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**Choice Deferral in the Context of Adding  
an Inferior Alternative across Different  
Types of Choice Sets**

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**Choice Deferral in the Context of Adding an Inferior Alternative across  
Different Types of Choice Sets**

Master's Thesis

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## DEDICATION

*This thesis is dedicated to my father (late),  
Muhammad Ibrahim.*

*I want to thank him for all the sacrifices he  
made to fulfill my dreams.*

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I begin with praising Almighty ALLAH and His prophet MUHAMMAD (PBUH) for giving me this wonderful life with beautiful people around me in the form of family, friends and teachers.

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## Abstract

In the past, manipulations in the choice context were found to influence consumers' choice significantly. In particular, researchers found that enlarging a single option choice set with a less attractive alternative rather than an equally attractive alternative tends to decrease consumers' tendency to defer choice. However, the research was limited to a single option choice set whereas consumers usually have a lot more options to choose from.

Recent research has examined the impact of adding an inferior alternative in three different types of choice sets (small, medium and large choice set) based on the number of alternatives (2, 5 and 10). Considering the fact that consumers tend to use non-compensatory decision strategies as the number of alternatives increases in the choice set, I expected to find moderating effects of the types of choice sets. By using an online survey, the findings enhance our understanding of the influence of adding an inferior alternative on the tendency for choice deferral. Initially, when only the small choice was considered, the results suggest that adding an inferior alternative in the choice set reduces the choice deferral significantly. These findings further extended by including medium and large choice set in the analysis to examine the moderating effects of the types of choice sets. However, there is less significant evidence about the moderating effects. Yet, the data display different patterns for the addition of an inferior alternative in small, medium and large choice set.

Additionally analysis of the underlying psychological process through measuring selection difficulty, anticipated regret and decision time provides further insights. The results explain the different data patterns found by adding an inferior alternative in different types of choice sets. Finally, managerial implications have been discussed for the construction of product recommendation sets to promote purchase tendency.

## 1 Introduction

Traditionally, decision-making literature was based on forced-choice tasks to understand consumers' purchase decisions. However, in real choice situations consumers also have the option to not make a choice. For instance, consumers might want to seek for more information or search for new alternatives. Moreover, behavioural decision research suggests that consumers' decisions are highly contingent upon choice context (Payne, Bettman and Johnson, 1992). Therefore, if there are no restrictions on the time to purchase and the given alternatives involve high conflict that makes it difficult for the consumers to decide which alternative to choose, they may tend to defer their choices (Tversky & Shafir, 1992). The issue is further complicated by the notion of preference uncertainty which suggests that consumers' choice is often narrowed down to few attractive alternatives. Nonetheless, they might not identify with certainty that which alternative is the most attractive (Dhar, 1997a, 1997b). Besides that, in the light of cognitive limitations and search costs, it is impossible for consumers to process all the information on all the available alternatives (Stigler, 1961; Shepard, 1964; Shugan, 1980).

The above discussion is grounded on the psychology process consumers experience under different choice conditions. If a choice condition involves high choice conflict or preference uncertainty, it increases the selection difficulty which leads to choice deferral. Conversely, if the choice conflict or preference uncertainty is low, it may reduce the selection difficulty and increase the overall purchase incidence. In this regard, prior research proposed that adding an inferior alternative in a choice set decreases the tendency to defer choice (Tversky & Shafir, 1992; Dhar, 1997a). However, this proposition was only investigated in a single-option choice set. In reality consumers usually have more options to choose from. In this study, I begin with considering a small choice set of two equally attractive options to examine the impact of adding an inferior alternative, which had the lowest value on every attribute and highest on price, on choice deferral. It not only enriches the phenomenon of adding an inferior alternative and choice deferral, but also demonstrates that under which conditions the effect is stronger.

Furthermore, I include some mediating variables to characterize the psychological process more explicitly. These variables were found to be significant determinants for choice deferral, but tested in a limited manner with the addition of an inferior alternative. First, I show the effect of adding an inferior alternative on selection difficulty, which integrates both the accounts of choice conflict and preference uncertainty (Anderson, 2003). Second, I model the impact of adding an inferior alternative on the regret anticipated by the consumers. Despite the fact that regret is the most frequently studied emotion in decision-making literature and its anticipation under uncertain choices (Bell, 1982; Loomes & Sugden, 1982), it has not been studied in the presence of an inferior alternative. Therefore, it seems interesting to investigate the impact on anticipated regret. Finally, I present the influence of adding an inferior alternative on the time consumers take to make a decision. In the past, this proposition was mostly tested with durable products on which consumers typically spend more time. Therefore, it seems intriguing to consider product categories of more hedonic nature.

At the end of this study, I extend the phenomenon of adding an inferior alternative to medium and large choice set containing five and ten equally attractive alternatives. Focussing on the decision-making process, I expect that adding an inferior alternative does not influence the tendency to defer choice in medium and large choice set. Additionally, I predict that adding an inferior alternative doesn't reduce selection difficulty, anticipated regret and decision time in medium and large choice set. This is based on the assumption that consumers might not notice the presence of an inferior alternative in small and medium choice set. In line with this, prior research demonstrated that consumers were more involved in attribute-based processing than alternative-based in complex choice sets, to simplify their decision-making process (Payne, 1982; Payne, Bettman, & Johnson, 1993).

To conclude, I investigate the effect of adding an inferior alternative, which has the lowest value on every attribute but highest on price, on choice deferral. I studied this effect in three choice sets (small, medium and large) which differ on the number of equally attractive alternatives. Moreover, I examine the underlying psychology process by including selection difficulty, anticipated regret and decision time as the mediating variables. The rest of the study begins with the review of literature on choice deferral and adding an inferior alternative, which leads to several hypotheses that are tested in this study. Next, it describes the data and

methodologies for testing the proposed hypotheses. Then, it discusses the analysis and results. Finally, it concludes by suggesting managerial implications and possible directions for future research.

## 2 Theory And Hypotheses

### *2.1 Choice Deferral In The Presence Of An Inferior Alternative*

The phenomenon of choice deferral is characterized by postponing decision, maintaining the status quo or refusing to select an option. Consider the case described by Thomas Schelling, who had decided to buy an encyclopaedia for his children. In the bookstore he discovered that there were two encyclopaedias available, contrary to his expectation. Both would have been satisfactory, but he bought neither. This construct underlies the conflict theory which suggests that when the alternatives are equally attractive it generates a conflict about which alternative to choose. Therefore, increasing the degree of conflict may result in indecision and tendency to avoid commitment.

Degree of conflict is considered to be a significant determinant for choice deferral, as conflict is context-dependent which can be manipulated to alter the tendency to defer choice. One way to manipulate conflict is by varying the relative attractiveness of the available options. Consider the following result of Tversky and Shafir (1992): Decision makers tend to defer less when a single-option choice set was enlarged by the introduction of an inferior alternative than an equally attractive alternative. The reasoning behind this result states that when none of the alternatives is clearly superior it generates a situation of conflict which makes the choice difficult. However, when one alternative is superior to another alternative it decreases the choice difficulty which in turn decreases the tendency to defer choice. Similarly, Redelmeier and Shafir (1995) suggested that decision makers desire justifications for choices they make, and these become more scarce as the conflict increases. As a result, choice conflict leads decision makers to prolong their search.

An alternative source of choice deferral is based on the notion of preference uncertainty. Contrary to the conflict hypothesis, this notion proposes that preference uncertainty produces the selection difficulty which in turn increases choice deferral (Dhar, 1996, 1997a, 1997b; Dhar & Sherman, 1996; Dhar & Nowlis, 1999; Dhar, Nowlis, & Sherman, 1999). Particularly, Dhar and Nowlis (1999) found that the effect of choice conflict on choice deferral disappears under time pressure. The phenomenon of preference uncertainty is based on the assumption that before deciding whether to defer choice or not, decision makers first attempt to select an alternative. In

other words, selection decisions have primacy over deferral decisions. Nevertheless, under preference uncertainty, choice conflict seems to operate on deferral by influencing the selection difficulty. In line with this, Dhar (1997a) found that deferral was more likely when subjects were shown a choice set with two relatively equally attractive options than when one alternative clearly dominates the other. This result implies that when the alternatives are equally attractive, it creates uncertainty among decision makers that which alternative is the most attractive (selection difficulty). However, the presence of a dominated alternative reduces that uncertainty. Therefore, high preference uncertainty also leads to more choice deferral.

The above discussion is centered on the account of choice conflict or preference uncertainty. It suggests that choice deferral increases with the increase in choice conflict or preference uncertainty and decreases with the addition of a clearly inferior alternative which reduces the conflict and uncertainty. However, prior research has been limited in a sense that they only considered adding an inferior alternative in a single-option choice set. Therefore, it seems reasonable to study the effect of adding an inferior alternative in a choice set with two or more options on choice deferral. In line with this, Huber, Payne and Puto (1982) and Simonson and Tversky (1992) found that an inferior alternative increases the choice probability of the dominating alternative. Despite the fact that their focus was on the choice share and not on the purchase incidence, it seems feasible to assume that adding an inferior option could indeed increase the overall purchase incidence.

Moreover, two different explanations mentioned above for choice deferral, choice conflict or preference uncertainty, are not mutually exclusive. Both the accounts can be consolidated by introducing a common mediating variable, selection difficulty (Anderson, 2003). Thus, in order to satisfy both of the explanations for choice deferral, I hypothesize the effect of adding an inferior alternative on the selection difficulty.

An additional property of choice conflict or preference uncertainty which links them to choice deferral is anticipated regret. This implies that consumers might take regret into account when they are confronted with uncertain choices (Bell, 1982; Loomes and Sugden, 1982). The reasoning behind this states that when consumers are not sure on the choices they make they may compare the outcomes of their choices with the outcomes they would have received if they had

chosen other options. Regret has been found to be the most frequently studied emotion by decision-making theorists (Marcatto and Ferrante, 2008). Prior research found that anticipating regret not only influences decision making, but also produce systematic bias towards certain alternatives such as status quo, omission or choice deferral (Simonson, 1992; Baron and Ritov, 1994; Tsiros and Mittal, 2000; Inman and Zeelenberg, 2002). The choice of these options underlies that when consumers couldn't determine their preferred option, they tend to maximize their utility by choosing the option which minimizes their regret. Consider the result of Inman and Zeelenberg, (2002): Status quo selection is associated with less regret even though the outcome is poor. This finding suggests that status quo selection provides additional justification for the choice when one is not certain about the outcome. And even if the outcome turns out to be negative, one can still rationalize that the choice was best in the given situation (Inman and Zeelenberg, 2002).

In addition to that, Sugden (1985) and Zeelenberg (1999) also suggested that higher the decision difficulty higher the anticipated regret. In particular, Zeelenberg (1999) proposed that the presence of a dominant alternative in the choice set would decrease the anticipated regret. This is based on the construct of choice difficulty which suggests that when consumers are confronted with equally attractive alternatives, they have no reason to believe that the alternative they would choose would be the best one. Therefore, they start thinking about the consequences of having made a wrong decision which leads to high anticipated regret. However, in the presence of a dominating alternative, consumers spend less time thinking about the bad outcomes because there is no other option they would have chosen otherwise. As a result, it reduces the amount of regret they would anticipate.

Up to my knowledge, no one has yet attempted to incorporate the effect of adding a clearly inferior option on anticipated regret in past research. Therefore, it would be interesting to analyse the effect of adding an inferior alternative on anticipated regret.

Finally, researchers also claimed that consumers usually spend more time to choose an alternative if there is an uncertainty regarding which alternative is the best (Tsekouras, Dellaert and Donkers, 2011; Dellaert, Donkers and Van Soest 2012). Consider Tsekouras, Dellaert and Donkers, (2013), it suggests that consumers tend to spend less time comparing the alternatives if

a dominated alternative is present in the choice set. This hypothesis suggests that comparing time depends on the difficulty in selecting the best alternative. However, their study was based on durable products like mortgages where consumers generally spend more time. Thus, it seems compelling to analyse the effect of adding an inferior alternative on the time consumers take to compare alternatives, in some other product categories which are more of a hedonic nature. In the similar vein, Solvic (1975) and Elster (1980) found that consumers tend to resolve the uncertainty rather than choosing at random. This account suggests that consumers seek for justifications for the choice they make. Thus, it seems convincing to assume that high choice conflict will induce consumers to spend more time to choose an alternative (deciding which alternative to choose), whereas adding an inferior alternative will decrease the amount of time consumers spend to make a decision.

In summary, I study the effect of adding an inferior alternative on choice deferral. For the first set of hypotheses given below I only consider a small choice set of two equally attractive options. I demonstrate that consumers' preference to defer choice decreases when an inferior alternative is added in the small choice set. Furthermore, to understand the underlying psychological process more explicitly, I draw that addition of an inferior alternative would reduce the selection difficulty, anticipated regret and decision time. Finally, I also predict that these three variables mediate the effect of the addition of an inferior alternative on choice deferral. Based on this discussion, my first set of hypotheses is given below:

H1: The preference for choice deferral decreases with the introduction of an inferior alternative in the choice set.

H2a: Adding an inferior alternative decreases the selection difficulty.

H2b: Adding an inferior alternative decreases the anticipated regret.

H2c: Adding an inferior alternative decreases the decision time.

H3: The effect of adding an inferior alternative on choice deferral (H1) is mediated by the selection difficulty, anticipated regret and decision time

## *2.2 Moderating Effects Of The Types Of Choice Sets*

As I have shown in the previous section that adding an inferior alternative decreases choice deferral, it seems interesting to further investigate whether this effect disappears or is modified in other choice sets (medium and large). In other words, I analyse whether the effect of adding an inferior alternative is moderated under different choice conditions based on the number of alternatives. All the hypotheses outlined in the previous section were based on the small choice set (two options). However, in reality people usually have a lot more options to choose from. Therefore, I further extend the phenomenon of adding of an inferior alternative to medium and large choice set including five and ten alternatives.

In this vein, prior research found that consumers tend to defer their choices more with the increase in the number of alternatives (Arunachalam, Henneberry, Lusk & Norwood, 2009; Iyengar & Lepper, 2000; Carroll, White & Pahl 2011). In particular, Iyengar and Lepper (2000) concluded that participants bought more when they were confronted with a limited-choice condition than an extensive-choice condition. Moreover, it concluded that the common marketing supposition ‘the more choice the better’ may sometimes have detrimental consequences for human motivation. This conclusion is based on the discussion in previous section that consumers may have difficulty in managing large choice sets. However, they didn’t examine what happens if an inferior option is added in the large choice set.

Considering the literature on decision-making process, I assume that adding an inferior alternative may not help in motivating consumers to make a purchase in medium or large choice set. The theory underlying this proposition entails that when consumers are confronted with the medium or large choice set they tend to process fewer choices and consider less information regarding their choices (Hauser & Wernerfelt, 1990). It suggests that consumers may not realize the presence of an inferior alternative in the choice set. This prediction is grounded on the fact that with the higher number of alternatives in the choice sets consumers tend to follow simple heuristics to make the decision-making process easier (Wright, 1975; Payne, 1982; Payne, Bettman, & Johnson, 1988, 1993; Timmermans, 1993). For instance, when given with a large number of alternatives consumers may follow simple decision strategies such as non-compensatory or elimination strategy. Consequently, they focus more on the attribute-based processing rather than alternative-based. Therefore, it seems reasonable to assume that adding an

inferior alternative may not reduce selection difficulty, anticipated regret and decision time in medium and large choice sets. On the basis of this discussion, my final set of hypotheses is as follows:

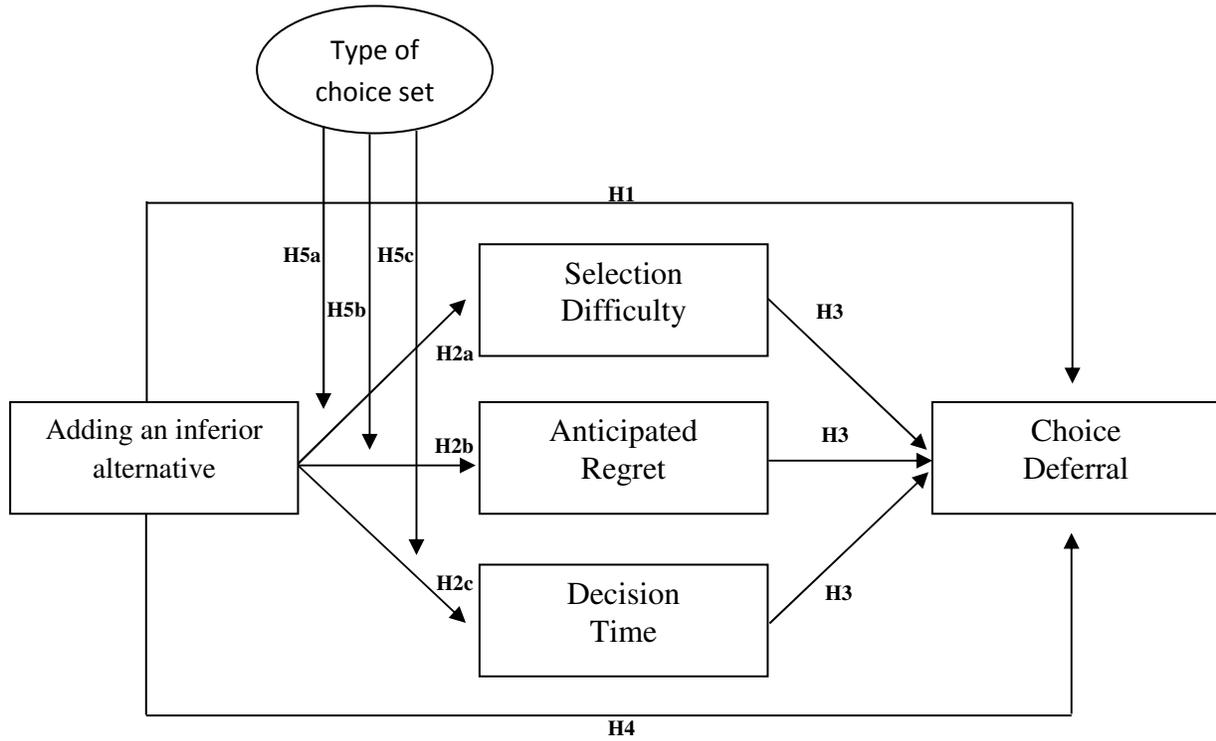
H4: The effect of adding an inferior alternative on choice deferral is moderated by the type of choice set.

H5a: The effect of adding an inferior alternative on selection difficulty is moderated by the type of choice set.

H5b: The effect of adding an inferior alternative on anticipated regret is moderated by the type of choice set.

H5c: The effect of adding an inferior alternative on decision time is moderated by the type of choice set.

### 2.3 Conceptual Model



## 3 Methodology

### 3.1 Data

In order to test the hypotheses stated above, data were generated through an online survey consisted of different choice conditions, using the platform of Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). A total of 251 subjects with 40 to 43 subjects in each choice condition completed the survey, which involves people from my social network or at the Erasmus University Rotterdam.

The survey was based on the fictional purchase of a television. Subjects were asked to imagine that they were looking for a TV. The alternatives shown were varied on design, size, video quality, sound system and price. Subjects were stressed that there were no right or wrong answers, so they should choose the option that best reflected their response in the given situation. Subjects were told that they can either choose a TV from the given TV models or choose to not make a choice and look for other televisions, as in real choice situation they also had the option to not make a choice.

To investigate the effects of different choice conditions on the consumers' tendency to defer choice, I created six conditions differing in terms of the composition of a choice set. The first condition consisted of two equally attractive alternatives. However, in the second condition, the choice set in the first condition was enlarged with the introduction of an inferior alternative. The third condition included five equally attractive alternatives. Conversely, in the fourth condition, an inferior alternative was introduced in the choice set given in the third condition. The number of equally attractive alternatives in the fifth condition was extended from five to ten alternatives. Finally, to investigate whether the effect of adding an inferior alternative still holds or not, fifth condition was enlarged with the addition of an inferior alternative. In order to avoid any learning effects (Andy Field, 2005), the between-subject design was implemented where the subjects were randomly assigned to any of these conditions.

In addition to that, subjects were asked some questions regarding their product selection experience (selection difficulty and anticipated regret. Finally, subjects were asked some

demographic questions such as age, gender and the highest level of education completed/currently enrolled. You can find a copy of the survey in appendix.

Below you will find the distribution of subjects across all the six conditions based on their demographics. First, you can see total number of subjects in each of the choice condition. Second, you can see the average age of subjects in each choice condition. Then, there is a distribution of subjects based on their gender. Finally, the level of education of the subjects is given across all the choice conditions.

**Table 1: Demographics**

<i>Type of Choice Set</i>	<i>(n)</i>	<i>Age</i>			<i>Gender</i>			<i>Level of Education</i>		
		<i>Mean</i>	<i>Male</i>	<i>Female</i>	<i>High School or less</i>	<i>Bachelor's</i>	<i>Master's</i>			
Small	43	25.72	62.8%	37.2%	7%	46.5%	46.5%			
Small + inferior alternative	42	25.31	78.6%	21.4%	7.1%	40.5%	52.4%			
Medium	43	24.23	72.1%	27.9%	7%	39.5%	53.5%			
Medium + inferior alternative	40	24.63	62.5%	37.5%	7.5%	30%	62.5%			
Large	42	24.79	59.5%	40.5%	2.4%	47.6%	50%			
Large + inferior alternative	41	24.49	80.5%	19.5%	9.8%	41.5%	48.8%			
<b>Total</b>	<b>251</b>	<b>24.86</b>	<b>69.3%</b>	<b>30.7%</b>	<b>6.8%</b>	<b>41%</b>	<b>52.2%</b>			

### ***3.2 Measures***

The dependent variable to measure subjects' response is a dummy variable indicating choice deferral. The main independent variables include dummy variables for different types of choice sets (small, medium or large) based on the number of equally attractive alternatives (2, 5 or 10), and the presence of an inferior alternative in the choice sets. In addition to that, to capture the underlying psychological process I also measured the selection difficulty, anticipated regret and decision time.

### *Choice Deferral:*

In each choice condition subjects are given a choice that they can either choose a TV from the given televisions or chose the option to defer their choice of a TV. The option to defer choice was represented by the option to not make a choice and look for other alternatives. Thus, if someone chooses the option to not make a choice and look for other alternatives it depicts choice deferral otherwise no choice deferral. Briefly, I measure preference to defer choice as a binary variable indicating “1” for those who chose to defer choice and “0” for those who chose to not defer.

### *Types of Choice Sets:*

To measure the effects of different choice conditions on the tendency to defer choice, I created six choice sets varied on the number of equally attractive alternatives and the presence of an inferior alternative. Specifically, I created three different types of choice sets: small, medium and large. Small choice set included two equally attractive alternatives, medium choice set included five equally attractive alternatives and large choice set included ten equally attractive alternatives. Moreover, I extended these choice sets by adding an inferior alternative to measure its effects on the choice deferral. In order to analyse them, I created dummy variables for the types of choice sets and the presence of an inferior alternative. The number of alternatives used in small, medium and large choice set is also consistent with the past research (Zuckerman et al., 1978; Iyengar & Lepper, 2000).

### *Selection Difficulty:*

In order to measure selection difficulty, I asked to subjects to complete three items to self-rate the level of difficulty: “Did you find it difficult to select a TV?”, “Did you feel confused when it comes to selecting a TV?”, and “Did it take longer than you originally wanted to select a TV?” All the items were measured on 7-point scale (anchored by not at all/very much). This is consistent with how selection difficulty was operationalised in the prior literature. For instance, some researchers asked subjects to self-rate the difficulty of the decision and some equated it

with the negative emotions experienced while making the decision (Beattie & Barlas 2001; Luce, 1998).

*Anticipated Regret:*

“Regret is a negative, cognitively based emotion that we experience when realizing or imagining that our present situation would have been better, had we decided differently” (Zeelenberg, 1999, p. 94 ). Similarly, every subject, in this study, completed two-item regret scale that assessed subjects’ regret associated with the choice they made: “If you could do it over, how likely would you change your choice?”, and “How much happier would you have been, if you had made a different choice”. Both the questions were measured on 7-point scale (anchored by not at all/very much).

Moreover, I took averages of the three-item selection difficulty and two-item regret scale after running the factor analysis. I chose principal components analysis as the extraction method and varimax as the rotation method. I extracted two components based on the fixed number of factors. In the table below, the amount of variance explained and factor loadings are given for both of the scales used to capture selection difficulty and anticipated regret. It can be seen that, all the items explained 76% of the variance. Furthermore, selection difficulty items are loaded high on the first component whereas anticipated regret items are loaded high on the second component. Thus, it is reasonably to take averages to compute selection difficulty and anticipated regret.

**Table 2: Total Variance Explained**

<i>Component</i>	<i>Initial Eigen Values</i>		
	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>
1	2.849	56.976	56.976
2	.967	19.350	76.326
3	.485	9.699	86.025
4	.410	8.192	94.216
5	.289	5.784	100.000

Extraction Method: Principal Component Analysis.

**Table 3: Rotated Components Matrix**

<i>Item</i>	<i>Components</i>	
	<i>1</i>	<i>2</i>
Did you find it difficult to select a TV?	.874	.187
Did you feel confused when it comes to selecting a TV?	.886	.136
Did it take longer than you originally wanted to select a TV?	.686	.402
If you could do it over, how likely would you change your choice?	.262	.834
How much happier would you have been, if you had made a different choice?	.156	.890

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

### *Decision Time:*

Decision time refers to the total time consumer takes to make a decision (Dellaert, Donkers and Van Soest 2012; Tsekouras, Dellaert and Donkers, 2013). The online platform of Qualtrics, which I used to create the survey, allows me to record the amount of time (in seconds) subjects spend on every page. Therefore, I put the question about the choice of a TV on a single page and recorded the amount of time subjects spent to answer that question. Since subjects couldn't go back to previous page once they have made the decision neither they could move to the next page without making a decision about the choice or choice deferral, I recorded the amount of time subjects spent on that page.

### **3.3 Methods**

The main purpose of this research was to enrich the phenomenon of choice deferral with the introduction of an inferior alternative in different choice conditions. Specifically, I was interested to test the effects of adding an inferior alternative on choice deferral in different types of choice sets varied on the number of alternatives (2, 5 or 10). I began with analysing the effect of adding an inferior alternative in the small choice set consisted of two alternatives on choice deferral. I predicted that the choice deferral will decrease with the introduction of an inferior alternative in the choice set (H1). In order to understand the underlying psychological process, I had also measured selection difficulty, anticipated regret and decision time taken by the

respondents to make a decision. I expected that adding an inferior alternative also decreases the selection difficulty, anticipated regret and decision time (H2a, H2b and H2c). Moreover, I expected them to mediate the relationship between adding an inferior alternative and choice deferral (H3). Finally, I also included medium and large choice set comprised of five and ten alternatives in the analysis to test the effects of adding an inferior alternative. I expected to find moderating effects of the type of choice set on choice deferral (H4) and on selection difficulty, anticipated regret and decision time (H5a, H5b and H5c).

Generally speaking, to model the effects of the adding an inferior alternative on choice deferral (H1, H3, H4), I applied binary logistic regression because the dependent variable, which is choice deferral in our case, is a categorical variable coded as “1” if subjects deferred their choices otherwise “0”. In this way we can model the effects on the probability to defer choice. In particular, for H1 I modelled choice deferral as a function of the presence of an inferior alternative in the small choice set. Moreover, to test the mediating effects of selection difficulty, anticipated regret and decision time in H3, I included them in the same model of choice deferral. Finally, to investigate the moderating effects of the type of choice set in H4, I modelled choice deferral as a function of the types of choice sets and their interactions with the presence of an alternative. I used SPSS to execute these binary logistic regression analyses.

In order to model the effects on selection difficulty, anticipated regret and decision time (H2a, H2b, H2c, H5a, H5b and H5c), I used regression analysis because all the dependent variables (selection difficulty, anticipated regret and decision time) and a dummy coded independent variable for the presence of an inferior alternative in the choice sets (inferior alternative) are scale. I used GLM procedure for multivariate regression analysis in SPSS. One can also run separate OLS regressions, but since the results will be the same I preferred multivariate regression analysis.

For further details see analysis & results section.

## 4 Analysis And Results

In this chapter the proposed hypotheses will be tested and results will be presented using the methodologies discussed in the previous section.

### *4.1 Descriptive Statistics*

Before presenting the results of the analysis, some descriptive statistics are given below to get a preview of the hypotheses and the variables tested in this research. Table 4 presents the descriptive statistics of all the variables across all the choice sets. First, the total number of subjects in each choice set is given. Then, there are percentages of subjects who deferred their choices and those who didn't for every choice set. Finally, you can see the means and standard deviations of selection difficulty, anticipated regret and decision time across all the choice sets.

From the table, it can be seen that the choice deferral decreased to 19% from 41.9% when an inferior alternative was added in the small choice set. It suggests that indeed subjects tend to defer less when an inferior alternative was added in the small choice set (H1). However, the addition of an inferior alternative didn't decrease the choice deferral when an inferior alternative was added in the medium or large choice set. As you can see in the table, the choice deferral only reduced to 12.5% from 14% by adding an inferior alternative in medium choice set and remains almost the same (11.9% and 12.2%) in large choice sets. These findings seems in line with the proposed hypothesis regarding the moderating effects of the types of choice sets on choice deferral (H4).

**Table 4: Descriptive Statistics**

<i>Type of Choice Set</i>	<i>(n)</i>	<i>Choice Deferral</i>		<i>Selection Difficulty</i>		<i>Anticipated Regret</i>		<i>Decision Time</i>	
		<i>Yes</i>	<i>No</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Mean</i>	<i>Std. Deviation</i>
Small	43	41.9%	58.1%	3.43	1.75	2.95	1.66	21.09	16.15
Small + inferior alternative	42	19%	81%	2.87	1.31	2.40	1.35	30.97	17.32
Medium	43	14%	86%	3.01	1.48	2.37	1.53	45.08	39.01
Medium + inferior alternative	40	12.5%	87.5%	3.20	1.50	2.55	1.38	37.40	27.81
Large	42	11.9%	88.1%	3.49	1.61	2.70	1.49	51.09	34.25
Large + inferior alternative	41	12.2%	87.2%	4.23	1.81	3.13	1.45	51.49	49.89

In addition to that, we can also have look at the means and standard deviations of selection difficulty, anticipated regret and decision time in different choice sets to further understand the above findings. It is clearly visible in the table that the mean value of selection difficulty and anticipated regret decreased to 2.87 from 3.43 and to 2.40 from 2.95 when an inferior alternative was added in the small choice set, as hypothesized in H2a and H2b. It shows that subjects experienced less selection difficulty and anticipated less regret with the addition of an inferior alternative. However, contrary to the hypothesized effect on decision time (H2c), subjects took more time to make a decision with the introduction of an inferior alternative in the small choice set. The mean value of decision time increased to 30.97 from 21.09 in the small choice set with an inferior alternative. One of the reasons for this effect could be that respondents

found more information to consider in the presence of an inferior alternative in the choice set, which in turn led to spend more time.

On the contrary, the addition of an inferior alternative doesn't seem to decrease selection difficulty and anticipated regret when it was added in the medium or large choice set, as expected in the moderating effects of the types of choice sets (H5a and H5b). In the medium choice set, average selection difficulty and anticipated regret slightly increased to 3.20 and 2.55 from 3.01 and 2.37 in the presence of an inferior alternative. Moreover, in the large choice set average selection difficulty and anticipated regret further increased to 4.23 and 3.13 from 3.49 and 2.70 by adding an inferior alternative. However, average decision time decreased to 37.40 from 45.08 when an inferior alternative was added in the medium choice set and increased a bit to 51.49 from 51.09 in the large choice set.

These findings regarding the selection difficulty and anticipated regret provides further clarification for the results we found above, where we saw that an inferior alternative only decreased choice deferral when it was added in the small choice set. We can see that both in the medium and large choice set subjects found it more difficult to make a choice and anticipated high regret when an inferior alternative was added in the choice set, as compared to its addition in the small choice set. Therefore, it makes sense that they would be more inclined towards avoiding choice deferral in small choice set than in medium or large choice set. However, the effects on the decision time are somehow mixed across the choice sets.

#### 4.2 Effect Of Adding An Inferior Alternative On Choice Deferral

Initially, I only considered the dataset containing small choice set with or without the presence of an inferior alternative to test the influence of adding an inferior alternative on choice deferral. My first hypothesis was:

*H1: The preference for choice deferral decreases with the introduction of an inferior alternative in the choice set.*

In order to test this hypothesis, I applied binary logistic regression because the dependent variable, which is choice deferral in our case, is a categorical variable coded as “1” if subjects deferred their choices otherwise “0”. For the independent variables, I only included the addition of an inferior alternative (labeled as “Inferior Alternative”) because I wanted to test whether the presence an inferior alternative in the choice set influences the probability to defer choice or not. “Inferior Alternative” is a dummy variable indicating “1” if an inferior alternative is present in the choice set otherwise “0”. In this way, we can model the direct effect of adding an inferior alternative on the tendency to defer choice.

Table 5 shows that the coefficient of “Inferior Alternative” is negative, -1.118 and the p-value is .025 which is less than .05. However, since my hypothesis is one-tailed, one-tailed p-value is .0125 (.025/2), which suggests highly significant negative influence of the addition of an inferior alternative on choice deferral. Therefore, it is evident that adding an inferior alternative in the small choice set significantly reduces the probability to defer choice, as predicted in H1.

**Table 5: Choice Deferral**

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.*</i>	<i>Exp(B)</i>
Inferior Alternative	-1.118	.500	5.004	1	.025	.327
Constant	-.329	.309	1.129	1	.288	.720
N				85		
Log Likelihood						99.367

Chi-square (Model)	5.314
Sig. (Model)	.021

\*P-values are two-tailed

### ***4.3 Effects Of Adding An Inferior Alternative On Selection Difficulty, Anticipated Regret And Decision Time***

Since we have seen that adding an inferior alternative reduces the choice deferral, now we will investigate the underlying psychological process as a result of adding an inferior alternative, which might have lead to the choice deferral. For this purpose, I modelled the effect of adding an inferior alternative on selection difficulty, anticipated regret and decision time. The proposed hypotheses were:

*H2a: Adding an inferior alternative decreases the selection difficulty.*

*H2b: Adding an inferior alternative decreases the anticipated regret.*

*H2c: Adding an inferior alternative decreases the decision time.*

In order to test these hypotheses I used multivariate linear regression analysis because all the dependent variables (selection difficulty, anticipated regret and decision time) and the dummy coded independent variable for adding an inferior alternative (inferior alternative), “1” if inferior alternative is added in the choice set otherwise “0”, are scale. One can also run three separate OLS regressions. However, since the coefficients and their significance will be the same, I preferred to model all the effects in a single multivariate regression analysis using the GLM multivariate procedure in SPSS.

Table 6 shows that the coefficients of “Inferior Alternative”, which represents the addition of an inferior alternative in the small choice set, for selection difficulty and anticipated regret are negative (-.561 and -.549) with the same p-value of 0.099. However, this p-value is two-tailed, contrary to the proposed one-tailed hypotheses (H2a and H2b). Therefore, one-tailed p-value ( $.099/2=.049$ ) which is less than 5% significance level suggests a significant negative effect of the addition of an inferior alternative on selection difficulty and anticipated regret. Thus, it can be concluded that indeed adding an inferior alternative reduces the selection difficulty and anticipated regret which is in line with H2a and H2b.

On the contrary, for decision time the coefficient of “Inferior Alternative” is 9.885 with the p-value of .008. This indicates that the decision time increases significantly with the addition of an inferior alternative, as opposed to H2c. Therefore, I couldn’t find support for H2c which states that adding an inferior alternative decreases the decision time. Since I could not disentangle the comparison time from the inspection time (Tsekouras, Dellaert and Donkers, 2013), it might be the reason that subjects found more information to consider when they found an inferior alternative in the choice set, which led them to inspect alternatives separately. This provides further justification for the effects found in (Tsekouras, Dellaert and Donkers, 2013) which suggests that adding an inferior alternative increases the time to inspect individual alternatives.

**Table 6: Effects on Selection Difficulty, Anticipated Regret and Decision Time**

<i>Independent Variables</i>	<i>Dependent Variables</i>								
	<i>Selection Difficulty</i>			<i>Anticipated Regret</i>			<i>Decision Time</i>		
	<i>B**</i>	<i>S.E.</i>	<i>Sig.*</i>	<i>B**</i>	<i>S.E.</i>	<i>Sig.*</i>	<i>B**</i>	<i>S.E.</i>	<i>Sig.*</i>
Intercept	3.343	.237	.000	2.953	.231	.000	21.094	2.553	.000
Inferior Alternative	-.561	.336	.099	-.549	.329	.099	9.885	3.632	.008
N		85			85			85	
R <sup>2</sup> (Model)		.032			.032			.82	
Sig. (Model)		.099			.099			.008	

\*P-values are two-tailed

\*\*Coefficients are unstandardized

#### ***4.4 The Mediating Role Of Selection Difficulty, Anticipated Regret And Decision Time***

In the above two sections, we have seen that adding an inferior alternative influences choice deferral, selection difficulty, anticipated regret and decision time (however, the effect on decision time was against the proposed hypothesis) in small choice set. To further understand whether the effect of adding an inferior alternative on choice deferral can be explained by selection difficulty, anticipated regret and decision time, I included them as mediating variables in the model. I proposed the following hypothesis:

*H3: The effect of adding an inferior alternative on choice deferral (H1) is mediated by the selection difficulty, anticipated regret and decision time.*

To investigate the mediating effects of selection difficulty, anticipated regret and decision time, I included them in the binary logistic regression model for choice deferral, which I used to test H1. In this way, we can analyse whether these variables mediate the relationship between adding an inferior alternative and choice deferral or not. If the coefficient of “Inferior Alternative” which was significant in H1 becomes insignificant after controlling for selection difficulty, anticipated regret and decision time and the effects of these variables become significant, then we may expect the mediating relationship. Whether there will be full mediation or partial mediation depends on if all or some of the mediating variables are significant.

However, it is clearly visible in table given below (Table 7) that selection difficulty, anticipated regret and decision time do not mediate the relationship between the presence of an inferior alternative and choice deferral, as the coefficient of “Inferior Alternative” is still significant (.021) at 5% significance level. Furthermore, selection difficulty, anticipated regret and decision time are found to be insignificant (.644, .398 and .301). Thus, it can be concluded that despite the fact that adding an inferior alternative influence selection difficulty, anticipated regret and decision time (see previous section) these variables do not mediate the relationship between the presence of an inferior alternative and choice deferral.

**Table 7: Choice Deferral including the mediating effects**

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.*</i>	<i>Exp(B)</i>
Inferior Alternative	-1.268	.550	5.309	1	.021	.282
Selection Difficulty	-.086	.187	.213	1	.644	.917
Anticipated Regret	.159	.188	.715	1	.398	1.172
Decision Time	.015	.015	1.072	1	.301	1.015
Constant	-.822	.711	1.336	1	.248	.439
N				85		
Log Likelihood			97.779			
Chi-square (Model)			6.901			

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Sig. (Model)	.141
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\*P-values are two-tailed

#### ***4.5 The Moderating Role Of The Types Of Choice Sets***

After analysing the small choice set, I considered the entire dataset including small, medium and large choice set with or without the presence of an inferior alternative to investigate the effects of adding an inferior alternative on choice deferral, in the context of different types of choice sets. I expected to find a moderating role of the type of choice set on choice deferral in the presence of an inferior alternative in the choice set:

*H4: The effect of adding an inferior alternative on choice deferral is moderated by the type of choice set.*

To model the moderating effects of the types of choice sets, I again used the choice deferral model discussed previously. For the independent variables, I included the dummy variables for medium choice set (Medium CS), large choice set (Large CS) and the addition of an inferior alternative (Inferior Alternative) in the choice set. Moreover, to capture the moderating effects, I included their interactions with the addition of an inferior alternative (Inferior Alternative) in the choice set. In this way, we can allow the effects of adding an inferior alternative to differ across choice sets. Since we have already investigated the small choice set, I chose the small choice set as the reference category. Moreover, I ran the model hierarchically. In the first block, I only included the main effects of medium choice set, large choice set and the presence of an inferior alternative. In the second block, I included their interactions with the presence of an inferior alternative simultaneously.

In table given below (Table 8), first we can see in block 1 that all the coefficients are significant. The addition of an inferior alternative decreases the preference for choice deferral by  $-.569$ , and it is significant with the one-tailed p-value of  $.047$  ( $.094/2$ ). Moreover, both the medium and large choice set significantly decreases the preference for choice deferral by  $-1.080$

and -1.183 as compared to small choice set. Finally, the model (without including the moderating effects) is also significant with the chi-square value of 14.261 (.003).

Now let's see block 2 which also contains the interaction terms for the moderating effects of the type of choice set. First, we can see that the coefficient of adding an inferior alternative in the medium choice set (Inferior Alternative \* Medium CS) is .992. This coefficient suggests that the effect of adding an inferior alternative on choice deferral is lower in the medium choice set when compared to that in the small choice set (-1.118). Specifically, adding an inferior alternative in the medium choice set only reduces the preference for choice deferral by -.126 (-1.118 + .992). However, the effect is not significant, as the p-value is not less than .05 (.226). Second, we can see that the coefficient of adding an inferior alternative in the large choice set (Inferior Alternative \* Large CS) is 1.146. This coefficient suggests that the effect of adding an inferior alternative on choice deferral is positive in the large choice set when compared to that in the small choice set (-1.118). Specifically, adding an inferior alternative in the large choice set increases the preference for choice deferral by .028 (-1.118 + 1.146). However, similar to the medium choice set, the effect is not significant because the p-value is not less than .05 (.172).

In addition to that, we can also see that the chi-square value of Block 2 is 2.480, which is also insignificant (.289). This suggests that the model with the moderating effects (interaction terms) doesn't account for more variance than the model without the moderating effects. To conclude, the hypothesis for the moderating effects of the type of choice set (H4) is not supported by the data.

Despite the fact that above findings conclude insignificant moderation effects, the data have shown different patterns for the effect of adding an inferior alternative on choice deferral in different types of choice sets. For instance, we have seen that adding an inferior alternative in medium choice set only reduces the preference for choice deferral by -.126 as compared to -1.118 when the inferior alternative was added in the small choice set, and it increases the choice deferral by .028 when the inferior alternative was added in the large choice set. Therefore, I would recommend future researchers to further explore this phenomenon of adding an inferior alternative and choice deferral in different choice sets based on the number of alternatives with different choice settings.

Additional analysis

In addition to that, we can analyse the effects of the types of choice sets on choice deferral after controlling the effect of adding an inferior alternative. In this way, we can get additional insights on the relationship between the types of choice sets and choice deferral.

Despite the fact that the addition of an inferior alternative in medium and large choice set didn't decrease choice deferral significantly in reference to small choice set, the effects found in block 1 of table 8, suggest that after controlling for the effect of adding an inferior alternative medium and large choice set significantly decreases the choice deferral as compared to small choice set (-1.080, -1.183). It seems that only presenting medium or large choice sets is more favorable for subjects than adding an inferior alternative in the small choice set.

**Table 8: Choice Deferral including the moderating effects**

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.*</i>	<i>Exp(B)</i>
<b>Block 1</b>						
Inferior Alternative	-.569	.340	2.807	1	.094	.566
Medium CS	-1.080	.403	7.178	1	.007	.340
Large CS	-1.183	.414	8.173	1	.004	.306
Constant	-.554	.280	3.907	1	.048	.575
Log Likelihood			227.810			
Chi-square (Block1/Model)			14.261			
Sig. (Model)			.003			
<b>Block 2</b>						
Inferior Alternative	-1.118	.500	5.004	1	.025	.327
Medium CS	-1.491	.538	7.682	1	.006	.225
Large CS	-1.673	.568	8.676	1	.003	.188
Inferior Alternative * Medium CS	.992	.820	1.463	1	.226	2.696
Inferior Alternative * Large CS	1.146	.840	1.863	1	.172	3.145
Constant	-.329	.309	1.129	1	.288	.720
N			251			

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Log Likelihood	225.330
Chi-square (Block 2)	2.480
Sig.	.289
Chi-square (Model)	16.741
Sig.	.005

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\*P-values are two-tailed

As we have analysed the moderating effects of different types of choice sets on choice deferral when an inferior alternative was added in the choice sets, now I present the findings of the moderating effects of the types of choice sets on selection difficulty, anticipated regret and decision time. It would further explain the results we found in the previous section. Lastly, I advanced the following hypotheses:

*H5a: The effect of adding an inferior alternative on selection difficulty is moderated by the type of choice set.*

*H5b: The effect of adding an inferior alternative on anticipated regret is moderated by the type of choice set.*

*H5c: The effect of adding an inferior alternative on decision time is moderated by the type of choice set.*

To model the moderating effects on selection difficulty, anticipated regret and decision time, I applied three separate linear regressions. In the first regression model, I chose selection difficulty as a dependent variable. Then, I chose anticipated regret for the dependent variable. Finally, I chose decision time as a dependent variable in the third model. I could also use the multivariate regression as discussed previously, but I wanted to run the hierarchical regression analysis as I applied it in the previous section where I ran the model in two blocks. And the GLM procedure for multivariate analysis as I discussed previously doesn't allow hierarchical regression.

Similar to the previous section, I used two blocks for each regression model. In the first block I only included the main effects of medium choice set (Medium CS), large choice set

(Large CS) and the addition of an inferior alternative (Inferior Alternative) in the choice set, as the independent variables. Then in the second block, I included their interactions with the addition of an inferior alternative (Inferior Alternative) in the choice set simultaneously. Since I could not include the interaction terms automatically in SPSS while following the linear regression procedure, I created them manually by taking product of the dummy variables (Inferior Alternative and Medium CS) for adding an inferior alternative in the medium choice set (labelled as Int\_InferiorMedium), and of (Inferior Alternative and Large CS) for adding an inferior alternative in the large choice set (Int\_InferiorLarge). As discussed in the previous section, I chose the small choice set as a reference category.

First, I will discuss the moderating effects on selection difficulty. It can be seen in the table below (Table 9 Model 1) that for selection difficulty in Block 1, all the effects are insignificant except the effect of large choice set which is .699 (.005) in reference to the small choice set. However, the model is significant,  $R^2 = .045$  (.009). Coming to Block 2, if we look at the coefficient of adding an inferior alternative in the medium choice set (Int\_InferiorMedium) which is .753, it suggests that the effect of adding an inferior alternative in the medium choice set on selection difficulty is positive as compared to its effect in the small choice set (-.561). In particular, it means that the selection difficulty increases by .192 (-.561 + .753) whereas it decreases by adding an inferior alternative in the small choice set. However, the effect is insignificant because the p-value is .126. On the contrary, when we look at the coefficient of adding an inferior alternative in the large choice set (Int\_InferiorLarge) on selection difficulty (1.297), it is statistically significant (.009). This suggests that adding an inferior alternative in the large choice set significantly increases the selection difficulty by .736 (-.561 + 1.297). Furthermore, if we see whether adding the moderation effects further explain the variance in the model, then we can see that the  $R^2$  change is .027 which is also significant (.031).

Therefore, it seems reasonable to conclude that the effect of adding an inferior alternative on selection difficulty is moderated by the type choice set (H5a). It decreases when the inferior alternative was added in the small choice set, but increases when the inferior alternative was added in the medium and large choice set. However, in medium choice set the effect was insignificant.

Second, I will discuss the moderating effects on anticipated regret. It can be seen in the table below (Table 9 Model 2) that in Block 1, all the effects are insignificant. However, the model is significant,  $R^2 = .045$  (.009). Now, if we look at Block 2, similar to the effects found on selection difficulty the anticipated regret decreases when an inferior alternative was added in the small, but increases when the inferior alternative was added in medium and large choice set. But only the effect in large choice set was significant at 5% significance level. In particular, in large choice the coefficient of the interaction term (Int\_InferiorLarge) is .980, which is statistically significant (.034). This suggests that adding an inferior alternative in the large choice set significantly increases the anticipated regret by .431 (-.549 + .980). Finally, if we see the  $R^2$  change (.019), at 10% significance level it is also significant (.087).

Therefore, strictly speaking the effect of adding an inferior alternative on anticipated regret is also moderated by the type of choice set (H5b). It decreases when the inferior alternative was added in the small choice set, but increases when the inferior alternative was added in the medium or large choice set. However, the effect was only significant in the large choice set.

Finally, I will discuss the moderating effects on decision time. It can be seen in the table below (Table 9 Model 3) that in Block 1, all the effects are significant except the effect of adding an inferior alternative in the choice set. The model without including the moderating effects is also significant,  $R^2 = .093$  (.000). Now, if we look at Block 2, the coefficient of adding an inferior alternative in medium choice set (Int\_InferiorMedium) is -17.568 which suggests that it reduces the decision time by -7.863 (9.885 - 17.568) whereas the decision time increases by 9.885 when the inferior alternative was added in the small choice set. In the large choice set (Int\_InferiorLarge) the coefficient is -9.488 which means that adding an inferior alternative in the large choice set only increases the decision time by .397 (9.885 - 9.488). However, both of the effects in reference to the small choice set are insignificant (.085, .351). This suggests that the effect of adding an inferior alternative on decision time is not moderated by the type of choice set.

Furthermore, including the moderating effects do not explain any additional variance in the model ( $R^2$  change = .011, p-value = .225). Therefore, the hypothesis H5c that the effect of

adding an inferior alternative on decision time is moderated by the type of choice set is not supported by the data.

**Table 9: Moderating effects on Selection Difficulty, Anticipated Regret and Decision Time**

	<i>Model 1</i>			<i>Model 2</i>			<i>Model 3</i>		
	<i>Dependent Variable: Selection Difficulty</i>			<i>Dependent Variable: Anticipated Regret</i>			<i>Dependent Variable: Decision Time</i>		
	<i>B**</i>	<i>S.E.</i>	<i>Sig.*</i>	<i>B**</i>	<i>S.E.</i>	<i>Sig.*</i>	<i>B**</i>	<i>S.E.</i>	<i>Sig.*</i>
<b>Block 1</b>									
Constant	3.099	.201	.000	2.675	.187	.000	25.513	4.124	.000
Inferior Alternative	.117	.203	.565	.016	.189	.934	.942	4.162	.821
Medium CS	-.055	.248	.824	-.224	.231	.33	15.421	5.086	.003
Large CS	.699	.248	.005	.233	.231	.313	25.311	5.086	.000
R <sup>2</sup> (Block 1/Model)			.045			.016			.093
Sig. (Block 1)			.009			.275			.000
<b>Block 2</b>									
Constant	3.434	.243	.000	2.953	.227	.000	21.094	5.016	.000
Inferior Alternative	-.561	.345	.105	-.549	.322	.090	9.885	7.136	.167
Medium CS	-.426	.343	.215	-.581	.320	.071	23.996	7.094	.001
Large CS	.058	.345	.867	-.251	.322	.437	29.999	7.136	.000
Int_InferiorMedium	.753	.491	.126	.727	.459	.115	-17.568	10.155	.085
Int_InferiorLarge	1.297	.491	.009	.980	.459	.034	-9.488	10.152	.351
N			251			251			251
R <sup>2</sup> change (Block 2)			.027			.019			.011

Sig. (Block 2)	.031	.087	.225
R <sup>2</sup> (Full Model)	.072	.035	5.670
Sig. (Full Model)	.002	.118	.000

\*P-values are two-tailed

\*\*Coefficients are unstandardized

## 5 General Discussion

### 5.1 Conclusion

This research investigates the impact of adding an inferior alternative in different types of choice sets based on the number of alternatives on the tendency to defer choice. Particularly, by using an online survey, I examine the impact of adding an inferior alternative in small, medium and large choice set comprised of 2, 5 and 10 alternatives. In addition that, I also analyse the influence on selection difficulty, anticipated regret and decision time to capture the underlying psychological process.

I begin with the analysing the impact of adding an inferior alternative on choice deferral in the small choice set. The results suggest that indeed adding an inferior alternative reduces the tendency to defer choice. Additionally, I also investigate the impact on selection difficulty, anticipated regret and decision time when an inferior alternative is added in the small choice set. I find that the addition of an inferior alternative reduces the selection difficulty and anticipated regret. However, I couldn't find the predicted effect on decision time; decision time increases when an inferior alternative is added in the choice set. One of the reasons could be that subjects might incline towards spending more time on inspecting individual alternatives when they also see an inferior alternative in the choice set, which results in increasing the time to make a decision. An alternative explanation could be that with small number of alternatives consumers tend to use compensatory strategies to make a choice which are more time consuming. Finally, I

also test whether the relationship between adding an inferior alternative and choice deferral is mediated by selection difficulty, anticipated regret and decision time or not. However, I couldn't find significant support for the mediation effects.

After analysing the small choice set, I examine the entire dataset including all the different types of choice sets (small, medium and large) with or without the addition of an inferior alternative. By using different types of choice sets based on the number of alternatives, I investigate the moderating effects of the types of choice sets on choice deferral, selection difficulty, anticipated regret and decision time when an inferior alternative is added in the choice set. First, I analyse the moderating effects on choice deferral. Despite the fact that I do not find a significant support for the moderating effects of choice set types on choice deferral, data patterns are in line with the predicted hypothesis. The addition of an inferior alternative in the medium choice set reduces the effect on choice deferral as compared to when an inferior alternative is added in the small choice set. On the contrary, choice deferral increases in the large choice set when an inferior alternative is added. Moreover, it is also found that after controlling the effects of adding an inferior alternative medium and large choice set further decreases the preference for choice deferral, and the effects are highly significant. Therefore, I would encourage future researchers exploring these choice contexts in different settings with the addition of an inferior alternative.

In addition to that, I also examine the moderating effects of the types of choice sets on selection difficulty, anticipated regret and decision time. First, I find that the effect of adding an inferior alternative on selection difficulty is moderated by the type of choice set. The results reveal that the selection difficulty increases significantly when an inferior alternative is added in the choice set. Selection difficulty also increases by adding an inferior alternative in the medium choice set, but the effect is not significant. Second, I also find the moderating effect of the type of choice set on anticipated regret (at 10% significance level). Similar to the effects on selection difficulty, I find that anticipated regret increases when an inferior alternative is added in medium and large choice set. However, the effect is only significant for the large choice set. These findings further indicates the need for future research in the context different choice sets based on the number of alternatives because the addition of an inferior alternative does not decrease selection difficulty and anticipated regret in large choice set. Finally, I analyse the moderating

effects on the decision. The results are somehow mixed, but I couldn't find support for the moderating effects of the types of choice sets.

To conclude, the use of three different types of choice sets (small, medium and large) enriches the phenomenon of adding an inferior alternative and choice deferral. I find reasonable support for the influence of adding an inferior alternative on choice deferral, selection difficulty and anticipated regret in the small choice set. Moreover, I also find that the effects of adding an inferior alternative on selection difficulty and anticipated regret are also moderated by the type of choice set. However, I couldn't find significant support for the moderating effects on choice deferral. Yet, the data show patterns which suggest future possibilities in this area of research.

## ***5.2 Managerial Implications***

From a managerial perspective, my findings suggest important implications for the construction of product recommendation sets. Specifically, for product recommendation websites or online firms, the findings suggests that indeed adding an inferior alternative in the product recommendation set would help in boosting their sales. The findings suggest that adding an inferior alternative in the choice set of one or two equally attractive alternatives makes it easier for the consumers to make a choice. Moreover, the consumers would anticipate less regret while making their choice. This suggestion is highly recommendable for those websites which present small product recommendation sets to their customers, for instance, top 3 or best 3 products. However, the effects found in the moderating effects do not recommend adding an inferior alternative in the medium or large product recommendation sets because it might not help in reducing the choice deferral. However, further research is needed to confirm these findings because the data patterns in my research are in line but not significant. Furthermore, it is also found that selection difficulty and anticipated regret increases by adding an inferior alternative in medium and large choice set which makes it difficult for the consumers to make a choice, and restrains them from making a choice as they would expect risk of having made a wrong decision.

In addition to that, on the basis of the effects found in the medium and large choice sets, online firms might also consider reconstructing their small product recommendation sets. Particularly, I suggest giving attractive reasonable choice options to consumers rather than only

presenting top 3 or best 3 products or adding an inferior alternative among them. My findings also revealed that after controlling the effects of adding an inferior alternative, choice deferral was the lowest in large choice set of 10 alternatives. These results are contradicting to previous research (Iyengar & Lepper, 2000) which recommends that overly extensive choice sets might de-motivate choice. However, they used chocolates as their product and presented 24 options in the extensive choice set. However, I consider TVs for my research and presented 10 options in the large choice set. Moreover, I believe that presenting 10 options for product categories like electronics (TV, CD players etc.) would be fairly large.

Additionally, sales persons could also benefit by presenting their clients a couple of best products and also presenting them an inferior alternative which makes the choice easier and reduces any regrets of having made a wrong decision. Or they can present a reasonable amount of attractive alternatives.

### ***5.3 Limitations And Future Research***

My research doesn't come without limitations. There are several possibilities which future researchers could try to explore further. One of the significant avenues for future researchers would be to manipulate the composition of an inferior alternative. In this research, the inferior alternative which I considered had the lowest values on all the attributes but the highest price. In future research, researchers may try to consider different attributes rather commonly used attributes such as the technical specifications, for creating an inferior alternative. For example, an inferior brand.

In addition to that, my account for the moderation effects was based on the decision strategies used by the consumers. However, I couldn't capture what type of decision strategies were used by the subjects. Therefore, an enquiry into the decision strategies when the inferior alternative is added in the choice set would also provide additional insights.

Finally, I only included only one inferior alternative in medium and large choice set and I didn't find any significant impact on reducing the choice deferral. It would be interesting to see if the number of inferior alternatives increases in the choice set.

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## Appendix

### *Questionnaire*

Dear Participant,

Thank you for taking your time to fill in the survey for my master's thesis!

I am a student of master's in Economics and Business (Marketing) at Erasmus University Rotterdam. I am carrying out a research to understand consumers' purchase decisions.

The survey is based on the fictional purchase of a television, and it is divided into three segments. Firstly, you will be asked to make a choice from the given set of options. Secondly, you will fill in some evaluation questions about your product selection experience and the choice you made. Finally, there will be some demographic questions. The survey will take you around 5 to 10 minutes approximately.

I kindly request you to read the instructions before each segment carefully. If you have any questions regarding this research please do not hesitate to contact me.

Muhammad Adnan Ahmad

Email: [adnan042@yahoo.com](mailto:adnan042@yahoo.com)

Q1: Where are you currently located?

- Pakistan
- Netherlands
- Others

**Note: (Since I also asked my friends in Pakistan to fill in the survey, I created two different versions of the survey. Both of the versions were exactly the same except the prices of TVs. In order to make the survey as realistic as possible I put prices in Pakistani currency for those who chose their location as Pakistan. I also researched about TV prices in the Pakistani market before creating the survey.)**

Q2: Imagine that you are looking for a new TV. Since televisions come with different features such as design, screen size, video quality and sound system, you might need to make trade-offs between these features and prices.

On the following page, you will find some TV models. As in real choice situations, you can either choose from the given TV models or you also have the option to not make a choice and to look for other TVs. Remember that there are no right or wrong answers, so you should choose the option which best reflects your response in the given situation.

**Note: (After this question, subjects were randomly assigned to one of the following six choice conditions)**

**Choice Sets with prices in Euros**

**1: Small Choice Set (without inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (Euros)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	450
○	UE46502	Average	46 inches	Full High Definition	Stereo	550
○	I would not choose any of these TVs and look for other TVs					

**2: Small Choice Set (with inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (Euros)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	450
○	UE46502	Average	46 inches	Full High Definition	Stereo	550
○	UE40705	Average	40 inches	High Definition	Stereo	725
○	I would not choose any of these TVs and look for other TVs					

**3: Medium Choice Set (without inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (Euros)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	450
○	UE46502	Average	46 inches	Full High Definition	Stereo	550
○	UE50601	Good	50 inches	High Definition	Stereo	600
○	UE46463	Good	46 inches	High Definition	Sub-woofer	600
○	UE40403	Good	40 inches	Full High Definition	Stereo	500
○	I would not choose any of these TVs and look for other TVs					

**4: Medium Choice Set (with inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (Euros)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	450
○	UE46502	Average	46 inches	Full High Definition	Stereo	550
○	UE40705	Average	40 inches	High Definition	Stereo	725
○	UE50601	Good	50 inches	High Definition	Stereo	600
○	UE46463	Good	46 inches	High Definition	Sub-woofer	600
○	UE40403	Good	40 inches	Full High Definition	Stereo	500
○	I would not choose any of these TVs and look for other TVs					

**5: Large Choice Set (without inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (Euros)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	450
○	UE46502	Average	46 inches	Full High Definition	Stereo	550
○	UE50601	Good	50 inches	High Definition	Stereo	600
○	UE46463	Good	46 inches	High Definition	Sub-woofer	600
○	UE40403	Good	40 inches	Full High Definition	Stereo	500
○	UE50602	Average	50 inches	High Definition	Sub-woofer	650
○	UE46462	Good	46 inches	Full High Definition	Sub-woofer	700
○	UE40402	Good	40 inches	Full High Definition	Sub-woofer	575
○	UE50464	Average	50 inches	Full High Definition	Stereo	700
○	UE46453	Good	46 inches	High Definition	Stereo	500
○	I would not choose any of these TVs and look for other TVs					

**6: Large Choice Set (with inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (Euros)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	450
○	UE46502	Average	46 inches	Full High Definition	Stereo	550
○	UE40705	Average	40 inches	High Definition	Stereo	725
○	UE50601	Good	50 inches	High Definition	Stereo	600
○	UE46463	Good	46 inches	High Definition	Sub-woofer	600
○	UE40403	Good	40 inches	Full High Definition	Stereo	500
○	UE50602	Average	50 inches	High Definition	Sub-woofer	650
○	UE46462	Good	46 inches	Full High Definition	Sub-woofer	700
○	UE40402	Good	40 inches	Full High Definition	Sub-woofer	575
○	UE50464	Average	50 inches	Full High Definition	Stereo	700
○	UE46453	Good	46 inches	High Definition	Stereo	500
○	I would not choose any of these TVs and look for other TVs					

**Choice Sets with prices in PKR (Pakistani rupees)**

**1: Small Choice Set (without inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (PKR)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	50000
○	UE46502	Average	46 inches	Full High Definition	Stereo	60000
○	I would not choose any of these TVs and look for other TVs					

**2: Small Choice Set (with inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (PKR)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	50000
○	UE46502	Average	46 inches	Full High Definition	Stereo	60000
○	UE40705	Average	40 inches	High Definition	Stereo	77000
○	I would not choose any of these TVs and look for other TVs					

**3: Medium Choice Set (without inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (PKR)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	50000
○	UE46502	Average	46 inches	Full High Definition	Stereo	60000
○	UE50601	Good	50 inches	High Definition	Stereo	65000
○	UE46463	Good	46 inches	High Definition	Sub-woofer	65000
○	UE40403	Good	40 inches	Full High Definition	Stereo	55000
○	I would not choose any of these TVs and look for other TVs					

**4: Medium Choice Set (with inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (PKR)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	50000
○	UE46502	Average	46 inches	Full High Definition	Stereo	60000
○	UE40705	Average	40 inches	High Definition	Stereo	77000
○	UE50601	Good	50 inches	High Definition	Stereo	65000
○	UE46463	Good	46 inches	High Definition	Sub-woofer	65000
○	UE40403	Good	40 inches	Full High Definition	Stereo	55000
○	I would not choose any of these TVs and look for other TVs					

**5: Large Choice Set (without inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (PKR)
○	UE40401	Average	40 inches	High Definition	Sub-woofer	50000
○	UE46502	Average	46 inches	Full High Definition	Stereo	60000
○	UE50601	Good	50 inches	High Definition	Stereo	65000
○	UE46463	Good	46 inches	High Definition	Sub-woofer	65000
○	UE40403	Good	40 inches	Full High Definition	Stereo	55000
○	UE50602	Average	50 inches	High Definition	Sub-woofer	70000
○	UE46462	Good	46 inches	Full High Definition	Sub-woofer	75000
○	UE40402	Good	40 inches	Full High Definition	Sub-woofer	62000
○	UE50464	Average	50 inches	Full High Definition	Stereo	75000
○	UE46453	Good	46 inches	High Definition	Stereo	55000
○	I would not choose any of these TVs and look for other TVs					

**6: Large Choice Set (with inferior alternative)**

	Model #	Design	Screen Size	Video Quality	Sound System	Price (PKR)
<input type="radio"/>	UE40401	Average	40 inches	High Definition	Sub-woofer	50000
<input type="radio"/>	UE46502	Average	46 inches	Full High Definition	Stereo	60000
<input type="radio"/>	UE40705	Average	40 inches	High Definition	Stereo	77000
<input type="radio"/>	UE50601	Good	50 inches	High Definition	Stereo	65000
<input type="radio"/>	UE46463	Good	46 inches	High Definition	Sub-woofer	65000
<input type="radio"/>	UE40403	Good	40 inches	Full High Definition	Stereo	55000
<input type="radio"/>	UE50602	Average	50 inches	High Definition	Sub-woofer	70000
<input type="radio"/>	UE46462	Good	46 inches	Full High Definition	Sub-woofer	75000
<input type="radio"/>	UE40402	Good	40 inches	Full High Definition	Sub-woofer	62000
<input type="radio"/>	UE50464	Average	50 inches	Full High Definition	Stereo	75000
<input type="radio"/>	UE46453	Good	46 inches	High Definition	Stereo	55000
<input type="radio"/>	I would not choose any of these TVs and look for other TVs					

Thank you for your choice. Now I would like you to answer some questions regarding your product selection experience and the choice you made on a 7-point scale. I kindly request you to answer truthfully as your responses are very valuable for my research

Q3: Did you find it difficult to select a TV?

Not at All						Very much
<input type="radio"/>						

Q4: Did you feel confused when it comes to selecting a TV?

Not at All						Very much
<input type="radio"/>						

Q5: Did it take longer than you originally wanted to select a TV?

Not at All						Very much
<input type="radio"/>						

Q6: If you could do it over, how likely would you change your choice?

Not at All						Very much
<input type="radio"/>						

Q7: How much happier would you have been if you had made a different choice?

Not at All						Very much
<input type="radio"/>						

Q8: What is your age?

Q9: What is your gender?

- Male
- Female

Q10: What is the highest level of education you have completed or currently enrolled in?

- Primary school
- Secondary school
- High school/Some college
- Bachelor's degree
- Master's degree