Erasmus School of Economics

Master Thesis Behavioural Economics

"Do we choose what we like, or do we like what we choose? The external validity of the Implicit Choice Paradigm in a consumer choice setting"

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Abstract

Theory suggests that the preferences of individuals are affected by their choices, a concept that could have major consequences on business and economic decision-making. The external validity of the choice-induced preference change in a real setting with consumer products has yet to be tested via the Implicit Choice Paradigm. The present thesis was focused on studying the external validity of the choice-induced preference change of individuals, using the Implicit Choice Paradigm in a consumer setting with real incentives. Within this context, a framed field experiment was designed and implemented, where 247 participants had to rank and make choices between Tony's Chocolonely chocolate flavours. Based on their reported behaviour, the change in their preferences was measured, along with their level of experienced cognitive dissonance. The findings of this research could not confirm that the participants exhibited a positive spreading of alternatives, regardless of whether they had purchased the product in the past. In addition, most of them did not report high levels of cognitive dissonance, yet dithering was the emotion most strongly experienced. Overall, a choice-induced preference change was not observed, when implementing the Implicit Choice Paradigm. Nevertheless, limitations of this research, such as sample selection bias and sample representativeness, should be carefully considered before drawing generalizing conclusions.

Keywords: Implicit Choice Paradigm, External validity, Cognitive dissonance, Real incentives

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Table of Contents

Introduction

Each choice represents a sacrifice. People are put up with countless choices each day, varying from selecting what they will have for lunch to accepting a job offer. Choice overload leads individuals to take mental shortcuts, in order to avoid being anxious and cognitively overwhelmed (Kahneman, 2011). Similarly, the freedom of choice, meaning the autonomy that people have to decide between two or more alternatives, drives them to feel frustrated, or even powerless. More often than not, mistakes can be made, or people could feel regret over a choice, building up to the already existing frustration, caused by the act of choice (Schwartz, 2004). Could it be possible that people change their preferences to feel better about their choices?

Existing literature has tried to study whether one's preferences are significantly affected by the choices they make. In the field of neuroscience and psychology, it has been shown that prior choices can increase the desirability of future choices, regardless of the context and the environmental conditions. This effect is known as the mere choice effect. In other words, having chosen an alternative in the past results in an increase in the desirability of the same alternative in the future. However, this position troubles economists, who base the estimation of demand functions, social welfare, and latent preferences on choice data. Therefore, additional research is necessary in order for economists to evaluate the extent to which the formulation of preferences is driven by the mere choice effect (Alós-Ferrer & Granic, 2023).

For over six decades, the Free-Choice Paradigm, along with its variations, has been used as an experimental design by researchers, who set out to study the effect of choices on the preferences of individuals (Chen & Risen, 2010). In this experimental design initially developed by Brehm (1956), participants have to complete the rating of certain objects based on their desirability and then choose between two alternatives with similar ratings. It was found that after making such choices, participants reevaluated the chosen alternative more positively,

compared to the one they rejected (Brehm, 1956). Therefore, according to the findings of studies that utilize the Free-Choice Paradigm, when a person makes a choice, their preferences change to favor that decision in the future (Alós-Ferrer et al., 2012). If this preference change was not present, then the individual would feel discomfort from the inconsistency between their actions and their preferences (Mullainathan & Washington, 2009).

Lyubomirsky and Ross (1999) investigated the concept of changing preferences, by examining whether the evaluations and perceptions of high school graduates, regarding colleges they had sent applications to, were altered after their admission results were revealed. Indeed, the subjects decreased the evaluation of the colleges that did not offer them admission, with researchers finding a stronger effect on those participants who were satisfied with their current admission status (Lyubomirsky & Ross, 1999).

Chen and Risen (2010) later found a flaw in this reasoning; a person might appear to be fonder of an alternative, after being driven to make a choice, even though in reality they are not. Considering that the ratings provided by individuals are an imperfect measure of preferences, people might make choices that differ from what their ratings suggest. In this case, the Free Choice Paradigm would record a spreading – meaning an increase in the valuation of one alternative and a decrease in the valuation of the second one – not due to a change in their true preferences, but because the individuals have additional information that is not measured through the Free Choice Paradigm. In other words, there is a difference between stated preferences and actual choices that introduces bias in the measurement (Chen & Risen, 2010).

Building on the findings of Chen and Risen (2010), the Implicit Choice Paradigm was developed, to address the flaws of the Free-Choice Paradigm that impacted the effectiveness of the experimental design. In detail, the bias introduced in the Free Choice Paradigm was caused by the endogenous classification of the alternatives into unchosen and chosen items.

The classification was endogenous as it depended on the direct choices and decisions of the individuals. In the Implicit Choice Paradigm, however, the participants had to complete a subliminal decision-making process. Instead of being presented with one choice task with two alternatives of similar rankings, they were presented with two choice tasks. The first choice task was comprised of one of the initial alternatives and one higher-ranking one, while the latter was comprised of the second alternative and one lower-ranking one. In this design, one choice would be always freely selected, and one freely rejected, since they were compared with options of lower and higher rankings respectively. The allocation into the two choice tasks was random, and thus, the alternative that was selected was randomly predetermined by the researcher. In other words, the participants did not have to directly choose between the two similarly ranking alternatives, which was the source of the selection bias, but they were rather placed in choice tasks that were independent of their underlying preferences (Alós-Ferrer et al., 2012).

Within this context, there are fields that the external validity of the choice-induced preference change phenomenon, meaning the change of people's preferences after making a decision, has not been tested via using the Implicit Choice Paradigm. One of these fields includes the consumer setting, in which an individual makes choices regarding the goods they are, or are not going to purchase. According to microeconomic theory, consumers structure their preferences based on their individual tastes or utility they derive from the goods they consume, the constraints they face – such as their limited income –, and their effort to maximize their well-being (Pindyck & Rubinfeld, 2013). At the same time, multiple other factors can influence their preferences. The personal beliefs, the life-cycle stage, the reference groups, the culture and the lifestyle are just a few of the psychological, social, personal, and cultural factors that influence the formulation of consumer preferences and choices (Kotler & Armstrong,

2008). In this context, it is possible that the choices themselves can also affect the future preferences – and thus choices – of consumers.

Finally, apart from the aforementioned factors that affect the formulation of one's preferences, the monetary value of a consumer good is a considerable determinant of consumer behaviour (Nagyová et. al., 2020). Consumers have limited financial resources that they are willing to spend on a good, in order to satisfy their needs and wants. Price is a constraint that is taken into consideration when deciding on a purchase and as a result, can influence consumer preferences and behaviour (Pindyck & Rubinfeld, 2013, Zhao et. al., 2021)

Studying and understanding consumer behaviour and how individuals choose between different goods is of great importance. For businesses, consumer behaviour needs to be systematically and methodically researched as it is a source of uncertainty that affects the success or failure of a business venture (Makarewicz, 2013). For economists and policymakers need insights into consumer behaviour in order to provide more accurate and effective advice for economic action (Directorate for Science, Technology and Innovation Committee on Consumer Policy, 2017).

Finally, to test the external validity of the Implicit Choice Paradigm in a consumer setting, the use of real incentives needs to be considered to better simulate the consumer environment. According to Mørkbak et al., (2014) in choice experiments, the decision-making process of an individual can be affected by the existence of real economic incentives (Mørkbak et al., 2014).

Based on the above analysis, the focus of this research was to study the validity of the choice-induced preference change in a consumer setting, where real incentives directly affect the choices made by consumers, using the Implicit Choice Paradigm. Since this effect is yet to be confirmed, outcomes of this research could potentially shed light on practical implications

that can be considered by relevant stakeholders interested in fostering an in-depth understanding of consumer behaviour. The external validity was studied through the design and implementation of an online experiment. In this experiment, participants had to complete ranking and choice tasks, following the experimental design of the Implicit Choice Paradigm, regarding the purchasing of the product of Tony's Chocolonely chocolate bars. During the experiment, individuals had to rank different chocolate flavours of the brand. Based on their answers, their choice-induced preference change would be measured, via the calculation of the spreading of alternatives they exhibited, in regards to these products.

Based on all the above, the research question of this thesis was the following:

"Do consumers increase the valuation of a previously selected product and reduce the one of a previously rejected product, after being placed in an implicit choice setting with real incentives for consumer products?"

Literature Review

In an effort to examine whether past choices can change future preferences, a better understanding of the factors that can affect human behaviour is necessary. Therefore, in this section of the paper, the literature review was focused on understanding the main concepts that are involved in the decision-making processes of individuals, and specifically consumers. At the same time, since the topic of this thesis was centered on a consumer setting, certain considerations regarding one's behaviour, when purchasing consumer products were studied. Due to the need to test the external validity of the choice-induced preference change phenomena, specifically for consumer choices, certain considerations regarding the experimental design of the research, such as the design of a frame field experiment with real incentives, were examined.

Preferences and Past Choices

Evidence from the field of neuroscience and psychology supports that past choices tend to increase the desirability of a selected option in the future. The main reason why this process occurs is that people tend to want to decrease the emotional discomfort they experience, an effect also known as cognitive dissonance, due to having to choose between two items of seemingly similar evaluation (Alós-Ferrer & Granic, 2023). Especially in choices that are self-relevant for an individual, meaning that they have a direct impact on the individual's self-concept, greater dissonance can be aroused, leading to a greater change in attitude. Such choices include the decisions regarding one's lifestyle and habits, relating to nutrition and diet (Bem, 1967, Abelson, 1968).

On the other hand, the study of the effect of one's choices on their preferences and attitudes entails the consideration of multiple other factors that could be determinants of this preference change. An economist would, for example, consider the assumption of stable choice

patterns. This contrasts with theories in psychology which support that the act of choice can result in a fundamental change of preferences, even when no additional information has been revealed (Egan et. al., 2010, Ariely & Norton, 2008, Alós-Ferrer & Granic, 2023, Venkataraman, 2020). If that were the case for economic choices as well, then the choice-based preference formulation process could potentially interfere with the same concept it tries to measure. As a result, the estimates of researchers regarding the utility and demand functions, or the social welfare – concepts used to study the economic behaviour of individuals (Harsanyi, 1955, Afriat, 1967) – could present systematic bias (Alós-Ferrer & Granic, 2023).

Similarly, economists use the revealed preferences of individuals, in order to measure their latent preferences and consumer demand. According to the revealed preference theory, introduced by Paul Samuelson (1948), people's preferences are revealed through their purchases, and therefore, through their choices (Alós-Ferrer & Granic, 2023, Samuelson, 1948). However, this analysis depends on the implicit assumption that the choice patterns of individuals are both stable and well-defined (Alós-Ferrer & Granic, 2023). This is rarely the case as people's preferences are affected by uncertainty, the availability of salient information, as well as by distorted memories, and insufficient knowledge (Samson, 2014), highlighting another factor that complicates the study of the choice-induced preference change.

Based on an example mentioned by Alós-Ferrer and Granic (2023), the preferences of a consumer might be imprecisely and vaguely formulated, without them being aware of this inconsistency. People rather tend to shape their preferences, by observing their past behaviour. However, the memory of past behaviour can be faulty and inaccurately capture hedonic experiences (Ariely & Norton, 2008, Alós-Ferrer & Granic, 2023). For instance, having bought a product in the past does not necessarily entail to having one's needs fulfilled by this purchase. Nevertheless, consumers could end up buying the same, unsatisfying product multiple times, partly due to not always making rational, utility-maximizing choices and partly due to having

faulty memory of having their needs met in the past (Alós-Ferrer & Granic, 2023). In other words, past and repeated choices and purchases, lead to increased levels of stability in the preferences of consumers (Hoeffler & Ariely, 1999). As a result, there was a need to better understand to what extent the memory of prior choices, and thus purchases, could affect the formulation of future preferences. Hypothesis 2 of this thesis was designed in order to shed some light on this inquiry, comparing the creation of a positive spreading for consumers that have both purchased and not purchased a specific product in the past.

Mere Choice or Mere Exposure Effect?

Smith et al., (2008) found that past behaviour is one of the strongest predictors of the self-reported intention to buy a product, especially for repeated purchases. This effect can also be explained by the use of System 1 thinking for the purchase of convenience goods. According to Kahneman (2011), individuals employ two thinking systems. System 1 thinking is an automatic and intuitive process, requiring little effort and is mainly driven by one's experiences. It is useful in minimizing the paralyzing weight of constant decision-making processes. System 2 thinking on the other hand requires more time and effort (Kahneman, 2011). Convenience goods are goods of low price and require little planning and effort by the consumer, in order to be purchased. Convenience goods include soft drinks, bread, laundry detergent, as well as other products bought frequently by a household. The decision-making process between these products is made on impulse and based on their availability (Holton, 1958). Subsequently, System 1 thinking can be linked with the purchase of convenience goods, as consumers tend to repeat these purchases and could choose to rely on past behaviour in order to fast-track the decision-making process.

A concept that takes into consideration System 1 thinking is the mere choice effect. Even in cases when the individual does not have any additional information after or by the

choice, their preferences can be changed by the mere act of making a choice (Egan et. al., 2010). In other words, merely chosen alternatives are selected more often compared to merely rejected alternatives. However, there is yet no significant evidence that the mere choice effect can lead to a choice-induced preference change. Researchers have, thus, considered studying the mere exposure effect in relation to choice-induced preferences. (Alós-Ferrer & Granic, 2023, Zajonc, 2001).

According to the psychological phenomenon of the mere exposure effect, individuals tend to foster a preference for an alternative purely because they have been exposed to it and as a result, they are more familiar with it (Alós-Ferrer & Granic, 2023, Zajonc, 1968). In this context, familiarity is increased by repeated exposure to an alternative. This has proven to be true even in cases where the subject does not completely understand the alternative. According to Zajonc, humans prefer easier processes to complex cognitive ones, resulting in them making decisions based on familiarity. This theory is also in line with the reasoning on System 1 thinking of Kahneman (Kahneman, 2011). As a result, individuals might develop a preference for a product, not because it maximizes their utility, but because they are simply familiar with it. This conclusion supports the aforementioned analysis on consumers who purchase products based on irrational reasoning, such as faulty memory.

Based on the above, this thesis identified a need to evaluate the extent to which these effects are realized in a real-life environment. Therefore, this thesis tested the external validity of the Implicit Choice paradigm, where individuals would be exposed to a choice between consumer goods of a specific brand, but were also asked to report on whether they had purchased this brand in the past. This last question was included to test the actual effect of past memory – faulty or not – in the choice-induced preference change. At the same time, a convenience good was selected to be included in the experiment, as this would stimulate the

use of System 1 thinking, which is responsible for most of the choices – or purchases – that people make in a consumer environment (Corporate Finance Institute, 2023).

Cognitive Dissonance Theory

Another concept that one should consider to better understand human behaviour is the relation between preferences and choices is the effect of emotions, especially negative ones. A common framework in literature is the cognitive dissonance theory. Choices usually involve, at least to some extent, trade-offs, since they are comprised of both desirable and undesirable features. Therefore, a rejected option still has some positive characteristics, while the selected one might have some negative ones (Alós-Ferrer, Granic, Shi & Wagner, 2012). The generated trade-off difficulty can lead to negative emotions, such as anxiety, which then might influence the decisions that the individual makes. People tend to try to reduce the discomfort, and escape from unpleasant feelings (Luce et al., 1999). According to the definition of Festinger (1957), cognitive dissonance can be described as a psychologically uncomfortable state that drives an individual to reduce said discomfort. In an effort to reduce the dissonance people unconsciously adjust their preferences, increasing the desirability of the selected choice (Alós-Ferrer & Granic, 2023). This results in a positive spreading of alternatives, which captures the change in the desirability of two alternatives. The positive spreading of alternatives is created since the alternative selected by individuals is considered to be more desirable than it was before, after the individuals completed the decision-making process, while the rejected alternative is considered to be less desirable than before. (Chen & Risen, 2010).

However, according to Chen and Risen (2010), this spread may appear even in cases of no actual change in preferences, since a choice is a reflection of a preference, only within the Free Choice Paradigm. Since the introduction of this criticism, certain researchers have tried

to address the bias. This is when the Implicit Choice Paradigm, by Alós-Ferrer et al., (2012) came into the spotlight.

Nevertheless, cognitive dissonance had only been studied in regard to the Free Choice Paradigm. Therefore, there was a need to study whether cognitive dissonance also affected the choice-induced preference change, when using this Implicit Choice Paradigm. The impact of cognitive dissonance also needed to be measured. This gap was addressed by this thesis, through the creation of a specific experimental structure that set out to measure the level of cognitive dissonance after being placed in an Implicit Choice setting.

Implicit Choice Paradigm as an Experimental Design

Alós-Ferrer et al. (2012) developed the Implicit Choice Paradigm as an elaboration on the previously used experimental design of the Free Choice Paradigm, whose aim was to study the existence of a positive spreading. The Free Choice Paradigm used a Rate-Choice-Rate structure, according to which, participants initially had to rate certain alternatives. Then, they had to directly choose between two alternatives that had similar ratings. Lastly, they had to re-rank all the alternatives. Based on the last ratings, researchers tested whether a positive spreading of the ratings, between the two alternatives that were used in the Choice-phase of the experiment, was presented (Alós-Ferrer et al., 2012).

In contrast to this experimental design used by the Free Choice Paradigm, the design of the Implicit Choice Paradigm removed the concept of direct comparison, by pairing the two initial alternatives with the same ratings, with two additional ones: one rating higher and one rating lower in preference. This resulted in the rejection of one option and the acceptance of the other, based on their comparison with the secondly introduced items. In other words, the participants did not have to choose between two equally rated items. Therefore, the act of choice between the two alternatives was made subconsciously (Izuma & Murayama, 2013).

This design addressed the concerns raised by Chen and Risen (2010), regarding the structure of the Free-Choice Paradigm.

To recapitulate, this thesis aimed to test the external validity of the Implicit Choice Paradigm, specifically in a consumer choice setting, while taking into consideration past behaviour. The research was focused specifically on consumer products that are repeatedly purchased, as it was analysed that past behaviour has a significant effect on the intention to buy a product again (Smith et al., 2008). This increased intention to purchase the same product could affect the spreading of the alternatives presented in the Implicit Choice Paradigm. Finally, cognitive dissonance was also introduced as a factor that could have an impact on the spreading and thus, needed to be studied.

Incentives

In an effort to test the external validity of the Implicit Choice Paradigm, it was crucial to design a framed field experiment that would be able to document revealed preferences. The revealed preferences needed to be as close as possible to the true preferences of the participants. Therefore, a structure for the provision of real incentives was designed.

In economic experiments, the provision of an incentive is a crucial part of experimental studies. It is supported that individuals do not participate in research initiatives for free and they tend to work more effectively and persistently if they are presented with a motive to increase their performance (Camerer et. al., 1999). This notion comes in contrast to the assumption made by psychologists, who support that the intrinsic motivation of subjects is high, even without the provision of monetary rewards, resulting in the production of steady effort, throughout the experiment. At the same time, it is supported that incentives do not always improve performance (Camerer et. al., 1999). This is an idea on which both fields agree on. One of the principles of experimental economics highlights that a careful selection of

incentives needs to be made in order to avoid the generation of a negative effect from the provision of incentives. For instance, subjects might commit to a task they would normally not, because they expect a reward. Similarly, they might make a mental process shift, from automatic to control, placing more effort on automated tasks and deviating from the objective of the experiment. If subjects are aware that there is a reward for participating in the experiment, they might place additional effort on a task – an action they would not normally perform in a real-life scenario. This would result in an inaccurate representation of the subjects' behaviour (Ariely et. al., 2009).

Nevertheless, real incentives have been proven to improve the performance and effort of participants in surveys, in specific types of experiments. Higher incentives result in improved performance in judgment tasks, combined with increased effort. Financial incentives improve the judgment and accuracy of the prediction of subjects, minimizing the effect of anchoring bias. Specifically in the field of hypothetical choices for consumer products, which are the main focus of the framed field experiment, real incentives prevent participants from overreporting their purchase intention. In support of this argument, in cases where there is no clear standard of performance, incentives drive individuals away from "self-presentation" behaviour and towards realistic choices (Camerer et. al., 1999).

Last but not least, it should be mentioned that literature does not indicate a major difference in the effectiveness of incentives, when not all participants receive the reward. Rewarding one or a portion of the participating individuals is at least as effective as rewarding all of them in the experiment (Charness et. al., 2016). Therefore, the structure of the experimental design of this thesis took into consideration the assumptions of economic experiments, the limited number of participants that could be rewarded, and the uncompromised character of the experiment. These considerations are presented in more detail in the section Methods, under Experimental Design.

Based on the above analysis, this thesis set out to study the external validity phenomenon of the choice-induced preference change in a consumer setting. This would be achieved through the testing of the positive spreading of alternatives that people would exhibit in an implicit choice setting. The experimental design of the Implicit Choice Paradigm needed to be used in this study, as prior experimental designs, such as the Free Choice Paradigm, presented a certain bias that could impact the analysis, while the provision of real incentives could facilitate the accurate simulation of true consumer behaviour. The selection of the consumer setting was based on the lack of research in the specific field, as well as its importance in understanding consumer behaviour and mitigating the uncertainty involved in the success or failure of a business venture.

Within this context, the first hypothesis of this thesis, in regards to the research question, was formulated:

H1: Consumers will exhibit a positive spreading of alternatives, after having been exposed to an implicit choice setting with real incentives for consumer products.

At the same time, it was noted that consumer behaviour is not always rational, and therefore, consumer decisions can be driven by factors such as past choices and purchases. In fact, consumers might repurchase certain items multiple times, even though this act might not represent their true preferences. Repeated past choices lead to an increased level of stability in one's preferences. The extent to which this effect has a significant impact on the formulation of a positive spreading of alternatives needs to be studied. As a result, a second hypothesis was developed:

H2: After having been exposed to an implicit choice setting with real incentives, consumers will exhibit a larger spreading of alternatives, in case of consumer products they have not purchased in the past, compared to products they have purchased in the past.

Methods

Testing the external validity of the Implicit Choice Paradigm in a consumer setting with real incentives required the design of a frame field experiment. Framed field experiments are implemented in a field context and the subjects are aware of their participation (Harrison & List, 2004). Based on the findings of Lusk et. al., (2006), out of all the different types of non-natural experiments, framed field experiments are the ones in which participants exhibit a behaviour, as close to reality as possible. As a result, researchers can use them to test the external validity of a theory. Therefore, a framed field experiment was selected as an effective means of studying the external validity of the Implicit Choice Paradigm. Even though the individuals would be aware of their participation in an experiment, this was not expected to affect their behaviour, due to the inclusion of real incentives, whose effect was analysed in the previous section.

In detail, the framed field experiment was implemented via an online questionnaire sent out to prospective participants, and it satisfied the three assumptions of economic experiments: monotonicity, salience and dominance (Reidl, 2011, Friedman & Sunder, 1994). The online environment was selected due to the short duration of the overall experiment and the large sample size that was necessary for this research based on the power calculation. The participants had to answer a set of questions implementing the Implicit Choice Paradigm, using a random incentive system to incentivize choice. The products of the choice in the Implicit Choice experimental design were the different flavors of Tony's Chocolonely Chocolate Bars. At the same time, keeping in mind that the participants had to fill in an online questionnaire without actually buying, tasting or seeing the product, they had to be as familiar as possible with the type of product they would be presented with. As a result, they would be most able to accurately report their preferences and how these could change in an Implicit Choice setting in

real life. A chocolate bar, being a convenience good purchased by most consumers, was a product that fulfilled all the above conditions. Finally, participants would be able to report their preferences for the different chocolate flavors, even if they had not purchased the specific chocolate brand presented in the experiment. This is because chocolate is a type of product they have bought and tested in the past, resulting in being aware of which flavors they prefer (i.e., enjoying milk more than dark chocolate). Consequently, the second hypothesis, on whether the prior purchase of a product affected the extent of the preference change of individuals, could be tested.

Last but not least, the analysis of the data was carried out via both parametric and non-parametric analysis. In the following section, more details on the structure of the experiment and the econometric analysis will be provided.

Experimental Design

The online experiment was developed using the Qualtrics software. The online experiment started with informing prospective participants about the purpose of the questionnaire and required both their consent to participate and their confirmation that they were over 18 years of age. In the next section, they were informed about the overall outline of the experiment and the different types of tasks they would have to complete. Specifically, they were made aware that they would have to rank ten different chocolate flavors of Tony's Chocolonely. Then, they would have to complete two choices between two chocolate flavors each, and finally rank once again the same ten chocolate flavors. A note was made that the experiment was not a memory test, in order to prevent participants from trying to remember or memorize their responses and rankings.

Participants were then informed that they had the chance to enter a lottery scheme. Should they agreed to participate, they were informed about the exact structure of the lottery

and how it was connected with their decisions in the experiment. In detail, out of all participants, six individuals would be randomly selected to win a chocolate bar. The number of possible winners was calculated based on the limited resources, that could be used for the purpose of this thesis (a maximum of 25 euros to be given as an incentive to participants) and the average price of a Tony's Chocolonely Chocolate bar. As already explained in the previous section, rewarding only a few participants was not expected to have a negative impact on the experimental design, since partial rewarding structures are as effective as complete ones, given the type of task the participants had to complete (Charness et. al., 2016).

A chocolate bar would be selected based on the answers given by the selected individual in the experiment. Participants were incentivized to be as truthful as possible, in order to have the chance to win a chocolate bar they actually like. Specifically, prospective lottery winners would have to complete all three main tasks of the experiment (Rank-Choices-Rank). Out of these three tasks, one would be randomly selected, and participants would receive a chocolate bar, based on the following process:

- If a rank task was randomly selected, two out of the ten chocolate bars that the participants had to rank would be randomly selected. The bar which was ranked the highest would be selected as the lottery prize.
- If the choice task was randomly selected, one of the two choices would also be randomly selected, and the bar selected in the choice would be given as the lottery prize.

In the next section, participants were asked to select the Tony's Chocolonely chocolate flavors they had bought in the past. This question was necessary to report whether participants had previously purchased the brand and whether this familiarity would affect their preferences (Hypothesis 2).

Then, they had to perform one ranking task, two choice tasks and one last ranking task, using the chocolate bars of Tony's Chocolonely. In the first ranking task, participants had to rank ten chocolate flavors. Then, the fourth and fifth-ranking flavor were selected, by the Qualtrics software and were used in the next two choice tasks. The fourth and the fifth ranking flavors were selected, since it was assumed that participants would have similar preferences for them, since they were placed in consecutive ranks. The choice tasks were designed as follows. The first choice task used the fourth and the first-ranking flavor. The second choice-task used the fifth and the last ranking flavor. Based on the structure of the Implicit Choice Paradigm and should the participant had accurately reported their preferences, in the first choice-task the fourth ranking flavor should be freely rejected, while in the second choice-task, the fifth ranking flavor should be freely selected. This part of the experiment was used in the analysis to test if the participants accurately reported their preferences in the first ranking task.

Just after completing the two choices, they were asked four questions that aimed to measure their cognitive dissonance. The four questions focused on the feelings of frustration, despair, emotional unease and dithering. Based Sweeney et. al., (2000), a 22-item scale to measure cognitive dissonance was developed. This scale was comprised of three dimensions, each one measured by certain questions; the emotional, the wisdom of purchase and the concern over deal dimension. In other words, these dimensions measured the individual's psychological discomfort after completing a purchase decision, their understanding of whether they needed the product or whether they settled for a lesser choice, as well as their understanding that they were influenced by other parties (salesmen) in their decision to purchase (Sweeney et. al., 2000). However, this scale was then reduced to fifteen items by Sweeney and Soutar (2006). Out of these fifteen items, four were selected to be included in this experiment, representing the emotional and wisdom of purchase dimension. As the original scale was mainly focused on the cognitive dissonance fostered after a purchase (Sweeney et. al., 2000), only four of these

items could be used to measure the cognitive dissonance of a choice. Therefore, the last dimension of concern over the deal could not be represented in this thesis questionnaire. The cognitive dissonance, based on the four items, was measured via Likert Scale questions, with seven possible answers, ranging from strongly disagree to strongly agree (Soutar & Sweeney, 2003).

Lastly, the second ranking task was presented where participants had to rank all the ten flavors once again. The flavors in the two ranking tasks were randomized between participants and across tasks, in order to avoid any bias caused by the order the flavors were presented.

Finally, they completed certain control questions on their age, gender, and education. Overall, the online experiment followed a story-like structure, driving participants to imagine that they are in a chocolate shop, in order to better simulate a real-life scenario. Images were used to support this effort. Lastly, throughout the questionnaire, participants were not informed about the Implicit Choice Paradigm, since this could have interfered with their behaviour in the experiment. The full transcript of the online experiment can be found in Appendix A.

Before the circulation of the online questionnaire of the experiment, the Behavioural Master Thesis Ethical Questionnaire was completed, in order to ensure that this research adhered to the ethical standards of the Erasmus University Rotterdam. The questionnaire had passed the Questionnaire.

Sample

Using the conventional criterion, the average effect size used by similar recent studies that addressed the criticism of Chen and Risen (2010) was small and equal to d=0.26 (Cohen, 1988, Izuma & Murayama, 2013). This comes in contrast to earlier meta-analyses that overestimated the effect of the preference change due to prior choices (Izuma & Murayama, 2013). For the purpose of this research, this small effect size was used to calculate the sample

size to be used in the testing of H1 and H2, in order to maintain a conservative estimate in the analysis. Based on this, and the selection of the test of the One-sample Wilcoxon signed rank test, for the analysis of the data for H1 (see next section) a sample size of 98 was estimated, according to the power calculation. According to H2, the Mann-Whitney U test was selected, and using the same effect size, a sample of 386 individuals was estimated. Therefore, since H2 required a much larger sample, the total sample size selected was equal to 386.

Regarding H2, the effect of the choice-induced preference change was studied, in relation to whether the participants had purchased the chocolate brand in the past. This Hypothesis was meant to study the effect of prior purchase on the choice-induced preference change. It was expected that the participants of the two treatment groups would not present any significant differences affecting their standard deviation, apart from having purchased the chocolate in the past. As a result, the analysis of the data would require that both treatment groups have the same size which was equal to 193. Participants were placed into the two groups based on what they indicated during the experiment. Since the participants were randomly recruited in the field, based on their willingness to join a master thesis experiment, their allocation into the two treatment groups can be considered random and without sample bias.

The participants were recruited via the distribution of the questionnaire in public areas, such as the waiting areas of train, tram and metro stations, where the background and characteristics of participants would be randomized.

Analysis

According to the research question and the two hypotheses, the main focus of this analysis was to test whether participants presented a positive spread in their preferences, after being placed in an Implicit Choice setting for a consumer product. A positive spreading would be present if participants increased the desirability of the selected alternative and decreased the

desirability of the rejected one, after completing the Choice tasks in the experiment. The desirability of each alternative was elicited through the rankings provided by the participants, according to the formula analysed later on in this section. On a second note, this spreading needed to be calculated for two groups; those who have previously purchased the product, and those who have not. Finally, the extent of the effect of the cognitive dissonance on the spreading was also to be measured. For the analysis of all the above factors two non-parametric tests – a One-sample Wilcoxon signed rank and a Mann-Whitney U test – and a regression analysis were designed.

Preparation of data

Before proceeding with the implementation of the test and the regression analysis, the data were imported to Stata, in order to be cleaned and prepared for analysis. Starting with the preparation of the variable of "prior purchase", if participants had selected that they had already bought at least one chocolate bar, this variable took the value 1. Otherwise, the "prior purchase" was equal to 0. This was the variable that was used to divide the participants into two groups for the testing of the second hypothesis.

The next part of the preparation of the data regarded the structure of the Implicit Choice design. For this reason, two variables were developed which tested whether the participants freely rejected the lower ranked chocolate bar and freely selected the higher ranked one, within choice pairs. The two variables were named as "choice test 1" and "choice test 2" and took the value 1 if the participant completed these two choices according to the Implicit Choice Paradigm (rejecting the lowest-ranking alternative and selecting the highest-ranking one, according to the rankings they provided in the first Rank Task). If both variables took the value 1, then a variable named as "choice satisfied" took the value 1 as well, meaning that the participant successfully completed both choices, as expected.

Finally, the variable "Spreading" was designed and developed. According to the analysis of Jarcho et. al. (2011), the spreading of the alternatives could be calculated based on the following formula:

$$Spreading = \left(R_s\,(Task\,1) - R_s\,(Task\,2)\right) - \left(R_r\,(Task\,1) - R_r\,(Task\,2)\right)$$

where R_s is the Ranking of the freely selected item, in the first ranking and the second ranking tasks respectively, while R_r is the Ranking of the freely rejected item. According to the structure of the experiment, the fifth ranking item, based on the ranks provided by the participant, was always freely selected and the fourth ranking item was always freely rejected (if the "choice satisfied" variable was equal to one, meaning that the choices of the participant were in line with the Implicit Choice Design). Therefore, $R_s\,(Task\,1)$ always took the value 5 and $R_r\,(Task\,1)$ the value 4, while $R_s\,(Task\,2)$ and $R_r\,(Task\,2)$ were dependent on the rankings provided by the participant in the second ranking-task. If the selected chocolate bar became more desirable in the second ranking, for the participant, after being placed in an Implicit Choice Setting, while the rejected one became less desirable, the spreading would be positive. Similarly, the variable "Spreading" would take the value of zero, if no choice-induced preference change was observed, and it would lastly be negative is the participants increased the valuation of the rejected alternative and decreased the valuation of the selected one.

One-sample Wilcoxon Signed Rank Test

The one-sample Wilcoxon Signed Rank test was used to test the first hypothesis, as it could be considered the non-parametric version of the t-test.

H1: Consumers will exhibit a positive spreading of alternatives, after having been exposed to an implicit choice setting with real incentives for consumer products.

For this test, the variable "spreading" was used. The null hypothesis of the test was that "spreading" was equal to 0, meaning that there was not a statistically significant spreading in

the preferences of the participants, after they were placed in an Implicit Choice setting for a consumer product. At the same time, in order to test the direction of the spreading, a one-tailed test was implemented.

Mann-Whitney U Test

The Mann-Whitney U test was selected for the second hypothesis, as the goal was to test if there was a statistically significant difference in the means of the two groups.

H2: Consumers will exhibit a larger spreading of alternatives, after having been exposed to an implicit choice setting with real incentives, in case of consumer products they have not purchased in the past, compared to products they have purchased in the past.

For this test, the sample was divided into two groups, using the variable "prior purchase". Those who had not purchased Tony's Chocolonely chocolate bars in the past, and thus had a "prior purchase" value equal to 0 were placed into one group, while the remaining participants who had purchased the chocolate bars in the past were placed in the second one. This test was used to compare the two independent groups, since "spreading" – the dependent variable – was not normally distributed (see Table 8) (Sundjaja et. al., 2023). The null hypothesis of this test was that the two groups do not differ in their attitudes towards exhibiting a positive spreading of alternatives, based on whether they have purchased the product in the past.

In order to implement the Mann-Whitney U, certain assumptions need to hold. The first one regards the coincidence of the sample, the second one the ordinal nature of the data, and the last one assumes that the observations are independent (Milenovic, 2011). All three assumptions hold, as the sample was randomly drawn from the population, the data are ordinal, and no observation is simultaneously in both of the treatment groups (having and not having purchased the chocolate brand in the past).

Regression Analysis

As a final step of the analysis of the data gathered, an OLS regression was formed in order to test the extent to which cognitive dissonance had an effect on the spreading. The cognitive dissonance, as already explained, was measured via four different variables, namely the feeling of frustration, despair, emotional unease and dithering. These variables are categorical ones, with seven different categories – strongly disagree, somewhat disagree, disagree, neither agree nor disagree, agree, somewhat agree, and strongly agree. The statement of strongly disagreeing with feeling one of the aforementioned emotions was equal to the value of 1, and the statement of strongly agreeing was equal to the value of 7. Therefore, the strongest was the feeling of cognitive dissonance, the highest was the value of each variable.

As a result, a regression analysis was conducted on different groups, while taking into consideration the controls of age, gender and education. On a first level, the regression analysis tried to replicate the findings of the Mann-Whitney U test of the H2. For this reason, the following regression was run to test the relation between the cognitive dissonance and the creation of a spreading of alternatives.

$$Spreading_{pp} = \beta_o + d_1 Prior\ Purchase + \beta_1 Frustration + \beta_2 Despair$$
$$+ \beta_3 Emotional\ Unease + \beta_4 Dithering + \beta_5 Age + \beta_6 Gender$$
$$+ \beta_7 Education + \varepsilon$$

(1)

with Prior Purchase being a dummy variable, taking the value 1 when participants had purchased at least one Tony's Chocolonely chocolate bar in the past, and 0 if they had not.

On a second level, the analysis was focused on the treatment sub-groups. Therefore, a similar analysis was conducted to test the relation between the cognitive dissonance and the creation of a spreading of alternatives. However, in this case, the participants were further

divided into those who participated in the lottery and those who did not. As a result, the effect of the real incentives would also be measured. In detail, the participants were pooled into four subgroups: those who had purchased the brand in the past and participated in the lottery, those who had not purchased the brand in the past but participated in the lottery, those who purchased the brand in the past and did not participate in the lottery and lastly those who had not purchased the brand in the past and did not participate in the lottery.

For all the four different sub-groups, the following regression was run:

$$Spreading_{ppl} = \beta_o + \beta_1 Frustration + \beta_2 Despair + \beta_3 Emotional\ Unease$$
$$+ \beta_4 Dithering + \beta_5 Age + \beta_6 Gender + \beta_7 Education + \varepsilon$$

(2)

Robustness Test

The t-test was run as a robustness check on the Wilcoxon Signed Rank Test. The null hypothesis was that the value of spreading was different from zero. On the 5% significance level, the null hypothesis could be rejected, meaning that spreading was different than zero.

Results

Starting with the experimental procedures, the collection of the data was completed in two rounds. During the first round, only a few observations were gathered, which were used to test whether the data could be analyzed properly. The second round was completed on the 7th of October 2023. A total of 315 individuals entered the experiment, out of which 247 completed the whole online questionnaire. The drop-out rate was 21.34%. Almost all the individuals who dropped out of the experiment did so at an early point, specifically after spending 79.52 seconds on the questionnaire. Four outliers drove the average time spent in the experiment much higher, as they accounted for over 99% of the total time spent by the dropouts. Therefore, these observations were removed from the calculation of the average time spent by drop-outs, since

a timing error must have occurred on their device (i.e., they kept the online questionnaire open on their browser, even though they were not working on the experiment). It can be assumed that the people who dropped out of the experiment did so at an early stage, due to reasons such as little interest in participating in the research or not wanting to spend their time filling in a questionnaire. Nevertheless, no systematic bias is expected to have influenced their decision to drop out. The average completion time of the completed questionnaires – after removing three outliers that accounted for 87,2% of the total completion time – was 458.29 seconds, or 7 minutes. This signifies that individuals needed more time than originally expected to fill in the questionnaire.

Descriptive Statistics

Out of the 247 participants who completed the experiment, 70.04% entered the lottery. A total of 170 participants had purchased at least one Tony's Chocolonely flavor in the past, 75.88% of those also joined the lottery. The average age of the participants was 27.6 years, ranging from 18 to 69 (Figure 1). The sample consisted of 58.3% females, 40.08% males, 1.21% non-binary and the remaining 0.40% preferred not to say (Figure 2). Regarding the highest level of education received, 19.84% had completed high school, 9.31% college and 37.25% university education of bachelor level. Master graduates accounted for 32.79% of the sample, while those with a PhD diploma represented 0.81% of the sample (Figure 3).

Table 1: Descriptive Statistics of Lottery Participation and Age

	Full Sample					Prior Purchase					No Prior Purchase				
Variable	Obs.	Mean	Std. dev	Min	Max	Obs.	Mean	Std. dev	Min	Max	Obs	.Mean	Std. dev	Min	Max
Lottery Participation	247	0.7	0.459	0	1	170	0.759	0.429	0	1	70	0.571	0.498	0	1
Age	247	27.68	10.929	19	69	170	26.16	9.375	18	69	70	31.052	13.209	18	63

Note: The table shows the descriptive statistics of Lottery Participation and Age, for the full sample and the two sub-samples: participants who have purchased the brand in the past, and participants who have not.

Based on whether they had purchased at least one Tony's Chocolonely chocolate bar in the past, the participants were placed in two treatment groups, for the purpose of studying H2. The demographic characteristics of the two groups did not present any significant differences in regard to gender and education. In regard to education, the average age of those who have not purchased a Tony's Chocolonely bar is higher by 5 years. This can be seen in Table 2 as well as Table 3 to Table 5 in Appendix B.

Table 2: Descriptive Statistics of Gender and Education

	Full Sample		Prior Purchase		No Prior Purchase	
Variable	Freq.	Percent	Freq.	Percent	Freq.	Percent
Gender						
Male	99	40.08	70	41.18	29	37.66
Female	144	58.30	96	56.47	48	62.34
Non-binary	3	1.21	3	1.76	-	-
Prefer not to say	1	0.40	1	0.59	-	-
Education						
High School	49	19.84	37	21.76	12	15.58
College	23	9.31	16	9.41	7	9.09
University (Bachelor)	92	37.25	60	35.29	31	41.56
University (Master)	81	32.79	56	32.94	25	32.47
PhD Diploma	2	0.81	1	0.59	1	1.30

Note: The table shows the descriptive statistics of Gender and Education, for the full sample and the two sub-samples: participants who have purchased the brand in the past, and participants who have not.

Regarding the cognitive dissonance of the participants, they reported their emotions in four different categories: frustration, despair, emotional unease, and dithering. A Likert scale from 1: Strongly Disagree to 7: Strongly Agree was used. For these four categories, which represented the cognitive dissonance, participants did not exhibit strong emotions. In other words, most of the participants disagreed with the statements presented. Nevertheless, the emotion that affected the individuals the most, was the one of dithering. More than 38% of the participants agreed that they wondered whether they made the right choice. The visual representation of the cognitive dissonance can be found in Figure 4 to Figure 7.

Main Results

Before testing the H1 of this thesis, it was necessary to test whether participants freely rejected their lowest ranking chocolate bar and freely selected the higher ranking one, when placed in the Implicit Choice Setting. If that were the case, their spreading could be analysed. The choices that they had to complete have already been mentioned in the previous section. All the 247 participants, who successfully completed the experiment, also satisfied the above criterion. As a result, their data were used to study whether they exhibited a positive spreading of alternatives.

For H1, which set out to test the existence of a positive spreading in the sample, the one-sample Wilcoxon Signed Rank Test was implemented. With a p-value of 0.574, the null hypothesis could not be rejected. As a result, the spreading of the alternatives of the sample, after being placed in an implicit choice setting with real incentives, for a consumer product was not statistically different than 0, at the 5% significance level. For those participants who did not join the lottery scheme, the null hypothesis can still not be rejected at the 5% significance level (Table 6). As a result, the answer to the H1 of this thesis is that participants do not exhibit a positive spreading of alternatives after being exposed to an implicit choice setting, with real incentives for consumer products.

The second hypothesis of this thesis was tested via the implementation of a Mann-Whitney U Test. The p-value of those participants who joined the lottery scheme was 0.44. As a result, it was not possible to reject the null hypothesis that the consumers who had not purchased the product in the past would present a larger spreading of alternatives, after having been exposed to an implicit choice setting, with real incentives. This analysis included only the participants who joined the lottery (Table 7).

Figure 8: Mean of Spreading per Participants' Group
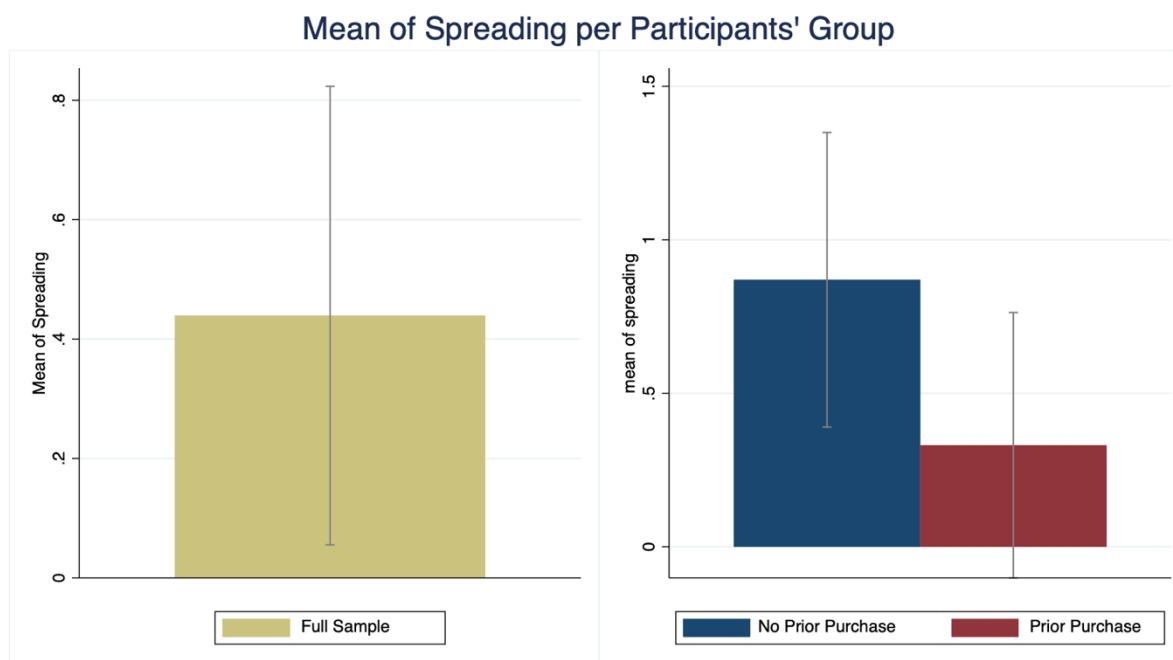
Notes: The Figure shows the mean of spreading for the whole sample of participants that completed the survey and two sub-samples: those who have not purchased and those who have purchased the brand at least once in the past. The Figure covers the participants who joined the lottery scheme.

Even though H2 focused only on the individuals who joined the lottery, the Mann-Whitney U test was also implemented on the group that did not opt to be included in the lottery. The p-value of the test in this case was 0.84 (Table 7). The null hypothesis was also rejected.

Running the Regression (1) on the part of the sample that has completed the experiment, all the variables measuring cognitive dissonance, were not statistically significant at the 5% significance level. Having purchased at least one Tony's Chocolate in the past had a negative effect on the average spreading, signifying that having purchased the brand in the past, reduced the average spreading of alternatives that was experienced by the participants. Emotional unease also had a negative effect, meaning that as the participants experienced higher levels of emotional unease, they reduced their average spreading of alternatives. Frustration, dithering and despair had a positive effect and resulted in participants increasing their average spreading, as they were experiencing higher levels of these emotions. Lastly, all the control variables,

apart from education, were also not statistically significant at the 5% significance level. Age, gender and education were negatively associated with the average spreading, meaning that the higher the level of the completed education, the fewer changes participants made in their preferences. The coefficient of age was almost zero, meaning that age was not economically significant for this regression. Education was statistically significant at the 5% level and one additional level of completed education, decreased the average spreading of alternatives by 0.031 points. The constant was statistically significant at the 10% level.

Table 9: Regression (1) Results for Participants who Completed the Experiment

Variable	(1) Spreading
Prior Purchase	− 0.363
	(0.252)
Frustration	0.083
	(0.121)
Despair	0.245
	(0.171)
Emotional Unease	− 0.17
	(0.144)
Dithering	0.035
	(0.091)
Age	− 0.001
	(0.016)
Gender	− 0.031
	(0.3)
Education	− 0.306 **
	(0.152)
Constant	1.782 *
	(1.031)

Notes: *This table shows an OLS regression, run on the participants that completed the experiment. The dependent variable is "Spreading". The variable "Prior Purchase" is a dummy variable. The control variables are: "age, "gender", and "education". The standard errors are in parentheses. The significance level is shown by the stars: ***p<0.01, **p<0.05, *p<0.1.*

Regression (2) was run a total of four times, on four different subgroups. The first subgroup was comprised of participants that participated in the lottery and had purchased the brand in the past. All variables were statistically insignificant at the 5% level. The constant term was statistically significant at the 10% level. Regarding the direction of the associations, frustration, despair and dithering were positively associated with the average spreading of alternatives, while emotional unease was negatively associated. This means that for people who have tried the specific chocolate choices, feeling emotional unease over a choice they made, would decrease the average spreading of alternatives. On the other hand, experiencing frustration, despair and dithering resulted in increasing their average spreading of alternatives. All control variables were negatively associated with the average spreading, and being an older female, with a higher level of completed education, decreased the average spreading of alternatives.

Table 10: Regression (2) Results for Participants with Prior Purchase and Lottery Participation

Variable	(1) Spreading
Frustration	0.071
	(0.17)
Despair	0.124
	(0.264)
Emotional Unease	− 0.131
	(0.208)
Dithering	0.097
	(0.13)
Age	− 0.015
	(0.026)
Gender	− 0.647
	(0.414)
Education	− 0.222
	(0.214)
Constant	2.334 *
	(1.401)

Notes: *This table shows an OLS regression, run on the participants that reported purchasing at least one Tony's Chocolonely chocolate bar in the past and had participated in the lottery. The dependent variable is "Spreading". The control variables are: "age, "gender", and "education". The standard errors are in parentheses. The significance level is shown by the stars: *** p<0.01, ** p<0.05, * p<0.1.*

The second subgroup was the one of participants who joined the lottery but had not purchased the Tony's Chocolonely brand in the past. All variables were statistically insignificant at the 5% level. In this group, frustration and emotional unease were positively associated with the average spreading of alternatives, while despair and dithering presented a negative association. Similar to the previous results, age and education were negatively associated, but gender was positively associated. Therefore, being female increased the average spreading, compared to being male.

Table 11: Regression Results for Participants with No Prior Purchase and Lottery Participation

Variable	(1) Spreading
Frustration	0.095
	(0.314)
Despair	− 0.229
	(0. 418)
Emotional Unease	0.553
	(0.462)
Dithering	− 0.159
	(0.292)
Age	− 0.003
	(0.034)
Gender	1.068
	(0.845)
Education	− 0.43
	(0.381)
Constant	0.727
	(2.531)

Notes: *This table shows an OLS regression, run on the participants that joined the lottery and reported not having purchasing at least one Tony's Chocolonely chocolate bar in the past. The dependent variable is "Spreading". The control variables are: "age, "gender", and*

*"education". The standard errors are in parentheses. The significance level is shown by the stars: *** p<0.01, ** p<0.05, * p<0.1.*

Furthermore, the results of the regression analysis for frustration, dithering and emotional unease of the participants who had purchased the brand in the past, but did not join the lottery were statistically insignificant at the 5% level. However, emotional unease was statistically significant at the 10% level, meaning that higher levels of experienced emotional unease decreased the average spreading of alternatives by 0.557 points. Despair was statistically significant at the 5% level as an increase in the level of despair for having to make a choice, increased the average spreading of alternatives by 0.791 points. The emotions of frustration and dithering were negatively associated with the average spreading. Regarding the control variables, gender being female, compared to male increased the average spreading of alternatives by 1.273 points, for individuals that had purchased the product in the past, but did not participate in the lottery. The effect was significant at the 10% level. Age and education were statistically insignificant at the 5% level, with the first being positively association, and the latter a negative one.

Table 12: Regression Results for Participants with Prior Purchase and No Lottery Participation

Variable	(1) Spreading
Frustration	− 0.247
	(0.365)
Despair	0. 79 **
	(0.383)
Emotional Unease	− 0.557 *
	(0.292)
Dithering	− 0.014
	(0.208)
Age	0.061
	(0.042)
Gender	1.273 *
	(0.698)
Education	− 1.778

	(0.393)
Constant	− 2.034
	(2.264)

Notes: *This table shows an OLS regression, run on the participants that did not join the lottery and reported not purchasing at least one Tony's Chocolonely chocolate bar in the past. The dependent variable is "Spreading". The control variables are: "age, "gender", and "education". The standard errors are in parentheses. The significance level is shown by the stars: *** p<0.01, ** p<0.05, * p<0.1.*

Lastly, the results of the regression analysis on the participants who had not purchased the brand in the past, and did not join the lottery presented statistically insignificant results at the 5% level for all variables. Frustration and despair were negatively associated, while emotional unease and dithering were positively associated with the average spreading of alternatives. All the controls presented a negative association, similar to the sub-group that participated in the lottery and had purchased the brand in the past.

Table 13: Regression Results for Participants with No Prior Purchase and No Lottery Participation

Variable	(1) Spreading
Frustration	0.128
	(0.303)
Despair	0. 595
	(0. 672)
Emotional Unease	− 0.519
	(0.669)
Dithering	− 0.536
	(0.238)
Age	− 0.024
	(0.032)
Gender	− 0.745
	(0.939)
Education	− 0.602
	(0.509)
Constant	5.295
	(3.376)

Notes: *This table shows an OLS regression, run on the participants that did not join the lottery and reported having not purchased at least one Tony's Chocolonely chocolate bar in the past. The dependent variable is "Spreading". The control variables are: "age, "gender", and "education". The standard errors are in parentheses. The significance level is shown by the stars: *** p<0.01, ** p<0.05, * p<0.1.*

Discussion

The first part of this research was focused on testing H1, and whether participants would exhibit a positive spreading of alternatives, after being placed in an Implicit Choice setting for consumer products. The one-sample Wilcoxon signed rank test concluded that the null hypothesis could not be rejected, at the 5% level. Therefore, the hypothesis that the spreading might be zero and that the participants do not change their preferences could not be rejected.

The H2 also presented statistically insignificant results, on the 5% level. It could not be concluded that the group of individuals who had purchased the brand in the past exhibited different behaviour from the group that had not purchased the brand, when placed in the Implicit Choice setting. As a result, the prior purchase of the Tony's Chocolonely chocolates did not affect the formulation of the future preferences of consumers. The expectation that individuals who had a past experience with a product would be less likely to exhibit a choice-induced preference change was not confirmed.

Out of all the four emotions measuring cognitive dissonance, the ones that presented statistically significant results at the 10% or 5% level, were the ones of despair and emotional unease. Both these emotions were statistically significant in the respective levels, for participants that had purchased the brand in the past but did not join the lottery. In detail, for people who had purchased the product in the past, and who had not participated in the lottery, feeling in despair about the choices they could make increased the spreading they reported, while emotional unease decreased that spreading. At the same time, as it can be seen from Figure 5, despair was one of the emotions that most of the participants strongly disagreed of

feeling. This could be attributed to the nature of the experiment and the type of product selected. Individuals might not develop high levels of despair for a product they can easily purchase and that can be quickly substituted (i.e., via other brands of chocolate or types of desserts). Further research could be conducted on the effect of despair on spreading for different types of consumer products. In addition, out of all the four emotions, dithering was the one that was experienced the most by participants, as can be seen in Figure 7.

Regarding the real incentive provided, most of the participants that had tried the specific chocolate brand in the past, entered the lottery scheme. This effect was lower for those who had not purchased a Tony's Chocolonely chocolate. Therefore, the incentive was perceived as more effective for those who were most familiar with the reward. For the participants that had not tried the chocolate, the reward could be ineffective, because they were not sure whether they actually liked the chocolate enough, in order to be motivated to join the lottery, or because the reward was also of a small monetary value. The participants who had purchased the brand in the past, also decreased the choice-induced preference change in the alternatives when they participated in the lottery. For those who had not purchased the brand in the past, the effect of real incentives on the spreading was negative. As a result, those participants who were familiar with the brand and its flavours found it easier to change their hypothetically stated preferences. However, those who did not have a prior experience with the product, did not report mailable preferences, and tended to decrease their spreading.

Finally, the demographic characteristics of the two groups – the one that had previously purchased at least one Tony's Chocolonely chocolate and the one that had not – did not present major differences. Therefore, it could not be concluded that there were forces, such as age, education or gender, that drove participants to purchase the brand. Having purchased the brand could have been affected by other factors, such as the likeliness to buy chocolate, the likeliness to try different brands, the availability of the brand on the shelves, or the price of the chocolate.

Overall, the external validity of the Implicit Choice Paradigm in a consumer setting could not be confirmed. However, before drawing a conclusion, the limitations of this research should also be considered.

Limitations

The first limitation of this thesis concerns the sample size and representativeness. The expected sample size, which was estimated by the G power calculation, was not reached. This was because the research was conducted as part of a master thesis, a condition that entailed the limited availability of resources to recruit participants, as well as the short time period at hand to conduct the distribution and completion of the online questionnaires of the experiment. The small sample size was mostly a concern for the testing of H2 via the Mann-Whitney U test, as the expected sample size for H1 was reached. Therefore, the realized ex-post power of the Mann-Whitney U test was calculated in order to better understand the effect of the small sample size on the null results. According to Cohen's calculation, the effect size of the test was equal to 0.186, which was smaller than the expected 0.26 effect size of the power calculation. Even though this effect size was small, it was not trivial. Nevertheless, it was still not possible to generalize the results to the broader population and draw definite conclusions about the external validity of the implicit choice paradigm. This could be a result of the sample size, but also of other factors, such as the structure of the experimental design or the effectiveness of the real incentives.

Furthermore, selection bias might had also affected the validity of the findings. In detail, adult participants aged up to 27 years old and having obtained at least one degree of higher education, such as a bachelor's or master's degree, comprised the majority of the participants of the sample. Other subgroups were not adequately represented. This might have been a result of the distribution of the online questionnaire to the network of the author, as this

was comprised by mainly peers. Alternative channels of distribution that could have reached a more diverse audience were employed (i.e., LinkedIn), but they did not yield the expected results. It should be noted that, another sample imbalance concerned the number of people who had already purchased the brand at least once in the past. Even though two groups of equal size should have been used in the analysis, those who had completed a prior purchase were more than double the size of the group with no prior purchase.

As already mentioned, there were limited time and financial resources available for the implementation of this research, as it was part of a master's thesis. This narrowness affected the diversity of the sample. At the same time, it was not able to incentivize participants with a more significant reward. As only 25€ were allowed to be spent on rewards, the maximum prize that a participant could win was one chocolate. As a result, the chocolate might not have been an effective incentive that would drive the participants' behaviour in a manner similar to what was expected, according to theory. This could explain why incentives did not have an effect on the size of the choice-induced preference spreading.

Finally, even though the online experiment was an applicable means of testing, due to the large sample size expected and the limited time available, it was not the best means to test the cognitive dissonance. Specifically, participants were placed in an imaginary scenario of having to make a choice, before being questioned about the feelings they experienced. However, the cognitive dissonance scale, created by Sweeney and Soutar (2003), which was used in this online experiment, was initially developed for face-to-face experiments. As a result, it might have not been the most effective means of measuring cognitive dissonance in an online environment, where participants were not exposed to the actual act of making a purchase. This could explain why most of the participants seemed to disagree with the statements of feeling any type of cognitive dissonance, such as frustration, emotional unease and despair.

Conclusion

The purpose of this thesis was to study the external validity of the choice-induced preference change, when implementing the Implicit Choice Paradigm, in a consumer setting with real incentives. For this reason, a frame field experiment was designed and implemented, where participants were asked to provide rankings and make choices regarding different flavours of the Tony's Chocolonely chocolate bars. Based on their reported preferences, the spreading of alternatives was calculated. At the same time, the level of cognitive dissonance was measured, via four questions targeting the emotions of frustration, despair, emotional unease and dithering. Real incentives were provided in the form of the provision of a chocolate bar as a reward to participants, via a randomized process.

The findings of this research suggest that participants did not exhibit a positive spreading of alternatives. The effect of prior purchase of the product on the positive spreading was also studied, but the analysis did not yield statistically significant results either. Furthermore, participants who had purchased at least one Tony's Chocolonely chocolate bar in the past were not statistically different from those who had not, in regard to their demographic characteristics. In contrast, the real incentive provided was more attractive for the individuals who had purchased the brand in the past and were, thus, more familiar with it. This group of participants also exhibited a larger spreading of alternatives, suggesting that they had more mailable preferences when placed in an Implicit Choice setting.

Regarding the reported cognitive dissonance, most of the participants did not experience high levels of frustration, emotional unease, or despair. Out of all the emotions, the one of dithering was the one that affected individuals the most. Overall, the external validity of the choice-induced preference change in an implicit choice setting for consumer products

was not confirmed. Nevertheless, it was not possible to generalize the findings of this research, due to certain limitations.

For future research, a larger and more diverse sample could be employed which will better represent the overall consumer population. A different experimental design and incentive structure, such as the implementation of a physical experiment, could also be tested. Participants might report a greater change in their reported preferences when being exposed to an actual choice and product, instead of a hypothetical scenario. In this scenario, the measuring of cognitive dissonance might be more effective and produce significant results.

References

Abelson, R. P. (Ed.). (1968). *Theories of cognitive consistency; a sourcebook*. Rand

McNally. Retrieved October 17, 2023, from

https://archive.org/details/theoriesofcognit0000unse/page/354/mode/2up

Afriat, S. N. (1967). The construction of utility functions from Expenditure

Data. *International Economic Review*, *8*(1), 67. https://doi.org/10.2307/2525382

Alós-Ferrer, C., & Granic, G. D. (2023). Does choice change preferences? an incentivized

test of the mere choice effect. *Experimental Economics*, *26*(3), 499–521.

https://doi.org/10.1007/s10683-021-09728-5

Alós-Ferrer, Carlos & Granic, Georg & Shi, Fei & Wagner, Alexander. (2012). Choices and

Preferences: Evidence from Implicit Choices and Response Times. Journal of

Experimental Social Psychology. 48. 1336-1342. 10.1016/j.jesp.2012.07.004.

Ariely, D., & Norton, M. I. (2008). How actions create – not just reveal – preferences. *Trends

in Cognitive Sciences*, *12*(1), 13–16. https://doi.org/10.1016/j.tics.2007.10.008

Ariely, D., Gneezy, U., Loewenstein, G., & Mazar, N. (2009). Large stakes and big

mistakes. *Review of Economic Studies*, *76*(2), 451–469. https://doi.org/10.1111/j.1467-

937x.2009.00534.x

Bem D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance

phenomena. *Psychological review*, *74*(3), 183–200. https://doi.org/10.1037/h0024835

Brehm, J. W. (1956). Postdecision changes in the desirability of alternatives. *The Journal of

Abnormal and Social Psychology*, *52*(3), 384–389. https://doi.org/10.1037/h0041006

Charness, G., Gneezy, U., & Halladay, B. (2016). Experimental methods: Pay One or pay all. *Journal of Economic Behavior & Organization*, *131*, 141–150. https://doi.org/10.1016/j.jebo.2016.08.010

Chen, M. K., & Risen, J. L. (2010). How choice affects and reflects preferences: Revisiting the free-choice paradigm. *Journal of Personality and Social Psychology*, *99*(4), 573–594. https://doi.org/10.1037/a0020217

Cohen, J. (1988). *Statistical Power Analysis for the behavioral sciences*. L. Erlbaum Associates.

Consumer products. Corporate Finance Institute. (2023, May 10). https://corporatefinanceinstitute.com/resources/economics/consumer-products/

Directorate for Science, Technology and Innovation Committee on Consumer Policy. (2017). (publication). *Use of Behavioural Insights on Consumer Policy*. Retrieved October 5, 2023, from https://one.oecd.org/document/DSTI/CP(2016)3/FINAL/En/pdf.

Egan, L. C., Bloom, P., & Santos, L. R. (2010). Choice-induced preferences in the absence of choice: Evidence from a blind two choice paradigm with young children and Capuchin Monkeys. *Journal of Experimental Social Psychology*, *46*(1), 204–207. https://doi.org/10.1016/j.jesp.2009.08.014

Festinger, L. (1957). *A theory of cognitive dissonance. Stanford, CA: Stanford University Press*. Stanford University Press.

Friedman, D., & Sunder, S. (1994). Principles of economics experiments. *Experimental Methods*, 10–20. https://doi.org/10.1017/cbo9781139174176.004

Harrison, G. W., & List, J. A. (2004). Field experiments. *Journal of Economic Literature*, *42*(4), 1009–1055. https://doi.org/10.1257/0022051043004577

Harsanyi, J. C. (1955). Cardinal welfare, individualistic ethics, and interpersonal comparisons

of utility. *Journal of Political Economy*, *63*(4), 309–321.

https://doi.org/10.1086/257678

Hoeffler, S., & Ariely, D. (1999). Constructing stable preferences: A look into dimensions of

experience and their impact on preference stability. *Journal of Consumer

Psychology*, *8*(2), 113–139. https://doi.org/10.1207/s15327663jcp0802_01

Holton, R. H. (1958). The distinction between convenience goods, shopping goods, and

Specialty Goods. *Journal of Marketing*, *23*(1), 53–56.

https://doi.org/10.1177/002224295802300108

Izuma, K., & Murayama, K. (2013). Choice-induced preference change in the free-CHOICE

PARADIGM: A critical methodological review. *Frontiers in Psychology*, *4*.

https://doi.org/10.3389/fpsyg.2013.00041

Jarcho, J. M., Berkman, E. T., & Lieberman, M. D. (2011). The neural basis of

rationalization: Cognitive Dissonance reduction during decision-making. *Social

Cognitive and Affective Neuroscience*, *6*(4), 460–467.

https://doi.org/https://doi.org/10.1093/scan/nsq054

Kahneman, D. (2011). *Thinking fast and slow*. Penguin Books.

Kotler, P., & Armstrong, G. (2008). *Principles of Marketing* (12th ed.). Pearson Education.

Luce, M. F., Payne, J. W., & Bettman, J. R. (1999). Emotional trade-off difficulty and

choice. *Journal of Marketing Research*, *36*(2), 143. https://doi.org/10.2307/3152089

Lusk, J. L., Pruitt, J. R., & Norwood, B. (2006). External validity of a framed field

experiment. *Economics Letters*, *93*(2), 285–290.

https://doi.org/10.1016/j.econlet.2006.05.016

Lyubomirsky, S., & Ross, L. (1999). Changes in attractiveness of elected, rejected, and precluded alternatives: A comparison of happy and unhappy individuals. *Journal of Personality and Social Psychology*, *76*(6), 988–1007. https://doi.org/10.1037/0022-3514.76.6.988

Makarewicz, A. (2013). Consumer behavior as a fundamental requirement for effective operations of companies. *JOURNAL OF INTERNATIONAL STUDIES*, *6*(1), 103–109. https://doi.org/10.14254/2071-8330.2013/6-1/10

Milenović, Ž. (2011). Application of mann-whitney U test in research of professional training of Primary School Teachers. *Metodički Obzori/Methodological Horizons*, *6*(1), 73–79. https://doi.org/10.32728/mo.06.1.2011.06

Mørkbak, M. R., Olsen, S. B., & Campbell, D. (2014). Behavioral implications of providing real incentives in stated choice experiments. *Journal of Economic Psychology*, *45*, 102–116. https://doi.org/10.1016/j.joep.2014.07.004

Mullainathan, S., & Washington, E. (2009). Sticking with your vote: Cognitive dissonance and political attitudes. *American Economic Journal: Applied Economics*, *1*(1), 86–111. https://doi.org/10.1257/app.1.1.86

Nagyová, Ľ., Géci, A., & Horská, E. (2020). Consumer preferences and decision-making determinants for the purchase of sheep's milk and its products. *Potravinarstvo Slovak Journal of Food Sciences*, *14*, 673–681. https://doi.org/10.5219/1424

Pindyck , & Rubinfeld . (2013). Chapter 3 Consumer Behaviour. In *Microeconomics* (8th ed., pp. 67–68). Chapter, Pearson.

Reidl, A. M. (2011). Experimental economics: Economic and game theoretic principles in experimental research in the Social Sciences. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1993030

Samson, A. (2014). An introduction to behavioral economics. *Behavioral Economics*, 1–12.

https://doi.org/10.4324/9781315817897-10

Samuelson, P. A. (1948). Consumption theory in terms of revealed

preference. *Economica*, *15*(60), 243. https://doi.org/10.2307/2549561

Schwartz, B. (2004). *The paradox of choice: Why more is less*. Harper Perennial.

Smith, J. R., Terry, D. J., Manstead, A. S. R., Louis, W. R., Kotterman, D., & Wolfs, J.

(2008). The attitude–behavior relationship in consumer conduct: The role of norms,

past behavior, and self-identity. *The Journal of Social Psychology*, *148*(3), 311–334.

https://doi.org/10.3200/socp.148.3.311-334

Soutar, G. N., & Sweeney, J. C. (2003). Are there cognitive dissonance segments? *Australian*

Journal of Management, *28*(3), 227–249.

https://doi.org/10.1177/031289620302800301

Sundjaja, J. H., Shrestha, R., & Krishan, K. (2023). *McNemar And Mann-Whitney U Tests*.

StatPearls Publishing. July 17, 2023,

https://www.ncbi.nlm.nih.gov/books/NBK560699/

Sweeney, J. C., Hausknecht, D., & Soutar, G. N. (2000). Cognitive dissonance after purchase:

A multidimensional scale. *Psychology and Marketing*, *17*(5), 369–385.

https://doi.org/10.1002/(sici)1520-6793(200005)17:5<369::aid-mar1>3.0.co;2-g

Sweeney, J., & Soutar, G. (2006). A Short Form of Sweeney, Hausknecht and Soutar's

Cognitive Dissonance Scale. In J. Kennedy, & L. Di Milia (Eds.), *2006 Proceedings of*

the 20th Annual Conference of the Australian and New Zealand Academy of

Management (Yeppoon, Queensland, Australia ed., Vol. CDROM, pp. CDROM).

Central Queensland University.

Venkataraman, S., Dew, N., Sarasvathy, S. D., & Slovic, P. (2020). The Construction of Preference. In *Shaping Entrepreneurship Research: Made, as well as found* (1st ed., pp. 103–119). essay, Routledge.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, *9*(2, Pt.2), 1–27. https://doi.org/10.1037/h0025848

Zajonc, R.B. (2001). Mere exposure: A gateway to the subliminal. *Current Directions in Psychological Science*, *10*(6), 224–228. https://doi.org/10.1111/1467-8721.00154

Zhao, H., Yao, X., Liu, Z., & Yang, Q. (2021). Impact of pricing and product information on consumer buying behavior with customer satisfaction in a mediating role. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.720151

Appendix A

Questionnaire Transcript

Introduction

Welcome to this online survey, part of my *Master Thesis* at the *Erasmus University Rotterdam!*

In this 5-minute survey, you will be asked to complete 3 Tasks and you will have the chance to win a Tony's Chocolonely Chocolate Bar.

Your participation is voluntary, and you can exit the survey at any point. You must be at least 18 years old in order to participate.

 If you have any questions, you can contact me at 637101mt@eur.nl

- -

Confirmation Do you confirm that you are at least 18 years old, and that you consent to participate in this survey?
- I confirm[1]
- I do not confirm[2]

(If second option is selected, the participant is redirected to the end of the survey)

The Experiment

The Survey

There are 3 Tasks in the survey. In these Tasks, you will be asked to:
- Rank 10 different chocolate bars according to how much you like the taste
- Make choices between two chocolate bars that will be presented on your screen
- Rank once again 10 different chocolate bars, according to how much you like the taste

Note: This *survey is NOT a memory task.*

You do not need to remember exactly the choices you made during the tasks.

You only need to answer based on how much you like each chocolate, at the moment and when asked!

Lottery Process

There is a chance to win one Toney Chocolonely Chocolate Bar by participating in the survey.

We will randomly select 6 survey respondents. Each one will win one chocolate bar. If selected, the flavour will depend on the choices you made in the study. The more truthful you are in reporting your preferences, the higher the chance that you win a flavour that you like more.

Note: If you choose to participate in the lottery to win a chocolate bar, you will need to provide your email address, in order to contact you in case you win. All data will be confidentially treated.

Would you like to participate in the lottery to win a chocolate bar and get more information about the lottery process?
- Yes[1]
- No[2]

(If first option is selected, participants are redirected to the section "Lottery Participation". If the second option is selected, participants are redirected to the section "Prior Purchase")

Lottery Participation

Please provide your email address in order to contact you in case you are one of the winners of the chocolate bar. In case you win, you will be informed after the end of the survey data gathering process.

_____

The Lottery Process

6 participants will be randomly selected to win a chocolate bar.

If selected, you will receive a Toy's Chocolonely Chocolate Bar based on your choices in the survey. So, choose carefully!

In this survey, there are 3 Tasks where you have to rank or make choices between 10 different chocolate bars.

One of these three tasks will be randomly selected, and based on your answers you will receive one chocolate bar, according to the following process:
- Rank Task: 2 out of the 10 chocolate bars that you will have to rank will be randomly selected. The bar that was ranked the highest by you will be selected as the lottery prize.
- Choice Task: You will be presented with two sets of choices, between 2 chocolate bars each. One of these sets of choices will be randomly selected, and the bar that was chosen by you will be picked as the lottery prize. *Let's start with the survey!*

Prior purchase

Have you purchased any of these Tony's Chocolonely Chocolate Bars in the past?

Select as many as applicable. If you haven't purchased the brand in the past, proceed to the next question.

- Milk Chocolate
- Milk Chocolate Chip Cookie
- Milk Caramel Sea Salt
- Milk Chocolate 32 Almond Honey Nougat
- Milk Hazelnut
- Dark Milk
- Dark Chocolate Biscuit Lemon Caramel
- Dark Almond Sea Salt
- White Raspberry Cookie Sprinkles
- White

Task 1 - Text

Imagine you are now in a Chocolate Shop.

You are aware that the Tony's Chocolonely chocolate bars are produced in the following different flavours.

Task 1 – Rank

How would you rank the flavours, from 1 (the bar you are most likely to buy) to 10 (the bar you are least likely to buy)?

If you haven't bought a Tony Chocolonely Chocolate in the past, rank based on how likely you are to buy each flavour (regardless of the chocolate brand)

Drag and drop the chocolate bars to rank them based on your preferences.

- Milk Chocolate
- Milk Chocolate Chip Cookie
- Milk Caramel Sea Salt
- Milk Chocolate 32 Almond Honey Nougat
- Milk Hazelnut
- Dark Milk
- Dark Chocolate Biscuit Lemon Caramel
- Dark Almond Sea Salt
- White Raspberry Cookie Sprinkles
- White

Task 2 – Text

Unfortunately, most of the flavours are sold out. There are only two left.

- -

Task 2 – Choice 1

Between the two flavours, which one are you most likely to buy?
- "Chocolate placed in the fourth place of the ranking scale"
- "Chocolate placed in the first place of the ranking scale"

Task 2 text You visit the shop again, as you want to buy more chocolate bars. There are still only two flavours.

However, they are different from the ones you saw the previous time.

Task 2 – Choice 2

Between the two flavours, which one are you most likely to buy?
- "Chocolate placed in the fifth place of the ranking scale"
- "Chocolate placed in the last place of the ranking scale"

Intermission

You ended up NOT buying a chocolate bar.

Note: This survey is NOT a memory task. You don't need to remember the choices you made in the Tasks.

Dissonance
Previously, you were asked to make certain choices. How do you feel about them?

After completing the choices:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I felt frustrated							
I was in despair							
I experienced emotional unease							
I wondered If I made the right choice							

Task 3 – Text

You decide to visit the shop again after a couple of days.

You find ALL the flavours are available again.

Task 3 – Rank

How likely are you to buy each chocolate bar, based on its flavour?

Rank the flavours from 1 (the bar you are most likely to buy) to 10 (the bar you are least likely to buy)?
If you haven't bought a Tony Chocolonely Chocolate in the past, rank based on how likely you are to buy each flavour (regardless of the chocolate brand).
Drag and drop the chocolate bars to rank them based on your preferences.
  - Milk Chocolate
  - Milk Chocolate Chip Cookie
  - Milk Caramel Sea Salt
  - Milk Chocolate 32 Almond Honey Nougat
  - Milk Hazelnut
  - Dark Milk
  - Dark Chocolate Biscuit Lemon Caramel
  - Dark Almond Sea Salt
  - White Raspberry Cookie Sprinkles
  - White

Age
How old are you?

_____

Gender

Which best describes your gender?
- Male
- Female
- Non-binary
- Prefer not to say

Education

What is the highest level of education you have completed?
- Primary School
- Secondary School
- High school
- College
- University (bachelor's degree)
- University (master's degree)
- PhD Diploma

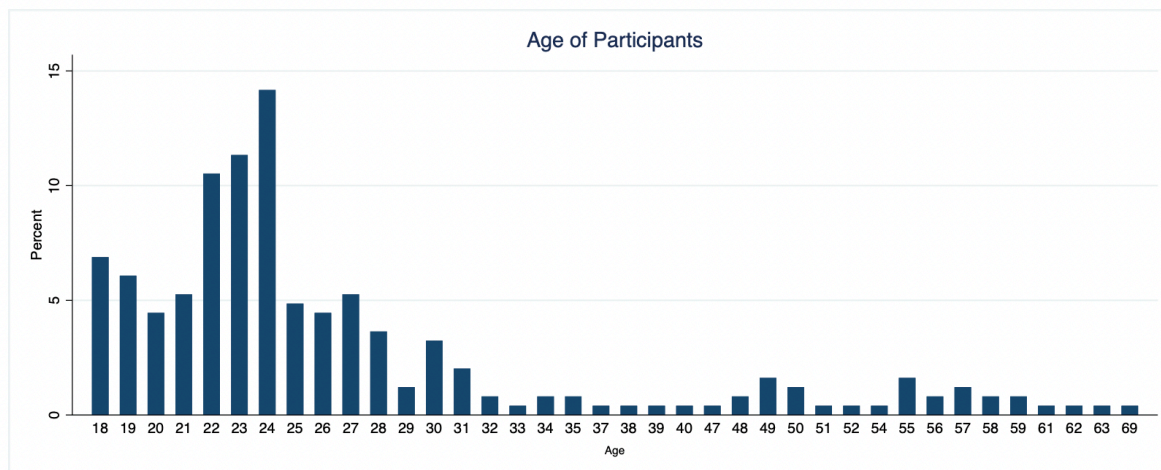**End of Survey**

This is the end of the Survey!

Thank you for participating and I hope you enjoyed the process.

If you wish to learn more about this research, you can contact me on this email address: 637101mt@eur.nl

Appendix B

Figures and Tables

Figure 1: Age of Participants

Notes: The figure age of the participants of the experiment.

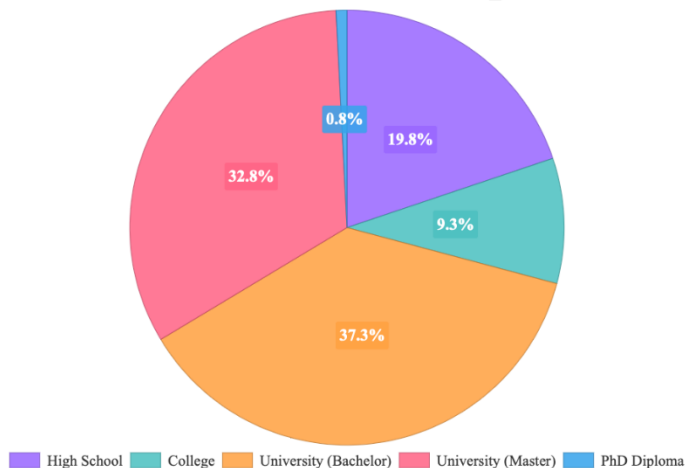*Figure 2: Reported Gender*
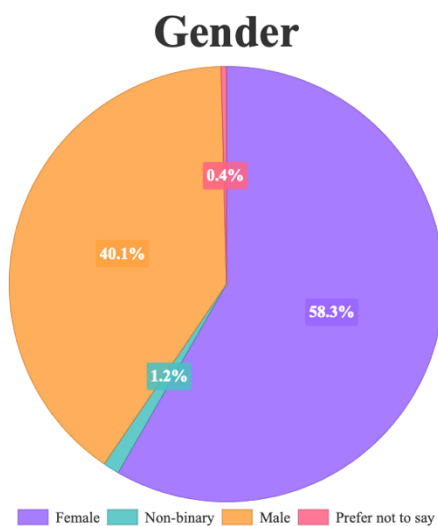
Notes: The figure shows the reported gender of the participants. .
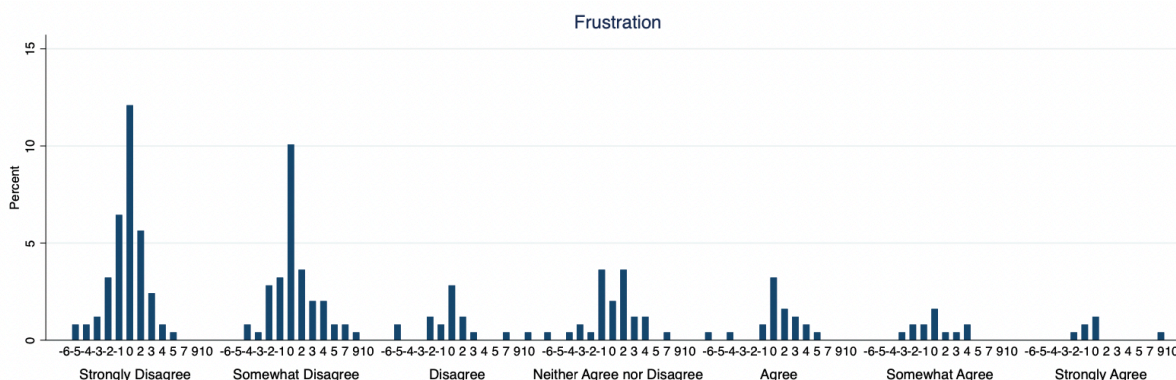
Figure 3: Education of Participants
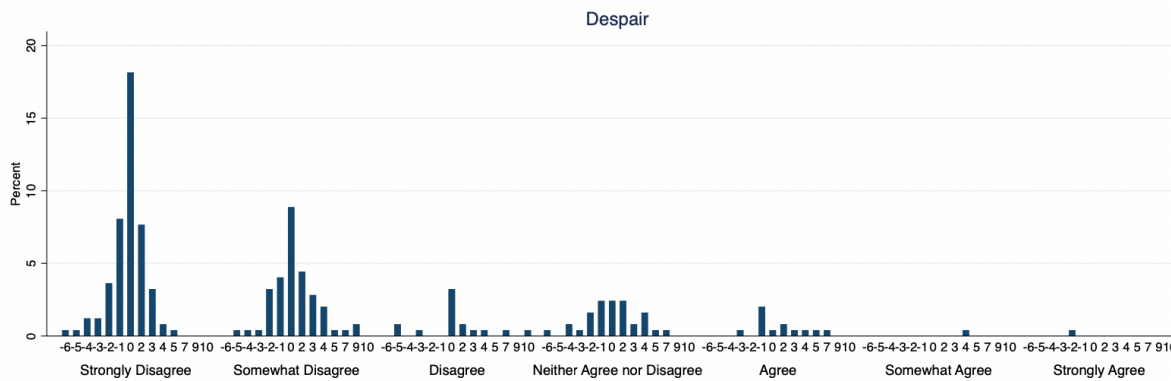
Education of Participants

Notes: The figure shows the highest level of completed education of the participants.
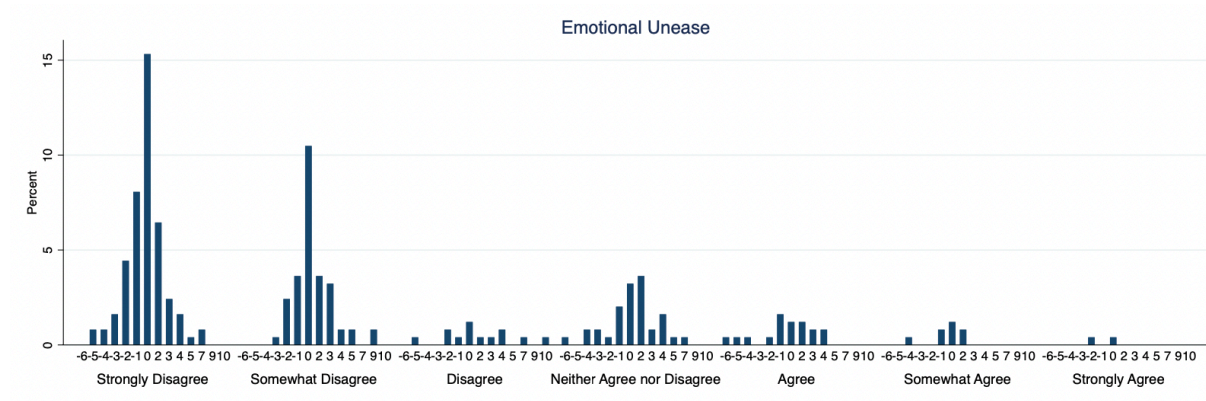
Figure 4: Frustration

Notes: The Figure shows the answers of participants to the statement "After completing the choices, I felt frustrated". The answers are summarized in percentages per each level of spreading presented.
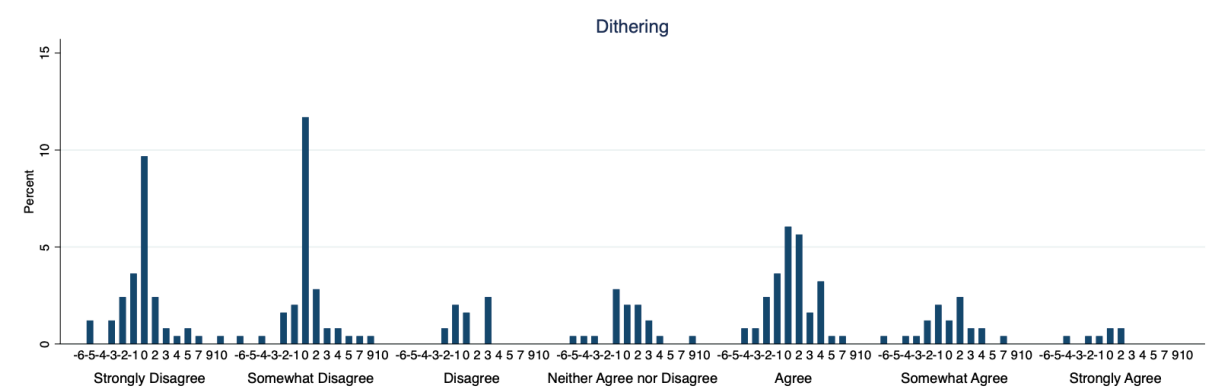
Figure 5: Despair

Notes: The Figure shows the answers of participants to the statement "After completing the choices, I was in despair". The answers are summarized in percentages per each level of spreading presented.

Figure 6: Emotional Unease

Notes: The Figure shows the answers of participants to the statement "After completing the choices, I experienced emotional unease". The answers are summarized in percentages per each level of spreading presented.

Figure 7: Dithering

Notes: The Figure shows the answers of participants to the statement "After completing the choices, I wondered if I made the right choice". The answers are summarized in percentages per each level of spreading presented.

Table 3: Gender of the Participants in the Two Treatment Groups

Gender	Prior Purchase	No Prior Purchase
Female	56.47%	37.66%
Male	41.18%	62.34%
Non-binary	1.76%	-
Prefer not to say	0.59%	-

Note: The table shows the gender declared by participants in percentages and in the two treatment groups. Prior Purchase includes the participants that have purchased at least one Tony's Chocolonely Bar in the past and No Prior Purchase those who have not.

Table 4: Age of the Participants in the Two Treatment Groups

Variable	Mean	Std. dev.	Min	Max
Age (prior purchase)	26.15882	9.375377	18	69
Age (no prior purchase)	31.05195	13.20875	18	63

Notes: The table shows the age of the participants in the two treatment groups. Prior Purchase includes the participants that have purchased at least one Tony's Chocolonely Bar in the past and No Prior Purchase those who have not.

Table 5: Education of the Participants in the Two Treatment Groups

Education	Prior Purchase	No Prior Purchase
High School	21.76%	15.58%
College	9.41%	9.09%
University (Bachelor)	35.29%	41.56%
University (Master)	32.94%	32.47%
PhD Diploma	0.59%	1.30%

Notes: The table shows the highest level of education completed by the participants in percentages and in the two treatment groups. Prior Purchase includes the participants that have purchased at least one Tony's Chocolonely Bar in the past and No Prior Purchase those who have not.

Table 6: One-Sample Wilcoxon Signed Ranked Test

Variable	P-value
Spreading (for lottery participants)	0.5746
Spreading (for non-lottery participants)	0.3919

Notes: P-value given from One-Sample Wilcoxon Signed Rank test per participation in the lottery scheme

Table 7: Mann-Whitney U Test

Variable	P-value
Spreading (for lottery participants)	0.4387
Spreading (for non-lottery participants)	0.8375

Notes: P-value given from Mann-Whitney U test per participation in the lottery scheme

Table 8: Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2

Spreading	247	0.0002	0.0009	20.57	0.0000

Notes: *This table shows the results of the skewness and kurtosis test, run for the testing of the normality of the distribution.*