Decisions Following Distraction: How (Un)Conscious Processing and Decision Task Influence the Selection of Hedonic and Utilitarian Alternatives

Abstract: Prior literature indicates that hedonic alternatives are preferred under a rejection task, whereas utilitarian attributes are preferred under a choice task when a decision is simple and conscious. However, when the decision is both complex and conscious, there is evidence supporting a preference for hedonic alternatives in a choice task. We propose that the extent to which a decision is preceded by conscious or unconscious information processing may alter the preference for utilitarian versus hedonic options in a choice or rejection task as a function of the complexity being processed. Our findings indicate important qualitative departures from the extant literature when complex decisions are preceded by unconscious processing as a function of the decision task at hand. In the context of complex decisions, we find a preference for utilitarian alternatives in choice tasks and a preference for hedonic alternatives in rejection tasks, but only when information is processed unconsciously.
Keywords: Decision Task; Choice and Rejection; Hedonic; Utilitarian, Unconscious.

Introduction

Jeanne recently accepted a new job and is now searching for an apartment to rent. She would love to live in a building with a beautiful view that is near her work, so she can save time and money on transportation while also being able to experience the restaurants and art scene the location offers. She learns that to achieve her utilitarian ideal (e.g., saving time and money), she would have to lower her ideal hedonic expectations (the view and what the city has to offer) and vice-versa. As she evaluates apartment options, she wonders if she should focus on choosing an alternative or rejecting alternatives until only one option is left to be selected. Should she focus on just a few or as many attributes as possible? She also ponders whether she should create a spreadsheet to rate and compare each apartment's attributes to thoroughly evaluate the apartments or just go out and have a relaxing dinner to take her mind off the decision hoping that the right decision will come to her?

Decisions such as the one in the opening example often involve trade-offs between utilitarian and hedonic alternatives. The use of different decision approaches, choice or rejection, has often led to different outcomes (e.g., Dhar and Wertenbroch 2000; Laran and Wilcox 2011; Sokolova and Krishna 2016). Consumers tend to select utilitarian alternatives in choice tasks, whereas, in rejection tasks, consumers tend to rely on hedonic attributes (Dhar and Wertenbroch 2000). Decision-task research has mainly focused on studying choice and rejection decisions under deliberative thinking in settings with a relatively small number of alternatives and attributes (Laran and Wilcox 201). One notable exception is Sela and Berger (2012), who studied the role of attribute numerosity on choice. Their findings of preference for hedonically-dominated alternatives in complex multiattribute decisions are at odds with the finding of preference for utilitarian alternatives in a choice task. In line with the suggestion by Sokolova and Krishna (2016), who identified a relationship between deliberative thinking and rejection tasks and pointed out the need for a better understanding of the role of unconscious processing in decision tasks, we aim to contribute to this literature by incorporating a stream of research that focuses on the role of unconscious processing and its impact on complex decisions regarding utilitarian versus hedonic alternatives under choice and rejection decision strategies. We make the case that biases such as increased usefulness stemming from attribute numerosity that favor hedonic alternatives can be reversed if such multi-attribute complex decisions can be unconsciously, rather than deliberatively, processed.

Although consumer research tends to agree that distractions during complex decisions are not be beneficial (Chaiken 1980), recent research in psychology indicates that, under some circumstances, distracted consumers – those who allow their brains to work on a decision

unconsciously – might make superior decisions (Dijksterhuis 2004). This research ultimately suggests that consumer decision-making would benefit from a period of distraction (i.e., unconscious processing), as opposed to conscious deliberation (Wilson and Schooler 1991) in complex decision situations, an account that has been labeled Unconscious Thought Theory (UTT; Dijksterhuis 2004). This is expected because the distraction mechanism causes the information to be processed by the unconscious cognitive system, which is predicted to be a more powerful information-processing system than the conscious, short-memory based, system. According to this account, while the working memory focuses on more practical tasks and objectives, the unconscious is able to process the information with greater depth (Dijksterhuis et al. 2006).

In this research, we make the case that complex decision tasks such as the one in the opening apartment scenario are not only likely to be influenced by the decision task (choice vs. rejection) and the nature of the attributes (utilitarian vs. hedonic) but also by whether the information is processed consciously or unconsciously. We add to the decision-task literature by showing that when making a complex decision, a choice task leads to a preference for utilitarian alternatives, whereas a rejection task leads to a preference for hedonic alternatives when the information available for the decision is processed unconsciously. This is expected because unconscious processing leads to a more thorough processing of complex information allowing for a more proper attribute weight assignment, decreasing one's susceptibility to heuristic processing stemming from numerosity effects.

We provide support for the role of unconscious processing in the domain of decision-task and selection of hedonic versus utilitarian alternatives in four. The first study tested the key hypothesis in an apartment rental scenario and showed that how information is processed, consciously versus unconciously, has important implications for selecting hedonic versus utilitarian alternatives as a function of the decision task. The second study examined the role of cognitive load in unconscious processing and ruled conscious processing as an alternative explanation for the results of experiment 1. The third study examined the role of ego depletion on unconscious processing and further provided evidence for the unconscious processing account. The fourth study aimed to replicate the findings from study 1 in a food context with implications for one's own utility where participants received the (indulgent vs. healthy) snack they selected.

Theoretical Background and Conceptual Framework

Individuals may use two basic general approaches when making a decision: choice or rejection. Choice tasks involve selecting from alternatives as opposed to rejection tasks which involve giving up alternatives and they often lead to outcomes with opposite patterns (Dhar and Wertenbroch 2000). Researchers studying choice and rejection decision tasks have also examined the role of such approaches to decision on preference for hedonic and utilitarian attributes. Their findings indicate that, in choice tasks, individuals tend to focus on utilitarian attributes (Dhar and Wertenbroch 2000) whereas, in rejection tasks, individuals tend to place more emphasis on hedonic attributes (Meloy and Russo 2004). Dhar and Wertenbroch (2000) found that the use of a rejection strategy leads to elaboration on hedonic benefits, which, in turn, leads to preference for hedonic alternatives. In contrast to the finding that people prefer a virtuous or utilitarian option when using a choice strategy, Krishnamurthy and Prokopec (2010) found that rejection decisions can lead to more virtuous behavior when people have mental budgets for indulgent decisions, because in rejection tasks people elaborate on reasons to avoid a certain option. Laran and Wilcox (2011) explored these conflicting findings with respect to the relationship between choice/rejection tasks and indulgent behavior and found that preference for indulgent options during a rejection decision (Laran and Wilcox 2011). Put simply, choice tasks were found to encourage elaboration on information that was consistent

with the consumer's preferences whereas rejection tasks encouraged elaboration on information that was inconsistent with the consumer's preferences.

Relevant to this research is the impact of decision tasks on the selection of hedonic versus utilitarian alternatives (Nagpal, Lei, and Khare 2015). In the domain of simpler, conscious decisions, these studies have found that hedonic attributes tend to be favored in rejection tasks, whereas utilitarian attributes tend to be favored in choice tasks. In contrast to the findings reported above, Sela, Berger, and Liu (2009) propose that in the domain of more complex decisions the use of a choice strategy when choosing from larger assortments can lead to an increase in preference for hedonic options. In a follow-up study, Sela and Berger (2012) demonstrated that attribute quantity, which increases the complexity of a decision, asymmetrically benefits hedonic over utilitarian options by increasing the extent to which the former type of attributes appear to be more useful as a result of an attribute-numerosity bias. They observe that by evenly adding hedonic and utilitarian attributes to the choice set, there is a shift in preference for hedonic options, regardless of whether the attributes are hedonic, utilitarian, or mixed in nature. These effects were magnified when individuals engaged in heuristic processing as predicted by the numerosity-bias argument Sela and Berger (2012) put forward.

Prior literature has also examined the relationship between decision tasks and task complexity (Strick et al. 2011; Scheibehenne, Greifeneder, and Todd 2010). However, few have examined the relationship between rejection strategies and task complexity. Prior literature seems to indicate that rejection tasks are complex, deliberative, thought-oriented, and resource-consuming (Sokolova and Krishna 2016), therefore implying conscious deliberation during information processing. The extant literature has shown that increasing attribute quantity increases choice difficulty (Lurie 2004), leading people to "give up" and choose an emotionally gratifying hedonic option. Yet, this account is inconsistent with prior research that suggests that choice difficulty tends to lead consumers to prefer hedonic options to utilitarian ones because the former is easier to justify (Sela, Berger, and Liu 2009). This evidence reveals that the processing capacity of consciousness is limited, which leads us to infer that such a low capacity might not be sufficient for complex decisions (Dijksterhuis 2004) and may lead to heuristic processing and biases as predicted by Sela and Berger (2012).

Alternatively, a growing body of literature supports the idea that individuals facing a greater level of complexity in decision making might benefit from a period of distraction (i.e., unconscious processing), as opposed to conscious deliberation (Wilson and Schooler 1991) and such unconscious processing of information has been proposed to lead to superior choices under deliberation-without-attention (Dijksterhuis 2004). This distraction mechanism results in unconscious processing while the working memory, which relies on conscious processing, focuses on other unrelated tasks at hand. UTT suggests that while the working memory is focused on these distracting tasks, unconscious processing continues to process work on complex information to which the individual was exposed as part of their evaluation of alternatives process (Dijksterhuis et al. 2006). According to UTT, conscious processing has been found to be more effective when considering alternatives that only vary in a small number of attributes. In other words, simpler, more straightforward decision tasks benefit from conscious processing because attention is focused on the task itself and the problem must be fully weighed before a final decision is made (Bargh 2011).

Alternatively, unconscious thought is defined as a more cognitive and/or affective processing that occurs outside of consciousness (Dijksterhuis et al. 2006). UTT argues that an individual's unconscious processing leads to better decisions than conscious thought does because the unconscious is able to better organize information and it more accurately takes into account the weights of the attributes by increasing the likelihood that attention is distributed across a broader array of features (Bargh 2011).

This attentional mechanism may explain some of the benefits of unconscious over conscious thought. In line with this argument, Abadie, Waroquier, and Terrier (2013) reported that unconscious thinking increases the memory for attributes that are more relevant, effective and important at the time of decision than for attributes that are unimportant. Thus, it is plausible to hypothesize that individuals making complex decisions, such as the one in the opening example, would benefit from unconscious processing, whereas those making simple decisions would benefit from conscious processing.

Summary and Predictions

In sum, to the best our knowledge, no research has investigated preference for utilitarian versus hedonic alternatives in complex decisions under varying decision tasks and unconscious processing. Recall that, in contrast with the literature for simple decisions, Sela and Berger (2012) found a pattern of preference for hedonic over utilitarian attributes when individuals use a choice strategy in complex, conscious, decisions. If such a preference for hedonic options occurs as a result of increased perceived usefulness of hedonic alternatives through heuristic processing, more thoroughly processing information should reverse this pattern. Given that UTT predicts that unconscious processing is more powerful than conscious processing, it is plausible to expect the biased weighting of attributes to be reduced, leading to a decrease in preference for hedonic alternatives in complex decisions in a choice task. This pattern of result would lead to a replication of the pattern of results observed when decisions are conscious in simple decision settings.

Studies Overview

We tested these predictions in four studies. In study 1, we demonstrate that the information-processing mode (conscious vs. unconscious) affects the preference for hedonic versus utilitarian alternatives when the complexity of the choice set and decision task vary. When the decision is conscious and involves fewer attributes, we replicate the basic effect from Dhar and Wertenbroch (2000) under conscious processing but not under unconscious processing. However, differently from Sela and Berger (2012), who showed that individuals prefer hedonic alternatives when making complex decisions in a choice task, we show that individuals show greater preference for utilitarian alternatives, but only when the decision is complex and follows unconscious processing. In study 2, we rule out the possibility of conscious processing of information during a distraction task by limiting conscious processing via a cognitive load manipulation and providing process evidence supporting unconscious processing. In study 3, we use an ego-depletion manipulation that is predicted to impair both conscious and unconscious processing to provide further evidence that unconscious processing is the key driver of the predicted effect while identifying a novel boundary condition for the phenomenon studied. In study 4, we demonstrate that the impact of unconscious processing holds in contexts with true consequences for one's own utility in terms of selection of utilitarian and hedonic options by replicating our findings in a realistic setting with actual food choice consequences. Our results provide important insights regarding the differences among choice, rejection, and processing mode in terms of the underlying evaluation processes of utilitarian and hedonic options.

Study 1

Study 1 was designed to test how (un)conscious processing of hedonic and utilitarian attributes affects choice and rejection strategies under different levels of task complexity. We used a modified version of the scenario employed by Dhar and Wertenbroch (2000) and Wang et al. (2015), in which people had to choose (reject) among four apartment alternatives with different hedonic and utilitarian features. In this study, we seek to replicate the results found by

Dhar and Wertenbroch (2000) when a decision is simple and conscious. However, when the decision is simple and unconscious, we do not expect to replicate this pattern as conscious processing should be beneficial for simpler decisions. When the decision becomes more complex (i.e., involving a larger number of attributes) we hypothesize that the basic finding by Sela and Berger (2012) would be reversed under unconscious processing in a choice task.

Participants and Design - A final sample of 398 participants (60% women; M_{age}= 38.96; SD_{age}=12.34), were recruited from Mechanical Turk were randomly assigned to the conditions resulting from a 2 (information complexity: simple vs. complex) x 2 (processing mode: conscious vs. unconscious) x 2 (decision task: choice vs. rejection) full-factorial design.

Procedure and Stimuls - Participants were told they would be presented with four different apartments featuring (A-D) a variety of attributes and asked to form a general impression about the four apartments that were available for lease. In the complex condition, each of the apartments featured three hedonic and three utilitarian attributes of varying valences for a total of six attributes. Apartment B strongly dominated in terms of hedonic attributes, whereas apartment D strongly dominated in terms of utilitarian attributes. In the simple condition, two attributes with the same valence characteristics used in the complex condition. Two apartments were used as fillers to increase the amount of information processed. Participants were randomly assigned to one of the eight experimental conditions. The order of presentation of the four apartments was randomized. For each of the four apartments, attributes were presented one at a time in random order for four seconds each.

After, participants in both processing-mode conditions were told that they would later be asked to make a decision about the apartments. In the conscious-processing condition, participants were told that, prior to that decision, they would have four minutes to write their thoughts about the apartments. In the unconscious-processing condition, participants were answer a memory task. The distraction task designed to trigger unconscious processing was a word-search adapted from Nieuwenstein et al. (2015).

Following this task, in both conditions, participants were told that the filler apartments were no available and that they would have to select one of the two target apartments. In the choice-task (rejection) condition, participants were told that their task was to choose (reject) one of the two apartments. They rated their choice (rejection) using a 7-point trade-off scale ranging from -3 definitely (accept/reject) apartment B to +3 definitely (accept/reject) apartment D. The likelihood was the dependent measure. After, we follow attention checks by Oppenheimer, Meyvis, and Davidenko's (2009) suggestion. Next, as a manipulation check, we requested that participants indicate how difficult the task was on an 11-point scale ranging from "0 - not too much" to "10 - very much." At the end, participants answered questions about demographic variables and were debriefed.

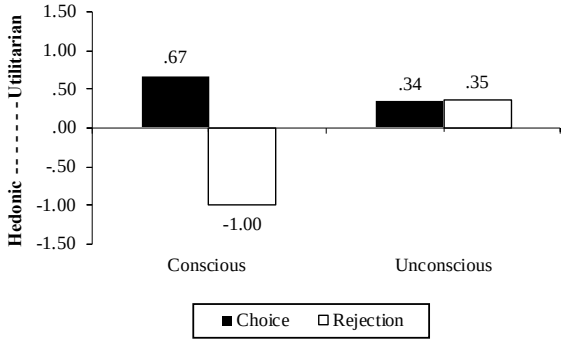
Manipulation Check - An ANOVA on the task difficulty measure showed that the task was perceived as more difficult in the complex condition than in simple condition ($M_{complex}$=4.67, M_{simple}=3.72; $F(1,390)=10.62$, $p< .001$) as a result of the increased number of attributes in the complex condition. Except for a two-way interaction between processing mode and decision task ($F(1,390)=5.35$, $p=.021$), no other main effect or higher-order interactions achieved statistical significance. An inspection of this interaction did not show a statistically significant difference in ratings across decision-task conditions (M_{choice}=4.45; $M_{rejection}$=3.90, $F(1,390)=1.64$, $p=.200$) in the unconscious-condition. In the conscious-processing condition, participants in the choice-task condition judged the task to be more difficult in comparison to their counterparts in the rejection-task condition (M_{choice}=3.78 and $M_{rejection}$=4.61, $F(1,390)=3.96$, $p=.047$).

Apartment Selection Likelihood - An ANOVA on the likelihood to choose (reject) an apartment revealed a statistically significant three-way interaction among the processing-mode, decision task, and the complexity factors ($F(1,390)=11.83$, $p<.001$). There were also

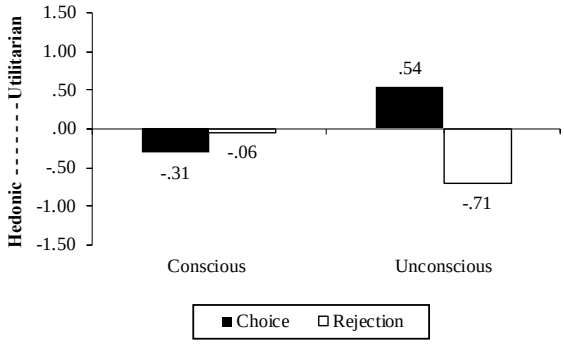
statistically significant processing-mode by decision-task interactions, both in the simple ($F(1,390)=6.51$, $p<.05$) and complex conditions ($F(1,390)=5.34$, $p<.05$). An inspection of the simple main effects of the interaction in the simple-context condition revealed that, in the conscious-processing condition, there was a preference for the apartment that dominated in terms of utilitarian attributes over the apartment that dominated in terms of hedonic attributes (i.e., D>B) whereas the opposite was true in the rejection-task condition ($M_{utilitarian}=.67$, $SD=2.41$; $M_{hedonic}=-1.00$, $SD=2.25$, $F(1,390)=12.19$, $p< .001$). Alternatively, no difference in preference for apartments was observed in the unconscious processing condition across choice and rejection tasks ($M_{choice}=.34$, $SD=2.40$, $M_{rejection}=.35$, $SD = 2.29$ $F(1,390) <1.0$) with a directional preference for the utilitarian apartment, see figure 1, panel A.

Figure 1 – Simple and Complex Context Condition

Panel A – Simple Context



Panel B – Complex Context



An inspection of the interaction between the processing-mode by decision-task factors in the complex-context condition showed no difference across decision-task conditions in the conscious-processing condition ($M_{choice}=-.31$, $SD=2.26$; $M_{rejection}=-.06$, $SD=2.25$; $F(1,390)< 1.0$), with a directional preference for the hedonic apartment. This is expected because, according to UTT, complex information cannot be thoroughly processed by the conscious system. In the unconscious-processing condition, however, there was an increase in the preference for the utilitarian apartment in the choice-task condition (i.e., B>D) relative to the rejection-task condition ($M_{utilitarian}=.54$, $SD=2.17$, $M_{hedonic}=-.71$, $SD=2.29$, $F(1,390)=6.89$, $p<.001$), see fihure 1, panel B.

Discussion

Study 1 showed that decisions about utilitarian-dominated versus hedonic-dominated alternatives vary as a function of processing mode, decision task and decision complexity. In a simple decision context, our results replicate those of Dhar and Wertenbroch (2000) by showing a preference for options that dominate in terms of hedonic attributes when one uses a rejection strategy. Alternatively, in line with Nagpal, Lei and Khare (2015) and Dhar and Wertenbroch (2000), our results show a preference for options that dominate in terms of utilitarian alternatives in a choice task. We also confirm the proposition of UTT that shows that in a simple set, consumers' use of conscious processing results in the selection of the more utilitarian alternative (Dijksterhuis et al. 2006). In contrast with Sela and Berger's (2012) finding that individuals prefer hedonic alternatives when confronted with complex information in a choice task under conscious thought, we demonstrate that, under unconscious thought, consumers in a choice task are more likely to choose utilitarian alternatives. This finding is in line with UTT's prediction that the unconscious can more thoroughly assign weights to attributes, which may decrease susceptibility to biases such as a numerosity bias.

Study 2

The mechanism underlying the UTT is based on the idea that the complex information is being processed within a more powerful unconscious system. It is possible that the distraction task in study 1 still allowed for consciously processing of the attributes during the distraction task even if participants were not explicitly asked to deliberate on the attributes. To rule out this possibility, in study 2, we add a cognitive load task to both test for the underlying mechanism and rule out the potential concern related to the distraction task not preventing deliberative thinking about the apartments. Loading the cognitive system should limit the ability of the short-term memory to process the information about apartment attributes because it should limit the number of elements that can be processed. If our theorizing is correct, and information is processed within the unconscious system under distraction, a cognitive load should not affect the basic finding of study 1.

Design and participants - The final sample included 196 participants (120 women; M_{age}=38.82; SD_{age}=13.06), were recruited from MTurk and were randomly assigned to the conditions resulting from a 2 (cognitive load: low vs. high) x 2 (decision task: choice vs. rejection) between-subjects full factorial design.

Procedure and Stimuli **-** The first task in the experiment involved the cognitive load manipulation. The cognitive load was manipulated through four-by-four matrices with 4 dots presented within 16 possible locations adapted from Hayman et al. (2015). Following the exposure to the apartments and their attributes as in study 1, participants performed the same word-search puzzle used in study 1 in the unconscious condition and rated their likelihood to choose (vs. reject) one of the two apartments as in study 1. Participants then saw a blank matrix and were asked to complete the matrix based on their recall of the position of the dots in it as a check for the cognitive load manipulation. There was no time limit for participants to reproduce the pattern of dots. Participants then performed the same attention checks of study 1.

Manipulation checks **-** An ANOVA on the number of dots correctly placed on the grid showed that the average number of correctly localized dots in the low-cognitive-load condition was statistically significantly higher than in the high-cognitive-load condition (M_{low}=3.95; M_{high}=2.93, $F(1,192)=59.65$, $p<.001$), confirming that the cognitive load manipulation worked as intended. No other main effect or the interaction was statistically significant.

Apartment Selection Likelihood **-** An ANOVA on the apartment selection ratings rendered a non-statistically significant main and interaction effect between the decision strategy and cognitive load factors ($F(1,192)<1.0$). The analysis did reveal a statistically significant effect of the decision strategy ($F(1,192)=6.61$, $p=.011$). In the choice-task condition, there was a preference for the apartment that dominated in terms of utilitarian attributes (i.e., B<D) over the apartment that dominated in terms of hedonic attributes (M_{choice}=.40, SD=1.85) whereas the opposite was true in the rejection-task condition ($M_{rejection}$=-.36, SD=2.34).

Discussion

The results of study 2 replicated those of study 1 in the complex context and unconscious conditions and did not vary as a function of cognitive load. Study 2 shows that even when individuals perform a cognitive load task, they engage in a decision through deliberation-without-attention. If the findings in the unconscious-process condition were to actually result from conscious thinking at the time of judgment, then a different pattern of results should have arisen in the high-cognitive-load condition.

Study 3

Study 3 was designed to further test the process underlying the key phenomenon we investigate. In study 2, we provided evidence that impairing the short-term memory's ability to process information does not affect the ability of the unconscious system to process complex information. It follows that if one can diminish the ability of the unconscious system to process complex information, the effect observed in study 2 should be moderated by diminishing the

magnitude of the difference in preference for utilitarian versus hedonic options. To that end, in study 3, we used an ego-depletion manipulation. An ego-depletion effect occurs when individuals significantly reduce their ability to self-control after performing a fatiguing or frustrating task, influencing their performance on a subsequent task (Muraven, Tice, and Baumeister 1998). Relevant to the goal of this research is the fact that when people are depleted, both conscious and unconscious judgment become be impaired (Baumeister 2014). If this is the case, the effect we find following a distraction task might not arise under ego depletion as a result of the potential impairment of the unconscious system stemming from ego depletion.

Design and Participants – The final sample included 377 participants (57% women; M_{age}=38.03; SD_{age}=12.18) were recruited from MTurk workers, were randomly assigned to the conditions resulting from a 2 (distraction task: ego depletion vs. control) x 2 (decision task: choice vs. rejection) between-subjects design. The design replicated that of study 2 with the ego-depletion factor replacing the cognitive-load factor.

Procedure and Stimuli - Participants were informed that they would perform two unrelated tasks. In the first task, they form an overall impression of four apartments as in the previous studies. In the second task, they were tasked with completing a word-search puzzle that was ostensibly an attention check.

Following apartments task, participants received a word-search puzzle as a memory task. In both conditions, they were told that their data would be deemed invalid if they failed the attention check, and payment would be withheld. In the ego-depletion condition, participants received an unsolvable word-search puzzle which was used to trigger a state of ego depletion. In the control condition, the puzzle was solvable.

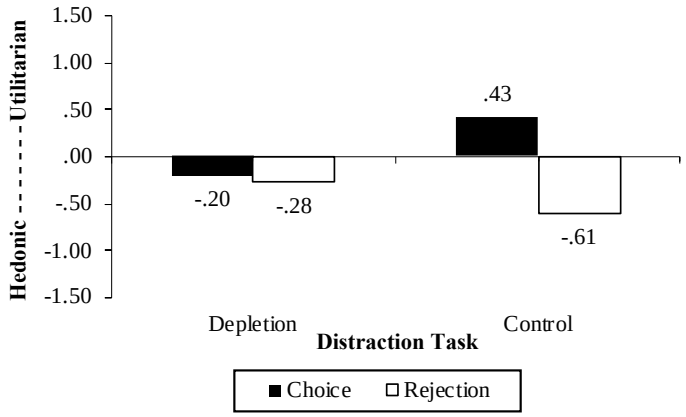
Following the dependent measure, we asked participants to indicate how they felt about the task, using five 7-point scales (easy/hard; enjoyable/boredom; pleasant/unpleasant; enthusiasm/frustration; fun/hard-work), and answer the following questions as an ego-depletion manipulation check "I had to exert control over myself during the task"; and "I strongly had to control myself to inhibit a certain inclination". These items were measured on a 11-point scale (from 0 – "not much" to 10 – "very much") based on Baumeister et al.'s scale (1998). Participants respond to the main apartment question, and perform the same attention check used in studies 1 and 2.

Distraction Task - Participants in the ego-depletion condition (M=3.73; SD=1.52) felt statistically significantly less positive (e.g., bored/frustrated) with the task than their counterparts in the control condition (M=2.70; SD=1.39; t(375)=6.88, p<.001). Participants in the ego-depletion condition spent more time to solve the word-search puzzle (M_{seconds}=419.85, SD=221.32) than those in the control condition (M_{seconds}=300.88, SD=232.88; t(375)=5.08, p<.001). An ANOVA on this composite measure yielded a significant main effect of the distraction task factor (F(1,373)=34.51, p<.001). Participants in the ego-depletion condition were statistically significantly more depleted ($M_{ego\_depletion}$=4.61; SD=2.30) than those in the control condition ($M_{control}$=3.24; SD=2.24). No other main effect or the interaction was statistically significant.

Apartment Selection Likelihood - An ANOVA on the likelihood of choosing/rejecting apartments revealed statistically significant interaction between the distraction task and decision-task factors (F(1,372)=5.44, p<.05), see figure 2. In the control condition, there was a statistically significant simple main effect of the decision-task factor (F(1,373)=12.77, p<.001). Participants in the choice strategy condition (M_{choice}=.43, SD=1.95) preferred apartment D, which dominated in terms of utilitarian features, to apartment B, whereas participants in rejection strategy condition ($M_{rejection}$=-.61, SD=1.90) preferred apartment B, which dominated in terms of hedonic features, to apartment D. In the ego-depletion condition, the simple main effect of the choice strategy factor did not reach statistical significance (M_{choice}=-.20, SD=1.95;

$M_{rejection}$=-.28, SD=2.17, $F(1,373)<1.0$) indicating no preference of an apartment over the other, replicating the finding of the conscious condition in a complex choice in study 1.

Figure 2 - Ego Depletion under Unconscious Processing



Discussion

In study 3, we replicated the results of study 1 in the complex-context condition under unconscious processing without ego depletion but not when ego depletion was activated. Consistent with our proposition that ego depletion impairs unconscious processing, the results were moderated, supporting the unconscious processing argument we put forward.

Study 4

Study 4 was designed to replicate the finding of study 1 in the unconscious and complex decision conditions with real-life implications stemming from the participants' decisions. Specifically, we tested how (un)conscious processing of hedonic and utilitarian attributes of snacks affects product selection depending on whether the task is a choice or rejection task. As in study 1, we used a modified version of the scenario employed by Wang et al. (2015) in a complex set of information in which participants had to choose (reject) among four snack pack options with different levels of healthy (utilitarian) and unhealthy (hedonic) snacks.

Design and Participants

Participants were two hundred and twenty-four students who were recruited from a major university (113 women; M_{age} = 20.35; SD_{age} = 1.98). The design was a 2 (processing mode: conscious vs. unconscious) x 2 (decision task: choice vs. rejection) between-subjects design. Participants were randomly assigned to the experimental conditions.

Procedure and Stimuli

We pretested a sample of 22 snacks to determine their level of healthiness using a sample from the same population as the main study. A final set of 16 was selected based on the average mean healthiness score from the pretest. The eight healthiest and eight least healthy snacks were selected to form the four snack packs (see web-appendix). Different from study 1, in study 4 we used a set of products rather than a set of attributes and increased the number of items in the set from six to eight. Thus, each snack pack contained eight snacks and this increased number of items was used with the goal of increasing the complexity of the condition given the potential familiarity with the items in the set. Participants were told that they would be asked to form a general impression about four different snack packs with eight different snacks each (generically labeled packages A-D). The target snack packs contained either all healthy (i.e., utilitarian) or all unhealthy (i.e., hedonic) snacks. The remaining two packs featured four healthy and four unhealthy snacks. The former two snack packs were the target

stimuli, and the latter two packs were fillers used to increase the amount of information and complexity of the task.

The target healthy snack pack included: almonds, a banana, an apple, cashews, a pear, a granola bar, strawberries, and grapes. The target unhealthy snack pack included: a chocolate bar, a cookie, a croissant, a cupcake, a Danish, fries, fudge, and a muffin. The order of presentation of the packs was randomized, and so were the snacks within each of the packs. Each snack in the pack was presented, one at a time, for four seconds on the computer screen. Participants were asked to form an opinion about four different snack packs with eight snacks in each.

Following the presentation of the snack information, participants were exposed to the processing-mode manipulation. All participants were told that they would later be asked about their opinion about the snack packs. In the conscious-processing condition, participants asked to write about each of the snack packs and that they had four minutes to complete this taks. As in study 1, participants were asked to write at least one hundred characters. In the unconscious-processing condition, participants were told they would have four minutes to complete a memory task (i.e., the word-puzzle used in study 1). In both conditions, a timer was shown with the lapsed time.

Upon completion of the processing-mode task, participants were exposed to the decision-strategy manipulation. First, all participants were informed that they would actually receive one of the snacks from whichever snack pack they selected but that the filler snack packs were no longer available. In the choice condition, participants were asked to choose one snack pack from which they would like to receive a snack at the completion of the study. In the rejection condition, participants were asked to reject the snack pack from which they would not wish to receive a snack at the completion of the study. Binary options were presented with participants selecting between packs A and B. The snack selection binary variable was used as the dependent variable and the selection in the rejection condition was reverse-coded.

Following the selection of a snack pack, we requested that participants indicate how difficult the task was on an 11-point scale anchored on "0 - not difficult at all" on the left and "10 - very difficult" on the right, as a manipulation check for complexity. Again, participants completed demographic information and were debriefed, thanked for their participation, and asked to pick up the snack from the package that they selected. The snacks were a granola bar for the healthy/utilitarian snack package and a chocolate bar for the unhealthy/hedonic snack package. They were labeled as either "Package A" or "Package B" and presented next to each other near the exit of the lab (see appendix for image).

Results

Task Difficulty

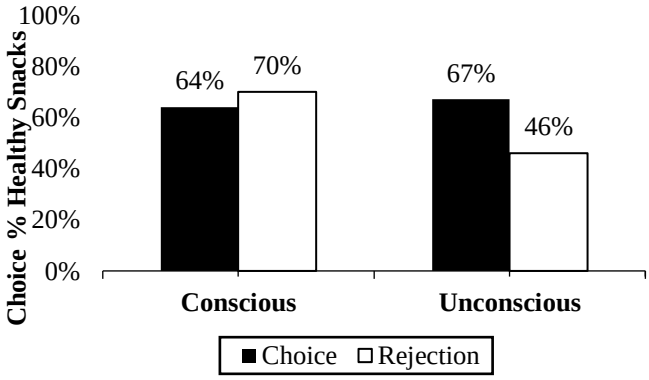
Overall participants reported the task of evaluating the snack packs to be difficult (M = 5.88, SD = 2.43) as measured relative to the midpoint of the scale $t(224) = 5.44$, p <.001). An ANOVA on the perceived difficulty of the task showed that this perception did not vary as a function of decision task ($F(1,116) = .039$, $p = n.s.$), processing mode ($F(1,106) = .002$, $p = n.s.$), or their interaction ($F(1,221) = .13$, $p = n.s.$).

Decision Task

A logistic regression on the selection of snack type (healthier (utilitarian) vs. less healthy (hedonic)) revealed a significant interaction between the processing mode and decision strategy factors (Wald χ^2 (1) = 4.31, $p < .05$, *Cohen's d* = .28). To explore the nature of the interaction, we compared whether there were significant differences across the processing modes in both the rejection and choice-decision-strategy conditions. A simple main effect

analysis showed no statistically significant difference in the proportions of selection of snacks in the conscious-processing across levels of the decision-task factor (M_{choice} = .64, *SD* = .48; $M_{rejection}$ = .70, *SD* = .46, *F*(1,118) = .142 *p = n.s., Cohen's d* = .15). In the unconscious-processing condition, a larger proportion of participants chose the healthy (utilitarian) snack in the choice than in the rejection condition (M_{choice} = .67, *SD* = .47; $M_{rejection}$ = .46, *SD* = .50, *F*(1,105) = 6.67, *p* < .05, *Cohen's d* = .47; figure 3).

Figure 3 – Choice Proportion for Healthy Snacks



Discussion

The findings of this study replicate the findings of study 1 in a complex context for a choice with actual behavioral consequences. We show that the hypothesized effect is robust even with additional information – more snacks in each pack – and our results remain consistent in a different decision context with increased preference for utilitarian alternatives in complex unconscious decisions.

Meta-analysis for Choice and Rejection under Unconscious Processing

To further support the results of our studies, we conducted a random-effect meta-analysis of the main effect across choice and rejection under the unconscious processing across the four studies. We expected that decisions between hedonic and utilitarian alternatives would have different effects on rejection or choice conditions under unconscious processing, as supported by all individual studies. Consistent with our proposition, the meta-analysis revealed a significant difference in the expected effect between the choice and rejection conditions on unconscious processing across all four studies (*Estimate*=.471, *SE*=.080; *CI95%* =[.315, .628], *Z*=5.91, *p*<0.001). In addition, a heterogeneity test (*Qtest*=.997, *p*=.882; I^2=0%) shows that the results are homogeneous and consistent.

General Discussion

Our research investigates how conscious and unconscious processing modes influence decisions when consumers use a rejection or choice task under different levels of decision complexity based on the principles of UTT (Dijksterhuis et al. 2006). Our research builds upon prior literature that has examined hedonic-utilitarian trade-offs involving choice or rejection task (Sokolova and Krishna 2016; Wilcox and Laran 2011; Dhar and Wertenbroch 2000) and the relationship between set sizes and hedonic/utilitarian features (Sela and Berger 2012) by integrating another theoretical approach that considers the efficacy of conscious and unconscious processing modes under varying levels of task complexity (Dijksterhuis et al. 2006). The findings in this research advance marketing literature in several ways, integrating and qualifying previous findings.

Our research responds to previous calls, testing the effect of strategies of choice and rejection on different processing modes (Sokolova and Krishna 2016), different sets sizes (Dhar and Wertenbroch 2000) and possible boundary conditions (Laran and Wilcox 2011; Sokolova and Krishna 2016). We introduce UTT into this field of study and confirm the importance of the concept of unconscious decision making in this area of decision research and marketing.

Our findings provide substantial insights into the differences between choice, rejection and processing mode in terms of underlying evaluation processes. Specifically, we add to the research on choice/rejection strategy and the impact of complexity and decision strategy on consumer behavior. First, we show that the information-processing mode (conscious vs. unconscious) affects consumer decisions. Our findings indicate an unexpected and meaningful change in preference towards utilitarian choices under a rejection task when respondents used unconscious thinking in decisions of lower complexity.

In addition, while Sela and Berger (2012) indicated that consumers prefer hedonic alternatives when confronted with complex sets, we demonstrate that under unconscious thought, consumers using a choice task are more likely to choose utilitarian alternatives. Third, our research indicates an important boundary condition based on the distraction task when consumers employ a choice strategy. When consumers are performing a distraction task that leads to ego depletion, they are likely to prefer hedonic over utilitarian alternatives in a choice strategy condition. These findings have a potentially significant impact on both consumer behavior theory and marketing practice.

Finally, as previously proposed, our findings contribute to the choice and rejection literature by showing that the task type not only changes the weights allocated to attribute options (Laran and Wilcox 2011; Sokolova and Krishna 2016), but we also show how this information is processed (Dijksterhuis 2006) and their possible mechanisms (Manigault, Handley and Whillock 2015; Maranges et al. 2016).

Practical Contribution

Based on the results of our research, we can offer several practical considerations for consumers and marketing managers. For consumers, in a complex context, our findings imply that individuals could benefit by managing their decision strategies according to the number of alternatives and attributes presented and how this information is processed during the decision-making process. For instance, consumers looking for more utilitarian benefits would benefit from using a choice task and also allowing information to be processed unconsciously, making this decision after a period of distraction. In contrast, when individuals are looking for more hedonic benefits, they would benefit from using a rejection task. When consumers process information consciously, the decision tends toward more hedonic alternatives, regardless of the type of decision task used.

Another possible direct implication for consumers involves consumer management of their food consumption. Dieting consumers often use rejection task to make decisions -- eliminating alternatives that they cannot or should not eat. However, rejection task lead consumers to choose unhealthier (hedonic) rather than healthier (utilitarian) alternatives, resulting in decisions that might be inconsistent with their goals. Instead of using a rejection task, dieters could use choice task with an unconscious process. When using choice task, consumers may select healthier (utilitarian) sets.

For marketing managers, we show that companies could benefit from this knowledge through how they present offers. Marketers offering a complex product may be able to assist consumers in making better decisions by distracting consumers before they ultimately make a decision. This work suggests that allowing unconscious thought to occur would benefit the consumer. In addition to allowing for unconscious thought, marketers interested in selling hedonic alternatives might encourage consumers to adopt rejection-based decision strategies and marketers interested in selling utilitarian alternatives may consider encouraging choice-

based decision task. Conversely, if marketers discover which strategy clients use to make their decisions, the marketers can present alternatives more consistent with those decision strategies.

Limitations and Future Work

This research has a number of limitations. The cognitive load manipulation used in the second experiment was comprised of visuospatial dot patterns whereas the decision task description was primarily verbal, just as in Manigault, Handley and Whillock's study (2015). Visuospatial and verbal processing may employ different cognitive resources and therefore the cognitive load manipulation might not have sufficiently interfered with the decision task. However, visuospatial stimuli are preferred in online tasks.

Studies in the literature that attempted to test the principles of UTT have a wide variation in distraction tasks. We have chosen to apply a single type of distraction task in our studies since some studies have identified distraction tasks as a possible moderator (Acker 2008; Nieuwenstein et al. 2015). In order to be able to control this variation between studies, we have used the words-search task as *ceteris paribus* where we could vary the information load and make it unsolvable. Future studies could use the same procedures of this research and apply different types of distraction tasks to confirm these effects found in this research, leading to replications or a new distraction tasks boundary condition.

Future research could examine possible boundary conditions between processing mode and rejection task. We find that depleted individuals using a choice task made similar decisions to individuals using a rejection strategy (Study 3). It could be useful to know if there are conditions under which rejection task has the reverse effect. Future research could also examine if goal-orientation would influence decision task under different processing modes. Another possible avenue of research would be to try to understand how processing mode works or does not work with goal pursuit.

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