



The Influence of Cancer Warning Labels on Alcohol Purchasing Decisions in different Social Contexts

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Dissertation submitted in partial fulfilment of requirements for the
MSc in Business, at the Universidade Católica Portuguesa, 6th of
January 2025.

Abstract

Alcohol consumption is connected with significant health risks, including a well-established link to various cancer types. The public awareness regarding the carcinogenic nature of alcohol is surprisingly low though. This thesis explores the effects of cancer warning labels on consumer purchasing decisions for alcoholic beverages. It focusses deeper on the role social pressure plays in the efficiency of these labels. Through a 2x2 factorial experiment, this study analyses consumer behaviour across four distinct scenarios: with or without a warning label, as well as a high – or low pressure social scenario.

In contradiction to the assumptions from the literature review, the experiment revealed that the cancer warning label did not universally prevent alcohol purchases. For participants with a low risk awareness and those with a less health-conscious lifestyle, the purchasing likelihood of alcohol paradoxically increased in the presence of a label. The reasons could either be an unintentional overcorrection or psychological tensions like defiance mechanisms or cognitive dissonance. Individuals who has a higher health and risk awareness, or those who had negative experiences with alcohol in the past, showed little to no behavioural change. On the other hand, the labels seem to have a positive influence on reducing peer pressure in a typical drinking scenario.

“The Influence of Cancer Warning Labels on Alcohol Purchasing Decisions in different Social Contexts” by Linda Jurisch; Keywords: Alcohol consumption, Anti-Marketing, Anti-Consumption, Consumer Behaviour, Purchasing decisions

Sumário

O consumo de álcool está associado a riscos significativos para a saúde, incluindo uma ligação bem estabelecida a vários tipos de cancro. No entanto, a sensibilização do público para a natureza cancerígena do álcool é surpreendentemente baixa. Esta tese explora os efeitos dos rótulos de advertência sobre o cancro nas decisões de compra de bebidas alcoólicas por parte dos consumidores. Centra-se mais profundamente no papel que a pressão social desempenha na eficácia destes rótulos. Através de uma experiência fatorial 2x2, este estudo analisa o comportamento do consumidor em quatro cenários distintos: com ou sem rótulo de advertência, bem como um cenário de alta ou baixa pressão social.

Em contradição com os pressupostos da revisão da literatura, a experiência revelou que a etiqueta de advertência relativa ao cancro não impediu universalmente a compra de álcool. Para os participantes com uma consciência de risco reduzida e para os participantes com um estilo de vida menos preocupado com a saúde, a probabilidade de compra de álcool aumentou paradoxalmente na presença de um rótulo. As razões podem ser uma sobrecorreção não intencional ou tensões psicológicas, como mecanismos de desafio ou dissonância cognitiva. Os indivíduos que têm uma maior consciência da saúde e dos riscos, ou aqueles que tiveram experiências negativas com o álcool no passado, mostraram pouca ou nenhuma mudança de comportamento. Por outro lado, os rótulos parecem ter uma influência positiva na redução da pressão dos pares num cenário típico de consumo de álcool.

“A influência dos rótulos de advertência sobre o cancro nas decisões de compra de álcool em diferentes contextos sociais” por Linda Jurisch; Palavras-chave: Consumo de álcool, Anti-Marketing, Anti-Consumo, Comportamento do consumidor, Decisões de compra

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1. Introduction

In 2018, alcohol consumption contributed to nearly 92,000 cancer-related deaths in the European region (WHO, Factsheet – 5 facts about alcohol and cancer, 2021).

Studies revealed that alcohol consumption is causing over 60 different health, one of which is cancer (Gutjahr, Gmel, & Rehm, 2001). Alcohol is a Group 1 carcinogen, which indicates the highest level of risk. It is directly linked to seven distinct types of cancer. Breast and colorectal cancers are the most widespread of those (O Anderson, et al., 2023).

As highlighted in a Lancet study from early 2023 and further emphasised by the WHO (WHO, 2023), the risks associated with alcohol consumption are existing from the very first sip (O Anderson, et al., 2023). Even though there has been comprehensive research conducted on the risks of consuming alcohol and the findings are clearly showing strong health risks, consumers are generally shockingly unaware of the link between alcohol consumption and cancer. In Europe, up to 80% of the people are not aware of the alcohol risks that are associated with diseases such as breast cancer (Kokole, et al., 2023).

In Europe, the average person is approximately consuming around 9.2 litres of pure alcohol per year. This is the highest global consumption rate (UN, 2024). This fact, plus the public unawareness of alcohol related health risks, lead researchers and politicians to request measures to increase this awareness in the general population. In February of 2021, the European Commission published a "Beating Cancer Plan," (European-Commission, 2021). The plan included measures to reduce alcohol consumption in the general public. Some of these measures are to limit advertising, review tax policies, but also introducing a system for mandatory health warning labels by the end of 2023 (Laaninen, 2021). Ireland is the first European country, and after South-Korea the second country worldwide, that is planning to introduce health warnings on alcoholic beverages in 2026 (WHO, 2023).

This plan is raising questions regarding the efficiency of those alcohol health warning labels. The goal of this thesis is to investigate the influence of cancer-related alcohol warning labels on consumer purchasing decisions.

The purchasing and consumption of alcohol in the public is often event related and happens in social settings (Kushnir & Cunningham, 2014). Social influence can play a critical role in the purchasing decisions of consumers. Specifically, settings with a high social pressure might amplify or weaken the effect of cancer warnings, while settings with lower social pressure are giving more room for personal reflection and decision-making (Argo & Dahl, 2019). Because

alcohol purchasing situations are often of a social nature, this thesis is also trying to examine the differences in the efficiency of the labels in between high and low pressure social purchasing scenarios.

2. Theoretical Framework

Now, that the context has been established for why research on the alcohol cancer warning labels is important, it is crucial to give this discussion a theoretical baseline. This helps to describe how consumers interpret these warnings and what factors drive their choices to purchase the product.

2.1 Anti-Consumption Behaviour

Cancer warning labels are part of a public health strategy with the goal to reduce consumption. They are a social marketing tool that is supposed to influence consumer behaviour. To do so, they are trying to highlight the health risks associated with alcohol consumption. Through the increase in risk awareness, they should lead to a change – specifically a decrease – in purchasing decisions. Anti-consumption literature argues that social marketing represents a crucial pathway to reducing consumption (Peattie & Peattie, 2009).

Anti-consumption literally means “against consumption” (Lee, Fernandez, & Hyman, 2009) and can be defined as “intentionally and meaningfully excluding or cutting goods from one’s consumption routine or reusing once-acquired goods with the goal of avoiding consumption” (Makri, Schlegelmilch, Mai, & Dinho, 2020). This includes a range of phenomena, like brand avoidance, consumer resistance, and ethical or sustainable consumption.

Anti-consumption is characterised by the intentional reduction of consumption, which leads to conscious decisions and the establishment of clear intentions, or in short, if to purchase or not to purchase a product (Makri, Schlegelmilch, Mai, & Dinho, 2020).

One of the main drivers of anti-consumption are health-related reasons. Alcohol cancer warnings are a health-related stimulus that could trigger anti-consumption behaviour.

2.2 Consumer Decision making in purchasing situations in purchasing decisions

Consumer behaviour can be defined as the processes that individuals undergo when they search, select, use and assess products or services in order to meet their needs or desires. It includes the

cognitive, emotional and behavioural aspects of human actions (Hoyer, MacInnis, & Pieters, 2017).

This thesis will specifically focus on a sub-part of consumer behaviour: the purchasing decision. The term 'customer purchasing behaviour' is defined as “the sum total of a consumer’s behaviours to satisfy his or her needs and desires by searching goods and information, then generating a purchase intention, and subsequently comparing goods for decision-making when purchasing a product” (Moslehpour, Kien, & Danyfisla, 2014).

Consumer purchasing behaviour includes both purchase intentions and purchase decisions. The difference is, that 'purchase intentions' are defined as the subjective **probability or possibility** of a consumer purchasing a particular product. A 'purchasing decision' is the **actual purchase** itself. A positive purchasing decision occurs when a consumer is deciding for a purchase and a negative purchasing decision has been made when a consumer decides against buying a product (Rimal, Fletcher, & McWatters, 1999).

Wikansari et al are summarizing, which are the strongest psychological elements, influencing consumer decisions: **motivation, perceptions, attitudes and beliefs, and lifestyle** (Wikansari, Ausat, Hidayat, Mustoip, & Sari, 2023).

Motivations are driven by the consumer's needs. Maslow’s hierarchy of needs summarizes the most important needs that are influencing purchasing decisions. They include physiological needs, safety and security, love and belonging, self-esteem, and self-actualization (Navy, 2020). When buying alcohol with a cancer warning, the purchasing decision might be influenced by the needs of safety and security, because the warning label indicates that the consumption is not safe for the physical health. Another hypothesis is, that in a social setting, with a group that is advocating alcohol consumption, a cancer warning label is more likely to be ignored, due to the need of love and belonging. And vice versa, in a group that avoids alcohol consumption or follows a lifestyle that is generally considered healthy, the effect of the cancer warning might increase.

The **Perception** is the way an individual filters and organises information to form his or her own selective understanding or point of view (Wikansari, Ausat, Hidayat, Mustoip, & Sari, 2023). External influences, such as the positive display of alcohol in the media, leads the consumer to perceive alcohol use as unproblematic or even desirable behaviour and views alcohol consumption as a normalized activity that goes along with many social events (Atkinson, Elliott, Bellis, & Sumnall, 2011).

The tendency to perceive alcohol consumption in a positive light may lead to consumers being more likely to disregard the warning, because they view alcohol consumption as an enjoyable and carefree activity.

These positive perceptions that consumers have about alcohol consumption are formed by their general **opinions and beliefs** about alcohol. Opinions and beliefs influence the perspective and knowledge that the consumer has of the product. (Wikansari, Ausat, Hidayat, Mustoip, & Sari, 2023). When a consumer has a positive attitude or belief about alcohol, for example, that drinking alcohol is a normal, harmless activity, a cancer warning can question this belief. It can also lead to a change of the consumer's opinions and beliefs.

The term "**lifestyle**" is defined as the manner in which individuals live, allocate financial resources, and distribute their time. A change of lifestyle will result in a related change of consumption patterns (Zahra & Anoraga, 2021). Consumers tend to stay aligned with their lifestyle, and choose products that are associated with their desired lifestyle. A person, for example, who is motivated to live a healthy lifestyle is more likely to make purchases related to health and wellness (Herawati, Prajanti, & Kardoyo, 2019). The introduction of a cancer warning label on alcohol could keep consumers who are striving to maintain a healthy lifestyle from purchasing the product.

Wikansari et al. also mention further important factors, that consumers are considering when making a purchase. They look at the functionality, quality, current and future value, or the opinions of others (Wikansari, Ausat, Hidayat, Mustoip, & Sari, 2023). Therefore, it is important to consider those influences when conducting research on purchasing decisions.

2.3 Influence of risk perception and - denial on purchasing decisions

An additional crucial element that influences consumer purchasing behaviour is the risk perception associated with a product. Consumers feel a sense of risk when they face uncertainty or the possibility of negative results when they perform a purchase. The greater the perceived risk is, the less likely consumers are to make a purchase (Zhang, Tan, Xu, & Tan, 2012).

To reduce potential health risks, consumers with a high health awareness are trying to look for products that align with a healthy choice. For example, would they prefer products that are perceived as safer, such as organic foods or – in the context of alcohol consumption – low-risk or non-alcoholic beverages. Often, these choices are influenced by the psychological mechanism of risk - and loss aversion. This aversion means, that the consumer is avoiding

potential health risks at the point of purchase (Nie, Medina-Lara, Williams, & Smith, 2021). Health concerns can encourage consumers to buy safer products, but these changes in buying intention don't necessarily mean, that people actually change their purchasing behaviour. A study by Nie et al. highlights that economic and regional factors can moderate the effect of health risk perceptions on buying behaviours. This shows that health risk awareness is a powerful factor, but additional factors such as affordability, accessibility or brand awareness are often a significant influence. But also cultural and social norms play an important role here. The health attitudes of the consumer can be strongly influenced by cultural traditions or societal norms. When alcohol consumption is for example deeply integrated in the culture it is more likely that health warnings are having less impact on the purchasing decisions than in regions with where the norms are traditions are more health-conscious (Nie, Medina-Lara, Williams, & Smith, 2021).

In his review of the risk perception of alcohol consumption, L. Sjöberg states that the risk target is of significant importance when it comes to the strength of the perceived risk. People tend to perceive personal risks as lower than the same risk for others. Moreover, he underscores the fact that individuals who consume alcohol frequently deny the potential risks associated with their behaviour (Sjöberg, 2006). A French study on alcohol risk denial revealed that both risk denial and risk relativisation are higher among male respondents, older consumers, and those with a low socioeconomic status. Also, it showed that when people had a higher risk relativisation score, they were also more likely to drink daily (Bocquier, Fressard, Verger, Legleye, & Peretti-Watel, 2017).

So while a cancer warning label might influence a consumer health risk perception and therefore reduces purchasing intentions, several external factors or even risk denial play an important role that have to be considered when evaluating the efficiency of the label.

2.4 Social Influence and Cognitive Dissonance in purchasing decisions

2.4.1 Social Influence

Social influence refers to the ways in which individuals' decisions are shaped by the opinions, actions, or presence of others (Crano, 2000). There are two types of influences: Majority influence happens when individuals conform to group norms. Minority influence happens, when deeper attitude changes happen (Moscovici & Lage, 1976).

In regard to alcohol consumption, especially among young people, peer pressure and parental influence were identified as the most significant factors in starting drinking (Atkinson, Elliott, Bellis, & Sumnall, 2011). Peer pressure is the influence of a reference group. A reference group is defined as “a group whose presumed perspectives or values are being used by an individual as the basis for his or her current behaviour” (Hawkins & Mothersbaugh, 2010). There are different types of influence a reference group can have on the behaviour of a consumer. One of which is normative influence. This occurs, when a person acts according to the group's expectations, in order to receive a reward or avoid sanctions. Depending on the group's expectations, this can lead to consumption or anti-consumption (Hawkins & Mothersbaugh, 2010).

Hawkins and Mothersbaugh also found out that the direct visibility of the product in purchasing situations, the relevance of the product to the group, and the inclusion of products that may not be essential, probably increase the group's influences (Hawkins & Mothersbaugh, 2010).

Given that alcohol is typically visible to a group during purchasing situations, has a relatively low degree of necessity and a high degree of relevance to the group in numerous social scenarios (e.g., meetings to plan social outings, celebrations, and sporting events), it can be reasonably assumed that group pressure in purchasing scenarios is high. Consequently, the efficacy of a cancer warning label is significantly influenced by the group's expectations.

Solomon Asch's famous 1955 study (Asch, 1955) about conformity shows how social pressure impacts individual judgment. Participants performed a simple task: they had to find the correct lines that were matching in length. A subject was unknowingly placed in a group that was instructed to provide incorrect answers. The key findings showed that pressure to conform with the wrong answers increased as the group size grew. This reached the peak at three people. Larger groups created a sense of unanimous agreement, which made it harder for people especially to offer different opinions. When a single disagreed with the group, this reduced the pressure by breaking the group's unity. When opinions were declared publicly, this increased the pressure because of the fear of social judgment. If an ally who disagreed with the group conformed or withdrew, it often led others to submit even more, feeling isolated.

When purchasing alcohol in a group setting, there are similar social pressures happening, like in Asch's study. Large, unanimous groups can intensify the pressure to order alcohol. This is especially strong, when decisions are being made in front of others, like a group of friends. This happens especially in groups that have strong drinking norms. On the other hand, once one

person in the group is choosing a non-alcoholic option, and is therefore not conforming with the group's standard, this can reduce the pressure as well.

2.4.2 Cognitive Dissonance

The theory of cognitive dissonance was originally proposed by Festinger. It is the psychological discomfort that an individual feels when his beliefs or attitudes are not consistent with his behaviours. When looking at purchasing decisions, this discomfort often comes after a purchase already has been made and consumers are starting to question whether they made the right choice. Now, they will try to reduce this dissonance. Oftentimes they are trying to do so, by looking for information that reinforces their decision. They might also downplay possible alternative choices, or even return products (Cooper, 2012).

Individuals are always looking to protect their self-image and self-worth. This might be challenged by a threatening or negative information that is clashing with their opinions or beliefs. When this happens, risk perception plays a crucial role (Dunning, 2007). When consumers are faced with information that could make them feel guilty, uncomfortable, or that trigger cognitive dissonance - such as health warnings on alcoholic beverages - they are very likely to engage in coping mechanisms to avoid those negative emotions maintain a positive self-concept.

Health-related warnings, such as cancer labels on alcoholic beverages, might trigger exactly this kind of self-image, when consumers for example think about themselves as a generally healthy person. A warning label might highlight this dissonance of their identity as a healthy person and their choice to consume alcohol. Referring to Dunning's theory, (Dunning, 2007) it says, that to reduce this discomfort, people are likely to downplay the importance of the warning or justify their consumption by focusing on the social benefits of drinking.

In social situations, this becomes even more important, because peer pressure is present as another factor that influences purchasing behaviour. Social norms and avoidance of judgement may make these effects even stronger (Kassarjian & Cohen, 1965).

2.5 Research review of alcohol warning labels

A study from Australia tested six cancer warning statements to assess the effectiveness of cancer warning labels to raise awareness about alcohol-related cancer risks. They found out that the statement "Alcohol increases your risk of bowel cancer" was the most impactful (Pettigrew, et al., 2016). This is specifically interesting, because this phrasing includes a health message

related to cancer. The participants perceived this message as directly relevant to their health. This was fostering a stronger intention to reduce their alcohol intake. Furthermore, regression analyses showed that when participants think that the warnings are believable and relevant for them personally, they are more likely to consider a reduction (Pettigrew, et al., 2016).

There was another study, by Winstock et al, that found that warning labels can strengthen the knowledge link between alcohol and specific cancer types. Nearly 40% of the participants showed a willingness to reduce their drinking when they got informed about the cancer risks associated with alcohol consumption (Winstock, Holmes, Ferris, & Davies, 2020). They found out, that demographic variables and the drinking behaviour also has an effect on the efficiency of the warning labels. Women and high-risk drinkers for example were notably more responsive to cancer warnings. But also the age is an important factor: Adult drinkers are effectively influenced by the warning labels, while they have a minimal impact on adolescents (Winstock, Holmes, Ferris, & Davies, 2020). There is another study by Scholes-Balog, Heerde and Hemphill that specifically focusses on adolescents and shows similar findings, that for them, cancer warning labels did not significantly alter their beliefs or behaviours regarding alcohol consumption (Scholes-Balog, Heerde, & Hemphill, 2012).

The use of visual warnings that are both engaging and strategically placed, similar to those seen on cigarette packages, were found to be an effective method of altering perceptions and behaviours related to alcohol consumption. On the other hand, the use of less obvious labels has been demonstrated to be an insufficient method of prompting significant changes in drinking behaviour (Al-hamdani & Smith, 2015). For example, studies in Canada revealed that applying rotating, highly visible labels on alcohol containers was associated with a reduction in population-level alcohol consumption (Zhao, Stockwell, Vallance, & Hobin, 2020).

2.6 Hypothesis and summary of the literature review

The literature review shows that warning labels are designed to raise awareness of health risks, such as cancer, and therefore increase perceived risk, which should reduce purchase intentions. This is particularly important for the large number of people with a low baseline awareness. However, it has been found that the effectiveness of cancer warnings varies from person to person. A high level of health consciousness and health anxiety should increase the effectiveness of the label. On the other hand, people with high alcohol consumption or low health awareness are more likely to resist the warning label. Another important factor is the social context. Research shows, that labels are supposed to be more effective in low-pressure

environments compared to situations with a low-pressure social dynamic. Factors that increase this pressure are a strong group's drinking norm or a group that is supporting less healthy choices, as well as the drinking occasion. Lastly, there are psychological factors such as cognitive dissonance and defiance that might come into place. Cognitive dissonance can on one hand lead to a reduced consumption, because people are reducing their consumption to align their actions with the label. On the other hand, they may stick to their consumption, but will try to find a strategy to overcome this dissonance by justifying their consumption in some way, for example by downplaying the health issues. Furthermore, if people feel like their identity is threatened by the warning label, this could trigger a defiance mechanism that may even increase alcohol purchases.

The design and visibility of the label can also have a significant impact on its effectiveness. Research suggests that the more prominent and specific the warnings, the more effective they should be.

Based on these assumptions derived from the existing literature, it is expected that cancer warnings will reduce purchase intentions overall, but their effectiveness will vary depending on factors such as individual risk perception, social context, psychological dynamics and the design of the warning. The aim of this research is to investigate these relationships.

The Hypothesis to be tested in the following study therefore is:

- H0: There is no significant difference in purchasing likelihood between the group that is confronted with a warning label and the group that is not.
- H1: There is a significant difference in purchasing likelihood between the group that is confronted with a warning label and the group that is not.

The literature review suggests, that the data should support the alternative hypothesis H1, and therefore, H0 should be rejected.

Furthermore, the hypothesis on the influence on social influence on the efficiency is as followed:

H0: There is no significant difference in purchasing likelihood between the group that is confronted with a warning label in a high pressure social scenario compared to a low pressure social scenario.

H1: There is a significant difference in purchasing likelihood between the group that is confronted with a warning label in a high pressure social scenario compared to a low pressure social scenario.

The literature review suggests, that also here, the Null-Hypothesis can be rejected, as there will be a significant difference between the groups. Specifically it is expected, that a high pressure social situation in a health conscious group will increase the efficiency of the label, while a low for a less health conscious group, the difference between label and no label will be smaller.

The same style of hypothesis as for the social context was also used to analyse the impact of various personal factors. They compared the differences for:

- High vs Low Risk Awareness
- High or low influenceability by other people
- High vs low social desirability
- High vs low Alcohol consumption
- many vs few negative experiences with alcohol
- high vs low health and death anxiety
- healthy vs unhealthy lifestyle
- good vs bad general attitude towards warning labels
- high vs low regret after the purchase
- cancer cases in the social circle vs no cases
- demographics

3. Methodology

3.1 Research Design

For this study, a quantitative research approach with a 2x2 experimental design was used. The objective of the experiment was to investigate the effect of cancer warning labels on alcoholic beverages, as well as the influence of social context on consumer purchasing decisions. The 2x2 design is supposed to ensure a comprehensive and systematic evaluation the dynamics between the independent variables – the presence of a cancer warning label and the social situation – as well as the influence of further variables like the personal factors of the participants.

To conduct the experiment, the digital platform Qualtrics was chosen. This approach ensures for an easy design, distribution and analysis of the survey. Qualtrics also makes it possible to conduct the experiment with a random assignment to the four experimental conditions (see: Figure 2 - Survey Logic). The participants were randomly assigned to one of the four experimental conditions (see: Figure 1 - Research Design Visualisation) where they were presented with a hypothetical drinking scenario. After, answered a sequence of questions in regards to the scenario, before moving to a number of question blocks about their personal factors.

The survey took around 5-6 minutes to complete. This timeframe was chosen to increase participation and allowing for a compact but still comprehensive data collection.

3.2 Sample

The survey was distributed via a variety of online platforms, including social media (LinkedIn, Instagram, Reddit, and WhatsApp) and work Slack channels. This distribution method was selected to achieve the greatest possible outreach, attracting participants from a range of backgrounds, while maintaining accessibility and convenience.

To ensure a big enough sample size for a representative statistical analysis, the goal of the data collection was to recruit at least 200 participants. Also, they should come from different demographic groups. This might have been influenced by the method of an online survey, because here, a self-selection takes place, rather than a chosen representative sample with all demographics included. The participants must have been at least 18 years old and have had consumed alcohol in the past 6 months. Those, who did not meet these requirements, as well as participants that failed the attention check questions, were excluded from the analysis.

After this exclusion, the total sample size for this study came up to 203 participants. The average age was 31 years, with a majority being in the 20-30 age range. The gender was nearly evenly distributed. It was 96 males, 100 females and a small proportion of people that define as non-binary or prefer to self-describe their gender. The overall sample was very well-educated. 165 of the 203 participants are holding at least a Bachelor degree (see here for demographic charts:

Demographic Charts).

Even though it was tried to find a sample that was as diverse as possible, the demographics were relatively homogeneous. This might limit the representativeness of the findings.

3.3 Experiment

The study utilized four scenarios to simulate real-life drinking situations.

When choosing a setting for the experiment, the focus was set on creating an environment with a higher social norm for alcohol consumption. This is why, for this experiment, a bar was chosen as a high-consumption setting, as a label influencing decision-making, even in a setting where alcohol consumption is standard, demonstrates a potentially stronger impact of the warning label.

For each scenario, participants were provided with a brief description of a typical drinking situation, accompanied by an image of a neutral bar menu offering various alcoholic and non-alcoholic drinks. When designing the menus showed to the participants, it was made sure that additional factors such as affordability or brand preferences were taken care of by designing the most neutral menu possible, offering standard choices without any pricing.

The scenarios varied along two dimensions: the presence or absence of a visible cancer warning label on the bar menu, stating, "Alcohol can cause cancer," and the social setting (high social pressure vs. low social pressure).

The scenarios were as follows:

Scenario 1: High pressure, no warning label

Participants were supposed to imagine arriving at a bar alone, knowing that their friends would join later. In this setting, the social norm pressure was very high because their order would be visible to all the others after their arrival. The menu did not include any health warnings.

Scenario 2: Low pressure, no warning label

Participants imagined being at the bar again, but this time their friends were already present. In this scenario, some members of the group drank alcohol while others weren't. This created a lower-pressure environment that allowed participants to align with either the part of the group drinking or not drinking. The menu did not include any health warnings.

Scenario 3: High pressure, with a warning label

Participants imagined arriving at a bar alone under the same high-pressure conditions as in Scenario 1, but this time, the menu featured a warning saying: “*Alcohol can cause cancer.*”

Scenario 4: Low pressure, with a warning label

Participants imagined being at the bar with their friends already present, similar to Scenario 2. But now, they are also encountering the menu with the same cancer warning.

Directly following the experimental scenarios, participants were asked a series of nine questions to evaluate their purchasing intentions, perceptions, and behaviours. These questions were identical across all four scenarios, thus ensuring consistency and comparability between the test and control conditions. Each question was rated on a scale from 1 to 9. The scale varied depending to the specific question.

In order to evaluate the participants' purchasing behaviour, they were first asked to indicate their intention to purchase an alcoholic beverage in the described situation. The scale for this question was ranging from no intention at all (1) to totally intending to purchase (9). The next question was supposed to evaluate their perception of health risks in this situation, asking how risky they considered drinking alcohol in the given scenario. The scale ranges from not risky at all (1) to extremely risky (9).

Furthermore, three questions investigated the social context. Participants were asked to indicate their perception of how socially appropriate, desirable, and rewarding ordering an alcoholic drink would be in the given situation.

After that, participants were asked to imagine ordering an alcoholic drink and to evaluate two emotional factors of their decision. First, they were asked how much enjoyment the drink would bring them, rated from very little enjoyment (1) to very high enjoyment (9). After, they answered about their potential regret, indicating how much they believed they would regret ordering the drink later, with options ranging from not at all (1) to a great deal (9).

Finally, two questions measured the impact of the factors that were modified in the experiment. Participants evaluated the extent to which their decision to purchase an alcohol was, or would be, influenced by a cancer warning label, as well as the role of social influence. The latter was assessed by asking participants how much their decision was affected by the behaviour and

consumption of others in the bar. Both got rated on a scale with responses ranging from no influence at all (1) to a great influence (9).

3.4 Additional Questions

After the participants finish the experiment with the corresponding questions, they are forwarded to a set of five question blocks. These are designed to gather further details on personal factors.

The first block observed the alcohol consumption habits of the participants. They stated how frequent they have consumed alcohol in the past six months. The answering options that were offered ranged from "Never" to "Daily." The next question was focussing on the amount of alcohol they consume within a typical drinking occasion. To ensure that all participants have the same understanding of how much one drink is, the question guided them with specific examples of a standard drink, for example a 330 ml beer or a 150 ml glass of wine. After, the participants were asked what their preferred drinking scenario looks like. The options were: alone, with one person, or in larger social groups. They also got asked about their intentions about reducing their alcohol consumption. The answers here ranged from considering it frequently to never having thought about it. The last question asked negative experiences with alcohol and the participants had to state if they had these frequently, occasional, or non-existent.

The second block was about the social influence on alcohol consumption. In particular, it is evaluating the pressure participants feel to drink in the company of friends. This was measured on a scale from "No pressure at all" to "A very strong pressure." It was also assessed how comfortable participants feel being the only non-drinker in a group as well as their perceptions of how culturally common and accepted it is to drink in bars, rated on a scale from "Not common at all" to "Very common."

The third block looked at risk awareness and personal factors. Participants had to rate their perceptions of the risk of developing cancer from normal drinking on a scale from "Very low risk" to "Very high risk." They were also asked about their concerns in regards to cancer and other life-threatening health issues, as well as to what extent the thoughts of their themselves dying bothered them. Also they were asked how convincing they think health warnings on products like cigarettes or alcohol are. Furthermore, a question asked about their lifestyle, with

ratings from "Very unhealthy" to "Very healthy,". Lastly they were asked about experiences with cancer in their close social circles, including whether any of these cases were from alcohol consumption.

The fourth block was as a manipulation check to confirm participants' attention for the experimental scenarios. They were asked to recall whether the described scenario involved being alone or with friends and to say whether they noticed a cancer-related health warning label on the menu, selecting from options like "Yes," "No," or "Unsure."

The final block asked for demographics and collected information about the participants' age, gender, and the highest level of education.

3.5 Data Analysis

To analyse the purchasing decisions (dependent variable Y), a linear regression model was used. It was measured on a scale from 1 to 9, with 9 indicating the highest intention to purchase. The presence of a warning label (independent variable X) was coded as a categorical variable (Yes/No).

The dataset was divided into subgroups. These subgroups were separated based on the responses of the participants to questions about risk awareness, social influence, alcohol consumption, past alcohol experience, intentions to reduce consumption, cancer history, lifestyle and demographics. For each subgroup, participants were categorised as high or low based on a threshold score of 5.

For the main hypothesis test, the null hypothesis (H_0) stated that there is no significant difference between groups with and without the warning label, while the alternative hypothesis (H_1) said that there is a significant difference. The significance level for all tests was set at $p < 0.1$. This was chosen because of the relatively small sample size.

For each subgroup, a separate regression analyses was conducted by filtering the data according to the subgroup characteristics and then after, applying the same regression model to the filtered datasets.

The analysis was conducted using R. Here, filtering mechanisms were used for subgroup comparisons, the tidyverse for the regression analyses and ggplot for visualizations.

3.6 Ethics

This study was conducted in accordance with the ethical standards of research. It was ensured that all the rights and autonomy of research participants was protected. After starting the survey, all participants were provided with an intro text, explaining the research objectives and data protection:

In the text, the participants were informed that the objective of the study was to gain insight into consumer behaviour with regard to alcoholic beverages. Also, they were assured that their responses would be used only for academic purposes and that all the collected data would be stored anonymous and securely. Participation was entirely voluntary, and participants were able to decline at any point by exiting the survey.

Furthermore, participants were informed that the completion of the survey would require an estimated 5–6 minutes.

By proceeding with the survey, participants were considered to have provided implied consent and therefore, that they read and understood the information provided and agreed to participate voluntarily. This approach ensured that all ethical standards for informed consent and data privacy were upheld.

4. Results

4.1 Overall Effect of the Warning Label

The effect of the cancer warning label was surprising: Throughout all four scenarios, the participants in the group that was exposed to the warning label demonstrated a greater likelihood of purchasing an alcoholic beverage compared to those in the no-warning condition. In particular, participants who were not presented with the warning label indicated a mean likelihood of $M=6.93$, whereas those who were exposed to the warning label exhibited a slightly elevated likelihood, with a mean increase of .41 points.

The p-value for the difference between the group exposed to cancer warnings and the control group was not significant at $p=.147$. This indicates that, based on the current sample size, there is insufficient evidence to reject the null hypothesis and confirm that the warnings had a significant effect on purchasing behaviour. However, it is important to note that a non-significant p-value does not necessarily mean that there is no effect. Given the limitations imposed by the small sample size and the consequent reduction in statistical power, this analysis places particular emphasis on effect sizes, such as mean differences, to assess the magnitude of the trends observed. Effect sizes provide valuable information about the practical significance of the findings, regardless of statistical significance. This is given, while still taking into account that the maximum p-value should be as low as possible, below or close to .1, so $p=.1$.

4.2 Risk Awareness and Its Impact on Purchasing Decisions

The impact of the general risk awareness on the likelihood of purchasing an alcoholic beverage revealed clear patterns, when comparing those who got exposed to cancer warning labels versus those who were not. Participants got grouped into two categories based on their self-reported risk awareness: low risk awareness and high risk awareness. The following results were observed:

Individuals with low general risk awareness were found to be influenced by the presence of a cancer warning label in their purchasing decisions. In the absence of the label, the mean likelihood of purchase was $M=6.85$. After the participants got exposed to the warning label, the likelihood to purchase alcohol increased by .76 points. The p-value here was $p = .089$, which means this difference is approaching statistical significance.

The participants who had a high level of risk awareness had basically no reaction at all to the warning label. When no label was present, the mean purchasing likelihood for these participants was $M=7.07$. The group that got exposed to the warning label, only showed a slight decrease of .1 points, which was not statistically significant ($p=.824$).

4.3 Influence of a Healthy Lifestyle on Purchasing Decisions

Individuals who indicated that they did not engage in a healthy lifestyle demonstrated a noteworthy response to the warning label. In the absence of the warning label, the participants indicated a mean likelihood of purchase of $M=6.71$. When the warning level was present, the purchasing likelihood increased significantly by 1.19 points, summing up to a total likelihood of 7.90. This effect approached statistical significance, with a p-value of $p=.067$, which is a notable trend.

The participants that stated that they are living a healthy lifestyle, on the other hand, showed no noticeable effect of the cancer warning label on their purchasing decisions.

4.4 Influence of Health & Death Anxiety on Purchasing Decisions

For those who exhibited low levels of fear regarding health issues, cancer, and mortality, the cancer warning label had a notable impact: Without the label, the participants reported a mean likelihood to purchase of $M=6.84$. However, with the warning label, there was an increase of .74 points, resulting in a mean likelihood of $M=7.58$. This effect was statistically significant, with a p-value of $p=.04$.

4.5 Influence of Alcohol Consumption Habits and Drinking Experiences on Purchasing Decisions

Individuals who reported frequent alcohol consumption exhibited a mean purchasing likelihood of $M=7.34$ in the absence of the warning label, which increased to 7.96 when exposed to the label. This is an increase of .62 points, which is a trend approaching statistical significance ($p=.171$).

In contrast, low-frequency drinkers seem to only be minimally influenced by the labels. They showed a mean likelihood of $M=6.24$ without the label, and only an insignificant increase of .16 points when the label was present.

When it comes to the previous experiences with alcohol the participants had, the overall impact on the effectiveness of the label was insignificant. But there was one exception: For the

participants that reported multiple negative experiences with alcohol the warning label led to a small decrease in purchasing likelihood by .27 points. The sample size of this subgroup was too low, though, to achieve statistical significance.

4.6 Influence of Social Pressure on Purchasing Decisions - Experimental Scenarios

When no label was present, participants in high-pressure social situations demonstrated a higher likelihood of purchasing alcohol, with a mean likelihood of $M=7.35$. In contrast, those in low-pressure situations showed a significantly lower mean likelihood, decreasing by .78 points ($p = .074$). These findings suggest that in a situation with high cultural peer pressure people are more likely to order alcohol than in a low pressure scenario, when there is no label.

However, a cancer warning label seems to diminish this difference in purchasing likelihood between the high and low-pressure scenarios. In high-pressure situations, participants exposed to the label reported a mean purchasing likelihood of $M=7.55$, while those in low-pressure situations exhibited a smaller reduction of .43 points ($p=0.222$). This difference was not statistically significant, which suggests that the warning label may partially mitigate the influence of social pressure on purchasing decisions.

It is important to determine the impact the level of which individuals are influenced by others has on purchasing decisions. The findings are indicating that people who are usually less prone to social influence demonstrate a greater response to the warning label, compared to people who are more pressured by their peers.

For participants who stated that others have a low influence on their purchasing decisions, the mean likelihood of purchasing alcohol was $M=6.65$ without the label. When exposed to the warning label, their likelihood increased by .86 points, reaching a total of $M=7.51$ ($p = 0.082$). This trend indicates that the label has a meaningful, close to statistically significant, effect on individuals that are less impacted by external social pressures.

At the same time, participants with an overall low social desirability and impression management showed a comparable pattern. In the absence of the label, their purchasing likelihood was $M=6.74$, which increased by .73 points with the label, at a p-value of $p=0.051$, which is very close to being significance.

This contrasts with those who claim that social pressure has a greater influence on their purchasing behaviours. In this context, the warning label is observed to have no effect at all.

4.7 Factors Showing No Meaningful Effect

Some factors that were initially expected to have an influence on the responses to cancer warning labels, showed no meaningful effects. This includes intentions to reduce or quit alcohol consumption, and demographic factors such as gender, age, and education.

5. Discussion

5.1 Unexpected study outcome and the influence of risk awareness

Even though, alcohol consumption is widely associated with significant health risks, including forms of cancer, only a few people are aware of this relationship. Therefore, measures such as cancer warning labels aim to enhance the risk awareness for consumer and increase the knowledge of the potential dangers. According to the theoretical frameworks discussed in the literature review, an increase in perceived risk is expected to lead to a decrease in purchasing decisions. Specifically, the theory says that individuals weigh the perceived risks and benefits when making consumption choices. When the perceived risks of a product is high, consumers are less likely to buy.

From this perspective, cancer warning labels are designed to serve as an important visual cue to increase the consumers' awareness of the health threats posed by alcohol. By drawing attention to the association between alcohol consumption and cancer, such warnings are intended to amplify the perceived risks and trigger the need for safety and security, as described in the theoretical review about Maslow's Needs hierarchy, leading to anti consumption behaviour (Navy, 2020).

In contrast to the expectation that was built from the theoretical review, the results from this study revealed that the expected effect of cancer warning labels on purchasing decisions did not occur as predicted. Specifically, the presence of a cancer warning label did not lead to a decrease in purchase likelihood. Instead, the results showed that there was a difference between people that already had a high pre-existing risk awareness and people who did only know little about them. The once, that already perceived alcohol consumption as risky, had no observable impact on their purchasing decisions. On the other hand, for people who did not initially perceive alcohol as risky before, the cancer warning label paradoxically increased their likelihood of purchasing alcohol. This finding is counter-intuitive and clashes with the theoretical assumption

that increased risk perception always leads to reduced consumption, and is particularly critical given the known lack of risk awareness described in the introduction to this thesis.

One potential explanation is that the warning label may have triggered a psychological reaction, through which individuals feel like their autonomy is tried to be restricted and therefore ignore the label. This underlines the results from Sjöberg's study. It showed that individuals who consume alcohol are very likely to deny the potential risks associated with their behaviour.

5.3 Explanation of the study's outcome

As possible explanations of the unexpected results, the following systems are considerable:

5.3.1 Defiance and Model learning

These unexpected result is raising questions about the interplay between cognitive dissonance and psychological reactance. According to the cognitive dissonance theory individuals experience a discomfort when their behaviours conflict with their risk awareness, which should motivate them to reduce consumption to align with the warning. The overall positive perception of alcohol consumption is clashing with the warning label suggests that the observed increase in purchase likelihood for some groups suggests that psychological reactance might have dominated; individuals resisted the perceived imposition on their autonomy, leading to defiance.

Psychological reactions such as defiance and reactance are triggered when people think that their autonomy or freedom to make their own decisions are threatened. The more they believe the message they receive is very controlling or moralistic, the stronger this phenomena is. This leads them to respond with resistance or by defying the message that threatens their autonomy (Dan-Cohen, 1994). When being confronted with a alcohol cancer warning label, the participants might have felt threatened, especially because the topic of health and alcohol consumption is a very sensitive one, through which many people define themselves. As an act of defiance or revolt against the apparent attempt at authority or regulation, this might have caused them to reject the label's message and possibly increased the possibility that they would make a purchase.

Another interesting concept to mention here is the one of model learning. From childhood on, people tend to imitate the actions of the people around them, especially from those people that

they perceive as role models, that they admire or can relate to in a specific way. Model learning can influence the risk perception of the consumers significantly (Bak, 2019). This means that, when a person grew up in an environment, where alcohol consumption is normalized, and alcohol related risks are downplayed, they are likely to adapt those thoughts as well. The warning sign might not have much of an impact if the social norms in a person's immediate surroundings normalize drinking, particularly in social situations when it is frequently connected to positive, pleasant experiences.

Furthermore they might lack the proof of negative experiences that would be able to increase the risk awareness they got taught. For example, some individuals have cancer cases in their social circles, but they are often not aware that or if those are related to alcohol consumption. This is also supported by the data: 115 individuals, which are 56.6% of the study participants, reported that they had cancer cases in their close social circle. From those 115 people, only 6.9% knew, that there was a relationship between the cancer case and alcohol consumption. This could potentially result in statements such as those observed in an Australian study on alcohol warning labels, where consumers asserted that "everything causes cancer anyway" (May, Elliott, & Crabb, 2017).

5.3.2 The Hawthorne Effect

Another reason for the outcome of the study could be the Hawthorne effect. This effect occurs when participants change their behaviours because they know they are being observed in a study setting (Sedgwick & Greenwood, 2015).

In this experimental situation, the participants are aware of the fact that their purchasing decisions were going to be evaluated. For instance, participants exposed to warning labels may have felt a need to demonstrate resistance to the external influence provided by the experimental setting. This could've led to the observed effect of defiance or overcorrection. But also, they could've altered their choices to what they think is socially desirable.

5.3.3 Overcorrection and the Role of Bias

Another possibility to explain the outcomes is the phenomenon of overcorrection that happens in experimental study environments. As described by Wilson and Brekke (Wilson & Brekke, 1994), it occurs, when individuals believe that an external factor, such as a warning label, is influencing their decision-making. They react by attempting to compensate for this influence. The problem is though, that because they don't know about the magnitude of the effect, they

might overcompensate this correction. In this study, it can be assumed that participants believed that the warning label is influencing them to not buy, but do not know to what extent. To counteract this influence, they knowingly try to avoid being influenced by the label. Because they don't know what their actual purchasing decision would look like if the label wasn't present, they may end up overcorrecting.

This overcorrection effect can help explain why some individuals—particularly those who did not initially perceive alcohol as risky—paradoxically increased their likelihood of purchasing alcoholic beverages when exposed to the warning label. These individuals may have overcompensated and behaved in a way would not be their natural choice.

5.3.4 Study limitations as explanation of the unexpected outcome

Of course, another reason for the unexpected study outcome could be the study limitations, such as the small sample size, the non-descriptive sample distribution or the lack of a sufficiently strong warning label.

An important limitation to consider for this study was the digital **sampling method** and the distribution through online channels. The fact, that a digital platform was used to recruit participants might lead to an overrepresentation of people that are tech affine. Also, through the distribution over social media and the professional network of the author, the representability of the sample is limited to those in the authors social circle. Also it limits the participants to those who are active in social networks. This also can lead to an uneven distribution of demographics, such as age, gender, or cultural background.

Furthermore, the sample size is relatively small, which can limit the ability to detect statistically significant differences between the experimental groups.

Furthermore, the results of this study are indicating obvious tendencies that the cancer warning labels have an effect on purchasing behaviour, but due to the small sample, some of the results are not statistically significant. Therefore the hypotheses can't be accepted or rejected with a high confidence. To fix this, a larger sample size could've provided a more robust result.

Furthermore, **hypothetical scenarios** were used in the experiment. The use of those, rather than real-world settings may have resulted in differences between the behaviour the participants stated they would have and how they would actually act. This is because participants may not experience the same social and environmental pressures they would experience in a real bar environment. The study also **simplifies the concept of social influence**. The text about the bar only describes a static group behaviour and participants are not able to observe any dynamic peer interactions that would be there in real life. This could also affect participants' responses.

Another limitation is the use of **self-reported data** instead of a observation of actual behaviours. Here, the participant could be influenced by wanting to act in a way that's socially desirable. This can obviously lead to a falsification of the results, especially with such sensitive topics like health and alcohol consumption.

The **design of the warning label** was also limited to only one representation. It could've had a different influence if another wording, design or placement would have been used, because these elements can play a crucial role in shaping consumer behaviour (Edmunds, et al., 2023). Even though the **short duration** of the survey can help to reduce the participant fatigue, it might also limit the depth of data collected, particularly compared to the complex psychological factors such as cognitive dissonance or risk perception that were analysed in the study.

Finally, the emphasis on immediate responses to cancer warning labels does not evaluate their **long-term impact** on behaviour or purchasing patterns.

5.4 The Influence of individual differences on the efficiency of the warning label

5.4.1 A healthy lifestyle and health anxiety

Furthermore, the impact of cancer warning labels on purchasing behaviours is influenced by personal factors such as a healthy lifestyle or different levels of health or death anxiety. The results are showing that individuals who think about themselves as more unhealthy and those who have a lower anxiety level when it comes to their health, have a greater response to the warning label. The label confronts them with their unhealthy habits. This can potentially trigger a defensive response and they are more likely to purchase alcohol despite the warning. This also is aligned with the theory of cognitive dissonance, because the individuals are trying to reduce their discomfort that occurs from being confronted with their contradicting lifestyle choices.

5.4.2 Alcohol consumption habits

Alcohol consumption habits as well as drinking experiences also play a role in changing the reception of the cancer warning label. People who are more frequent drinkers show a higher resistance to the label's message, even increasing the purchasing likelihood. On the other hand, low-frequency drinkers were only minimally influenced. This might be the case, because the

might already have a more health-conscious attitudes or even less emotional engagement with the warning.

5.5 Determining the most likely reason for the unexpected outcome

To understand if the unexpected increase in purchasing likelihood comes from a defiance mechanism or is an honest mistake of overcorrection, it is important to explore what triggers each of those behaviours. As stated before, the reason for a defiance reaction is often a feeling of threat towards the participant's identity.

The sample shows, that in the bar setting, the cultural pressure to drink is very high. The participants rated the cultural acceptance of drinking in a bar at 8.5 out of 9. This highlights the strong drinking context that might increase identity-related tensions and defensive reactions when people are not allowed to drink in this situation.

To see what the actual reason for the increase in purchasing likelihood is, there should be a second experiment designed. In this experiment, the participants are presented with a more neutral drinking setting, such as a dinner or brunch. This new setting should be able to create a situation with a lower social pressure to drink, which therefore leads to a lower threat to the identity when the warning label suggests not to drink alcohol. If the purchasing likelihood doesn't increase in this setting, it is likely, that the reaction in this study was a defiance mechanism. If the increase still persists though, it is more likely, that in both settings, an unintentional overcompensation took place.

5.6 The effect of Social Pressure

As just described, the social pressure to drink in a bar setting was perceived as overall high by the sample. This thesis also aims to explore the nuanced impact of social pressure in purchasing decision on the efficiency of alcohol cancer warning labels.

When there are no health warnings present, the social pressure has a pronounced effect on the purchasing intentions. This finding is reinforcing the behaviours that are socially expected in high-pressure social contexts, in this case to consume alcohol in a bar.

But for the groups with the cancer warning labels, this effect of social pressure seems to disappear. The people are not as keen anymore to drink more in higher pressure scenarios.

One reason for this effect could be that the warning is shifting the focus more towards the **personal** health risks and therefore **away from social norms** and conformity. Another reason

could be that the label might lead to cognitive dissonance, which dissonance could lead them to rely less on their social group as well.

Oftentimes, in high-pressure social situations there is a strong emotional engagement to the situation, that people are not always noticing. The warning label might break up this automatic, emotional peer-influenced decision-making.

These findings are showing that warning labels not only raise awareness about health risks, but they may also serve as a counterbalance to social pressures in purchasing situations. It is important to note, though, that there is a difference of this effect depending on the level of social desirability of the participant. People who are more influenced by others are responding stronger to the warning label than people who are more influenced by external cues. The reason could be that the latter are more focused on social dynamics and may prioritize to fit in, while the less influenced are more focused on their own, personal health concerns.

6. Key takeaways to implement

Warning labels seem to change the impact of social pressure on alcohol purchasing decisions, but their effectiveness varies across individuals and situations. While they have the desired effect on social pressure, the overall results still show an increase in purchasing alcohol when a warning label is present. This suggests that further actions have to be taken before warning labels can have the desired effect over all social groups. This section is summarising the key takeaways and is suggesting future implementation:

Increasing Risk Awareness through educational campaigns

The results are showing that individuals may not be ready to fully engage with cancer warnings yet because they don't have enough awareness or knowledge about alcohol-related health risks. Low awareness of the health risks of alcohol was shown to lead to a strong increase in purchase decisions. Therefore, for health warnings to be truly effective, they should serve as a reminder of existing knowledge rather than a surprising or confrontational piece of information. Public education campaigns must therefore precede or accompany the introduction of warnings. These campaigns should focus on raising awareness of the link between alcohol consumption and cancer.

Tailoring Communication to Individual differences

The results of the study are underlining the importance of individual differences when it comes to the efficiency of the cancer warning labels. When public health initiatives are designing their campaigns, they should consider these findings and target their communication towards those various personal factors. For example, should they focus on individuals with a low health awareness and high alcohol consumption levels. Also, they should implement educational programs that to help building a better critical thinking and sense of personal responsibility for the general public.

Making Alcohol Consumption less socially desirable

Given that social pressure has a big effect in bar settings leading to a higher likelihood to buy alcohol, policymakers and public health advocates should consider strategies to reduce the social desirability of drinking. For example, they could introduce campaigns that normalise moderation or that highlight alternative beverage choices without alcohol. Also, challenging the automatic association between alcohol and social bonding could weaken group-driven behaviours. Other ideas would be visible health-related messages in bars - beyond labels on bottles.

Warning Label Implementation should be context-sensitive

While labels reduce social pressure in bar settings, the overall response is still very negative to the label. This could be different in other social scenarios where health-conscious behaviour is more normative (e.g. fitness events, workplaces). Here a label might already be adequate. Policymakers should consider testing the effectiveness of warning labels in different contexts to determine where they have the greatest impact and adjust their placement or design accordingly.

7. Future Research Directions

This study provides insightful results, but also shows that further research is needed to better understand the dynamics between social pressure, individual traits, and warning label effectiveness.

One key area for further study is the interplay between the **individual differences**—such as health anxiety, lifestyle, and response to social influence—and the effectiveness of warning labels. Understanding these variations can help tailor public health strategies to specific demographic or psychological profiles.

Future research should also explore **the role of education** in enhancing label effectiveness. The results indicate that low awareness of alcohol's health risks diminishes the impact of warnings, emphasizing the need for educational campaigns to precede or accompany labelling initiatives.

It should also be assessed what the **long term effects** of the warning labels and educational campaigns are.

Also, there should be more research done on the **optimal design and placement of warning labels** especially across **different social and cultural contexts**. It should be further explored how different formats, messages, and visual presentations of the labels are influencing purchasing behaviour across varying social groups. For this, also **different settings** then a bar, for example in restaurants, nightclubs or a workplace, should be considered.

Finally, future research should take a closer look at the impact of the **psychological mechanisms** discussed in this thesis. These include reactance, overcorrection, and identity-related tensions such as cognitive dissonance. This can help to refine both the content and context of anti-alcohol messaging.

8. Conclusion

This thesis looked at the impact of cancer warning labels on alcoholic beverages and uncovered a complex interplay of individual differences, social pressure, and psychological responses. The labels aim to reduce alcohol consumption by increasing risk awareness, but the findings suggest that in high-pressure social situations, such as bars, we are not yet at a stage where these interventions can actually effectively influence behaviour. The effectiveness of the label is influenced by the missing knowledge of the general population of the link between alcohol and cancer. For individuals with high pre-existing risk perception, the label seems to be redundant, while individuals with a low awareness showed counterproductive behaviours, by showing an increase in purchasing likelihood purchasing. Strong social norms and psychological factors, including reactance and overcorrection, further diminished the labels' impact in these contexts. The results are highlighting the fact that public health strategies must overcome this knowledge gap before warning labels actually can achieve their full potential. Educational campaigns are necessary to increase the awareness of the health risks of alcohol. This should ensure that the warning labels serve more as a reinforcement than an information piece. On top of that, campaigns should be designed with the goal to reduce the social desirability of drinking. Further strategies that should be integrated are promoting moderation and offering good non-alcoholic drinking alternatives. Also, integrating visible health messages in high social pressure settings can also help disrupt the pressure to drink.

Appendices

Survey Design

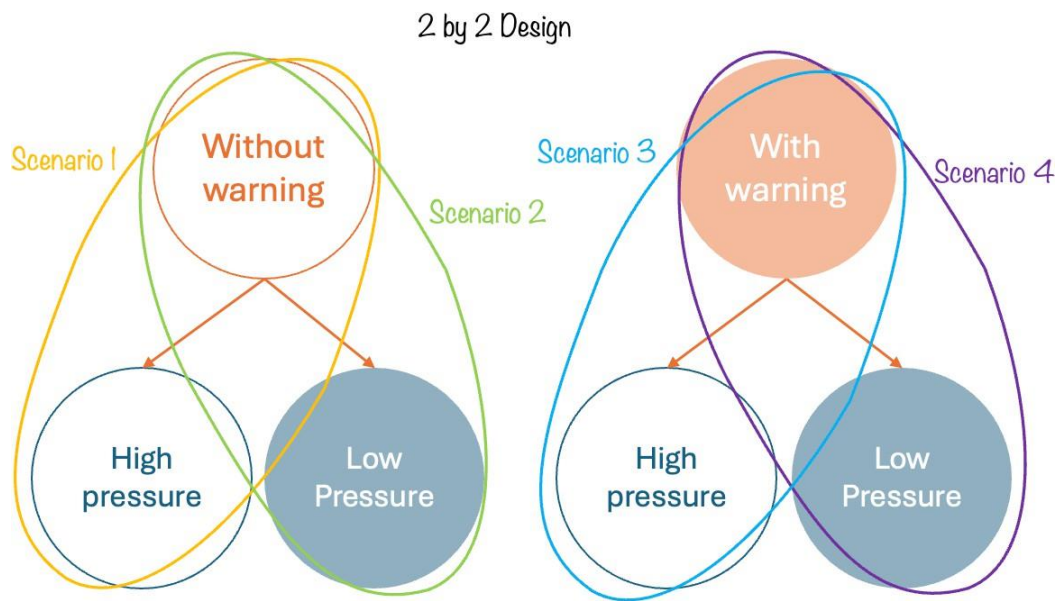


Figure 1 - Research Design Visualisation

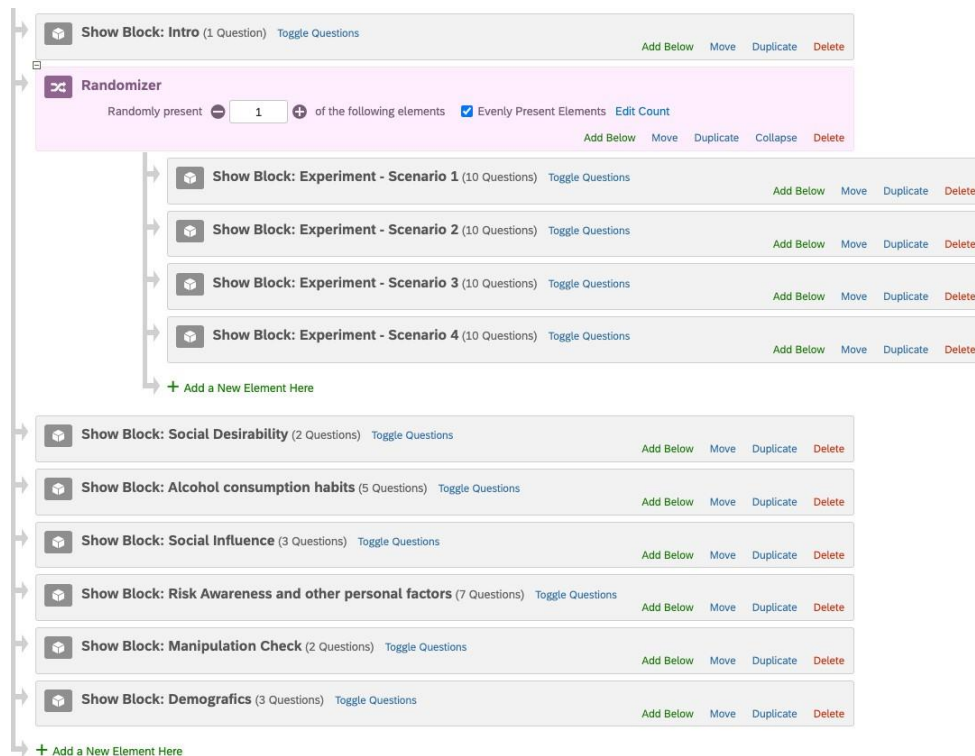


Figure 2 - Survey Logic

Survey Questions

Intro

You are being invited to participate in a research study about consumer behavior regarding alcoholic beverages. Completing this survey will take approximately 5-6 minutes. In the end you will have the chance to win a €20.00 Amazon Voucher. Use Your responses will remain completely anonymous and confidential.

All data will be securely stored and used solely for academic purposes. Participation in this study is entirely voluntary. By proceeding with the survey, you acknowledge that you have read and understood the information above and are voluntarily agreeing to participate in this study. If you do not wish to participate, you may close the survey now.

Please answer truthfully.

Experiment – Scenario 1

Imagine the following situation:

It is Friday night, and you are going to meet your friends in a bar. You arrive a little earlier than the others, so you enter the bar, find an empty table and take a seat by yourself. On the table you find the menu offering various alcoholic and non-alcoholic drinks (see below).

You look around and notice, that some people around you are drinking alcoholic beverages, others are not.

Now, the waiter comes up to you, asking what you would like to order.

the Bar

SIGNATURE DRINKS

*Pink Lemonade Mimosa
Classic Aperol Spritz*

WINE

*red wine, white wine, pink wine
sparkling wine*

BEER

dark beer, light beer, none alcoholic beer

NONE ALCOHOLIC

soft drinks, orange juice, sparkling water

Experiment — Scenario 2

Imagine the following situation:

It is Friday night, and you are going to meet your friends in a bar. When you arrive, your friends have already found a table. You join them. On the table you find the menu offering various alcoholic and non-alcoholic drinks (See below).

You notice, that some of your friends are drinking alcoholic beverages, others are not.

Now, the waiter comes up to you, asking what you would like to order.

the Bar

SIGNATURE DRINKS
Pink Lemonade Mimosa
Classic Aperol Spritz

WINE
red wine, white wine, pink wine
sparkling wine

BEER
dark beer, light beer, none alcoholic beer

NONE ALCOHOLIC
soft drinks, orange juice, sparkling water

Experiment — Scenario 3

Imagine the following situation:

It is Friday night, and you are going to meet your friends in a bar. You arrive a little earlier than the others, so you enter the bar, find an empty table and take a seat by yourself. On the table you find the menu offering various alcoholic and non-alcoholic drinks (See below).

You look around and see, that some people around you are drinking alcoholic beverages, others are not.

Now, the waiter comes up to you, asking what you would like to order.

the Bar

SIGNATURE DRINKS
Pink Lemonade Mimosa
Classic Aperol Spritz

WINE
red wine, white wine, pink wine
sparkling wine

BEER
dark beer, light beer, none alcoholic beer

NONE ALCOHOLIC
soft drinks, orange juice, sparkling water

Alcohol can cause cancer!

Experiment — Scenario 4

Imagine the following situation:

It is Friday night, and you are going to meet your friends in a bar. When you arrive, your friends have already found a table. You join them. On the table you find the menu offering various alcoholic and non-alcoholic drinks (See below).

Some of your friends are drinking alcoholic beverages, others are not.

Now, the waiter comes up to you, asking what you would like to order.

the Bar

SIGNATURE DRINKS
Pink Lemonade Mimosa
Classic Aperol Spritz

WINE
red wine, white wine, pink wine
sparkling wine

BEER
dark beer, light beer, none alcoholic beer

NONE ALCOHOLIC
soft drinks, orange juice, sparkling water

Alcohol can cause cancer!

Question Block – Experiment

<i>Code</i>	<i>Question</i>
Purchase	Please indicate your intention to buy an alcoholic beverage in this situation on a scale from 1 (no intention at all) to 9 (totally intend to).
Risk	How risky to your health would you consider drinking alcohol in this situation? 1 – not risky at all; 9 - Extremely risky
SocialAppropriate	How socially appropriate do you think it is to order an alcoholic drink in this situation? 1 – Very inappropriate; 9 – Very appropriate
Socialdesirable	How socially desirable do you think it is to order an alcoholic drink in this situation? 1 - Very undesirable; 9 - Very desirable
SocialRewarding	How socially rewarding do you think it is to order an alcoholic drink in this situation? 1 – Very unrewarding; 9 – Very rewarding
Enjoyment	Imagine that you ordered an alcoholic drink, how much enjoyment would it bring you? 1 – Very little enjoyment; 9 – Very high enjoyment
Regret	Imagine that you ordered an alcoholic drink, how much do you think you would regret ordering this drink later? 1 – not at all; 9 – a great deal
AWL.Influence	To what extent do you think your decision would be / was influenced by a health warning label on the menu saying: "Alcohol can cause cancer? 1 – no influence at all; 9 – A great influence
OtherPeople	To what extent do you think your decision was influenced by what other people are doing and consuming in the bar? 1 – no influence at all; 9 – A great influence

Question Block – Alcohol Consumption habits

<i>Code</i>	<i>Question</i>
Alc.Frequency	In the past 6 months, how often have you consumed alcoholic beverages? Never (1) Rarely (a few times a year) (2) A few times a month (3) Once a week (4) Several times a week (5) Daily (6)
Alc.Intensity	On a typical drinking occasion, how many standard drinks do you consume? <i>Note: A standard drink contains approximately 10–14 grams of pure alcohol. Examples include: - One 330 ml bottle of beer (5% ABV) - One 150 ml glass of wine (12% ABV) - One 45 ml shot of spirits (40% ABV) - One cocktail (may vary depending on ingredients)</i> 1-2 drinks (1) 3-4 drinks (2) 5-6 drinks (3) 7-9 drinks (4) 10 or more drinks (5) I don't drink (6)
Alc.Setting	In which setting do you most often prefer to drink alcohol? Mostly alone (1) Mostly with one other person (2) Mostly in small social groups (3-5 people) (3) Mostly in large social gatherings (6+ people) (4) I do not have a preference between social and solitary drinking (5)
Alc.Quitting	Did you ever think of reducing your alcohol consumption? Yes, I often think about reducing it (1) Yes, I occasionally think about it (2) Yes, I thought about it in the past but not recently (3) I sometimes think about reducing but haven't taken steps (4) No, I have never thought about reducing my consumption (5)
Alc.NegativeExp	Did you previously have had negative experiences with alcohol consumption? Yes, I have had several negative experiences. (1) Yes, I have had a few negative experiences. (2) No, I have never had a negative experience. (3) I am not sure. (4)

Question Block – Social Influence

<i>Code</i>	<i>Question</i>
Alc.PeerPressure	How much pressure do you feel to join your friends when they drink? 1 – No pressure at all; 9 – A very strong pressure
Alc.Group	How comfortable do you feel, if you are the only one not drinking in a group?

	<u>1 – Not comfortable at all; 9 – Very comfortable</u>
Alc.Culture	To what extent do you think it is culturally common and accepted to drink in a bar? <u>1 – Not common at all; 9 – Very common</u>

Question Block – Risk Awareness and other personal factors

<i>Code</i>	<i>Question</i>
Cancer.Risk	How high do you think is the risk of getting cancer from drinking on a regular basis? 1 – Very Low Risk; 9 – Very high risk
Health.Risk	How worried are you about getting cancer or other life-threatening health issues? 1 – Not worried at all; 9 – Very worried
DeathAnxiety	How much does the thought of your own death bother you? 1 – Not at all; 9 – A big deal
WarningAttitude	In general, how convincing do you find health warnings on products (e.g. "Smoking kills")? 1 – Not convincing; 9 – Very convincing
HealthyLifestyle	How healthy would you say your lifestyle is? 1 – Very unhealthy; 9 – Very healthy
CancerPast	Did you experience cases of cancer in your close social circle? Yes (1); No (2)
Alc.CancerPast	Display This Question: If Did you experience cases of cancer in your close social circle? = Yes Were any of these cancers caused by alcohol consumption? Yes (1); No (2)

Question Block – Manipulation Check

<i>Code</i>	<i>Question</i>
Check-Social	Please remember the scenario described in the beginning. When you imagined yourself choosing a drink, were you thinking of your self alone in the bar or with your friends? 1 – Definitely alone; 9 – Definitely with one or more friends

Check-Label	Please remember the scenario described in the beginning. Did you notice any health warning label on the menu regarding cancer? Yes, I noticed a label. (1) No, I did not notice any label. (4) I'm unsure. (5)
-------------	---

Question Block – Demographics

<i>Code</i>	<i>Question</i>
Age	How old are you? (Open Field)
Gender	What is your gender? Male (1) Female (2) Non-binary (5) Prefer not to say (7) Prefer to self-describe: (11) (Open text)
Education	What is the highest degree or level of school you have completed? Less than High School (1) High School Diploma or equivalent (2) Some College, no degree (3) Skilled worker diploma (9) Bachelor's Degree (5) Master's Degree (6) Doctorate (e.g., PhD) (8)

Survey Results

```

Call:
lm(formula = Purchase ~ AWL, data = df2)

Residuals:
    Min       1Q   Median       3Q      Max
-6.3367 -0.9293  0.0707  1.6633  2.0707

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   6.9293     0.1974  35.100  <2e-16 ***
AWLy           0.4074     0.2799   1.456   0.147
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.964 on 195 degrees of freedom
(6 observations deleted due to missingness)
Multiple R-squared:  0.01075,    Adjusted R-squared:  0.005676
F-statistic: 2.119 on 1 and 195 DF,  p-value: 0.1471

```

Figure 3 - Influence of AWL on the purchasing decision

```
{r}
df7 <- df2 %>%
  filter(AWL == "y" )
```

```
{r}
m7 <- lm(Purchase ~ Scenario, data = df7) %>%
  summary()
m7
```

```
Call:
lm(formula = Purchase ~ Scenario, data = df7)

Residuals:
    Min       1Q   Median       3Q      Max
-6.1224 -0.5510 -0.1224  1.4490  1.8776

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.5510     0.2463   30.66  <2e-16 ***
ScenarioS4   -0.4286     0.3483   -1.23    0.222
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.724 on 96 degrees of freedom
(4 observations deleted due to missingness)
Multiple R-squared:  0.01552, Adjusted R-squared:  0.005268
F-statistic: 1.514 on 1 and 96 DF, p-value: 0.2216
```

```
{r}
df7.2 <- df2 %>%
  filter(AWL == "n" )
```

```
{r}
m7.2 <- lm(Purchase ~ Scenario, data = df7.2) %>%
  summary()
m7.2
```

```
Call:
lm(formula = Purchase ~ Scenario, data = df7.2)

Residuals:
    Min       1Q   Median       3Q      Max
-5.5660 -0.9569  0.4340  1.6522  2.4340

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.3478     0.3167   23.203  <2e-16 ***
ScenarioS2   -0.7818     0.4328   -1.806    0.074 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.148 on 97 degrees of freedom
(2 observations deleted due to missingness)
Multiple R-squared:  0.03254, Adjusted R-squared:  0.02257
F-statistic: 3.263 on 1 and 97 DF, p-value: 0.07397
```

Figure 4 - Comparing Group and alone scenarios - Left: With label, Right: Without Label

```
{r}
df16.2 <- df2 %>%
  filter(Cancer.Risk_1 < 5 )
```

```
{r}
m16.2 <- lm(Purchase ~ AWL, data = df16.2) %>%
  summary()
m16.2
```

```
Call:
lm(formula = Purchase ~ AWL, data = df16.2)

Residuals:
    Min       1Q   Median       3Q      Max
-5.8500 -0.6154  0.3846  1.3846  2.1500

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.8500     0.3123   21.936  <2e-16 ***
AWLy         0.7654     0.4444    1.722    0.0891 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.975 on 77 degrees of freedom
(2 observations deleted due to missingness)
Multiple R-squared:  0.03709, Adjusted R-squared:  0.02458
F-statistic: 2.966 on 1 and 77 DF, p-value: 0.08906
```

```
{r}
df16.3 <- df2 %>%
  filter(Cancer.Risk_1 > 5 )
```

```
{r}
m16.3 <- lm(Purchase ~ AWL, data = df16.3) %>%
  summary()
m16.3
```

```
Call:
lm(formula = Purchase ~ AWL, data = df16.3)

Residuals:
    Min       1Q   Median       3Q      Max
-5.0698 -0.9737  0.0263  1.9302  2.0263

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.06977     0.29507   23.960  <2e-16 ***
AWLy        -0.09608     0.43080   -0.223    0.824
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.935 on 79 degrees of freedom
(2 observations deleted due to missingness)
Multiple R-squared:  0.0006293, Adjusted R-squared: -0.01202
F-statistic: 0.04974 on 1 and 79 DF, p-value: 0.8241
```

Figure 5 - Influence of Risk Awareness - Left: Low Risk Awareness, Right: High Risk Awareness

```
df9 <- df2 %>%
  filter(OtherPeople > 5 )
```

```
{r}
```

```
m9 <- lm(Purchase ~ AWL, data = df9) %>%
  summary()
m9
```

Call:

```
lm(formula = Purchase ~ AWL, data = df9)
```

Residuals:

Min	1Q	Median	3Q	Max
-6.067	-1.000	0.000	1.000	2.000

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	7.00000	0.28772	24.329	<2e-16 ***
AWLy	0.06667	0.39075	0.171	0.865

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.774 on 81 degrees of freedom

(1 observation deleted due to missingness)

Multiple R-squared: 0.0003592, Adjusted R-squared: -0.01198

F-statistic: 0.02911 on 1 and 81 DF, p-value: 0.865

```
df10 <- df2 %>%
  filter(OtherPeople < 5 )
```

```
{r}
```

```
m10 <- lm(Purchase ~ AWL, data = df10) %>%
  summary()
m10
```

Call:

```
lm(formula = Purchase ~ AWL, data = df10)
```

Residuals:

Min	1Q	Median	3Q	Max
-5.6500	-0.6500	0.4872	1.4872	2.3500

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	6.6500	0.3442	19.322	<2e-16 ***
AWLy	0.8628	0.4898	1.761	0.0821 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.177 on 77 degrees of freedom

(3 observations deleted due to missingness)

Multiple R-squared: 0.03873, Adjusted R-squared: 0.02625

F-statistic: 3.103 on 1 and 77 DF, p-value: 0.08214

Figure 6 - Influence of Other People - Left: High Influence , Right: Low Influence

```
{r}
df38 <- df2 %>%
  filter(Social.Perception_1 < 5 | Social.Impression_1 < 5)
```

```
{r}
```

```
m38 <- lm(Purchase ~ AWL, data = df38) %>%
  summary()
m38
```

Call:

```
lm(formula = Purchase ~ AWL, data = df38)
```

Residuals:

Min	1Q	Median	3Q	Max
-5.7358	-0.4687	0.5313	1.5312	2.2642

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	6.7358	0.2748	24.512	<2e-16 ***
AWLy	0.7329	0.3715	1.973	0.0509 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.001 on 115 degrees of freedom

(4 observations deleted due to missingness)

Multiple R-squared: 0.03273, Adjusted R-squared: 0.02432

F-statistic: 3.891 on 1 and 115 DF, p-value: 0.05094

Figure 7 - Influence of general Social Desirability

```
{r}
df17 <- df2 %>%
  filter(Alc.Frequency == "Several times a week" | Alc.Frequency == "Daily")
```

```
{r}
m17 <- lm(Purchase ~ AWL, data = df17) %>%
  summary()
m17
```

Call:
lm(formula = Purchase ~ AWL, data = df17)

Residuals:

Min	1Q	Median	3Q	Max
-6.3448	-0.9677	0.6552	1.0323	1.6552

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	7.3448	0.3230	22.737	<2e-16 ***
AWLy	0.6229	0.4494	1.386	0.171

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.74 on 58 degrees of freedom
(1 observation deleted due to missingness)
Multiple R-squared: 0.03206, Adjusted R-squared: 0.01537
F-statistic: 1.921 on 1 and 58 DF, p-value: 0.171

```
{r}
df18 <- df2 %>%
  filter(Alc.Frequency == "Rarely (a few times a year)" | Alc.Frequency == "A few times a month")
```

```
{r}
m18 <- lm(Purchase ~ AWL, data = df18) %>%
  summary()
m18
```

Call:
lm(formula = Purchase ~ AWL, data = df18)

Residuals:

Min	1Q	Median	3Q	Max
-5.400	-1.359	0.600	1.724	2.765

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	6.2353	0.3016	20.677	<2e-16 ***
AWLy	0.1647	0.4727	0.348	0.728

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.154 on 84 degrees of freedom
(4 observations deleted due to missingness)
Multiple R-squared: 0.001443, Adjusted R-squared: -0.01044
F-statistic: 0.1214 on 1 and 84 DF, p-value: 0.7284

Figure 8 - Influence of Alcohol consumption habits - Left: High Consumption, Right: Low Consumption

```
{r}

df32 <- df2 %>%
  filter(Alc.NegativeExp == "Yes, I have had several negative experiences." )
```

```
{r}
m32 <- lm(Purchase ~ AWL , data = df32) %>%
  summary()
m32
```

Call:
lm(formula = Purchase ~ AWL, data = df32)

Residuals:

Min	1Q	Median	3Q	Max
-6.0000	-1.4519	0.7308	1.7308	2.0000

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	7.2692	0.4105	17.706	<2e-16 ***
AWLy	-0.2692	0.5806	-0.464	0.645

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.093 on 50 degrees of freedom
(3 observations deleted due to missingness)
Multiple R-squared: 0.004282, Adjusted R-squared: -0.01563
F-statistic: 0.215 on 1 and 50 DF, p-value: 0.6449

Figure 9 - Influence of negative Experiences with Alcohol

```
{r}
df25 <- df2 %>%
  filter(Health.Risk_1 < 5 | DeathAnxiety_1 < 5)
```

```
{r}
m25 <- lm(Purchase ~ AWL, data = df25) %>%
  summary()
m25
```

```
Call:
lm(formula = Purchase ~ AWL, data = df25)

Residuals:
    Min       1Q   Median       3Q      Max
-5.8448 -0.5893  0.2829  1.4107  2.1552

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   6.8448     0.2516  27.207  <2e-16 ***
AWLy          0.7445     0.3590   2.074  0.0404 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.916 on 112 degrees of freedom
(3 observations deleted due to missingness)
Multiple R-squared:  0.03698, Adjusted R-squared:  0.02839
F-statistic: 4.301 on 1 and 112 DF, p-value: 0.04038
```

```
{r}
df25.2 <- df2 %>%
  filter(Health.Risk_1 > 5 | DeathAnxiety_1 > 5)
```

```
{r}
m25.2 <- lm(Purchase ~ AWL, data = df25.2) %>%
  summary()
m25.2
```

```
Call:
lm(formula = Purchase ~ AWL, data = df25.2)

Residuals:
    Min       1Q   Median       3Q      Max
-5.9565 -0.9565  0.1228  2.0435  2.1228

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   6.87719     0.27395  25.104  <2e-16 ***
AWLy          0.07933     0.40993   0.194  0.847
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.068 on 101 degrees of freedom
(2 observations deleted due to missingness)
Multiple R-squared:  0.0003706, Adjusted R-squared: -0.009527
F-statistic: 0.03745 on 1 and 101 DF, p-value: 0.8469
```

Figure 10 - Influence of Health & Death Anxiety - Left: Low, Right: High

```
{r}
df26 <- df2 %>%
  filter(HealthyLifestyle_1 > 5)
```

```
{r}
m26 <- lm(Purchase ~ AWL, data = df26) %>%
  summary()
m26
```

```
Call:
lm(formula = Purchase ~ AWL, data = df26)

Residuals:
    Min       1Q   Median       3Q      Max
-5.791 -1.100  0.209  1.797  2.209

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   6.7910     0.2415  28.118  <2e-16 ***
AWLy          0.4123     0.3530   1.168  0.245
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.977 on 124 degrees of freedom
(3 observations deleted due to missingness)
Multiple R-squared:  0.01089, Adjusted R-squared:  0.00291
F-statistic: 1.365 on 1 and 124 DF, p-value: 0.2449
```

```
{r}
df26.2 <- df2 %>%
  filter(HealthyLifestyle_1 < 5)
```

```
{r}
m26.2 <- lm(Purchase ~ AWL, data = df26.2) %>%
  summary()
m26.2
```

```
Call:
lm(formula = Purchase ~ AWL, data = df26.2)

Residuals:
    Min       1Q   Median       3Q      Max
-4.7143 -0.9000  0.6929  1.1000  2.2857

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   6.7143     0.4787  14.03 3.23e-15 ***
AWLy          1.1857     0.6241   1.90  0.0665 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.791 on 32 degrees of freedom
(1 observation deleted due to missingness)
Multiple R-squared:  0.1014, Adjusted R-squared:  0.07327
F-statistic: 3.609 on 1 and 32 DF, p-value: 0.06651
```

Figure 11 - Influence of a healthy lifestyle; Left: Healthy, Right: Unhealthy

Demographic Charts

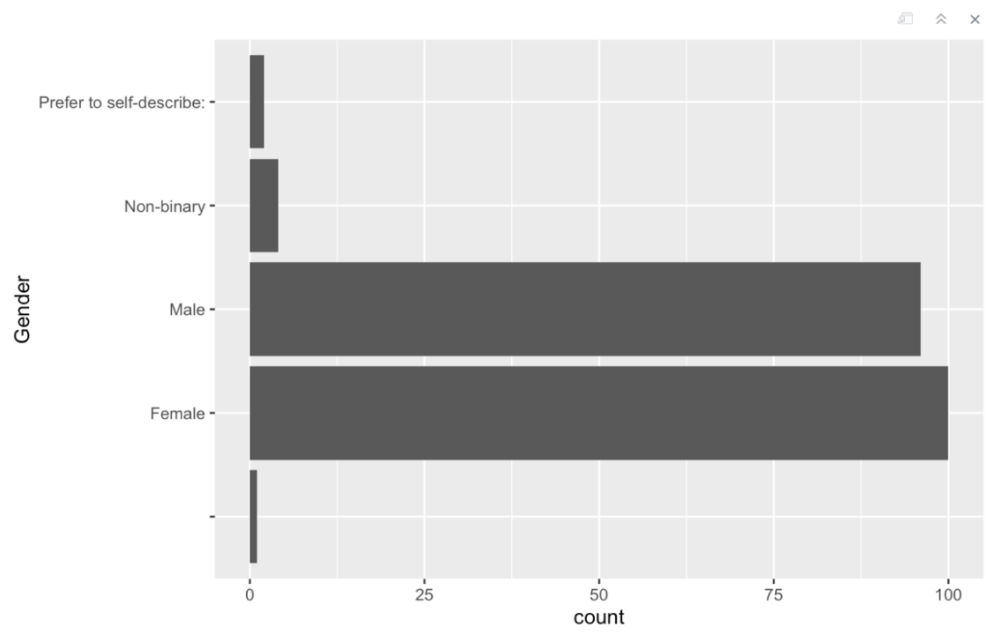


Figure 12 – Demographics: Gender Distribution

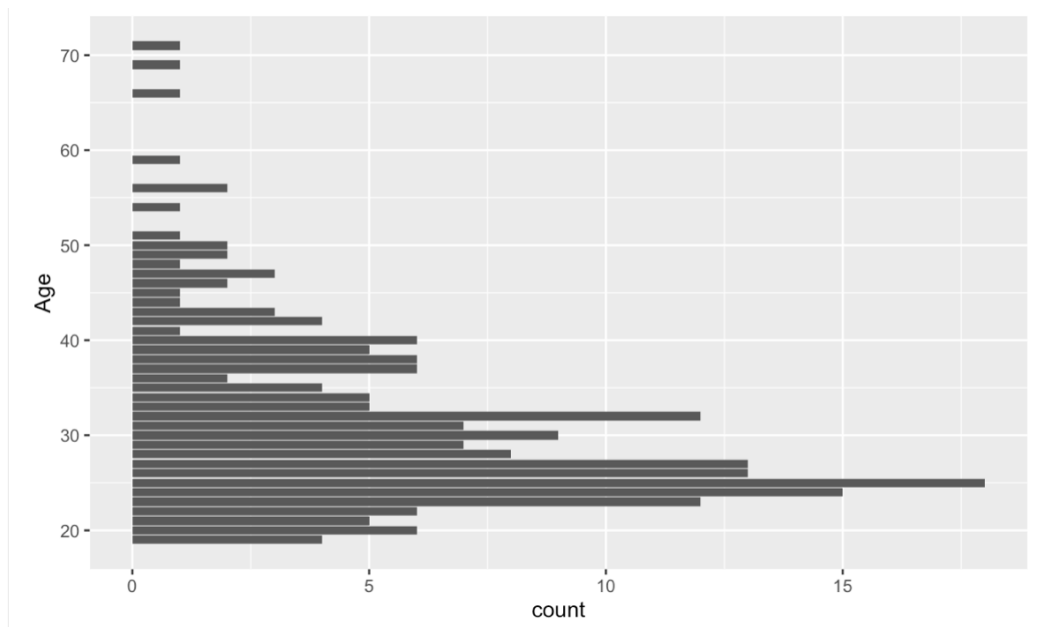


Figure 13 - Demographics: Age Distribution

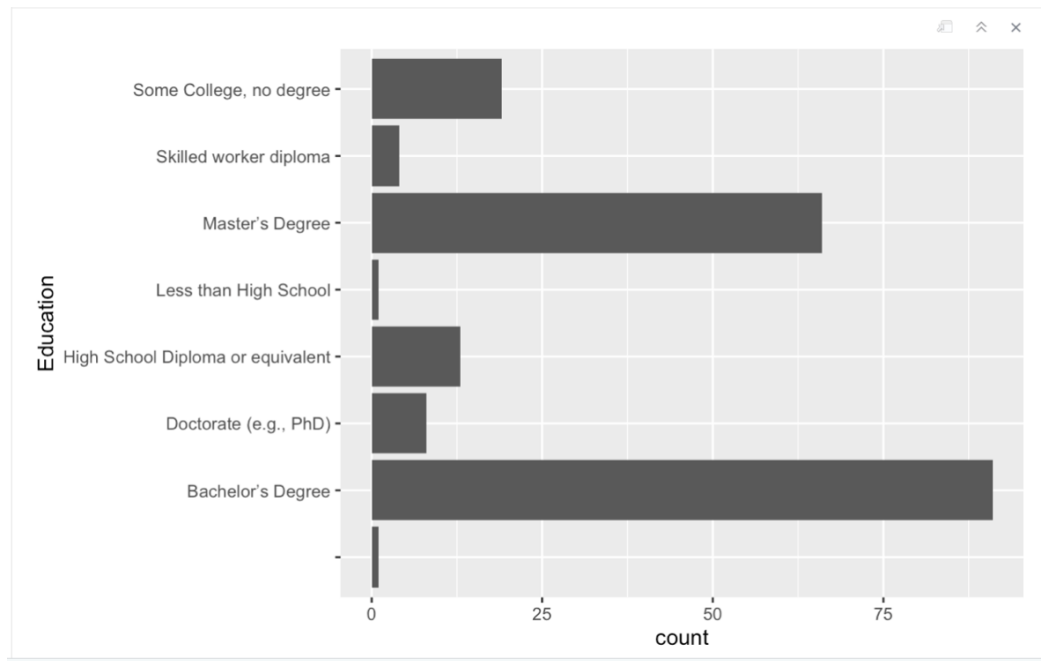


Figure 14 - Demographics: Education Distribution

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