EXPLORING THE RELATIONSHIP BETWEEN MAXIMIZING AND CHOICE SATISFACTION

Master`s Thesis Behavioural Economics

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Abstract

This paper examines the role that cognitive dissonance plays in choice satisfaction for maximizers and satisficers. An argument is developed for maximizers experiencing less dissonance reduction than satisficers due to a reluctance to commit to their choices, which is one of the necessary conditions for dissonance reduction to occur. While strong evidence could be found for maximizers being less committed to their choices, this paper could not find sufficient evidence to support the hypothesis that maximizers experience less dissonance reduction than satisficers, nor could a relationship be found between dissonance reduction and choice satisfaction. The findings should be interpreted carefully, however, as the current methodology applies a downwards pressure on obtaining significance.

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1. Introduction

Making the right decisions is a vital part of leading happy life. Life changing decisions such as, for example, which education to follow and which job to apply for all play a significant role when it comes to your own happiness. In modern times however, it has become harder and harder to make the right decision. The amount of options available when it comes to the products you can buy, the holiday destinations you can go to, and the job positions you can apply for seem to have become endless. Knowing whether you have made the "right" decision is therefore difficult, if not impossible. It is thus rather ironic that in a world of countless opportunities, people seem to have become less happy rather than more happy as the amount of choice options has increased. The nagging doubt of having made the right decision can make it difficult to be satisfied with what you currently have.

Fortunately, research into decision making and happiness is numerous. An influential book by Schwartz (2004) sheds some light on this dilemma. While Schwartz finds that people generally become less satisfied with their decision as the amount of choice options increases, this was not found to be the case for every type of person. Namely, the way in which people make decisions was found to be an important mediator. Here, a distinction is made between two types of decision makers: maximizers and satisficers. Broadly speaking, satisficers make decisions by choosing an option that meets a minimum threshold of acceptability, while maximizers compare all the available choices and aim to choose the best possible option out of all these choices[1]. Essentially, maximizers are thus very picky choosers whereas satisficers are not. However, even though being picky allows you to make objectively better choices, this comes at a price. Research finds that maximizers are generally speaking less satisfied with their choices, are more likely to suffer from depression, and have lower self-esteem than satisficers (Schwartz, 2004).

The way in which we make decisions thus play an important role in our happiness. Knowing how decisions influence happiness is highly relevant for marketeers, whose aim is to maximize customer satisfaction and to stimulate repurchasing behavior by making sure the customer

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[1] The idea that people set different thresholds for satisfactory decisionmaking is not new. In the 1950s, Simon (1955) constructed a model for rational decisionmaking, where *aspiration level (*the threshold for a satisfactory choice) is endogenous, and where individual variance is possible in *persistence* (the length of the information gathering process). The implication is that the rational outcome of the decisionmaking process need not be the "best" solution, but may also be a "good enough" solution. This is an important concept in behavioural economics. Decisionmaking models should function under the assumption that man is limited in knowledge and ability, and therefore the idea of what constitutes a rational decision, given these constraints, is broadened.

ends up with the right product. Therefore, insight into how product choices influence liking of a product, and how this is mediated by personality traits, can grant important insights.

While research to date has explored the many different characteristics of maximizers and satisficers thoroughly, and how these differences relate to choice satisfaction, research into the more immediate processes occurring in the brain that influence choice satisfaction is lacking. One of these processes is called *dissonance reduction.* The process of dissonance reduction is activated when an individual is faced with a difficult choice situation that involves trade-offs. Making a choice in this kind of situation involves rejecting the positive aspects of the unchosen option and accepting the negative aspects of the chosen option, which is inherently uncomfortable and results in a psychological tension during the decision making process named *dissonance.* Research has shown that people mitigate this tension by changing their post-choice evaluations of the choice options: they evaluate the chosen option more favourably whereas they evaluate the unchosen option less favourably. This allows them to maintain a positive self-image seeing as they now have reasons to back up their choice, and therefore it is thought to play an important role in creating choice satisfaction.

The present paper argues that maximizers may not benefit from the process of dissonance reduction as much as satisficers. The argument will be developed for maximizers benefiting less from dissonance reduction due to a reluctance to commit to their choices, which is one of the necessary condition for dissonance reduction to occur in the brain.

To test for the aforementioned differential in dissonance reduction, an experiment based on the free choice paradigm is designed. The experimental design is based on a classical research paradigm in cognitive dissonance first introduced by Brehm (1956), and takes into account methodological concerns expressed by Chen and Risen (2010). During the experiment, participants are given the opportunity to rank different candy bars in order of preference, choose between two candy bars that have similar rankings, and then to re-rank their candy bars. Finally, participants are asked to fill in a questionnaire to determine their maximization tendency. A difference in the spreading of rankings between maximizers and satisficers may indicate a differential in dissonance reduction.

The results of the experiment are as follows. A lower degree of dissonance reduction for maximizers than for satisficers could not be found, nor could a significant relationship be found between the degree of dissonance reduction and satisfaction with one`s choice. However, a significantly lower perception of commitment to choices was found for maximizers, which was a

necessary assumption underlying the main hypothesis. The findings should be interpreted carefully, however, as the current methodology applies a downwards pressure on obtaining significance. Failure to reject the null hypothesis is thus not sufficient evidence to assume there is no effect as the actual effect remains unknown under the current methodology.

The thesis proceeds as follows. Section 2 will develop the hypothesis that maximizers benefit less from dissonance reduction based on the theory and the empirical findings so far, and will provide the theoretical foundation for the methodology of the experiment constructed in section 3. Section 4 provides an overview of the data gathered during the experiment, and section 5 depicts the results. Section 6 elaborates on the experimental shortcomings, provides possible alternative explanations of the results, discusses suggestions for future research, and discusses possible alternative hypotheses when the time dimension is taken into account. Lastly, section 7 ends with a brief conclusion.

2. Literature review

The literature review will proceed as follows. Section 2.1 will provide a brief introduction to the theory of cognitive dissonance. Section 2.2 will mention the necessary conditions for cognitive dissonance to occur, and make a case for maximizers not fulfilling one of these conditions: commitment to choices. Section 2.3 will argument which are the characteristics of maximizers that result in reduced commitment to choices. Section 2.4 will go in depth on the most common methodology to test for cognitive dissonance, and how studies that implemented this methodology suffer from selection bias. Lastly, section 2.5 will propose a correction for this selection bias, based on choice manipulation using asymmetric dominance.

2.1 Cognitive dissonance

When a person holds two or more attitudes that are inconsistent with each other's, an uncomfortable feeling of "dissonance" is experienced (Festinger, 1962; Elliot & Devine, 1994). People tend to unconsciously resolve this dissonance by shifting their attitudes such that they become consistent with each other's. Prior research on cognitive dissonance has mainly focused on attitude shifts in the direction of recent behaviour (Chen & Risen, 2010). When an individual acts in a way that is inconsistent with previously held attitudes, research predicts that attitudes will shift to become consistent with the behaviour.

In this line, Brehm (1956) in his research on the free choice paradigm found that people tend to change their attitudes based on the choices they make. When presented with a difficult choice between two alternatives, respondents were found to improve their evaluation of the chosen alternative and worsen their evaluation of the unchosen alternative. Decision makers have to commit to one of the choice options, while the option that is not chosen is also appealing, which then creates two inconsistent beliefs that are resolved by the earlier mentioned process of dissonance reduction.

Similarly, Cohen (1962) found that students who were offered smaller rewards for writing an essay in favour of the New Haven police, who were subject to some controversies at the time, showed more positive attitudes. This could be explained by dissonance theory in the sense that students that were offered smaller incentives suffered from more dissonance, since they could not use the financial incentive as an explanation for themselves for writing a positive essay

about something they felt negatively towards. The group with low financial incentives therefore needed to resolve two conflicting attitudes, leading to an activation of the process of dissonance reduction, which caused them to adapt more positive beliefs about the New Haven police as a rationalisation for writing the essay.

While the criticism on these earlier studies on cognitive dissonance is numerous (Chen & Risen, 2010; Cooper & Fazio 1984; Izuma & Murayama, 2013), and plausible alternative explanations for these attitude shifts have been offered (Ariely & Norton 2008; Bem, 1972; Tedeschi, Schlenker & Bonoma, 1971), cognitive dissonance theory has not yet been debunked. Cognitive dissonance cannot be ruled out as an explanation because the finding that conflicting attitudes result in a feeling of arousal (dissonance), and that higher arousal results in a bigger attitude change, has been robust (Alos-Ferrer et al., 2012). The alternative explanations do not account for this feeling and how it is mitigated (Cooper & Fazio, 1984). Furthermore, even though earlier studies on cognitive dissonance suffered from methodological flaws that resulted in selection bias, more recent studies using improved methodologies still find an effect, albeit smaller than previously found (Izuma & Murayama, 2013). Therefore, cognitive dissonance, while it may not be the sole explanation for the occurring attitude changes, and its effect size may be smaller than previously thought, still warrants further research using improved methodologies.

2.2 Linking cognitive dissonance to decision satisfaction for maximizers and satisficers

One of the main findings by Schwartz (2004) is that the type of decisionmaker that you are influences your satisfaction with your decisions. More precisely, maximizers, who aim to make the best possible choice, were generally found to be less satisfied with their decisions than satisficers, who make choices based on a threshold of acceptability. Numerous behaviours were found to play a role in said decreased satisfaction, such as upwards social comparison, increased tendency for regret, and actively searching for information on how other alternatives turned out. However, research thus far mostly consists of self-reported, conscious measures of behaviour of maximizers and satisficers. Research that zooms in to the more unconscious pre- and post- decisional processes occurring in the brain that may influence decision satisfaction for maximizers, is scarce.

One of these decisional processes occurring in the brain is the aforementioned process of dissonance reduction. This paper will develop an argument for maximizers and satisficers

experiencing dissonance reduction differently due to their differing psychological states when making decisions. Namely, for the process of dissonance reduction to occur, certain conditions have to be met, and the case will be made for maximizers not fulfilling one of these conditions.

The literature identifies three requirements for dissonance reduction to occur when making decisions (Cummings & Venkatesan, 1976; Korgaonkar & Moschis,1982). The first condition is that the decision needs to be important. This could for instance mean that the decision outcome involves a high amount of costs in terms of time or money, which increases the pressure to make the right decision, thereby increasing dissonance. Secondly, the decision needs to be difficult, meaning that the choice options have to be similarly appealing such that it is difficult to weigh the pros and cons of the different options. Lastly, the choice needs to be irreversible. Dissonance reduction only occurs when people fully commit to their choice.

The case will be made for maximizers experiencing less dissonance reduction due to a lack of commitment to their choices. While maximizers do experience dissonance, characterized as an uncomfortable feeling of arousal when making choices, the process of dissonance *reduction* may not be activated for them. Dissonance reduction only occurs when people fully commit to their choice. As for the other two conditions, choice difficulty and choice importance, experimenters generally have more external control over these, and for the current paper the assumption is made that maximizers and satisficers both fulfil these conditions. For a more elaborate discussion on the fulfilment of the conditions refer to section 6.

The following section elaborates on three characteristics of maximizers identified in the literature that may indicate a lack of commitment to their choices. Namely, maximizers tend to opt out of making a decision at all if there is no option that stands out as the best choice, maximizers tend to engage more in social comparison after making a choice, and lastly, maximizers were found to be more likely to regret their choices.

2.3 Why maximizers are less committed to their choices than satisficers

In modern day society, commitment to one's choices is no longer self-evident. The majority of stores allow you to exchange your purchase, and even if this is not an option, with the emergence of online platforms such as Ebay it is possible to conveniently resell your newly made purchase, or even exchange it. Therefore, commitment to one's decisions is no longer

something that is externally required from you, but has become more of a psychological state of mind. In the remainder of this section, a case will be made for why maximizers are less likely to be psychologically committed to their choice.

Starting off with the first characteristic that could imply a lack of commitment to choices by maximizers, Parker et al. (2007) & Arunachalam et al. (2009) find that maximizers are more likely to avoid making decisions altogether when there is no clear option that stands out as the best choice. This may imply that maximizers decide not to choose at all in order to avoid commitment, seeing as committing to one option writes off the other possible choice options, which could potentially lead to regret.

Another characteristic that may indicate a lack of commitment to choices by maximizers is their engagement in social comparison after making a choice. Maximizers tend to use social comparison as a way to measure whether their choice was indeed the best. As the number of choice options increases, one can never be sure whether the right choice was made since it is not feasible to compare all possible choices options given time constraints. Therefore, maximizers are likely to compare their choices to other people, which they possibly use as an informational cue as to how good their choice was.

Schwartz et al. (2002) supports this thesis in their studies about consumer behaviour. Subjects were asked to recall the purchasing of an expensive and an inexpensive product, and were asked to indicate their degree of social comparison pre- and post- purchasing. A clear correlation was found between tendency for social comparison and maximization while controlling for dispositional happiness. Schwartz goes further in depth to examine this relationship in a second study in the same paper. This time, participants were asked to solve anagrams, and after performing the task, feedback was given as to how they performed compared to peers. It was found that especially maximizers responded strongly to negative social comparison information (being slower than their peers in solving the task). This resulted in significantly more negative affect, and significantly more doubt in their own ability at the task compared to satisficers.

Social comparison may thus indicate a lack of commitment to choices in the sense that it is hard to commit to a choice when continuously comparing one's choice to peers. If a peer comes along that made a better choice, this could influence maximizers' likelihood to stick to their choice, and may increase their tendency to seek out this better alternative.

The last characteristic that may indicate a lack of commitment to choices by maximizers is their tendency to experience more regret after making a decision. Schwartz et al. (2002) developed a maximization and a regret scale, and found that there was a positive correlation between the two scales: people higher on the maximization scale also tended to score higher in regret. These findings are supported by a study in the same paper. In this study, participants were exposed to an ultimatum game, in which a proposer gets to divide a sum of money between himself and a responder. If the responder accepts the offer, the money is divided between the two, whereas if the offer is rejected, both get nothing. Schwartz et al. (2002) adapted the experiment by adding a treatment condition in which the responder's reservation price was going to be revealed afterwards, whereas in the control condition this was not the case. It was found that maximizers divided a smaller sum of money to the responder in the treatment condition, which could be evidence for maximizers aiming to prevent regret in case the proposal would have been much higher than the reservation price.

Tendency for regret is also likely to indicate a lack of commitment to choices. People who have a tendency for regret, are also less likely to commit to something, seeing as commitment can lead to regret. Furthermore, as indicated by Schwartz et al.'s regret scale, regret often leads to behaviours such as wanting to reverse a decision, assessing hypothetical alternative scenarios, and looking for information of how the other alternatives turned out. These are all behaviours that could indicate a lack of commitment to one's choice.

Together, the three characteristics mentioned above are likely to indicate a lack of commitment to choices by maximizers. This thesis is supported by Sparks et al (2012), who developed a scale to measure people's tendency to keep options open, and another scale to measure people's tendency to avoid commitment by retaining the option to reverse the decision. Both of the scales were found to have a positive correlation with the maximization scale. Additionally, Chowdhury et al. (2009) examined the tendency to reverse decisions in an empirical setting and found that maximizers were more likely than satisficers to reverse their decision in a consumer purchasing scenario, if given the option to do so. Lastly, Shiner (2015)'s findings may support the notion that maximizers and satisficers could experience commitment differently, and therefore also differentially benefit from dissonance reduction. Shiner found that maximizers tended to be relatively less satisfied with their decision compared to satisficers if the decision was irreversible.

Taken together, these findings lead to the following hypothesis. The finding that maximizers are less committed to their choices, and the finding that commitment to choices is a prerequisite for

dissonance reduction to occur, may indicate that maximizers benefit less from dissonance reduction than satisficers.

Hypothesis 1: Maximizers benefit less from dissonance reduction than satisficers, indicated by a smaller positive spread in post-choice evaluation as compared to satisficers.

This hypothesis would also be in line with the finding that maximizers are generally less satisfied with their choices (Schwartz et al., 2002). If dissonance reduction results in an increased liking for the chosen option and a decreased liking of the unchosen option, it would then logically follow that people who experience more dissonance reduction would be more satisfied with their choice. Maximizers may thus be less satisfied with their choices because they experience less dissonance reduction. This hypothesis is supported by the findings of Sparks et al. (2012), and will be tested in the context of the current paper as well.

Hypothesis 2: People who experience more dissonance reduction will indicate being more satisfied with their choice.

2.4 The free choice paradigm: correcting for selection bias

To put the hypotheses constructed above to test, the current paper will design an experiment based on a classical research paradigm in cognitive dissonance first introduced by Brehm (1956): the free choice paradigm (FCP). Due to the numerous developments in the methodology for the FCP, the following section will expand on the literature related to this to motivate the design choices for this paper`s experiment.

The FCP was first designed by Brehm (1956) as an experiment to test for cognitive dissonance in the context of decision making. The FCP's methodology is straightforward, and consists of three different stages: evaluation, choosing, and re-evaluation. During the first *evaluation* stage, participants are presented with numerous choice options, such as consumer products or holiday destinations, and they are asked to evaluate these options to reflect their preferences. This can be done by either ranking the options, rating the options, or asking for one`s willingness to pay. Participants then move on to the *choosing* stage, where they are presented with two choice options that they have given (close to) similar rankings. Lastly, after having completed a filler task, they move on to the *re-evaluation* stage where they are asked once again to evaluate their choice options.

If respondents evaluate the option they chose more favourably in the re-evaluation phase and/or evaluate the unchosen option less favourably, this could be evidence for cognitive dissonance occurring. Cognitive dissonance theory predicts that, when people have to make a choice between similarly attractive choice options, this results in an uncomfortable state of mind called dissonance. The mind then engages in the process of dissonance reduction, in which the choice made is being rationalized, by contrasting the positive aspects of the chosen option with the negative aspects of the unchosen option. In the free choice paradigm, this could result in an increased liking for the chosen option and/or a decreased liking for the unchosen option, correspondingly reflected by a better evaluation of the chosen option, and/or a worse evaluation of the unchosen option during the re-evaluation phase. This phenomenon is coined with the term *spreading of alternatives*, seeing as the choice options' evaluations (the alternatives) spread away from each other's during the re-evaluation phase, which could be seen as evidence for the process of dissonance reduction occurring.

This methodology has received a fair amount of criticism since its first implementation (Chen & Risen, 2010; Izuma & Murayama, 2013). Mainly, Chen & Risen argue that the methodology suffers from selection bias. Their argumentation is as follows. Firstly, they argue that evaluations, such as rankings, imperfectly capture preferences. People may rank the same choice options differently in different points in time, everything else held constant. Rankings thus sometimes reveal imperfect information about respondents' preferences. Secondly, they argue that choosing (during the choosing phase), also reveals information about respondents' underlying preferences (they prefer this option over that option). Taken together, this means that after respondents have chosen a certain option, it is possible that they will now more accurately portray their preferences during the re-ranking phase, which then results in a higher re-ranking of the chosen option or a lower re-ranking of the unchosen option. It is therefore a possibility that it is not dissonance reduction that caused the spreading of alternatives, but the mere fact that the respondent preferred this option all along, and that this was imperfectly captured by their rankings during the first ranking phase, and more accurately captured during the re-ranking phase. Thus, by using this methodology, respondents are analysed differently based on the decisions that they make during the choosing phase, causing self-selection to bias the results.

Chen & Risen (2010) propose numerous solutions to correct for this selection bias. The first solution would be to have people choose an option blindly, without knowing which option they choose (Sharot et al., 2010). While this methodology can test for choice induced attitude change, it may not be suitable to test for cognitive dissonance specifically, since the choice options are

never actively compared to one another. The second solution they propose is to ensure that everyone makes the same choice (for example, by having one of the options recommended by an expert). Also this methodology may prevent active comparison of choice options, making it unsuitable to test cognitive dissonance. The third solution consists of having a treatment group that follows the traditional Rank-Choose-Rank methodology, and a control group that follows a different order, namely, Rate-Rate-Choose. In this way, information that is revealed by choices can be controlled for. It allows one to derive to what degree this information causes positive spreading. The issue with this methodology, however, is that it requires the addition of a control group, which may not be ideal if multiple treatments are used and time and cost are a concern.

The last solution they propose does not require the addition of a control group. This solution consists of subtly manipulating respondents to make a certain (randomly assigned) choice. Similar to the second solution, respondents are nudged towards choosing a certain option. The main difference with the second solution being that the manipulation should be subtle enough such that one can safely assume that it does not influence respondents' underlying preferences, and that the option that is manipulated should be randomized. This solves the issue of selection bias, because if respondents are manipulated towards choosing a certain option, it implies that the choice they make is not based on their underlying preferences. Therefore, under the assumption that the choice manipulation is completely effective, choosing does not reveal information about underlying preferences, allowing one to isolate the effect that the simple act of choosing has on post-choice evaluation. Another advantage of this methodology is that it allows for cognitive dissonance to be tested. The manipulation is subtle enough that the respondents are actively comparing choice options, and that the choice remains a *difficult* one, which is a necessary condition for cognitive dissonance to occur.

2.5 Asymmetric dominance as a subtle way to manipulate choices

The current paper develops a variant of the FCP in which asymmetric dominance is employed to nudge participants towards choosing one of the choice options. Asymmetric dominance works as follows; it makes one of the choice options seem more attractive by adding a *decoy option*. In this case, the decoy option is an option that is similar to one of the choice options, but made less attractive than this option so that no rational person would actually choose this option. The decoy option is thus clearly dominated by only one of the choice options, hence the term *asymmetric dominance*. Huber et al. (1982) find that the addition of a decoy option to the choice

set does significantly influence choice. Namely, it increases the likelihood of participants choosing the option that clearly dominates the decoy option, possibly because this choice is now easier to justify, or because this has become the choice option with the most "wins".

Wedell (1991) goes more in depth and examines which characteristics make a decoy option most effective at influencing choice. Specifically, Wedell examines choices that consist of two dimensions, and manipulates these dimensions to determine whether similarity or dominance in the dimensions influences the effectiveness of the decoy. The most effective decoy option was found to be similar in one dimension to one of the choice options, and made less attractive in the other dimension. The decoy option needs to be similar in at least one dimension to one of the choice options because this allows respondents to spot more easily which of the choice options is dominating the decoy option in an absolute sense.

The addition of a decoy option in the free choice paradigm would thus steer people towards one of the choice options, without having any reason to assume that it would change underlying preferences. Applying this methodology would therefore correct for selection bias, something that earlier papers with the same subject as the current paper, such as Sparks et al. (2012), have not done. Hence, the current paper will add to the literature by examining cognitive dissonance in the context of maximizers and satisficers using a methodology that is robust to selection bias.

3. Methodology

The experimental setup of the current paper is based on the free choice paradigm introduced by Brehm (1956), while making use of real incentives. The incentives employed in the current paper consisted of candy bars of the brand *Celebrations*. A box of *Celebrations* consists of a mix of 8 different brands of candy bars, and is a popular treat at birthday parties. Most people are therefore assumed to be familiar with the different kinds of candy bars offered in the Celebrations mix, making it possible to rank the candy bars in order of preference. Only participants familiar with the chocolate candy bars in the *Celebrations* mix were allowed to participate in the experiment, seeing as it would not be possible to ask people to rank items they are unfamiliar with. The incentive structure was designed in such a way that every respondent received candy bars for participating.

For the execution of the experiment pen and paper was used. The procedure was as follows. Students entering the Erasmus University library were asked for their willingness to participate in the experiment, mentioning that based on their decisions they would receive one or more candy bars of preference. Those who agreed to participate were asked to read through the instruction manual of the experiment (Appendix A1), which explains the incentive structure for the different phases of the experiment. The instructions remain slightly ambiguous because no information is given about the second ranking phase (re-ranking) in order to reduce memory effects. If respondents are aware of having to rank their options twice during the experiment they might think it is a memory task and behave differently. However, despite the ambiguity, the instructions make clear that truthful answers maximize the chance of receiving one's candy bar of preference.

After having read the instructions, participants started with the (first) ranking phase of the experiment. They were asked to pick their 6 favourite candy bars from the Celebrations mix, and to order these from most preferred to least preferred on a sheet of paper.

Before moving to the choosing phase, participants were asked to complete an unrelated filler task (Filler task 1, Appendix A3) to prevent memory and consistency effects from influencing the choice that would be presented to them in the choosing phase.

Next, during the choosing phase, participants were presented with the candy bars that they ranked at place 3 and place 4, in addition to a decoy option. The decoy option was constructed

following Wedell (1991), thus keeping one of the two product dimensions similar, and making the other dimension less attractive. In this case, the dimension that remained similar was the *brand* of one of the two choice options, and the dimension that was made less attractive was the *quantity*. This resulted in the following setup: the participant was offered the choice between *two* candy bars of rank 3, *two* candy bars of rank 4, and the decoy option consisted of *one* candy bar of either rank 3 or rank 4, which was randomly determined. Figure 1 below depicts the choice options. Note that the order of choices as displayed to the participant was also randomized.
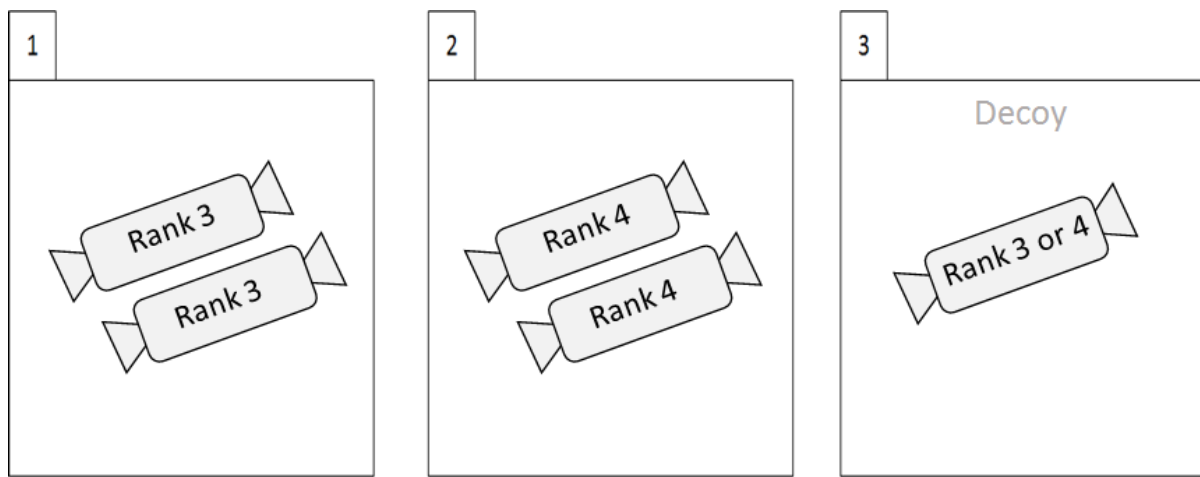
Figure 1: choice options presented to participants during the choosing phase

Before moving on to the Re-ranking phase, participants were once again asked to complete a filler task (Filler task 2, Appendix A3).

After completing the filler task, participants entered the re-ranking phase of the experiment. They were asked to once again rank the 6 candy bars in order of their preference. The experimenter explicitly stated that participants should rank the candy bars as to how they feel right now, and that it is not a memory task.

Finally, participants were asked to complete a survey (see Appendix A4). The survey consists of the 13 questions by Schwartz (2004) to elicit the degree of maximizing, in addition to a few more questions that were used to test the assumptions underlying the hypotheses of this experiment.

For a stepwise summary of the different stages of the experiment please refer to Appendix A6.

3.1 Paying out of incentives

Both the ranking phases and the choosing phase of the experiment were incentivized. Based on the roll of a die, the participant had a chance to win the incentive corresponding to one of the three phases. This incentive structure is based on the Random Lottery Incentive, which should prevent diminishing returns from influencing participants' behaviour. The rules for the incentive structure (based on dice rolls) were presented to the participants on a separate sheet at the end of the experiment (Appendix A2), and works as follows:

Participant rolls 1 or 2: win incentive based on phase 1 (ranking).

Participant rolls 3 or 4: win incentive based on phase 2 (choosing).

Participant rolls 5 or 6: win incentive based on phase 3 (re-ranking).

3.1.1 Incentive structure for phase 1 (ranking) & phase 3 (re-ranking)

The incentive structure for phase 1 (ranking) and phase 3 (re-ranking) is the same, and works as follows. The participant is asked to roll two dice. The lowest number of the two will represent the rank of the candy bar that the participant can win. For example, if the participant rolls 2 and 4, the candy bar that has been ranked place 2 will be won by the participant. Using this methodology, participants are incentivized to accurately portray their preferences, seeing as the better a candy bar is ranked, the higher the chance of winning it. As shown in Appendix A5, participants have an $11/36^{th}$ chance to win the candy bar they ranked on place one, and for each decrease in rank, the probability of winning the corresponding candy bar also decreases.

3.1.2 Incentive structure for phase 2 (choosing)

The incentive structure for phase 2 (choosing) works as follows. The option that the participant has chosen during the choosing phase will be paid out. For example, if the participant chose the two candy bars on rank 3, these will be paid out. Participants thus have an incentive to choose based on their preferences.

4. Data

The current section presents descriptive statistics of the experimental sample. A total of 98 respondents have participated in the experiment, all of them being students in one of the faculties on the Woudestein campus Rotterdam. The majority of the students were between the ages 18 and 25, and there was a more or less an even distribution of males to females. 5 observations have been removed from the data. These were respondents who either chose the decoy option during the choosing stage, or who indicated shifting their preferences to "game" the incentive structure[2].

For the 93 remaining observations, a classification into *maximizers* or *satisficers* was created following Schwartz et al. (2002). Schwartz et al. uses the responses from the maximization questionnaire, and labels respondents as maximizer if their composite score is in the top third of the distribution, and as satisficer if their score is in the bottom third of the distribution. Applying this methodology to the current sample, this results in a group of 30 maximizers with a mean on the Maximization Scale of 5.35 (SD=0.37), and a group of 31 satisficers with a mean of 3.5 (SD=0.44). The median of the full sample is 4.46. These descriptive statistics are rather similar to the sample Schwartz et al. (2002) obtained in study three (M(maximizers)=5.26; M(satisficers)=3.49; Md(full sample)=4.2).

Besides filling in the maximization questionnaire, respondents were asked to answer additional questions to determine their degree of commitment to choices (see questions 5, 6 and 7, Appendix A4). These questions have been designed to test for the hypothesis that maximizers are less committed to their choices than satisficers. For each of these questions, a higher score reflects a lower degree of commitment. Composite scores for the questions were calculated for both maximizers (M=3.93, SD = 1.06) and satisficers (M=2.83, SD = 1.25). A check for internal consistency of the questions returns $\alpha = 0.64$[3].

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[2] Participants who "gamed" the incentive structure verbally indicated during the experiment trying to shift the rankings of their candy bars in order to maximize their chances to win their candy bar of preferences. The experiment has been designed such that truthful answers maximize the chance of winning one's candy bar of preference, and therefore these respondents must have misunderstood the instructions, rendering their responses useless.

[3] Crohnbach's alpha measures the internal consistency of the scale. It is the function of the number of test items and the average inter-correlation of said items. In the context of the current paper, it measures how closely related the three questions are as a group. Generally, a crohnbach's alpha above 0.7 is considered acceptable.

Summary statistics for the spreading of alternatives, defined as a higher re-ranking of the chosen option and/or a lower re-ranking of the unchosen option, can be found in Table 1 below.

	Spreading of alternatives
Maximizers	M=0.43, SD=0.86
Satisficers	M=0.35, SD=1.08
Total	M=0.39, SD= 0.98

Table 1: Spread is calculated according to the following formula: *Spread = R2(chosen) - R2(unchosen) - (R1(chosen) - R1(unchosen))*. Here, R1 is ranking given in the first (pre-choice) ranking phase, and R2 is the rank given in the re-ranking phase (post-choice).

Lastly, the results of the choice manipulation that was used in the experimental design can be found in Table 2. In 56% of the cases the choice manipulation was successful and respondents chose the option that was dominating the decoy. However, rankings seem to have a stronger influence on choice, in 78% of the cases respondents chose the better ranked alternative (rank 3).

	RESPONDENT`S CANDYBAR CHOICE	
DECOY OPTION	**rank 3**	**rank 4**
rank 3	40	8
rank 4	33	12

Table 2: The rank of the decoy option and the choice of the respondent.

5. Results

The results section will proceed as follows. In section 5.1 different tests will be run over the entire sample to determine whether dissonance reduction is present, as would be evidenced by a higher re-ranking of the chosen option and/or a lower re-ranking of the unchosen option. In section 5.2 the main hypothesis, whether maximizers benefit less from dissonance reduction than satisficers, is put to test. In section 5.3 the second hypothesis, whether people who experience more dissonance reduction indicate being more satisfied with their choice, is put to test. Lastly, section 5.4 tests for the three conditions that are necessary for dissonance reduction to occur, and whether they differ between maximizers and satisficers.

Note that mainly t-tests will be employed to test for significance of the results, allowing for easier comparison to results in the existing literature. However, since it is uncertain whether the assumptions underlying the t-tests are met, mainly the assumption of normally distributed data, the non-parametric counterpart of the test will be added to the appendix as an additional robustness check in case any of the t-tests return a significant result.

5.1 Spreading of alternatives

Cognitive dissonance theory predicts that when respondents make a difficult choice, in the FCP this will result in a higher re-ranking of the chosen option and/or a lower re-ranking of the unchosen option, coined as the *spreading of alternatives*. For the current paper a t-test was employed on the entire sample to test for a spreading of alternatives significantly different from zero. It was found that the spreading of alternatives is statistically significant (M=0.39, SD=0.98; t(92)=3.92, p<0.001), however, due to the critique raised by Chen and Risen (2010) this finding cannot be taken at face value because of selection bias. Instead, a robustness check making use of the choice manipulation ingrained in the experimental design would have to be applied. The robustness check works as follows. It does not look at the actual choices that the respondents made, but assumes that the choice manipulation was completely effective (i.e. it treats choices as if respondents always choose the dominating option). Using this methodology, selection bias is no longer an issue because the treatment of choices is now randomly determined according to which option is dominating the decoy.

As evidenced by *Table 2*, however, the choice manipulation was effective in only 56% of the cases, whereas rankings seemed to have a much stronger effect on influencing choice. The data

show that 83% of respondents choose rank 3 when the dominating option is also rank 3, and 73% of respondents choose rank 3 when the dominating option is rank 4. A one-sided test of proportions cannot find a significantly higher chance of choosing rank 3 when this is the dominating option compared to when rank 4 is the dominating option ($z=1.17$, $p>0.10$). There is thus no evidence to suggest that the choice manipulation was significantly effective. Now, if one were to apply the robustness check, and thus treating choices as if the respondent always chooses the dominating option, this would mean that in 46% of the observations the respondent's choice would be imputed. This implies that, if the respondent's actual choice results in a spreading of alternatives, and the choice is treated as if the respondent had chosen the other option, this will consequently result in a negative value for the spreading of alternatives. This negative value then puts a counterweight on the real effect, placing a burden on obtaining significant results. Therefore, an alternative robustness check is proposed based on rankings. Rankings were found to have a stronger influence on choice, since 78% of the respondents chose the candy bar that they ranked on rank 3. If one were to assume as a robustness check that every respondent chooses rank 3, only 22% of respondents' actual choices would be imputed, putting less burden on obtaining significance. Furthermore, it removes selection bias because if the assumption is made that everyone makes the same choice, then everyone is treated the same, thus removing any kind of selection from the methodology.

Applying this robustness check, and thus treating choices as if every respondent chooses the candy bar on rank 3, the spreading of alternatives was found to be statistically insignificant ($M=0.03$, $SD=1.058$; $t(92)=0.29$, $p>0.10$). It is thus not possible to reject the null-hypothesis and conclude that there is a positive spreading of alternatives caused by the process of dissonance reduction. However, applying the robustness check puts a downwards pressure on obtaining significant results as explained in the above paragraph. Therefore, the inability to reject the null hypothesis is not sufficient evidence to suggest there is no effect, seeing as the actual effect remains unknown due to imputing choices.

Another way to look at the data would be to separate the sample by treatment, that is, looking only at respondents where the decoy option was on rank 3, or only looking at respondents where the decoy was on rank 4. Due to the random allocation of the decoy option to either rank 3 or rank 4, separating by treatment does not result in selection bias, and may result in the least amount of choices having to be imputed if the choice manipulation (the treatment) was even slightly effective. More precisely, applying the robustness check and looking only at the sample where respondents had the decoy option on rank 3 will have the least amount of imputed choices, as for this sub-sample 83% of the respondent chooses rank 3, and is thus likely closest

to the actual effect. The results are weakly significant at a 10% level when using imputed choices and only looking at respondents where the decoy option was on rank 3 (M=0.167, SD=0.88; t(48)=1.3, p=0.099). There is thus weak evidence to support that dissonance reduction was present under the current methodology. It is important to note that the weakness of the effect found here will likely also attenuate the effect that can be found for the main hypotheses in the remainder of the results section, since they are based on the idea that dissonance reduction is present.

From here on, results will be reported using both respondents` *actual choices*, and using *imputed choices* (assuming everyone chooses rank 3) as a robustness check. While actual choices may overstate the effect due to selection bias, imputed choices may understate the effect, therefore both measures are informative in a different way.

5.2 Spreading of alternatives in the context of maximizers and satisficers

The main hypothesis (1) predicts that maximizers benefit less from dissonance reduction than satisficers, which would be reflected in a lower spreading of alternatives for maximizers as compared to satisficers. Using a two-sample t-test, this hypothesis could not be confirmed using either actual choices (M=0.39, SD=0.97; t(59)=0.31, p>0.10), or imputed choices (M=0.098, SD=1.04; t(59)=-0.48, p>0.10). There is thus not sufficient evidence to suggest that maximizers benefit less from dissonance reduction than satisficers. Please note, however, that as in section 5.1 there was not sufficient evidence for dissonance reduction in general under the robustness test, this may also attenuate the effect that can be found under the current hypothesis. Despite this, it seems highly unlikely that a significant difference in the predicted direction could be found even in an ideal situation. Looking at *Table 1*, it looks like the effect points in the opposite direction: maximizers have a higher group mean compared to satisficers, albeit insignificantly so. Hence, even though imputing choices puts a downwards pressure on obtaining significance, it seems highly unlikely that significance in the desired direction could be obtained under the current sample, even if the actual effect could be measured.

5.3 The relationship between spreading of alternatives and choice satisfaction

One of the important findings by Schwartz et al. (2002) is that maximizers are generally less satisfied with their choices. While it was not the purpose of the current paper to test the robustness of this finding, it could not be replicated in the context of the current experiment. Applying a two-sample t-test on question 1 (Appendix A4), it was found that maximizers (M=6.23, SD=0.72) are not significantly less satisfied with their choice of candy bar than satisficers (M=6.10, SD=1.3), t(59)=0.5, p>0.10. This could possibly be due to the use of (too) weak incentives and should therefore not be generalized, and will be further discussed in section 6.

The aforementioned finding of Schwartz, however, is of importance for the construction of the main hypothesis that maximizers experience less dissonance reduction than satisficers. If dissonance reduction results in a more positive evaluation of the chosen option and/or a more negative evaluation of the unchosen option, does this imply that more dissonance reduction result in an increased satisfaction with one's choice? And could maximizers experiencing less dissonance reduction explain their lower choice satisfaction (in general)?

A full-sample regression analysis using choice satisfaction as dependent variable and ranking spread as independent variable did not detect a significant relationship between variables, using either actual choices (β=0.0048; SE=0.121; t(92)=0.04; p>0.10) or imputed choices (β=0.093 SE=0.112, t(92)= 0.83, p>0.10). Therefore, hypothesis 2 *[people who experience more dissonance reduction will indicate being more satisfied with their choice]* could not be confirmed. Please note, however, that as in section 5.1 there was not sufficient evidence for dissonance reduction in general under the robustness test, this also attenuates the effect that can be found under the current hypothesis. A failure to reject the null hypothesis therefore is not sufficient evidence of there being no effect. However, due to the very small magnitude of the coefficients under both measures it would seem unlikely that the actual effect would be significant.

5.4 Testing the assumptions underlying the hypotheses

Cognitive dissonance occurs when three conditions are met. The decision needs to be difficult, the decision needs to be important, and people need to commit to their decision. While these conditions can be influenced externally within the design of the experiment, the conditions may be perceived differently internally by each individual. In section 2 the case was made for

maximizers perceiving less commitment to their choices. Using the survey questions employed in the experiment (Appendix A4), this can be put to test, as well as whether the other two conditions are perceived differently between maximizers and satisficers.

5.4.1 Commitment to choices

The first condition that influences the degree of cognitive dissonance experienced is how committed someone is to their choice. The assumption underlying hypothesis 1 is that maximizers are less committed to their choices than satisficers. In the context of this experiment specifically, employing a two-sample t-test on question 2 (Appendix A4) reveals that maximizers were significantly more likely to want the option to reverse their decision (M=2.63, SD=1.94) as compared to satisficers (M=1.8, SD=1.34), t(59)=1.87, p<0.05. This finding was not robust under a non-parametric test, however (Appendix A7.1). This could again be due to the use of (too) weak incentives and should therefore not be generalized

Besides testing for maximizer's commitment in the context of the current experiment, the survey also allows testing for whether maximizers are less committed to choices in general. Using a two-sample t-test on the *commitment index* constructed in section 4 (consisting of the composite of questions 5, 6 and 7, Appendix A4), a significantly lower commitment to choices was found for maximizers (M=3.93, SD=1.06) as compared to satisficers (M=2.83, SD=1.25), t(59) = 3.69, p<0.001. This result was also found to be robust using a non-parametric test (Appendix A7.2). The assumption underlying the construction of hypothesis 1 was thus valid: maximizers perceiving lesser commitment to their choices could be the mediator for a lack of dissonance reduction.

5.4.2 Importance of decision

The second condition that influences the degree of cognitive dissonance experienced is how important the decision is. A two-sample t-test employed on question 4 (Appendix A4) reveals no significant difference when it comes to the importance of the decision between maximizers (M=3.7, SD=1.53) and satisficers (M=3.23, SD=1.54), t(59)=1.2, p>0.10.

5.4.3 Difficulty of choice

The last condition that influences the degree of cognitive dissonance experienced is how difficult the decision is. A two-sample t-test employed on question 3 (Appendix A4) reveals no significant difference when it comes to the difficulty of the decision between maximizers (M=3.3, SD=1.22) and satisficers (M=2.9, SD=1.09), t(59)=1.1, p>0.10. For a more elaborate discussion on the fulfillment of the three conditions refer to section 6.2.

6. Discussion

The discussion section will proceed as follows. Section 6.1 will elaborate on the limitations of the experiment. Section 6.2 discusses the three conditions necessary for cognitive dissonance to occur, and how the design of the current experiment influences these. Section 6.3 discusses alternative explanations for the results, as cognitive dissonance may not be the only theory to explain a spreading of alternatives. Lastly, section 6.4 discusses a possible alternative hypothesis, by distinguishing between the short- and the long-run.

6.1 Experimental shortcomings

6.1.1 The possibility of memory effects influencing the results

The experiment has been designed to take around 10 minutes. With the design of the current experiment, time is being saved by reducing the amount of options that respondents have to rank, and by reducing the length of the filler tasks in between. It is therefore likely that a significant proportion of respondents remembers their prior rankings of the 6 candy bars during the re-ranking phase, while ideally they would re-rank their candy bars intuitively, without relying on their memory. While not possible to completely eliminate memory effects, more memory between ranking phases could decrease the likelihood of spreading of alternatives due to people's desire to be consistent.

6.1.2 Drawbacks of imputing choices

The current methodology is robust to selection bias by treating choices as if everyone makes the same choice. This has two implications. Firstly, it is not possible to calculate the effect size of the spreading of alternatives since the methodology does not take the actual choices into account. Secondly, as argued in section 5.1, imputing choices will act as a counterweight on the actual effect, making it harder to obtain significant results. Hence, while preventing selection bias from influencing the results, it is likely that the current methodology understates the level of significance. Therefore, the methodology can provide evidence for a significant effect if the null hypothesis is rejected. On the other hand, if the null-hypothesis is not rejected, this is not sufficient evidence that there is no effect.

In the case of the current paper the choice manipulation making use of asymmetric dominance was found to be ineffective. While prior research on asymmetric dominance provided evidence to suggest it being a strong enough choice manipulation to include in the current methodology,

this evidence is based on hypothetical incentives. Potentially, asymmetric dominance using real incentives, or in the context of candy bars, is less effective. Future research should reconsider asymmetric dominance as a manipulator of choices, as ineffective choice manipulation may place a high burden on obtaining significant results.

6.1.3 Maximizing is domain specific

According to Schwartz et al. (2002) maximizing is domain specific, meaning that a maximizer may not maximize in every choice domain. They have the capacity to be a satisficer in some domains. It is thus possible that some respondents turn out to be a maximizer according to Schwartz's maximization scale, while not applying their maximization tendencies in the domain of choices between candy bars. Suggestions for future research would be to design control questions that test for this.

6.1.4 Representativeness of the sample

Following the methodology of Schwartz et al. (2002), maximizers have been classified as those being in the top one third quartile of the distribution, and satisficers as those in the bottom one third. It is thus a relative classification, which could mean that those in the bottom one third quartile are not actual satisficers (even though a definition as such does not exist), but maximize to a lesser extent. Despite this criticism, the group means in the current paper's sample are similar to those obtained in Schwartz's study as discussed in section 4. However, both this sample and Schwartz's sample consist of university students, and there could be reason to assume it consists of a higher proportion of maximizers as compared to the general population.

6.1.5 Comprehension of the incentive structure

As mentioned in section 4, certain respondents have been removed from the data due to misunderstanding the incentive structure by trying to "game" it. The purpose of the incentive structure is to reduce variance by providing respondents with an incentive to display their truthful preferences. However, if there were more respondents who misunderstood the incentive structure while not mentioning it, this could result in increased variance in the data instead.

6.2 The three conditions for cognitive dissonance to occur

6.2.1 The decision is important

One of the conditions for cognitive dissonance to occur is that the decision is important. Experimenters have external control over this condition in the form of the incentive that is paid out. It is arguable whether candy bars are a strong enough incentive to make respondents consider it an important decision. Hence, it is possible that the effect observed in the experiment is smaller than it could have been if stronger incentives were used, for both of the hypotheses.

When looking at the perceived importance, how respondents internally assess the importance of the decision (question 4, Appendix A4), the data do not find a significant difference between maximizers and satisficers. However, if the incentive is not strong enough to create an external perception of importance, this may also influence the variation possible for the internal perception of importance.

6.2.2 The decision is difficult

The closer the choice options are to each other in liking, the more difficult the decision. The current experiment presents respondents with the choice between the candy bars they ranked on place 3 and 4. However, due to the nature of ranking, information about the strength of the respondents' preferences is lost. This could be problematic in the sense that a respondent may have a very strong preference of rank 3 over rank 4, and therefore the choice is in fact not difficult, while this is not visible in rankings. While in the aggregate this effect is likely to be diminished, it may still be superior to use ratings over rankings if time and cost are of no concern in the experimental design.

As for the perceived difficulty of the decision (question 3, Appendix A4), the data do not find a significant difference between maximizers and satisficers. However, the difficulty of the decision is likely interlinked with the importance of the decision. A decision is inherently more difficult when choosing between two important, similarly liked alternatives compared to two unimportant, similarly liked alternatives. Suggestions for future research include using stronger incentives to test whether these results still holds, and additionally using unconscious measurements to determine whether maximizers perceive the decision to be more difficult, such as response times (Alos-Ferrer et al., 2012)

6.2.3 Respondents need to commit to their decision

The last condition for cognitive dissonance to occur is that respondents need to commit to their decision. The only control the experimenter has over this condition is by making the decision irreversible. However, one could argue that the type of incentive in the experiment could influence the perceived commitment. While candy bars are consumed at once, goods that last for a longer period of time could possibly be perceived as higher commitment.

As for the perceived commitment to the decision (question 5, 6, 7, Appendix A4), the data do point towards a lower commitment for maximizers as compared to satisficers. Taking the data on all three conditions together, the findings are congruent with the assumptions underlying the main hypothesis. Maximizers only fulfil one of the three conditions to a lesser extent than satisficers. They experience less commitment to their choices, but perceive the importance and difficulty of the decision similarly to satisficers. Whether this holds with stronger incentives should be examined in further research.

6.3 Alternative explanations for choice induced attitude change

While the current experiment has been specifically designed to elicit dissonance during the decision making phase, it should be noted that the process of dissonance reduction is not the only possible explanation for a spreading of alternatives after making a choice. For example, even in experiments where choices are blind, and participants thus never actively compare alternatives, a choice induced attitude change can be found (Egan et al., 2010). Since participants in this experiment do not choose based on their underlying preferences, and do not experience any dissonance, the choice induced attitude change cannot be caused by dissonance reduction, and must be caused by another explanation.

These alternative explanations include, among others, Ariely & Norton (2008) who argue that memory of earlier actions are generally a good guideline for future actions. Therefore, our biology may have evolved a way of shifting preferences towards earlier actions, such that they are more likely to be used in the future. This would mean that actions do not reveal preferences, but shape them. Furthermore, self-perception theory by Bem (1972) suggests that a choice induced attitude change could be explained by the idea that people learn about their own behaviour and attitudes the same way as they would by observing others. A respondent observing himself choose one option over another could use this as a behavioural cue to justify a differential re-ranking of alternatives. Lastly, impression-management theory by Tedeschi, Schlenker & Bonoma (1971) postulates that people will engage in face-saving behaviours in

order to maintain the impression of consistency. This implies that the differential re-ranking of alternatives is caused by respondents wanting to create the impression of consistency with their choice.

Taken together, the multitude of alternative explanations implies that choice induced attitude change may not purely be caused by the process of dissonance reduction, but could be partially explained by any of the other theories since it is not possible to isolate the effect caused by dissonance reduction.

6.4 Adding time to the equation

An important factor that has been overlooked, but may play a role in the relationship between maximizers, satisficers, and cognitive dissonance, is time. If dissonance reduction is the process of rationalising one's choice by contrasting the positive aspects of the chosen option with the negative aspects of the unchosen option, how do these rationalisations hold through time? Might it be possible that these rationalisations result in choice satisfaction in the short run, whereas in the long run the precise considerations for one's choice are forgotten, resulting in decreased choice satisfaction? And how does this play out for maximizers and satisficers?

While the current hypothesis argues for maximizers experiencing less dissonance reduction due to a lack of (psychological) commitment to choices and a general lack of satisfaction with their choices, the addition of the time dimension may allow one to argue for the opposite effect, while still being congruent with the theory and prior empirical findings. What if maximizers do in fact experience (psychological) commitment to their choices, but only in the short run? It may be possible to argue that, right after making a choice, maximizers may feel committed to their choice due to the effort expended of choosing. Then, over time, commitment to their choice may go down because in the long run they get exposed to more alternatives, social comparison sets in, and potential for regret increases as the initial rationalisations for one's choice are slowly forgotten.

Using this reasoning, the hypothesis can be constructed for maximizers experiencing less dissonance reduction in the long-run, while experiencing more in the short run. This can be derived from the three conditions for dissonance reduction to occur. As for the first condition, using the argumentation above, maximizers would now fulfil the condition of commitment to one's choice in the short term. The second condition (the choice is important) will remain unchanged, and for the last condition (the choice is difficult), one could argue that maximizers

more strongly fulfil it. Since maximizers try to make the best possible choice out of all options, and spend more time comparing options, it follows that choosing may also be more difficult for them. Then, as the difficulty of the choice goes up, the tension (dissonance) also goes up, increasing the potential for dissonance reduction. This is backed by Alos-Ferrer et al. (2012) who find that the closer the choice options are to each other's in preference ratings, the higher the spreading of alternatives (dissonance reduction), and the higher the response times. This is likely evidence for the choice being more difficult. Using stronger incentives, and adding response times as a proxy for choice difficulty may shed light on whether maximizers indeed experience the choice as being more difficult.

The long run looks different, however. While in the short-run maximizers may experience more dissonance reduction, according to this new hypothesis the process of dissonance reduction fades away in the long-run. This view makes it possible to reconcile the new hypothesis with the finding that maximizers are generally less satisfied with their choices. If dissonance reduction makes people more satisfied with their choices (Sparks et al., 2012), then the finding that maximizers are less satisfied with their choices still makes sense if dissonance reduction indeed fades out over time. Seeing as research to date on maximizers mostly consists of self-reported measures, which ask respondents to recall their satisfaction with a choice or purchase in the past, it is likely that the finding that maximizers are less satisfied with their choices reflects the long-run. Therefore, adding time to the equation allows for making the case that maximizers experience more dissonance reduction in the short-run, while this effect fades out in the long-run. Even though this case is made weaker by findings of Sharot et al. (2012) who find that choice induced attitude change is pretty consistent over time, it could still be possible that it is different for maximizers and satisficers, as (weakly) supported by Sparks et al. (2012) who find that maximizers show less spreading of alternatives when asked to re-rank their choice options one week after the experiment.

Further research is thus needed to assess the conditions for dissonance reduction to occur and how these behave in the short and the long run. While the current paper could find no difference in choice difficulty and choice importance between maximizers and satisficers, stronger incentives may shift these findings. Furthermore, while evidence was found for maximizers experiencing less commitment to choices, the question on how this condition plays out over time should be further examined.

7. Conclusion

The central focus of this paper was to determine whether maximizers benefit less from dissonance reduction than satisficers. No evidence was found to support this hypothesis. However, the ineffectiveness of the choice manipulation makes the results difficult to interpret seeing as there is a downwards pressure on obtaining significant results. Therefore, the actual effect remains unknown.

Comparing the current findings to a paper that is closely related by Sparks et al. (2012) makes room for additional questions. While the finding that maximizers are less committed to their choices than satisficers was highly significant, and is in line with their prior findings, the finding that a higher spreading of alternatives results in higher choice satisfaction could not be replicated. Additionally, while Sparks et al. (2012) found a significantly higher spreading of alternatives for satisficers, the effect size in the current paper seems to point in the other direction, albeit insignificantly so.

Due to the limitations of the current paper, and the lack of correction for selection bias by the aforementioned authors, there remains a lot to be explored in the domain of satisficers, maximizers, and cognitive dissonance. Future research should consider using stronger incentives, a higher number of choice options, and a revised methodology that is less likely to suffer from the burden of the robustness check applied. Promisingly, the differential fulfilment of the conditions for cognitive dissonance to occur between maximizers and satisficers provide valid starting points for future research.

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APPENDIX A1

Instructions

Welcome to my experiment about decision making. The experiment will take a maximum of 5 to 10 minutes, and based on your choices you will receive candy bars at the end of the experiment. Please read the instructions below carefully.

The experiment will consist of the following stages:

Ranking:
You are asked to rank 6 candy bars in order of preference (rank 1 is most preferred, rank 6 is least preferred).

Choosing:
I will present you with three choices of candy bars. Please choose your favourite option.

At the end of the experiment I will ask you to roll a die. The number you roll will select whether you win a candy bar based on the *choosing* stage or the *ranking* stage. All stages have an equal probability of being selected.

In case the *choosing* stage is selected: you will win the candy bar(s) that you chose in this stage.

In case the *ranking* stage is selected: I will ask you to roll two dice, and the lowest number of the two dice will represent the rank of the candy bar that you will win (x2). For example, if you roll 2 and 4, you will win the candy bar that you ranked on place 2. This means that the better you ranked a certain candy bar, the more chance you have of winning it, so think carefully what your preferences are!

APPENDIX A2

Rolling the die

If you roll 1 or 2, you will win a candy bar based on stage 1 (ranking).
I will ask you to roll two dice, and the lowest number of the two dice will represent the rank of the candy bar that you will win.

If you roll 3 or 4, you will win a candy bar based on stage 2 (choosing).
You win the candy bar(s) that you chose in this stage.

If you roll 5 or 6, you will win a candy bar based on stage 3 (re-ranking).
I will ask you to roll two dice, and the lowest number of the two dice will represent the rank of the candy bar that you will win.

APPENDIX A3

Focus task 1

Please solve the following equation:

$13347 - 8825 =$

Focus task 2

Please put a circle around all the A's in the paragraph below:

Aenean congue odio varius lectus dignissim ullamcorper. In quis nibh sit amet risus semper elementum et vitae magna. Donec quam nisl, pulvinar vel porttitor sit amet, aliquet congue sapien. Curabitur at diam vel quam.

APPENDIX A4

Survey

Please indicate (with an X) the degree to which you agree with the following statements.

1.STRONGLY DISAGREE **2**.DISAGREE **3**.MILDLY DISAGREE **4**.NEUTRAL **5**.MILDLY AGREE **6**.AGREE **7**.STRONGLY AGREE

	1	2	3	4	5	6	7
I am satisfied with the choice of candy bar I made							
I would like to have the option to reverse my decision							
The decision between the three sets of candy bars was difficult for me							
The decision between the three sets of candy bars was important to me							
I am wondering if one of the other candy bars I was offered would have been better than the one I picked.							
Whenever I buy a product, having the option to exchange it at a later time is important to me							
After making a decision, I often tend to change my mind							
Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment.							
No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.							
When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I am relatively satisfied with what I am listening to.							
When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.							
I treat relationships like clothing: I expect to try a lot on before finding the perfect fit.							
I often find it difficult to shop for a gift for a friend.							
Renting videos is really difficult. I'm always struggling to pick the best one.							
When shopping, I have a hard time finding clothing that I really love							
I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.).							
I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just							

right. I often do several drafts of even simple things.							
No matter what I do, I have the highest standards for myself.							39
I never settle for second best.							
I often fantasize about living in ways that are quite different from my actual life.							

APPENDIX A5

All possible outcomes rolling two dices						Probabilities
(1,1)	(2,1)	(3,1)	(4,1)	(5,1)	(6,1)	Probability of 1 being the lowest number: 11/36
(1,2)	(2,2)	(3,2)	(4,2)	(5,2)	(6,2)	Probability of 2 being the lowest number: 9/36
(1,3)	(2,3)	(3,3)	(4,3)	(5,3)	(6,3)	Probability of 3 being the lowest number: 7/36
(1,4)	(2,4)	(3,4)	(4,4)	(5,4)	(6,4)	Probability of 4 being the lowest number: 5/36
(1,5)	(2,5)	(3,5)	(4,5)	(5,5)	(6,5)	Probability of 5 being the lowest number: 3/36
(1,6)	(2,6)	(3,6)	(4,6)	(5,6)	(6,6)	Probability of 6 being the lowest number: 1/36

APPENDIX A6

Blueprint for experiment	
1. Read instructions	Participant reads through instruction manual (*Appendix A1*)
2. Phase I: Ranking	Participant ranks candy bars from 1 to 6 in order of preference
3. Filler task 1	Participant completes filler task 1 (*Appendix A3*)
4. Phase II: Choosing	Participant chooses his favourite candy bar out of the 3 choice options as presented in *figure 1*
5. Filler task 2	Participant completes filler task 2 (*Appendix A3*)
6. Phase III: Re-ranking	Participant once again ranks the candy bars from 1 to 6 in order of preference
7. Fill in survey	Participant fills in survey (*Appendix* A4) to determine maximization score
8. Paying out of incentives	Participant receives candy bars based on the roll of a die, according to the rules indicated in *Appendix A2*

APPENDIX A7

A7.1. Two-sample Mann-Whitney U test using the using question 2 (Appendix A4). Are maximizers more likely to want the option to reverse their choice of candybar?

	Observations	Rank sum	Expected
Maximizers	30	1033	930
Satisficers	31	858	961
Unadjusted variance	4805		
Adjustment for ties	-623.70		
Adjusted variance	4181.70		
P(Z=1.593)	0.1112		

A7.2. Two-sample Mann-Whitney U test using the commitment index. Are maximizers less committed to their choices than satisficers in general?

	Observations	Rank sum	Expected
Maximizers	30	1183.5	930
Satisficers	31	707.5	961
Unadjusted variance	4805		
Adjustment for ties	-24.77		
Adjusted variance	4780		
P(Z=3.667)	0.0002		