Behavior Among the Swedish Population

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Abstract

The rising prevalence of obesity and overweight in Sweden, now affecting over half of the population, highlights the need for effective public health interventions. This thesis investigates how front-of-pack labeling (FoPL) can be utilized to promote healthier consumer behavior among the Swedish population. Drawing upon theories of behavioral economics and consumer psychology, the research examines the impact of FoPL that highlights short-term versus long-term health costs associated with the consumption of foods high in free sugars. Through an experimental study involving Swedish consumers, this thesis explores the effects of different FoPL strategies on purchase intention and health risk perception of such foods.

The results reveal that FoPL highlighting short-term health costs, such as sugar crash and indigestion, significantly decreases purchase intention and significantly increases health risk perception among consumers. Conversely, FoPL highlighting long-term health costs, such as obesity and diabetes, also significantly increases the health risk perception but does not significantly decrease purchase intention. The study further examines the role of consumers' connection to their future selves as a potential moderator, finding no significant impact on the effectiveness of long-term costs FoPL.

These findings underscore the potential of FoPL as a tool to influence consumer behavior, with short-term cost warnings proving more effective than long-term cost warnings. Additionally, the findings show that even consumers with high connection to their future selves are more responsive to FoPL emphasizing short-term compared to long-term health costs. Therefore, the study suggests that policymakers and health advocates should prioritize FoPL strategies that highlight immediate health risks to effectively reduce the consumption of foods high in free sugars.

Keywords: Front-of-Pack Labeling (FoPL); Free Sugars; Short-term Health Costs; Long-term Health Costs; Health Warnings.

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1.0 Introduction

In 2022, over half (51%) of the Swedish population were affected by overweight or obesity, marking a notable increase of 5 percentage points from 2006 levels (Folkhälsomyndigheten, 2023). The financial burden is substantial, obesity alone cost the nation an estimated SEK 70 billion in 2017 (Folkhälsomyndigheten, 2017), accounting for around 1.5% of Sweden's GDP for the year. A prominent factor in this public health issue is the excess consumption of foods and beverages rich in free sugars, which not only contributes to overweight and obesity but also to associated conditions such as cardiovascular diseases and diabetes, mirroring a concerning global health trend (WHO, 2015).

At first sight, it might appear that Sweden's per capita annual total sugar consumption has begun to show a downward trend. This perception emerged when the consumption figures started to show a decline in 2016, dropping from the range of 41 kg to 49 kg during the period from 1980 to 2015, to 37 kg in 2020 (Jordbruksverket, 2021). Unfortunately, this trend was short-lived. Recent data from 2021 and 2022 indicates a reversal, with consumption rising to 40 kg and 41 kg, respectively (Jordbruksverket, 2022). Hence, the future trajectory of this pattern remains uncertain. However, contextualizing these figures within a broader historical framework reveal a dramatic increase in sugar consumption. In 1850, the annual per capita total sugar consumption in Sweden was a mere 5 kg, escalating to nearly 50 kg by the 1940s (Kostfonden, 2019). This remarkable escalation, matching with many other countries, is sometimes referred to as "the biggest dietary change in human history since we started cultivating grains" (Kostfonden, 2019).

To realign with healthy free sugar consumption levels in Sweden, a significant reduction is necessary. Namely, both the WHO and the Swedish Food Agency recommend that free sugar should comprise no more than 10% of the recommended daily caloric intake (Livsmedelsverket, 2023). When translated into annual per capita sugar consumption and adjusted for waste, this guideline equals 25 kg annually per capita for Sweden (Kostfonden, 2019). Achieving this target requires a reduction of as much as 40% from the current consumption levels.

Addressing the high levels of free sugar consumption presents a tough challenge, yet it can be approached through various interventions. The Swedish Food Agency listed, within the scope

of a government assignment, three overarching potential means of control aiming at promoting healthy food consumption: fiscal measures, regulatory interventions and informational tactics (Livsmedelsverket, 2022). Each of these overarching means encapsulates a range of different interventions. Fiscal measures involve, among others, manipulating prices via taxation on unhealthy foods or detaxation of healthier options. Regulatory interventions suggest, for instance, constraints on advertising unhealthy foods and their availability in public institutions. Informational tactics encompass front-of-pack labeling (FoPL), public awareness campaigns and behavioral nudges.

In Sweden, there has been advocacy for taxing products high in free sugars as a way to decrease their consumption (Nylander et al., 2016). However, Norway's experience with sugar taxation illustrates the complexities of using fiscal policy to influence dietary habits. The country phased out its extensive tax on "chocolate and sugar products" in 2021 with the aim of reducing cross-border shopping with Sweden, which does not impose such a tax (Folkehelseinstituttet, 2023). Despite these efforts, the anticipated reduction in border trade did not materialize a year later. Norwegian cross-border shoppers still bought the same amounts of products rich in free sugars as before (Folkehelseinstituttet, 2023).

Consequently, this study shifts its attention towards a relatively underexplored intervention: front-of-pack labeling (FoPL). The Swedish Food Agency has highlighted the limited research on the impact of FoPL on consumer purchasing behavior, noting a significant gap in understanding. According to the agency, the effects of FoPL on buying decisions are not well-documented, underlining the necessity for further investigation in this area (Livsmedelsverket, 2022). This acknowledgment serves as the foundation for our focus, emphasizing the potential of FoPL as a pivotal area for research, particularly with its focus on a Swedish demographic.

1.1 Background

1.1.1 Previous Research

Prior research has examined the efficacy of health warning labels on products with high levels of free sugars and their impact on consumer knowledge and behavior. Additionally, studies have explored alternative strategies for encouraging healthier dietary habits and reducing excessive free sugar consumption. Existing literature suggests that FoPL systems, including the Health star rating system, traffic light labeling, Nutri-Score, reference intake labeling and warning labels, can aid consumers in making more informed food choices and improve their perception of food quality based on nutritional value (Pettigrew et al., 2024). However, research indicates that graphical modifications to labeling are essential for enhancing understandability and usability, thereby increasing the effectiveness of FoPL initiatives (Pettigrew et al., 2024).

Moreover, research suggests that combining textual health warning labels with emotional graphical images increases the salience and influence of such warnings. However, the impact varies depending on whether the portrayed health effects are short-term (caries) or long-term (diabetes and obesity). Moreover, these messages may have a negative impact if consumers engage in a danger control process for overweight, underscoring the significance of demographic variables in shaping the effectiveness of warning labels on consumer behavior (Mehlhose et al., 2023). It is important to note that the stimuli used in the study involved real-world products bearing well-known brands. This approach may introduce a potential pitfall related to customer-based brand equity (CBBE), defined as "the differential effect brand knowledge has on consumer response to the marketing of that brand" (Kotler & Keller, 2016). Therefore, presenting a stimulus featuring a known brand may yield results that are less generalizable compared to a stimulus featuring neutral packaging.

A recent study examined the efficacy of displaying health-related costs associated with unhealthy behavior, specifically comparing short-term and long-term costs. Short-term costs, such as indigestion and sugar crash, were found to be more effective than long-term costs, including obesity and diabetes, in deterring unwanted behavior (Stillman & Woolley, 2023). The authors hypothesize that short-term costs are superior because they are more closely linked to the act of consumption, with their timing being immediate and their occurrence

likelihood being higher compared to long-term effects. Consequently, emphasizing short-term costs as a self-regulatory strategy for curbing unhealthy consumption compared to long-term costs is deemed underutilized (Stillman & Woolley, 2023).

Previous studies, such as the research conducted by Øvrebø et al. (2020), have examined the impact of tax increases on products with high sugar content. The study, focused on Norway's 2018 tax increase on high-sugar products, revealed a positive effect on the intended outcome of increasing tax-related revenue. However, the effects on consumer purchase behavior were less conclusive, with the observed changes being minimal. The authors contend that taxes aimed at improving public health must be carefully designed to achieve their intended objectives (Øvrebø et al., 2020). This suggests that monetary regulations may not be the most effective means of altering consumer behavior, highlighting the potential value of FoPL as an alternative approach.

1.1.2 The History Behind FoP Health Warning Labels

Health warning labels have undergone significant evolution over the past 50 years, becoming increasingly important. Notably, tobacco products have been subject to various revisions and regulatory measures concerning FoP health warning labels. The first-ever warning labels on cigarettes were introduced in 1965 in the United States (CDC, 2000). However, historical records dating as far back as 1602 document concerns regarding the potential negative effects of smoking tobacco products, drawing parallels between illnesses caused by soot exposure and potential health risks associated with tobacco use (Charlton, 2005). It was not until 1950 that medical research conclusively identified tobacco as the primary cause of lung cancer. Subsequently, major medical reports during this decade confirmed that tobacco consumption was linked to several serious diseases (Ruegg, 2015).

In 1965, the United States introduced the first FoP health warning label following government mandates, which required all packaging and advertising materials for cigarettes to include the cautionary statement: "Caution: Cigarette smoking may be hazardous to your health." This marked the inception of the initial generation of health warning labels concerning tobacco smoking, paving the way for subsequent iterations characterized by more distinct and impactful messaging. By 1969, the second generation of health warning labels emerged, with smoking firmly established as a definite health hazard. Package labels began to specify particular diseases associated with smoking, departing from previous vague and

generalized health warnings. However, these warnings were typically relegated to the side of the package, presented in small text, often overlooked or disregarded. The third generation of warning labels, featuring affirmative and prominently placed health warnings, was introduced on the front and/or back of cigarette packages. Subsequently, the fourth generation of warning labels, incorporating rotating warning messages, was implemented in 1977. It wasn't until 1985 that the graphical warning labels commonly recognized today were introduced. These labels combine health messages with graphical imagery such as depictions of blackened lungs, diseased hearts, or patients in distress (Hiilamo, 2012). While some regions experienced rapid advancements in regulating cigarettes, Sweden did not impose requirements for warning texts on tobacco products until 1977 and did not enact laws governing advertising until 1979 (Tobaksfakta, 2011). This indicates a significant delay between the discovery of health risks associated with tobacco and corresponding political action. Furthermore, there is a noticeable lag between the introduction of regulations in the first nation and their implementation in Sweden.

Turning to the contemporary landscape of sugar consumption, numerous studies in the past decade have underscored the role of sugar in contributing to various diseases and health-related issues when consumed excessively, particularly within today's ultra-processed food industry (Lane et al., 2024). Recent research has linked sugar consumption to dental damage, weight gain and diseases such as obesity and type 2 diabetes (Folktandvården, 2023). Despite growing awareness of these health concerns, governmental actions through regulations remain limited. However, it is reasonable to anticipate that regulations will become more stringent over time as research continues to advance. Some recent regulatory initiatives include the implementation of FoPL systems focused on nutritional value, such as the Nutri-Score, which ranks foods from E to A based on their nutritional quality. This system, introduced in France in 2017, considers nutrients that should be limited (e.g., sugar, salt) and those that should be encouraged (e.g., fiber, protein). Additionally, other countries, such as South Africa, have introduced warning labels on foods high in sugar, fat, or salt (Mahomedy, 2023). This reflects a broader global trend toward increased scrutiny of the nutritional content of foods, with a particular emphasis on the role of sugar.

1.1.3 Identified Research Gap & Expected Contribution

FoP warning labels have been extensively studied, primarily in the context of tobacco products, where existing research generally concurs on the potential positive health effects of

implementing warning FoPLs. However, research focusing on food products remains limited. Studies have shown that nutritional rankings, such as the Nutri-Score or reference intake, have been successful in the grocery industry, enhancing customer knowledge and promoting healthier dietary choices. The reference intake system is currently implemented in the Swedish market (Pettigrew et al., 2024). Furthermore, recent research suggests the superiority of highlighting short-term costs over long-term costs, contrary to traditional interventions that emphasize long-term consequences on FoP warning labels(Stillman & Woolley, 2023).

Given the substantial variability in consumer behavior influenced by cultural, personal and economic factors, it is inappropriate to directly extrapolate findings from previous studies analyzing FoP warning labels on products with high sugar content to the Swedish context. Recognizing these differences is crucial for a comprehensive understanding of the potential impact of FoP warning labels in Swedish society. Therefore, this study aims to specifically identify the potential effects of FoP warning labels in Sweden, providing insights to determine whether such implementation could achieve the intended objectives.

Another interesting potential moderator that affects the purchase intention is the connection to future self. A previous study has recommended future research to analyze one's connection to future self and the impact on purchase intention. They hypothesize that long-term costs may be as or even more effective than short-term costs for those that have a strong connection to their future selves. This moderator could bring an interesting and new lens on FoP health warning labels and its effectiveness on different consumer groups (Stillman & Woolley, 2023).

Another factor potentially falsely representing the data is price differences and brand equity. Previous studies have analyzed the effects of FoP warning labels on products containing high amounts of sugar but displayed various price options next to each label. This approach might affect the results of analyzing the effect warning labels have on the purchase probability since economic conditions come into play. Furthermore, displaying labels on a product where the brand is clearly shown might affect the results as well. Depending on the brand, different consumers might have different predetermined perceptions of the quality and desirability of that brand, which might affect the purchase intention (Mehlhose et al, 2023).

1.1.4 Definition of Foods High in Free Sugars

As formally defined by WHO, free sugars refer to “monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates” (WHO, 2015). The inclusion of sugars even from, for instance, fruit juices and smoothies underlines the broad scope of what constitutes free sugars. This extensive definition is employed to provide a comprehensive approach towards reducing sugar intake and mitigating related health risks. In this context, a high intake of free sugars is defined as an intake that exceeds 10% of an individual's total daily energy intake. WHO further advises that reducing this intake to below 5% of total energy intake, which is approximately 25 grams (or around 6 teaspoons) per day, could provide additional health benefits (WHO, 2015). When it comes to specific food items, they are considered high in sugars if they contain more than 15g of total sugars per 100g (IARC, n.d.).

1.2 Purpose

The study aims to elucidate the relationship between FoPL on the one hand and both purchase intention and health risk perception on the other hand, thereby guiding the formulation of targeted public health interventions to encourage healthier dietary choices. Furthermore, the moderation effect of individuals’ connection to their future selves on these relationships will be studied regarding FoPL highlighting long-term costs. By conducting experiment-based surveys, this study aims to identify the type of health costs that need to be highlighted to contribute to a successful health warning message. Additionally, the findings will provide insights that can assist companies and governments to successfully educate consumers and lower the level of unhealthy food consumption in society.

This implies the following research questions:

- How does highlighting short-term versus long-term health costs on FoPL differ in effectiveness regarding decreasing the purchase intention of foods high in free sugars and increasing the perception of health risks associated with their consumption?

- How does individuals' connection to their future selves affect their receptivity to FoPL highlighting long-term costs?

1.3 Focus and Delimitations

As with any study, there are some delimitations. Firstly, the number of available Swedish respondents via Prolific is limited, meaning that the statistical power and generalizability of the results might be weaker. This is especially apparent if analyzing certain sample groups with rare demographic attributes. Furthermore, this study only analyzes FoP warning labels in the form of warning messages. Warning messages were chosen because of ease of creation as well as most likely understandable among respondents. Moreover, geographical demarcation was also made for Sweden only to more accurately reflect the results. This study only analyzed one product type being a chocolate bar which decreases the findings generalizability. However, adding numerous products would increase the required sample size significantly. Moreover, this study aims to mitigate potential influencing factors such as brand loyalty or price sensitivity to ensure a more accurate evaluation of the results. Additionally, it is important to note that this study does not directly assess individual consumption levels but rather evaluates the efficacy of a potential tool for enhancing consumption habits.

1.4 Disposition

The following section of the theoretical framework (2) presents the theories that are relevant for the performance of study. Hypothesis formulation section (3) posits hypotheses related to the impact of short-term and long-term health cost warnings on consumer behavior, addressing both purchase intention and health risk perception. The research methodology (4) is thoroughly outlined, detailing the study's scientific approach, survey design, measures and data collection processes, ensuring robust and reliable data gathering. Analysis and results (5) are presented, including descriptive statistics and hypothesis testing, which lay the groundwork for a comprehensive discussion on the theoretical and managerial implications of the findings. The thesis concludes with an extensive discussion (6) followed by reflections on the limitations of the study and suggestions for future research, along with final remarks on the significance of the study's contributions to the field.

2.0 Theoretical Framework

2.1 Warning Labels and the Psychological Effects on Consumer Behavior

FoPL influences consumer purchase decisions through the framing of its message, which can be either gain or loss framed. Gain framing presents information emphasizing the potential positive effects or gains, such as the enjoyment derived from consuming a cookie or the health benefits of avoiding it. Conversely, loss framing highlights the risks or potential losses, such as the sugar crash resulting from eating a cookie. The concept of framing is closely associated with the work of Daniel Kahneman and Amos Tversky in prospect theory. Their research sheds light on how individuals perceive losses and gains, with the proposed value function revealing heightened sensitivity to losses compared to equivalent gains (Kahneman et al., 1979). Subsequent research has tested this theory by examining the effects of gain versus loss framing on consumer purchase decisions (Gamliel et al., 2007).

The presentation of framing information also influences psychological reactions, with differences in framing effects attributed to variations in information accessibility. Limited cognitive resources often result in a preference for easily understandable and accessible information (Thomas et al., 2011). This phenomenon aligns with the theory of availability heuristics, which posits that individuals tend to rely on readily accessible information that comes to mind quickly and easily when making decisions about future events (Tversky & Kahneman, 1974). Additionally, the affect heuristic plays a crucial role in shaping psychological reactions to framing. This heuristic acts as a shortcut, leading individuals to heavily rely on their emotional state when making decisions, rather than thoroughly considering the long-term implications of their choices. As a result, individuals may be inclined to favor options framed to evoke an immediate emotional response over those that require deeper consideration of long-term consequences. Framing often involves emotional appeals intentionally crafted to elicit specific emotional reactions (Yacoub et al., 2019).

Additionally, evidence suggests that the temporal context of a message can affect its interpretation. A message can be classified into present-oriented and future-oriented frames depending on the time perspective (Liberman & Trope, 2003). The construal level theory (CLT) posits that temporal distance affects how people mentally represent and respond to future events, with distant events being construed more abstractly and near events more

concretely. This construal shift influences evaluations, preferences, and predictions, making high-level aspects more significant in the distant future and low-level aspects more significant in the near future (Liberman & Trope, 2003). The theory suggests that over time, the value tied to high-level construals increases, while the value linked to low-level construals decreases. Furthermore, the construal level theory suggests that desirability (the value or attractiveness of an outcome) is a high-level construal, while feasibility (the ease of attaining an outcome) is a low-level construal. Lastly, predictions about future events are more confident and based on high-level traits when the events are farther in the future. As the event draws nearer, predictions become less confident and more influenced by situational factors (Liberman & Trope, 2003). Subsequent studies have extended the research of this theory and identified temporal context as a moderator of framing effects, thereby emphasizing the importance of distinguishing between short-term and long-term consequences (Gerend & Cullen, 2008). To provide a framework for this study using construal level theory, an example may be that, in the short-term, individuals perceive risks vividly and concretely, heightening their sense of immediacy and urgency, such as getting a sugar crash after eating a chocolate. Conversely, long-term risks are often viewed in abstract terms, like the risk of getting diabetes because of excessive consumption of free sugars, which may lead to underestimating their impact due to a lack of immediate, tangible consequences.

Another theory relevant to understanding the psychological and behavioral dynamics of warning labels is protection motivation theory (PMT). This model posits that cognitive processes play a crucial role in mediating the effects of fear appeals on behavior change. Fear appeals, which aim to induce fear through messaging, have been generally effective in eliciting attitude change. PMT delineates three key cognitive appraisal processes triggered by fear appeals. Firstly, individuals evaluate the severity of the threatened event. Perceiving the severity as elevated can heighten one's sense of vulnerability and emphasize the importance of taking protective measures. Conversely, underestimating the severity may lead to diminished motivation to respond proactively. Secondly, individuals assess the probability of the threat's occurrence. Perception of a high likelihood enhances feelings of vulnerability and underscores the need for protective measures. Conversely, perceiving a low probability may lead to underestimating risks and reduced inclination towards preventive actions. Lastly, PMT considers the efficacy of recommended coping responses. Strong efficacy in coping responses boosts individuals' confidence in their ability to manage the threat, thus increasing

motivation to adopt recommended behaviors. Conversely, low efficacy may create uncertainty about the effectiveness of suggested actions, diminishing the propensity to adopt protective behaviors. In the context of fear appeals and attitude change, emphasizing the effectiveness of coping responses in messages can enhance individuals' perceived capability to manage the threat, consequently elevating the likelihood of behavior change (Maddux & Rogers, 1983).

2.2 Connection to Future Self

In his seminal work, Parfit (1984) explores the concept of an individual's persistence over time. In a hypothetical teletransportation scenario, a person is scanned, destroyed at the original location (Earth) and then exactly replicated at a new location (Mars), including all their memories, personality traits and physical characteristics. A legitimate question arises: Is the person who arrives on Mars the same person who was scanned and destroyed on Earth? Parfit uses this thought experiment to challenge traditional views of personal identity, which often rely on physical continuity or the persistence of an immaterial soul (Parfit, 1984). He argues that what matters for survival is psychological connectedness and continuity, not the particular matter that constitutes our bodies or the presence of an immaterial soul. Psychological connectedness is defined as "the holding of particular direct psychological connections" e.g, memories and beliefs (Parfit, 1984). Meanwhile, psychological continuity is defined as "the holding of overlapping chains of strong connectedness" (Parfit, 1984). This approach opened the door for further research in consumer behavior, offering a valuable framework for exploring how individuals' connection to their future self influences their purchasing decisions and consumer habits.

In recent years, research has empirically investigated three principal theoretical frameworks regarding individuals' connections to their future selves: the concept of the future self as another entity, the notion of continuity between one's present and future selves and the idea of failures of imagining the future self (Hershfield & Bartels, 2018). The first perspective, the future self as another, posits that individuals sometimes see their future selves as separate entities. An example is a young boy who begins smoking, aware of the negative future health impacts but indifferent due to his current self's lack of concern for his future well-being (Parfit, 1984). This separation can influence decision-making, as the emotional and psychological distance may affect one's willingness to make sacrifices for the future self's

benefit (Parfit, 1984). The degree of connection or detachment from this conceptualized 'other' might play a crucial role in whether decisions are made in favor of long-term well-being (Hershfield & Bartels, 2018). The second buddy of theories, which studies the continuity between one's present and future selves, argues that a sense of connection and overlap between the present and future selves fosters decisions that are more considerate of future outcomes (Hershfield & Bartels, 2018). This perspective suggests that a strong sense of personal identity extending over time encourages a more future-oriented approach to decision-making, as individuals are more likely to value and prioritize the well-being of a future self they feel closely aligned with. Individuals with a stronger perceived continuity between their present and future selves have been proved to more likely value future rewards, exhibiting increased saving behaviors and greater financial asset accumulation (Ersner-Hershfield et al., 2009). Hershfield (2011) underscores two key components of future self-continuity that significantly influence intertemporal choices: similarity to future self and vividness of future self. Lastly, the failures of imagination perspective highlights the challenges individuals face in vividly picturing their future selves and the subsequent effects of these challenges on decision-making (Hershfield & Bartels, 2018). The theory suggests that a clearer, more vivid imagination of the future self could lead to decisions that better account for future well-being, indicating that the ability to project oneself into the future in a detailed and realistic manner is crucial for prudent decision-making.

3.0 Hypothesis Formulation

3.1 FoPL Highlighting Short-term Costs

Research indicates that people often make rapid, heuristic-based decisions when faced with uncertainty (Tversky & Kahneman, 1974) and FoPL can provide easily accessible information that influences these decisions (Bialkova & van Trijp, 2010). The highlighting of short-term costs of consuming unhealthy foods may have a direct impact on purchasing decisions (Stillman & Woolley, 2023). These decisions are theorized to be less influenced by one's connection to future self, as they are immediate and tangible (Stillman & Woolley, 2023).

It is hypothesized that the FoPL which clearly highlights the short-term costs associated with high free sugar content (indigestion and sugar crash) can reduce the purchase intention of such products. This hypothesis expects that the immediacy of the negative impact will resonate with all consumers, regardless of their connection to their future selves, due to the universal appeal of avoiding immediate negative outcomes.

H1a: FoPL that highlights **short-term costs** of consuming foods high in free sugars is hypothesized to **decrease the purchase intention** of such foods among consumers compared to the control group **regardless** of the consumers' level of connection to their future selves.

Similarly, this hypothesis proposes that when the short-term health risks are made explicit on the packaging, consumers will perceive these foods as riskier, enhancing their overall health risk perception. This effect is expected to occur independently of how connected individuals feel to their future selves, as the information pertains to immediate consequences that all consumers might wish to avoid.

H1b: FoPL that highlights **short-term costs** of consuming foods high in free sugars is hypothesized to **increase the health risk perception** of such foods among consumers compared to the control group **regardless** of the consumers' level of connection to their future selves.

3.2 FoPL Highlighting Long-term Costs

While the FoPL highlighting short-term costs of consuming unhealthy foods can influence all consumers, the effectiveness of labeling that emphasizes long-term costs might depend more significantly on individuals' connection to their future selves (Stillman & Woolley, 2023). Additionally, the theory of self-continuity suggests that individuals who feel a stronger connection to their future selves are more likely to consider long-term consequences in their present-day decisions, including those related to health (Hershfield, 2011).

This hypothesis explores whether the FoPL that highlights long-term costs of consuming foods high in free sugars (obesity and diabetes) will effectively reduce purchase intention among consumers who have a high-level connection to their future selves. It is motivated by the premise that these consumers are more inclined to value and be influenced by information that impacts their long-term health.

H2a: FoPL that highlights **long-term costs** of consuming foods high in free sugars is hypothesized to **decrease the purchase intention** of such foods among consumers compared to the control group **only** if the consumers have a high-level connection to their future selves.

Correspondingly, this hypothesis predicts that the FoPL highlighting long-term health costs will elevate health risk perceptions among consumers with a high connection to their future selves. The rationale is that these individuals are more receptive to warnings about future consequences, potentially leading to a greater perceived risk.

H2b: FoPL that highlights **long-term costs** of consuming foods high in free sugars is hypothesized to **increase the health risk perception** of such foods among consumers compared to the control group **only** if the consumers have a high-level connection to their future selves.

4.0 Research Methodology

4.1 Scientific Approach

This study adopts a quantitative research method for the systematic gathering and examination of data. An experimental setup was arranged in which participants were exposed to a stimulus, presented within the context of a self-administered survey featuring standardized questions and response options. This approach facilitates efficient collection, analysis and summarization of data, unlike approaches where both questions and responses are unique to each respondent (Söderlund, 2005). Standardization is crucial for enabling the generalizability of findings, thereby increasing their value for consideration in the adaptation of public health policies. Within this framework, statistical analysis can be applied to compare the various variables and explore their interactions. This includes, among other aspects, examining the impact of consumers' connection to their future selves on their responses to the FoPL that highlights long-term health costs associated with consuming foods high in free sugars. Such analyses are essential for conclusive hypothesis testing, providing empirical support for the effectiveness of different FoPL strategies.

4.2 Survey Design

The self-administered survey was designed to gather the quantitative data necessary for the analyses. Initially, participants were prompted to answer six questions that explore various dimensions of connection to the future self. Subsequently, participants were randomly presented with one of three stimuli: the first one was a chocolate bar featuring a FoPL emphasizing short-term health costs of excessive consumption of foods rich in free sugars, stating: "Excessive consumption of sugar causes indigestion and sugar crash". The second stimulus included the same chocolate bar but featuring a FoPL emphasizing long-term health costs of such dietary habits, stating: "Excessive consumption of sugar causes obesity and diabetes". The third stimulus included an identical chocolate bar but without any health-related FoPL, which will be the control group. The complete survey including the images of all three chocolate bar variations is included in the appendix for reference.

Following exposure to one of these stimuli, respondents were placed in a hypothetical scenario that reads, "Below you will find a possible product in a grocery store. Imagine encountering it the next time you consider purchasing a chocolate bar. Please examine the

picture thoroughly before responding to the subsequent questions". This is followed by two constructs, comprising three items each. The first construct aims to assess purchase intention, while the second evaluates the health risk perception of excess consumption of foods high in free sugars. A manipulation check was then conducted, asking respondents to identify which of the three stimuli they were exposed to. This step verifies whether the manipulation was perceived as intended. Given the extensive research on the short-term versus long-term health risks associated with excessive consumption of free sugars within the health domain, a preliminary study to test this aspect was deemed unnecessary; a manipulation check suffices. This process serves a validation purpose; an excessively high failure rate in the manipulation check could indicate potential inaccuracies in the research design. It also provides an additional variable to consider during data analysis, to check how the exclusion of participants who fail to correctly identify the stimulus they encountered affect the results of the analyses.

The survey continued with a dual-response item inquiring whether the specific FoPL under consideration should be implemented. This was accompanied by an optional open-ended question, enabling respondents to furnish detailed feedback. Such contributions provide valuable insights that can inform future research directions. Furthermore, in the concluding part of the survey, participants were requested to disclose their gender and age, with the latter being reported on an interval scale. Finally, an attention check was performed, consisting of a straightforward arithmetic question. This was designed to verify respondents' attentiveness and engagement with the survey content, ensuring the reliability of the data collected.

4.3 Measures

Despite general demographic variables, three study-specific variables were measured, each through a distinct construct in the survey. Individuals' connection to their future selves have been, throughout scholarly research, assessed using various methodologies. A prominent method is the "future self-continuity" index, which comprises two items designed to gauge (1) the perceived similarity and (2) the sense of connection an individual feels towards their future self. These questions are to be responded to using a 7-point scale, delineated at each interval by two circles illustrating a spectrum from no overlap to almost complete overlap (Ersner-Hershfield et al., 2009). Nevertheless, a more recent study has introduced a triadic model referred to as "future self-identification", highlighting the importance of taking in

account relatedness, vividness, and positivity altogether (Bixter et al., 2020). This framework suggests that an individual's bond with their future self, the precision with which they can visualize this future identity, and the positive emotions associated with it, play pivotal roles in influencing decision-making processes and behaviors directed towards achieving future-oriented objectives (Bixter et al., 2020). Accordingly, beyond the two-item index proposed by Ersner-Hershfield et al. (2009), which addresses the dimension of relatedness, this new approach introduces additional measures for capturing vividness and positivity. To assess vividness, two items are included to evaluate the (1) clarity and (2) ease of envisioning one's future self. In terms of positivity, additional two items measure the (1) perceived likelihood and (2) attitude towards the future self (Bixter et al., 2020). The authors empirically validate both the convergent and discriminant validity of the model, suggesting that the indicators effectively capture their respective factors and that these factors are independent of each other.

Hence, in this study, connection to future self was measured through Bixter et al.'s (2020) triadic conceptual framework of future self-identification. The internal consistency reliability of these items, as measured by Cronbach's alpha, was 0.83, signifying good reliability. This is notably higher than the mean Cronbach's alpha value of 0.75 typically observed in published marketing research studies (Söderlund, 2005). It is important to note that the acceptable threshold for Cronbach's alpha can vary, with suggested values ranging from 0.6 to 0.9 (Söderlund, 2005). For the purpose of this study, a Cronbach's alpha of at least 0.75 was deemed the minimum criterion for scale validity, reflecting the average alpha level reported in the literature within this field.

Purchase intention was measured through three items specifically designed for this study. The items were negatively coded to make respondents put more effort in understanding them, thus, they will subsequently be reversed for the analysis (Söderlund, 2005). Generally, custom-designed items should be avoided as they may pose challenges for comparison with other studies within the same domain (Söderlund, 2005). However, purchase intention as a variable was mostly measured in the context of studies examining attitudes towards ads and brands, with Bearden et al. (1984) recommending the use of the four bipolar statements: “likely-unlikely, improbable-probable, possible-impossible, and uncertain-certain” to measure it. Bergkvist & Rossiter (2009) later proposed a simplified approach, utilizing only two items (unlikely-likely and uncertain-certain) accompanied by a specific question for

evaluating them. Given the absence of a specific brand in this study, it was decided to proceed with the creation of custom-designed items. These items demonstrated an acceptable Cronbach's alpha of 0.85, indicating high reliability when combined into one scale. The Kaiser-Meyer-Olkin test yielded a KMO value of 0.68 ($p < 0.001$), indicating sufficient sampling adequacy, KMO above 0.6, for conducting factor analysis on the dataset (Vogt, 2005). Factor analysis revealed that all three items loaded significantly on a single factor describing 77% of the variance with an eigenvalue of 2.3, surpassing the commonly accepted threshold of 1 as per the Kaiser criterion, and exhibited factor loadings for each of the three items ranging from 0.8 to 0.92—well above the generally accepted threshold of 0.4. This indicates a strong association of these items with the underlying factor they are intended to measure and that they are only measuring one single dimension, i.e., they are not measuring different latent variables.

Similarly, the three items assessing health risk perception were uniquely designed for this study. In the relevant literature, health risk perception is defined as the "perception of the subjective likelihood of the occurrence of a negative event related to health for a person or group of people over a specified time period" (Menon et al., 2008). In this study, these items demonstrated a Cronbach's alpha of 0.88, indicating high reliability. The Kaiser-Meyer-Olkin test yielded a KMO value of 0.67 ($p < 0.001$), indicating sufficient sampling adequacy for conducting factor analysis on the dataset. Factor analysis revealed that all items loaded on a single factor describing 82% of the variance with an eigenvalue of 2.4, exceeding the Kaiser criterion threshold of 1, with factor loadings between 0.84 and 0.95. This exceeds the acceptable level of 0.4, confirming a strong linkage between the items and the factor they loaded on.

4.4 Data Collection

The survey was distributed online via Prolific, a paid academic-oriented access panel, through the recruitment of 161 participants from Sweden. To maximize response rates, the survey is designed to be user-friendly and can be completed within 3 minutes. Participation in the survey is entirely voluntary, with an emphasis on anonymity and confidentiality to promote honest and candid responses.

Utilizing a professional survey distribution service like Prolific offers several advantages over, for instance, the informal method of disseminating surveys to friends and relatives, particularly in the context of academic and scientific research. Firstly, Prolific provides access to a diverse and extensive participant pool, enabling reaching specific demographics and ensuring a broader representation of the population. This diversity enhances the generalizability of the findings, a critical aspect often lacking in surveys limited to personal networks. Secondly, the use of Prolific ensures a higher degree of data quality and reliability. Participants on Prolific are experienced in taking part in research studies and are often more engaged and attentive to the survey content than acquaintances might be. This can lead to more thoughtful and accurate responses. Thirdly, Prolific has mechanisms in place to verify the identity and demographic information of participants, further enhancing the integrity of the data collected. Lastly, Prolific allows for the ethical compensation of participants for their time and effort. This not only supports the principle of fair treatment but can also increase participation rates and reduce the likelihood of incomplete responses. The platform's structured approach to participant compensation is in stark contrast to the informal exchanges often associated with surveys distributed among personal contacts.

4.5 Data Analysis

Upon collecting the survey data, it will be cleaned and prepared for analysis. Descriptive statistics will provide a snapshot of the sample characteristics and the central tendencies of responses. Inferential statistics, including chi-square tests, will be utilized to examine any additional relationships between demographic variables and purchase intention and health risk perception. Furthermore, multiple regression analysis will be conducted to identify significant predictors of purchase intention and health risk perception, controlling for potential confounding variables.

To ensure the robustness of the findings, sensitivity analyses will be performed to assess the impact of missing data and potential response biases. Additionally, subgroup analyses will explore differences in experiences based on demographics. Due to the low statistical power of the study given its small sample size, all statistical tests with a p-value below 0.1 will be considered marginally significant to capture all potential effects. However, for a result to be considered statistically significant, the formal commonly used significance level of a two-sided p-value below 0.05 will be used.

4.6 Ethical Considerations

This study is conducted with strict adherence to ethical standards. Informed consent is obtained from all participants, with clear communication regarding the purpose of the research, the confidentiality of responses and the voluntary nature of participation.

5.0 Analysis and Results

5.1 Descriptive Statistics

Totally 161 (100%) responses were registered. No respondents failed the attention check at the end of the survey. 91 (56.5%) of the respondents identified as male, 68 (42.2%) as female and 2 (1.2%) as non-binary. Regarding age, the largest group of respondents were between the ages 20-29 years old, consisting of 74 (46%) respondents. 30-39 years of age were the second largest group consisting of 55 (34.2%) respondents. Other age groups were represented much less, representing less than 10% each. The three different stimuli were presented equally often, 53 (33%) of the respondents were exposed each for one of the three stimuli. Among respondents exposed to the short-term costs stimulus, 41 (75.9%) respondents believed that such a warning label should be implemented. However, only 34 (63%) of respondents exposed to the long-term costs stimulus believed that such a warning label should be implemented. Furthermore, 20 (12.2%) respondents failed the manipulation check, meaning that they perceived the stimulus they were exposed to differently than the intended manipulation of the stimulus. 53 (32.9%) of the respondents answered the only optional, open ended question. As mentioned earlier, this question is not directly connected to hypothesis testing, rather, it will be of greater use in gaining insights for discussion and future research.

Chi-square tests of independence were utilized to assess whether significant differences existed in the distributions of age and gender among the three distinct respondent groups. The findings indicated no statistically significant differences concerning age ($p = 0.61$) or gender ($p = 0.17$). Additionally, a one-way ANOVA test was conducted to evaluate potential differences in the level of connection to one's future self among the three groups. The analysis revealed a statistically marginally significant difference ($p = 0.073$), indicating that respondents, prior to exposure to the three different stimuli, may have exhibited differing levels of connection to their future selves.

5.2 Hypothesis Testing

Given the relatively small sample size, the responses from the twenty respondents that failed the manipulation check will be retained for subsequent analyses. Although these respondents did not fully comprehend the stimulus, they were nonetheless still exposed to it, which may

have influenced their responses. The hypothesis testing employs a two-step approach. Initially, a series of independent samples t-tests will be conducted for each FoPL to determine if exposure to the specific FoPL, compared to a control condition, affects consumers' purchase intention and health risk perception. Subsequently, a moderation analysis, utilizing Hayes' (2022) PROCESS Model 1, will be carried out to examine whether the effects of the two FoPL differ based on consumers' connection to their future selves. An illustration of this model is provided in the appendix. Hypotheses H1a and H1b, which suggest that the effects for the short-term costs FoPL occur regardless of the level of consumers' connection to their future selves, will be supported if the t-tests yield statistically significant results in the predicted direction and the interaction coefficients from the moderation analyses are statistically insignificant. Conversely, Hypotheses H2a and H2b, which suggest that the effects for the long-term costs FoPL only occur among consumers with a high-level connection to their future selves, will be supported if the t-tests yield statistically insignificant results and the interaction coefficients from the moderation analyses are statistically significant in the predicted direction.

5.2.1 FoPL Highlighting Short-term Costs

*"**H1a:** FoPL that highlights **short-term costs** of consuming foods high in free sugars is hypothesized to **decrease the purchase intention** of such foods among consumers compared to the control group **regardless** of the consumers' level of connection to their future selves."*

First step: An independent samples t-test was conducted with the type of stimuli (short-term costs FoPL vs. control group) as the grouping variable and the purchase intention scale variable as the test variable. The results indicated a significantly lower mean purchase intention in the group exposed to the short-term costs FoPL ($M = 3.75$, $SD = 1.49$) compared to the control group ($M = 4.37$, $SD = 1.51$), $t(105) = -2.16$, $p = 0.034$. A Cohen's d of -0.42 demonstrated a moderate negative effect size, indicating that the group exposed to the short-term costs FoPL scored lower by 0.42 standard deviations on the purchase intention scale.

Second step: A simple moderation analysis conducted via Hayes' (2022) PROCESS model 1 indicated that the interaction between the binary grouping variable including the control group (0) and the short-term costs FoPL (1) and the connection to the future self scale variable (1-7) was statistically insignificant ($B = -0.11$, $SE = 0.27$, $t = -0.40$, $p = 0.69$).

Summarily, the hypothesis is supported by the statistically significant decrease in purchase intention, $p = 0.034$ and the statistical insignificance of the interaction term, $p = 0.69$.

*"**H1b:** FoPL that highlights **short-term costs** of consuming foods high in free sugars is hypothesized to **increase the health risk perception** of such foods among consumers compared to the control group **regardless** of the consumers' level of connection to their future selves."*

First step: A similar independent samples t-test was conducted to test this hypothesis, using the same grouping variable (short-term costs FoPL vs. control group) but employing the health risk perception scale variable as the test variable. The results indicated a significantly higher mean health risk perception in the group exposed to the short-term costs FoPL ($M = 4.46$, $SD = 1.29$) compared to the control group ($M = 1.90$, $SD = 1.23$), $t(105) = 10.51$, $p < 0.001$. A Cohen's d of 2.03 demonstrated a substantial positive effect size, indicating that the group exposed to the short-term costs FoPL scored higher by 2.03 standard deviations on the health risk perception scale.

Second Step: The subsequent simple moderation analysis conducted via Hayes' (2022) PROCESS model 1 indicated that the interaction between the binary grouping variable including the control group (0) and the short-term costs FoPL (1) and the connection to the future self scale variable (1-7) was statistically insignificant ($B = -0.10$, $SE = 0.23$, $t = -0.43$, $p = 0.67$). Summarily, the hypothesis is supported by the statistically significant increase in health risk perception, $p < 0.001$ and the statistical insignificance of the interaction term, $p = 0.67$.

5.2.2 FoPL Highlighting Long-term Costs

*"**H2a:** FoPL that highlights **long-term costs** of consuming foods high in free sugars is hypothesized to **decrease the purchase intention** of such foods among consumers compared to the control group **only** if the consumers have a high-level connection to their future selves."*

First Step: An independent samples t-test was conducted using the type of stimuli (long-term costs FoPL vs. control group) as the grouping variable and the purchase intention scale variable as the test variable. The results indicated a statistically insignificant lower mean

purchase intention in the group exposed to the long-term costs FoPL (M = 4.14, SD = 1.51) compared to the control group (M = 4.37, SD = 1.51), t(105) = -0.81, p = 0.42. This shows that the FoPL highlighting long-term costs did not have a statistically significant effect on the purchase intention of consumers in general, regardless of their level of connection to their future selves.

Second Step: The subsequent simple moderation analysis conducted via Hayes' (2022) PROCESS model 1 indicated that the interaction between the binary grouping variable including the control group (0) and the long-term costs FoPL (1) and the connection to the future self scale variable (1-7) was statistically insignificant (B = 0.02, SE = 0.23, t = 0.87, p = 0.39). Summarily, the hypothesis is not supported because of the statistical insignificance of the interaction variable, p-value = 0.39.

*"**H2b:** FoPL that highlights **long-term costs** of consuming foods high in free sugars is hypothesized to **increase the health risk perception** of such foods among consumers compared to the control group **only** if the consumers have a high-level connection to their future selves."*

First Step: Similarly, an independent samples t-test was conducted using the type of stimuli (long-term costs FoPL vs. control group) as the grouping variable and the health risk perception scale variable as the test variable. The results indicated a statistically significant higher mean health risk perception in the group exposed to long-term costs FoPL (M = 3.55, SD = 1.56) compared to the control group (M = 1.90, SD = 1.23), t(105) = 6.05, p < 0.001. A Cohen's d of 1.17 demonstrated a substantial effect size, indicating that the group exposed to the long-term costs FoPL scored higher by 1.17 standard deviations on the health risk perception scale.

Second Step: The subsequent simple moderation analysis conducted via Hayes' (2022) PROCESS model 1 indicated that the interaction between the binary grouping variable including the control group (0) and the long-term costs FoPL (1) and the connection to the future self scale variable (1-7) was statistically insignificant (B = -0.12, SE = 0.22, t = -0.54, p = 0.63). Summarily, the hypothesis is not supported because of the statistical insignificance of the interaction variable, p-value = 0.63.

Additional analysis: Though not initially part of the hypothesis testing framework, an independent samples t-test was conducted to compare the effects of the short-term costs FoPL versus the long-term costs FoPL on health risk perception. This is motivated by the fact that both, on their own, increased the mean health risk perception compared to the control group. This analysis showed a significant increase in health risk perception in the group exposed to short-term costs FoPL (M = 4.46, SD = 1.29) compared to long-term costs FoPL (M = 3.55, SD = 1.56), $t(106) = 3.3$, $p < 0.001$. A Cohen's d of 0.64 indicates a medium effect size. Summarily, this finding indicates that the short-term costs FoPL is more effective compared to the long-term costs FoPL in increasing health risk perception.

5.3 Results Summary

Table 1: Mean comparisons (standard deviation)

	Short-term costs FoPL	Long-term costs FoPL	Control group	Statistical significance test
Purchase intention (H1a, first step)	**3.75 (1.49)**		**4.37 (1.51)**	**t = -2.16, p = 0.034**
Health risk perception (H1b, first step)	**4.46 (1.29)**		**1.90 (1.23)**	**t = 10.51, p < 0.001**
Purchase intention (H2a, first step)		4.14 (1.51)	4.37 (1.51)	t = -0.81, p = 0.42
Health risk perception (H2b, first step)		**3.55 (1.56)**	**1.90 (1.23)**	**t = 6.05, p < 0.001**
Health risk perception (Additional test)	**4.46 (1.29)**	**3.55 (1.56)**		**t = 3.3, p < 0.001**

Table 2: Moderation effects

	Interaction coefficient	Statistical significance test
Purchase intention (H1a, second step)	-0.11	t = -0.40, p = 0.69
Health risk perception (H1b, second step)	-0.10	t = -0.43, p = 0.67
Purchase intention (H2a, second step)	0.02	t = 0.87, p = 0.39
Health risk perception (H2b, second step)	-0.12	t = -0.54 p = 0.63

6.0 Discussion and Implications

The rise in obesity in Sweden shows no signs of decreasing. Currently, over half of the Swedish population is overweight. Various factors, including lifestyle habits, stress, sleep disorders and psychological illnesses, contribute to the likelihood of developing obesity or being overweight. These factors are closely intertwined with a critical element: our physical and social environment. The availability of unhealthy foods, their pricing, marketing strategies and the conditions for engaging in physical activity are all pivotal in guiding society towards better health. The easy accessibility of fast food and other unhealthy options, combined with persuasive marketing campaigns, complicates societal efforts to prevent obesity (Folkhälsomyndigheten, 2023).

In light of these considerations, the research aimed to investigate a potential intervention targeting the marketing of foods, specifically the use of loss framing through FoP warning labels. Our study sought to determine whether such labels, which emphasize short-term versus long-term health costs, could yield positive benefits at the point of purchase. Additionally, the study examined whether the perceived health risks of unhealthy foods could be reinforced by these labels. The resulting insights could assist public health agencies in incorporating interventions designed to promote a healthier lifestyle within society. Current research indicates that exposure to FoP warning labels on unhealthy food products has the potential to encourage healthier food consumption and educate consumers about the risks associated with poor diets. Furthermore, individuals' connection to their future selves has been proposed as a potential moderator of the effect of FoP warning labels when emphasizing long-term costs. This aspect represents a novel and previously unexamined addition to the concept of loss framing.

6.1 Theoretical Implications

Prior literature has examined the effects of FoPL on purchase intention and health risk perception by utilizing images and/or text. However, to the authors' knowledge, there is no quantitative research addressing the Swedish population while also controlling for factors such as brand equity or price, which might influence consumer behavior. Additionally, the concept of an individuals' connection to their future selves is notably absent in this research field. Therefore, the primary contribution of this study is to narrow down and examine the effects of FoPL in a more specific and controlled scenario while simultaneously exploring the

concept of connection to future self as a potential moderator. This dual focus enhances both the examination and applicability of the findings, making this report unique.

6.1.1 The Effects of Highlighting Short-term Costs

Our findings indicate that adding FoPL on food products that highlight short-term costs increases consumers' health risk perception compared to products without such labels. Furthermore, consistent with previous studies, this report confirms that consumers' purchase intention is decreased when short-term costs are highlighted via warning labels on packaging (Stillman & Woolley, 2023). This suggests that FoPL emphasizing effects such as indigestion and sugar crash for products high in free sugars can effectively curb the undesirable behavior of excessive sugar consumption. Our evidence supports the notion that loss framing in terms of short-term costs is effective. Consumers aim to avoid the negative consequences associated with these actions, thus avoiding the purchase and consumption of such products (Kahneman et al., 1979).

According to the theory of availability heuristics, warning labels that emphasize short-term costs, such as indigestion and sugar crash, highlight relatively common and frequently occurring events that most people have experienced, making them easily accessible and comprehensible. This information significantly influences decision-making processes, thereby reducing the likelihood of purchase and consumption (Thomas et al., 2011; Tversky & Kahneman, 1974).

Moreover, the protection motivation theory suggests that all three cognitive appraisal processes are triggered by the FoPL highlighting short-term costs used in this study. Firstly, the perceived severity of the event is heightened through the potential negative consequences of consumption. Secondly, the probability of occurrence is perceived as high since indigestion and sugar crash are common effects of consuming high levels of sugar. Thirdly, the efficacy of coping responses is high, as avoiding the purchase will entirely eliminate the likelihood of experiencing these adverse effects (Maddux & Rogers, 1983). These theoretical frameworks underpin the results observed in this study.

6.1.2 The Effects of Highlighting Long-term Costs

Previous studies have analyzed the influence of short-term versus long-term costs on consumer behavior and purchase intention. The results suggest a distinction between the

effects of short-term and long-term costs (Mehlhose et al., 2023), with some researchers arguing that short-term costs are more effective (Stillman & Woolley, 2023). Our study demonstrated a similar pattern, showing no significant effect on purchase intention when long-term costs, such as diabetes and obesity, were highlighted. This indicates that emphasizing long-term costs on FoPL is not an effective strategy to reduce excessive sugar consumption. However, in terms of health risk perception, long-term costs did show a significant effect. Consumers exposed to these warning labels recognized the severe health risks, yet this recognition did not sufficiently motivate them to alter their behavior. Our findings, therefore, reveal that while both short-term and long-term costs significantly affect health risk perception, consumers are only inclined to take action when confronted with short-term costs. This is intriguing, given that diabetes and obesity are generally considered more severe than a sugar crash or indigestion.

Several factors may explain this discrepancy. Firstly, the affect heuristic leads individuals to rely heavily on their emotional state when making decisions, often prioritizing the immediate positive emotions of consumption over potential long-term consequences. Simply put, consumers might value the immediate gratification from consumption more heavily than the distant and abstract long-term risks. Another reason for the lesser impact of long-term costs on behavior change could be the stronger association of short-term costs with the act of consumption, as noted by Stillman & Woolley (2023). They argue that the immediacy and higher perceived likelihood of short-term costs make them more compelling. This perspective aligns with the protection motivation theory. While the severity of non-communicable diseases like diabetes and obesity is high, their probability of occurrence is perceived as low, especially for a single purchase. Moreover, the efficacy of coping responses is high but requires sustained protective behavior, which introduces uncertainty about whether avoiding a single purchase will prevent disease (Maddux & Rogers, 1983). These factors may elucidate the differences in consumer behavior following exposure to short-term versus long-term cost warnings.

In addition to analyzing the effects of the dependent variables—purchase intention and health risk perception—when highlighting both short-term and long-term costs of consuming foods high in free sugars, our study also examines how these variables are influenced by consumers' connection to their future selves. A previous study suggested that this potential moderator should be analyzed, proposing that highlighting long-term costs might be as effective, or even

more effective, than short-term costs for individuals with a strong connection to their future selves. However, our results did not demonstrate a significant moderation effect of connection to future self on the long-term cost FoP labels for either purchase intention or health risk perception. This indicates that consumers with a higher connection to their future selves are not more effectively influenced by long-term FoPL.

Given that the previous analysis identified long-term costs as the less effective option, we can conclude that highlighting short-term costs is superior, regardless of whether the consumers exposed to the FoPL have a strong connection to their future selves. One potential reason for this phenomenon is that individuals' vision of their future selves may not necessarily align with their healthy food consumption habits. A person might vividly imagine their future self and feel content with that image while still not adhering to a healthy lifestyle, implying that factors other than physical well-being may hold greater importance in their vision of the future. Another possible explanation is that individuals with a high-level of connection to their future selves are expected to be more prudent in their planning, and thus already maintain a balanced lifestyle and diet. Consequently, these individuals may not be as affected by warning labels, as they are already highly aware of their own consumption habits.

Our survey included an open-ended question where respondents exposed to either short-term or long-term costs could express their opinions on whether such warnings should be introduced. A selection of these responses is provided in the appendix. Among the respondents who answered the open-ended question, a significant portion expressed the belief that warning labels would contribute to information dissemination and raise awareness. However, many respondents also indicated that the information conveyed by these labels is already widely known.

There was a slight disparity in consumer intention between short-term and long-term warning labels, with more respondents expressing support for the introduction of short-term cost labels. This observation aligns with the finding that short-term cost labels had the most significant impact on both purchase intention and health risk perception. One respondent drew a parallel to smoking, noting that despite widespread awareness of the dangers of smoking, people continue to smoke. This comparison is intriguing, particularly given the success of warning labels on cigarette packages in influencing consumer behavior, despite preexisting awareness of the risks. Similarly, for products high in free sugars, individuals

appear to be cognizant of the hazards of excessive consumption. However, some respondents expressed skepticism regarding the potential efficacy of warning labels similar to those on tobacco products, despite the proven success of such implementations. Nevertheless, it is important to acknowledge inherent differences between the two contexts.

6.2 Managerial Implications

Based on the findings of this study, several managerial implications emerge. Firstly, public health agencies are encouraged to implement mandatory warning labels on products containing high levels of free sugars. This measure aims to reduce the likelihood of purchase, thereby promoting healthier alternatives. By curbing unhealthy consumption patterns, such interventions have the potential to enhance overall public health outcomes, leading to reduced healthcare costs and alleviating the burden on the healthcare sector.

Additionally, public health agencies should prioritize highlighting the immediate and direct effects associated with consumption, in contrast to tobacco FoPL, where long-term health impacts, such as non-communicable diseases, are emphasized. These effects may encompass notable changes in energy levels, indigestion, or skin conditions like acne. It is also conceivable that such regulatory measures could diminish retailers' inclination to stock and sell products covered by FoPL requirements, further contributing to the reduction of unhealthy consumption.

6.3 Limitations and Suggestions for Future Research

Implementing FoPL has emerged as a potential tool for mitigating unhealthy consumer behavior. While the research was meticulously planned and executed, as with any study, certain constraints were encountered, particularly given that this study represents one of the first of its kind. Although the survey included an optional open-ended question to assess customers' intentions regarding the integration of FoP warning labels, a more comprehensive and extensive analysis of their perceptions and intentions concerning such implementation could enhance the depth of understanding. Furthermore, the study faced delimitations that translated into limitations in sample characteristics. Specifically, respondents were intentionally selected exclusively from Sweden, which restricts the generalizability of the study beyond the Swedish population. Another limiting factor pertains to the concentrated age distribution among respondents. Approximately 80% of respondents fell within the age

range of 20-39 years. Consequently, the results may not accurately reflect the broader population but instead primarily represent a specific age group. Given inherent variations in consumption habits across different age groups, this aspect warrants consideration.

While this study offers valuable insights, it is essential to acknowledge its limitations and explore other factors that influence consumer behavior concerning FoPL and consumption patterns. The study focused solely on one type of product (chocolate bars) and analyzed only two types of warning messages. Further research is warranted to examine aspects beyond those addressed in this study. Additionally, this study primarily analyzed the effects of warning labels highlighting health consequences. Future research could explore different types of warning messages, such as those emphasizing the negative impact on others in one's environment. These alternative warning messages, commonly utilized in the tobacco industry, may offer valuable insights into their potential relevance in the context of food consumption. Moreover, given the study's objective of analyzing a potential tool for reducing the incidence of non-communicable diseases and promoting overall healthier food consumption, it would be valuable to assess the comparative influence of pricing, especially since monetary regulations have been previously tested as a tool. Understanding the interplay between pricing strategies and FoPL could provide further insights into effective approaches for promoting healthier dietary choices.

Finally, as previously noted, individuals who are highly conscious of their consumption may not be significantly influenced by a warning label. Hence, a potential moderator to consider for future research could be individuals' current level of sugar consumption. Individuals with low sugar consumption may already be cognizant of their dietary habits and therefore are less affected by FoPL compared to those with a higher level of free sugars consumption. Exploring this moderator could provide valuable insights into the differential impact of FoPL across varying levels of free sugars consumption.

6.4 Conclusion and Final Remarks

The study examines the impact of FoPL on consumers' purchase intention and health risk perception, both through highlighting short-term and long-term costs. Results demonstrate that highlighting short-term costs significantly reduces purchase intention and increases health risk perception, whereas highlighting long-term costs only affects health risk

perception. Public health agencies are encouraged to consider implementing mandatory warning labels on products high in free sugars to mitigate unhealthy consumption and enhance overall health. Additionally, the study finds that the effectiveness of FoPL remains consistent regardless of consumers' connection to their future selves. Future research should investigate other moderating variables that may influence individuals' susceptibility to FoP warning labels.

References

Bearden, W.O., Lichtenstein, D.R. & Tell, J.E. (1984). Comparison Price, Coupon, and Brand Effects on Consumer Reactions to Retail Newspaper Advertisements. *Journal of Retailing* 60(2).

Bergkvist, L. & Rossiter, J. R. (2009). The Importance of Choosing One Good Item for Single-Item Measures of Attitude towards the Ad and Attitude towards the Brand and Its Generalization to All Measures. *Transfer Werbeforschung & Praxis* 55(2).

Bialkova, S. & van Trijp, H. (2010). What determines consumer attention to nutrition labels? *Food Quality and Preference* 21: pp. 1042-1051. https://doi.org/10.1016/j.foodqual.2010.07.001

Bixter, M.T., McMichael, S.L., Bunker, C.J., Adelman, R.M., Okun, M.A., Grimm, K.J., Graudejus, O. & Kwan, V.S.Y. (2020). A test of a triadic conceptualization of future self-identification. *PLOS ONE* 15(11): e0242504. https://doi.org/10.1371/journal.pone.0242504

Cancer Council. (n.d.). *A brief history of smoking.* https://www.cancercouncil.com.au/news/a-brief-history-of-smoking/#:~:text=A%20series%20of%20major%20medical,a%20range%20of%20serious%20diseases. (Accessed: 2024-03-25).

Centers for Disease Control and Prevention. (2000). *Reducing Tobacco Use: A Report of the Surgeon General.* U.S. Department of Health and Human Services. https://www.cdc.gov/tobacco/sgr/2000/complete_report/pdfs/fullreport.pdf (Accessed: 2024-03-01).

Charlton A. (2004). Tobacco or health 1602: an Elizabethan doctor speaks. *Health Education Research* 20(1): pp. 101-111. https://doi.org/10.1093/her/cyg097

Doron, G. (1979). *How Smoking Increased When TV Advertising of Cigarettes Was Banned*. American Enterprise Institute. https://www.aei.org/articles/how-smoking-increased-when-tv-advertising-of-cigarettes-was-banned/ (Accessed: 2024-03-08).

Ersner-Hershfield, H., Garton, M. T., Ballard, K., Samanez-Larkin, G. R. & Knutson, B. (2009). Don't Stop Thinking About Tomorrow: Individual Differences in Future Self-Continuity Account for Saving. *Judgment and Decision Making* 4(4): pp. 280-286. https://doi.org/10.1017/S1930297500003855

Folkehelseinstituttet. Abel, M.H. (2023). *Nordmenns handel av sjokolade, godteri og alkoholfrie drikkevarer i utlandet – Resultater fra en landsdekkende spørreundersøkelse høsten 2022*. https://www.fhi.no/publ/2023/nordmenns-handel-av-sjokolade-godteri-og-alkoholfrie-drikkevarer-i-utlandet/ (Accessed: 2024-02-07).

Folkhälsomyndigheten. (2017). *Förslag till åtgärder för bättre matvanor och ökad fysisk aktivitet*. https://www.folkhalsomyndigheten.se/contentassets/5514b381077f4175b13fca5fe1089abe/forslag-till-atgarder-matvanor-fysiskaktivitet.pdf (Accessed: 2024-02-05).

Folkhälsomyndigheten. (2023). *Statistik om övervikt och fetma: Övervikt och fetma hos vuxna*.

https://www.folkhalsomyndigheten.se/livsvillkor-levnadsvanor/mat-fysisk-aktivitet-overvikt-och-fetma/overvikt-och-fetma/statistik-om-overvikt-och-fetma/overvikt-och-fetma-hos-vuxna/ (Accessed: 2024-02-07).

Folkhälsomyndigheten. (2023). *Fortsatt ökning av fetma och övervikt.* *https://www.folkhalsomyndigheten.se/nyheter-och-press/nyhetsarkiv/2023/mars/fortsatt-okning-av-fetma-och-overvikt/#:~:text=Allt%20fr%C3%A5n%20genetik%2C%20biologi%2C%20livsh%C3%A4ndelser,och%20f%C3%B6ruts%C3%A4ttningar%20till%20fysisk%20aktivitet* (Accessed: 2024-05-11)

Folktandvården. (n.d.). *Om socker.* https://folktandvarden.vgregion.se/fakta-och-munhalsorad/mat-och-dryck/om-socker/#:~:text=Socker%20inneh%C3%A5ller%20mycket%20energi%20som,fetma%20och%20diabetes%20typ%202. (Accessed: 2024-03-07).

Gamliel, E. & Herstein, R. (2007). The effect of framing on willingness to buy private brands. *Journal of Consumer Marketing* 24(6): pp. 334-339. https://doi.org/10.1108/07363760710822918

Hajdu, S.I. (2017). Pathfinders in oncology from the end of the Middle Ages to the beginning of the 19th century. *Cancer* 123(11): pp. 1888-1897. https://doi.org/10.1002/cncr.30590

Hayes, A.F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* Third Edition. Guilford Press.

Hershfield, H.E. (2011). Future self-continuity: how conceptions of the future self transform intertemporal choice. *Annals of the New York Academy of Sciences* 1235: pp. 30-43. https://doi.org/10.1111/j.1749-6632.2011.06201.x

Hershfield, H. E. & Bartels, D. M. (2018). The future self. In Oettingen, G., Sevincer, A.T. & Gollwitzer, P. (Eds.). *The psychology of thinking about the future.* The Guilford Press, pp. 89–109.

Hiilamo, H., Crosbie, E. & Glantz, S.A. (2014). The evolution of health warning labels on cigarette packs: the role of precedents, and tobacco industry strategies to block diffusion. *Tobacco Control* 23(1): e2. https://doi.org/10.1136/tobaccocontrol-2012-050541

Hjärt-Lungfonden. (n.d.). *Vitt snus under radarn.* https://www.hjart-lungfonden.se/halsa/riskfaktorer/tobak/vitt-snus/ (Accessed: 2024-03-08).

IARC. (n.d.). *What is meant by "fatty and sugary foods".* https://cancer-code-europe.iarc.fr/index.php/en/ecac-12-ways/diet-recommendation/48-fatty-sugary-foods (Accessed: 2024-03-07).

Jordbruksverket. (2021). *Livsmedelskonsumtion och näringsinnehåll. Uppgifter till och med 2020.* https://jordbruksverket.se/om-jordbruksverket/jordbruksverkets-officiella-statistik/jordbruksverkets-statistikrapporter/statistik/2021-12-09-livsmedelskonsumtion-och-naringsinnehall.--uppgifter-till-och-med-2020 (Accessed: 2024-02-07).

Jordbruksverket. (2022). *Livsmedelskonsumtion och näringsinnehåll. Uppgifter till och med 2021.* https://jordbruksverket.se/om-jordbruksverket/jordbruksverkets-officiella-statistik/jordbruksverkets-statistikrapporter/statistik/2022-12-09-livsmedelskonsumtion-och-naringsinnehall.--uppgifter-till-och-med-2021 (Accessed: 2024-02-07).

Kahneman, D. & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica* 47(2): pp. 263–291. https://doi.org/10.2307/1914185

Kostfonden. (2019). *Ett sockersmart Sverige. Hur minskar vi den skadliga överkonsumtionen av socker?* https://www.kostfonden.se/wp-content/uploads/2019/04/Ett-sockersmart-Sverige_rapport-fra%CC%8An-Kostfonden.pdf (Accessed: 2024-02-08).

Kotler, P. & Keller K. L. (2016). *Marketing management.* 15 global ed. Pearson.

Lane, M.M., Gamage, E., Du, S., Ashtree, D.N., McGuinness, A.J., Gauci, S., Baker, P., Lawrence, M., Rebholz, C.M., Srour, B., Touvier, M., Jacka, F.N., O'Neil, A., Segasby, T. & Marx, W. (2024). Ultra-processed food exposure and adverse health outcomes: umbrella review of epidemiological meta-analyses. *The BMJ* 384: e077310. https://doi.org/10.1136/bmj-2023-077310

Livsmedelsverket. Skogström, L. (2022). *Styrmedel för en hälsosam livsmedelskonsumtion*. https://www.livsmedelsverket.se/globalassets/publikationsdatabas/rapporter/2022/l-2022-nr-19---styrmedel-for-en-halsosam-livsmedelskonsumtion.pdf (Accessed: 2024-02-08).

Livsmedelsverket. (2023). *Socker*. https://www.livsmedelsverket.se/livsmedel-och-innehall/naringsamne/kolhydrater/socker (Accessed: 2024-02-08).

Mahomedy, S. (2023). Half of all South Africans are overweight or obese. Warning labels on unhealthy foods help change that. *The Conversation.* 20 July. https://theconversation.com/half-of-all-south-africans-are-overweight-or-obese-warning-labels-on-unhealthy-foods-help-change-that-209251 (Accessed: 2024-03-08).

Gerend, M. A. & Cullen, M. (2008). Effects of message framing and temporal context on college student drinking behavior. *Journal of Experimental Social Psychology* 44(4): pp. 1167-1173. https://doi.org/10.1016/j.jesp.2008.02.007

Mehlhose, C. & Risius, A. (2023). Effects of immediate and distant health consequences: different types of health warning messages on sweets affect the purchase probability. *BMC Public Health* 23(1): 1892. http://dx.doi.org/10.1186/s12889-023-16760-y

Menon, G., Raghubir, P. & Agrawal, N. (2008). Health Risk Perception and Consumer Behavior. In Haugtvedt, C.P., Herr, P.M. & Kardes, F.R. (eds.). *The Handbook of Consumer Psychology*. Laurence Erlbaum, pp. 981–1010.

Nylander, A., Petersen, B., Hakeberg, M., Wide Boman, M. & Axtelius, B. (2016). Sverige bör snarast införa skatt på socker. *Svenska Dagbladet*. 16 July. https://www.svd.se/a/85ORG/sverige-bor-snarast-infora-skatt-pa-socker (Accessed: 2024-02-05).

Parfit, D. (1984). *Reasons and Persons.* Harvard University Press.

Pettigrew, S., Jongenelis, M., Maganja, D., Hercberg, S. & Julia, C. (2024). The Ability of Nutrition Warning Labels to Improve Understanding and Choice Outcomes Among Consumers Demonstrating Preferences for Unhealthy Foods. *Journal of the Academy of Nutrition and Dietetics* 124(1): pp. 58–64. *https://doi.org/10.1016/j.jand.2023.08.135*

Ruegg, T.A. (2015). Historical Perspectives of the Causation of Lung Cancer: Nursing as a Bystander. *Global Qualitative Nursing Research* 2: 2333393615585972. https://doi.org/10.1177/2333393615585972

Stillman, P.E. & Woolley, K. Undermining Desire: Reducing Unhealthy Choices by Highlighting Short-Term (vs. Long-Term) Costs. *Journal of Consumer Research* 50(3): pp. 554–575. https://doi.org/10.1093/jcr/ucad004

Söderlund, M. (2005). *Mätningar och Mått: I marknadsundersökarens värld.* Liber ekonomi.

Thomas, A. K. & Millar, P. R. (2011). Reducing the Framing Effect in Older and Younger Adults by Encouraging Analytic Processing. *The journals of gerontology* 67(2): pp. 139–149. https://doi.org/10.1093/geronb/gbr076

Trope, Y. & Liberman, N. (2003). Temporal construal. *Psychological Review* 110(3): pp 403–421. https://doi.org/10.1037/0033-295X.110.3.403

Tversky, A. & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science* 185(4157): pp. 1124–1131. https://doi.org/10.1126/science.185.4157.1124

Vogt, W.P. (2005). *Dictionary of Statistics & Methodology: A Nontechnical Guide for the Social Sciences.* SAGE.

World Health Organization. (2015). *Guideline: Sugars intake for adults and children.* https://iris.who.int/bitstream/handle/10665/149782/9789241549028_eng.pdf (Accessed: 2024-02-05).

Øvrebø, B., Halkjelsvik, T.B., Meisfjord, J.R., Bere, E. & Hart, R.K. (2020). The effects of an abrupt increase in taxes on candy and soda in Norway: an observational study of retail sales. *International Journal of Behavioral Nutrition and Physical Activity* 17: 115. https://doi.org/10.1186/s12966-020-01017-3

Appendix

Appendix A. The Survey.

Introduction

We invite you to a brief survey on the effectiveness of front-of-pack labeling in conveying health information about foods high in free sugars. Free sugars are defined as all the extra sugars added to food and drinks, along with sugars naturally found in honey, syrups, and fruit juices. This 3-minute survey seeks to explore how health communication strategies impact consumer decisions on free sugars intake. Participation is voluntary, anonymous, and you can withdraw at any time with no consequences. By starting the survey, you consent to the collection and use of your responses for this research.

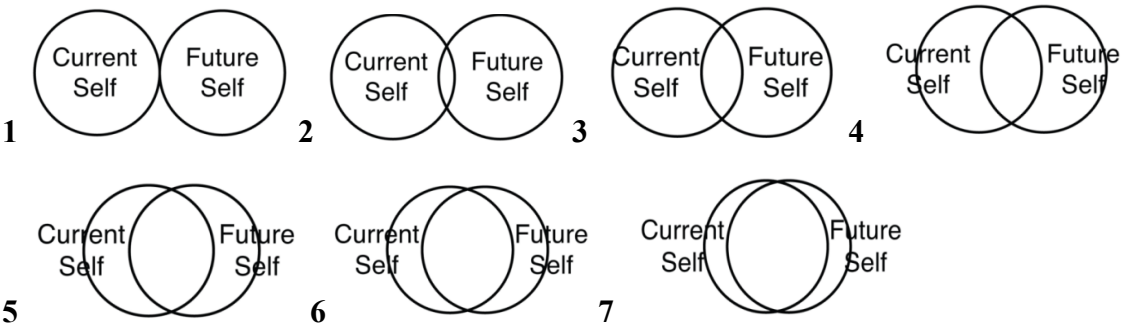
This survey supports a degree project by third-year Bachelor students at the Stockholm School of Economics. Your data will remain confidential and will be used exclusively for this study. Should you have questions or concerns, please contact us at at 50798@student.hhs.se.

Thank you for your contribution!

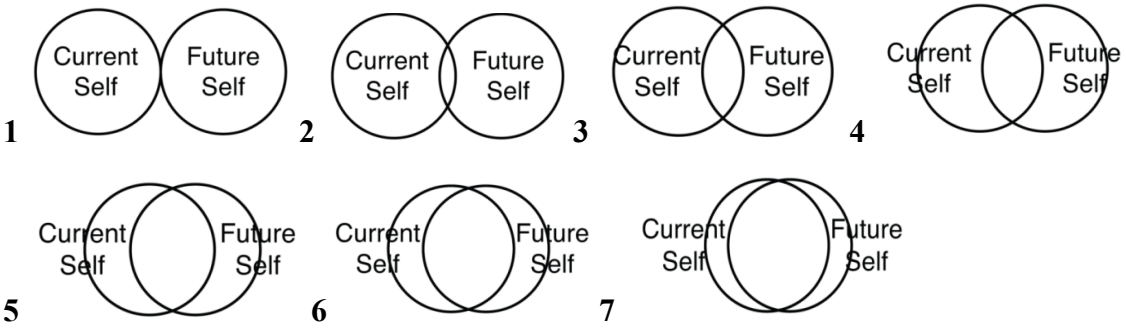
Connection to future self

When answering the following questions, think about your future self as yourself 10 years from now.

Select the pair of circles which best describes how ***similar*** you feel to your future self (1 = ***not at all similar*** to my future self, 7 = ***very similar*** to my future self).



Select the pair of circles which best describes how ***connected*** you feel to your future self (1 = ***not at all connected*** to my future self, 7 = ***very connected*** to my future self).



When you imagine your future self, how vividly do you picture it?

- **1 Not at all vividly (No clear image)**
- **2**
- **3**
- **4**
- **5**
- **6**
- **7 Very vividly (Very clear image)**

How easy is it for you to visualize a mental picture of your future self?

- **1 Very difficult**
- **2**
- **3**
- **4**
- **5**
- **6**
- **7 Very easy**

How much do you like your future self?

- **1 Don't like at all**
- **2**

- **3**
- **4**
- **5**
- **6**
- **7 Like as much as possible**

When I think about the future, my future self feels. . .

- **1 Very negative**
- **2**
- **3**
- **4**
- **5**
- **6**
- **7 Very positive**

Below you will find a possible product in a grocery store. Imagine that you saw it in the store next time you want to buy a chocolate bar. Please look at the picture carefully before answering the questions below.

N.B. Each respondent was randomly assigned only one of these three images. From the left: Short-term costs stimulus; Long-term costs stimulus: Neutral stimulus.



After reviewing this product, to what extent do you agree with these statements?

	Completely disagree 1	2	3	4	5	6	Completely agree 7
I will reconsider my purchase.	○	○	○	○	○	○	○
I will buy less foods high in free sugars in the future.	○	○	○	○	○	○	○

I will substitute foods high in free sugars with healthier alternatives.	○	○	○	○	○	○	○

After reviewing this product, to what extent do you agree with these statements?

	Completely disagree 1	2	3	4	5	6	Completely agree 7
The product has increased my understanding and awareness of the severity of diseases related to excess consumption of foods high in free sugars.	○	○	○	○	○	○	○
The product made me more aware and concerned about my vulnerability to diseases related to excess consumption of foods high in free sugars.	○	○	○	○	○	○	○

The product accurately reflects the severity of excess consumption of foods high in free sugars.	○	○	○	○	○	○	○

Which of the following statements is true?

- The message I reviewed highlighted short-term costs of excess consumption of sugar.
- The message I reviewed highlighted long-term costs of excess consumption of sugar.
- The image I reviewed showed a chocolate bar, but there was no message.

Do you think such a warning should be introduced?

- Yes.
- No.

Please elaborate on your previous answer (optional).

Please select your gender:

- Male
- Female
- Non-binary / third gender
- Prefer not to say

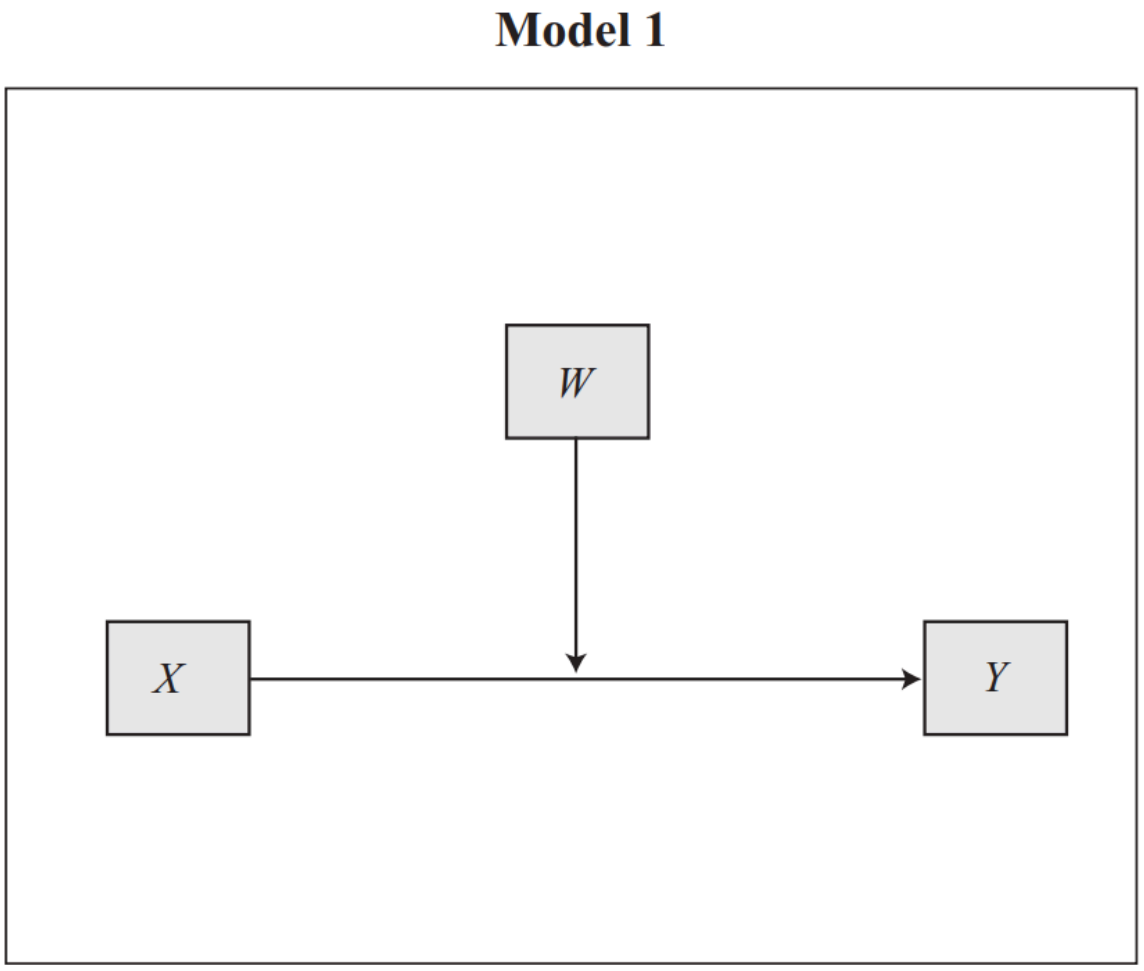
Please select you age:

- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-69

- 70+

What is 4 + 5?

Appendix B. An illustration of Hayes' PROCESS Model 1 (Hayes, 2022).



X (H1a, H1b) = Stimuli variable (Neutral [0] and short-term costs [1])

X (H2a, H2b) = Stimuli variable (Neutral [0] and long-term costs [1])

W = Connection to future self scale variable [1-7]

Y (H1a, H2a) = Purchase intention scale variable [1-7]

Y (H1b, H2b) = Health risk perception scale variable [1-7]

Appendix C. A selection of responses from the survey´s open ended question.

"It could be introduced, but most people are aware that nothing is healthy in excess. Most things are fine in moderation though."

"The warning serves as a reminder (of excessive sugar consumption) and builds awareness of sugar content in the product."

"It helps to be aware of the risks of eating this type of products"

"People know that too much sugar is unhealthy. What we need to do instead is make healthier foods cheaper and more attractive."

"I think the effects of sugar are well-known, and I won't think it would be accepted nationwide. It would most likely be seen as "something obvious", which would cause people to just ignore it even more."

"It's always good to educate the public in all fields. More information is more good!"

"For me No, because I feel like it's common sense, like that smoking is bad for you bad that doesn't stop the people smoking, if you have an addiction I don't think that that text would change the behavior"

"I don't think that these types of warning labels help. Either you ban sugar or you just let people decide."

Appendix D. Use of Generative AI.

AI has been used to aid with overarching thoughts such as testing different alternatives of how the hypotheses could be formulated. Additionally, it was used for revising some parts of the text, aiding in its formality. AI has not been used to create any new information, only to revise already written text.