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# THE IMPACT OF ASSORTMENT SIZE ON CHOICE SATISFACTION AND CHOICE DEFERRAL, MEDIATED BY TASK COMPLEXITY

## CHOICE OVERLOAD IN ONLINE SHOPPING

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**Author's Declaration**

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**Abstract**

The switch of modern-day markets from offline to online, offers both consumers and companies new tools. Switching to the online markets offers online-retailers the opportunity to offer as many products as they want. However, this might create what is called choice overload among the consumers. It is said that too many options influence the consumers behavior. Previous studies have shown that although a high assortment size could seem lucrative, it could also have a negative effect on the consumer. For example, it might lead to choice dissatisfaction or higher levels of choice deferral. This effect was often analyzed to be stronger when higher levels of task complexity were added. Studies also found that certain moderators can weaken this effect, such as the consumers product expertise. Prior academic research focused on the occurrence of choice-overload in offline environments. This study analyzes this issue by experimenting an online-shopping environment.

To test the occurrence of choice-overload, the mediation effect of task complexity and the moderation of product expertise an online experiment is conducted. The study was conducted among a sample of 326 participants, who were randomly assigned to one of the four combined choice set conditions (High assortment size, Low assortment, High task complexity and low task complexity). However, results obtained from this experiment showed that assortment size didn't affect choice satisfaction or choice deferral. It was found that perceived task complexity was stronger when the assortment size was higher. Moreover, when perceived task complexity was found to be high, choice satisfaction was found to be lower, this is in line with prior research. Besides, the study didn't find any significant evidence for the mediating role of task complexity nor the moderating role of product expertise. The findings of this study provide valuable insights for business strategies. Online marketeers will get a better insight in the effect of assortment size on choice satisfaction and choice deferral, this will eventually help with sales efficiency.

# 1. Introduction

Nowadays real shops have a physical limit on the maximum number of products they can display in store, online shopping platforms have virtually no limit and can easily present thousands of different items (Fasolo et al., 2007). These shops had to make a shift to the online commerce. There is an estimation of 1.92 billion digital buyers and is expected to be growing rapidly in the next few years (Optinmonster, 2020). Unlike real shops online shops have no virtual limit on the number of items or information they can present.
Although presenting a variety of options might seem like an advantage, it can create a problem among online shoppers. This problem is known as "choice overload". Choice overload occurs when the information capacity of a given choice set exceeds the cognitive capacity of the human brain (Simon, 1955; Toffler, 1970). Overload is hard to measure as it is seen as mental construct. However, there are many measurable outcomes of choice overload which were used in prior research, such as deferring the decision to make a choice, also known as "choice deferral" (Haubl and Trifts 2000; Iyengar and Lepper 2000).

Shoppers are known to be attracted by large choice sets. However, it is suggested that an overload of options to choose from sometimes lead to negative outcomes. These outcomes of large assortments include a lack in motivation to make a choice, to commit to a choice, or to make a choice at all (Iyengar, Huberman, and Jiang 2004; Iyengar and Lepper 2000), thus influencing the decision-making process of the consumer. Iyengar & Lepper (2000) found that limiting the number of alternative choices increases the consumers choice satisfaction.

Prior research found that confronting decision makers with more information lead to a less informed choice, this occurs because the lack in cognitive ability to process the relevant information (Scheibehenne et al. 2010; Lee and Lee 2004). In line with the choice overload paradigm, information overload also proposes that decision makers have a finite limit to the amount of information they can process during a decision-making process. Information overload takes place when these limits are exceeded (Malhotra, Jain, and Lagakos 1982). This could eventually result in decision makers being aware of these limitations, which could affect their choice satisfaction or decision to make choice at all, proving overload.

Decision makers are often unable to evaluate all the given options when in a decision-making process, therefore they make use of a two-stage process. In the first stage, decision makers screen a large part of the available alternatives and try to filter the most relevant part of alternatives. Afterwards, the filtered options are evaluated in more depth by comparing relative alternatives based on the most important attributes and eventually make a choice (Haubl & Trifts, 2000). Reutskaja and Hogarth (2009) found that increasing the complexity of the offered options led to a decrease in choice satisfaction. Information overload can have different outcomes on consumers, they can feel overwhelmed and dissatisfied or make them not select an option at all (choice deferral) (Jacoby, Speller, and Berning 1974). In line with this, Greifeneder et al. (2010) found that an increase in assortment size led to a decrease in satisfaction only when the alternatives to choose from were described on many attributes.

Previous research has provided initial evidence that an overload of attributes can be a serious source of information overload. Decision makers who had to choose from choice set described by more attributes, were more likely to feel confused and unsure of their choice than choosing from a choice set described on fewer attributes. (Fasolo et al. 2007; Jacoby et al., 1974). A study conducted by Malhotra (1982) examined information overload when both the number of alternatives and the number of attributes were increased. The study found that the perceived overload was too high when the number of attributes was increased but not when the number of options was increased. Arguably, an abundance of attributes (task complexity) is perceived as more disconcerting than abundance of options (Fasolo et al. 2007).

Task complexity and choice overload are quite mature research areas however, past research on choice overload was often not concerned with the task complexity presented to decision makers (Scheibehenne et al. 2010). Most of the previous studies on choice overload and task complexity were conducted in an offline environment a very small number research tested the online environment (e.g., Nagar and Gandotra, 2016). Online webstores can offer a lot of information due to the infinite virtual capacity, which could cause choice and information overload. Task complexity in decision-making is often defined in terms of the number of options and the number of attributes on which the options are evaluated (Timmermans, 1993). This study will research the mediating effect of task complexity and the moderating effect of product expertise on the relationship of assortment size on choice satisfaction and choice deferral. Prior studies have proved that online decision makers tend to suffer from purchase

anxiety more than offline decision makers (Gehl, 2007). Studies have shown a difference between online and offline decision making, thus this research is focused on the online environment because of its maturity in choice overload and task complexity studies.

***Research question: does an increase in task complexity mediate the relationship between assortment size and choice satisfaction, and does product expertise moderate this relationship?***

This research will get a deeper understanding in how online consumers handle information provided by online retailers. This will eventually help e-business managers build the most efficient and effective marketing strategies to provide online consumers with information (Wu and Lin, 2006; Alba et al., 1997). The main goal of this study is to explore the assortment size and task complexity in the online shopping environment and whether an increase in assortment size and task complexity have any consequences on choice satisfaction and choice deferral. It is essential for online retailers to be aware of the new trends in their market. This research will provide both the consumers and the online retailers with the optimal online shopping experience. In which consumers experience a positive decision-making process without being hindered by the assortment size or the task complexity. This research will also provide online retailers with more depth in whether product expertise moderates the relationship of assortment size on the choice satisfaction and choice deferral.

The methodology chapter of this study consists of two parts. The first part is a theoretical analysis based on relevant articles and literature from previous studies. The second part is the experimental design which consists of a replicated real-life webstore in a survey form. The participants will be asked to make a product choice on a survey designed webstore, which looks identical to a real-life online shop, so the participants can experience a real-life shopping environment. In order to test the hypotheses, there will be a few manipulations added to the experiment. The most important manipulation in this research is the assortment size. This will be manipulated by appointing participants to different assortment size sets. Task complexity will be manipulated by changing the number of attributes per product from low to high, this way participants will experience different task complexity. Furthermore, decision time will be added as a manipulation check for assortment size and task complexity. Afterwards, the participants will be asked to complete a survey in which their choice satisfaction the degree of product expertise will be measured.

## 2.1 Literature review

### Choice overload

In today's market consumers are guaranteed growing number of options to choose from in almost every purchase decision. This wide variety of choices might attract a lot of consumers; however, this overload of choice may also lead to negative effects as proven by different studies (Scheibehenne, Greifeneder & Todd, 2010). Some of the negative effects include a lack in motivation to make choice, to carry out any choice at all and choice dissatisfaction (Scheibehenne, Greifeneder & Todd, 2010; Iyengar, Huberman, and Jiang 2004; Iyengar and Lepper 2000).

Choice overload occurs when the information capacity of a choice set of options exceeds the cognitive capacity of the decision maker (Simon, 1955; Toffler, 1970). Choice overload is not a recent discovery it was first mentioned by the French philosopher Jean Burdian (1300-1358), who discovered in a study where donkeys were exposed to a choice of two equal options, would eventually delay their choice decision. This is also known as the dilemma of "Buridan's ass" (Zupko, 2003). Choice overload has been mentioned in many studies under different names it has been referred to as "The tyranny of choice" (Schwartz, 2000), "over choice effect" (Gourville and Soman, 2005) and often referred to as the "choice overload hypothesis" or "choice overload" (Scheibehenne, Greifeneder & Todd, 2010).

Researchers have regularly argued that negative effects do not always occur when analysing choice overload (Scheibehenne, Greifeneder & Todd, 2010). Studies in favour of the choice overload hypothesis have shown negative results including regret, disappointment (Schwartz, 2000) and choice dissatisfaction (Iyengar and Lepper, 2000). Other studies stated the benefit of offering more choice gives retailer a competitive advantage over retailer who offer less choice (Scheibehenne, Greifeneder & Todd, 2010). Furthermore, offering more choice also benefits the consumers by giving them a variety of options to choose from, which offers them change, new choices, the feeling of guarantee against uncertainty (Ariely and Levav 2000).

## Assortment size

One of the most important managerial decisions for retailers and manufactures is the assortment decision, which has been highlighted by numerous marketing studies (Iyengar, 2008; Levy & Weitz, 2006; Schwartz, 2003). Because of the managerial importance of assortment size, the idea of how this effects the consumer choice has generated large amount of interest among marketing researchers (Scheibehenne, Greifeneder & Todd, 2010; Iyengar, Huberman, and Jiang 2004; Iyengar and Lepper 2000).

Offering the consumer, a large set of options too choose from can cause a two-sided effect on choice. It can be both beneficial and harmful on the consumer's choice (Chernev, 2015). Large assortments with a variety of options to choose from are likely to provide a more difficult choice as the differences between equal options get smaller and the available information about the increases (Fasolo, 2009). Large assortment size makes a thorough comparison between all options seem difficult, because the high time and effort that's used, which could lead to fear of not being able to make the right choice decision (Iyengar, Wells, and Schwartz 2006). Due to the large variety of choice, the attractiveness of the second- best option increases, which lead to wrong thinking and and regret after making a choice (Schwartz, 2000). Large assortments have also been found to enlarge expectations of choosing the optimal option, and if the offered option is all identical, these expectations will be satisfied (Dieh & Poynor, 2010).

Iyengar and Lepper (2000) who made a study on the effect of large assortment sizes on consumers by a series of experiments. The main experiment was conducted by setting up a tasting table at the entrance of a supermarket. The tasting with exotic jams displayed two different assortments a small assortment which consists of six different jams and a large assortment of 24 jams. Consumers at the table received a coupon to purchase the jam of their choice. They found out that a large assortment was more attractive than a small assortment. However, sales wise, only 3% of the consumers in the large assortment purchased the jam, on the other hand in small assortment, 30% of the consumers purchased the jam. This finding was interpreted as a negative impact of a large assortments as it the 24 jams caused a decrease in choice motivation.

Despite its multiple negative effects, large assortments have multiple important benefits. Prior studies have shown that a large assortment can have a positive effect on consumers. The most important benefit of large assortments, featured remarkably in marketing and economic studies, is that the higher the number of options in a choice, the greater that likelihood that consumers can find their optimal choice expectation (Chernev, 2015). Furthermore, it has been proposed that large assortments boost the shopping enjoyment experience (Babin, Darden, & Griffin, 1994) and enhances the consumers' choice satisfaction (Botti & Iyngar, 2004).

Retailers also benefit from offering large assortments. A few studies have found out that retailers who offer large variety of options gained a higher competitive advantage than retailer with a small assortment set (Oppewal and Koelemeijer, 2005). A few research proposed that offering less options did not increase the sales, but lead to a sales decrease (Verhoef, 2006).

## Task complexity

Tasks are a part of our daily live, every activity we execute to carry on with our work or live is considered a task. These tasks have characteristics, which have an impact on our behaviour. To understand how these tasks characteristics can affect us, a few studies have been performed in the field of social and behavioural science. It's a fact that we live with complexity. Even though technological developments are meant to make tasks easier to execute, their impact has made our lives and many tasks more difficult and complicated than before (Rescher, 1998).

It has been found that task complexity has an impact on peoples' behaviour and performance. This topic gained interest in many fields, especially in marketing and psychology literatures. Studies focusing on the decision-making aspect found that complex tasks which demand decision making effects their choice decision (Tversky and Kahneman, 1981). Other researchers also found that task complexity could be interpreted as a rational moderator for the goal-setting effect: when people faced a low-complexity task, the positive effect of goal setting on the task performance was strong, while in a high-complexity task, the positive effect of goal setting on the task performance was weak (Campbell, 1991).

When it comes to increasing the complexity of options offered to consumers by adding more attributes to each product, Reutskaja and Hogarth (2009) found that it leads to a reduction in choice satisfaction. Studies have shown that increasing the amount of information in a choice set leads to negative effects (Scheibehenne, Greifeneder & Todd, 2010). Furthermore, it has been proven that providing decision makers with more information has a negative impact on their choice. Thus, making a less informed choice due to the cognitive limits which prevents them from processing the relevant information to the choice (Lee and Lee 2004).

In order to measure task complexity, we need to consider the number of options, but more importantly the number of attributes and the depth within each attribute. Prior studies on choice overload did not address the amount of information provided to decision makers (Scheibehenne, Greifeneder & Todd, 2010). However, a research conducted by Greifeneder et al. (2010) found that an increase in assortment size didn't influence satisfaction, but when the available options were presented on many attributes' levels, satisfaction decreased.

*H1: An increase in assortment size leads to an in increase on task complexity.*

## Choice satisfaction

Choice satisfaction is considered the main dependent variable of this study. This variable is part of the consumer decision-making process and is affected by many different variables. Choice satisfaction has been defined by numerous studies as the consumer evaluation of the current performance (Gustafsson, Johnson and Roos, 2005). Other studies described it as the consumer experience of the satisfaction level (Kim, Park and Jeong, 2004). Choice satisfaction has been highlighted by many marketers as an essential stimulus of repeat purchase, loyalty of consumers and positive word-of-mouth. Choice satisfaction has gained interest among marketing and consumer behaviour researchers (Bearden,1983). Satisfaction of consumers has been defined by numerous studies as the consumer evaluation of the current performance (Gustafsson, Johnson and Roos, 2005). Other studies described it as the consumer experience of the satisfaction level (Kim, Park and Jeong, 2004). It is also considered to be one of the most important variables which lead towards a competitive business advantage (Hennig-Thurau and Klee, 1997).

To understand consumer satisfaction, it is needed to investigate the factors that impact this phenomenon. According to Turel et al. (2006) the service and products price are the most important measures that determine consumer satisfaction. Russell-Bennett, McCollKennedy and Coote (2007) found that the purchase process of time investment and information seeking also influences the satisfaction level.

According to Kohli et al. (2004) saving online consumers time and money will eventually lead to an increase in satisfaction. Time saving is essential to the overall satisfaction, in an online situation this factor will be affected by variables such as the assortment size and task complexity. However, numerous studies argued about the effect of assortment size on satisfaction, Iyengar and Lepper (2000) found out that an increase in assortment size led to consumer dissatisfaction. In contrast with this study, other studies found out that increasing assortment size leads to an in increase in satisfaction (Chernev, 2003). Accordingly, we can hypothesize that:

*H2: A higher assortment size leads to a decrease in choice satisfaction.*

When it comes to increasing the complexity of options offered to consumers by adding more attributes to each product, Reutskaja and Hogarth (2009) found that it leads to a reduction in choice satisfaction. Studies have shown that increasing the amount of information in a choice set leads to negative effects (Scheibehenne, Greifeneder & Todd, 2010). Furthermore, it has been proven that providing decision makers with more information has a negative impact on their choice. Thus, making a less informed choice due to the cognitive limits which prevents them from processing the relevant information to the choice (Lee and Lee 2004). One can thus formulate the following hypothesis:

*H3: A higher task complexity leads to a decrease in choice satisfaction.*

## Choice deferral

Consumers in a decision-making process have the option to defer their choice in different ways, for example seeking more information or searching for alternatives beyond the presented set (Corbin, 1980). Choice deferral is considered the preference for the no-choice option, which allows decision makers to look for additional information or evaluate different options. Choice deferral has been neglected by previous studies; researchers assumed that decision maker simply chooses the highest utility alternative. The no-choice option was not considered in the choice set (Dhar, 1997)

Scholnick & Wing (1988) indicates that when the choice set is formed of equally likeable and sufficient options, without any clear 'best' alternative, decision makers will start to feel confused which lead to choice avoidance. Choice deferral had been related to the number of options in the choice set (assortment size) (Pilli, 2016). A study conducted by Iyengar & Lepper (2000), carried out in a real supermarket, showed that large assortment leads to lower purchases in comparison to smaller assortments. Moreover, the smaller assortments drew more consumers to consider a trial in comparison to the larger assortment. This proves the effect of assortment size on choice deferral. Another study conducted by Shah & Wolford (2007) also showed the same effect. Participants were asked to evaluate different pen sets, these set sizes were ranging from 2 to 20 pens. After the participants' evaluation, they were given the option to purchase the pens at a discounted price. The option of 'not purchasing' is a form of choice deferral. This option had a curvilinear (inverted U) relation with the pens set size.

Tversky and Shafir (1992) found out that choice deferral increased when choice sets got complex. This indicates that choice overload, as well as task complexity, can lead to an increase

in choice deferral due to the presence of many options and many product attributes in a choice set. Similarly, Dhar (1997a, 1997b) proposes that consumers will choose to defer their choice when the choice environment becomes more complex. Having evaluated the stream of literature one can derive the following hypotheses:

*H4: A higher assortment size leads to higher levels of choice deferral*

*H5: A higher task complexity leads to higher levels of choice deferral.*

## Product expertise

With the developments in the modern-day online markets online consumers have developed more knowledge in different product categories. Due to this development, consumers are likely to be aware of the product's most important features and attributes, this knowledge is known as 'product expertise'. Prior research has found that consumers with higher product expertise are more likely to be satisfied with large assortments and may experience it as an easy task to choose from a large set (Alba and Hutchinson, 1987; Hoeffler and Ariely, 1999).
Scheibehenne et al. (2010) found that product expertise was one of the few important moderators that can be used to reduce the effect of choice overload in order to increase the choice set.

Chernev 2015 found that the effect of a choice set size on overload is a function of consumer expertise and in particular the consumers knowledge of the attributes and features of the choice set. Furthermore, studies have shown that consumers with a low level of product expertise, who had to choose from a large choice set, were more likely to experience choice deferral and weaker preferences for the alternative options. On the other hand, consumers with higher product expertise levels were more likely to defer their choice when choosing from a small choice set, thus proving a reversed effect (Chernev, 2003b; Mogilner et al., 2008; Morrin, Broniarczyk, and Inman, 2012). Accordingly, we can hypothesize that:

*H6: Product expertise moderates the relationship between assortment size and choice satisfaction; when product expertise is high, the effect of assortment size on choice satisfaction is weaker.*

*H7: Product expertise moderates the relationship between assortment size and choice deferral; when product expertise is high, the effect of assortment size on choice deferral is weaker.*

## Hypotheses overview

| Hypothesis | Description |
|---|---|
| H1 | *An increase in assortment size leads to an in increase on task complexity.* |
| H2 | *A higher assortment size leads to a decrease in choice satisfaction.* |
| H3 | *A higher task complexity leads to a decrease in choice satisfaction.* |
| H4 | *A higher assortment size leads to higher levels of choice deferral.* |
| H5 | *A higher task complexity leads to higher levels of choice deferral.* |
| H6 | *Product expertise moderates the relationship between assortment size and choice satisfaction; when product expertise is high, the effect of assortment size on choice satisfaction is weaker.* |
| H7 | *Product expertise moderates the relationship between assortment size and choice deferral; when product expertise is high, the effect of assortment size on choice deferral is weaker.* |

*Table 1: Hypotheses overview*

**Figure 1 – Conceptual framework**

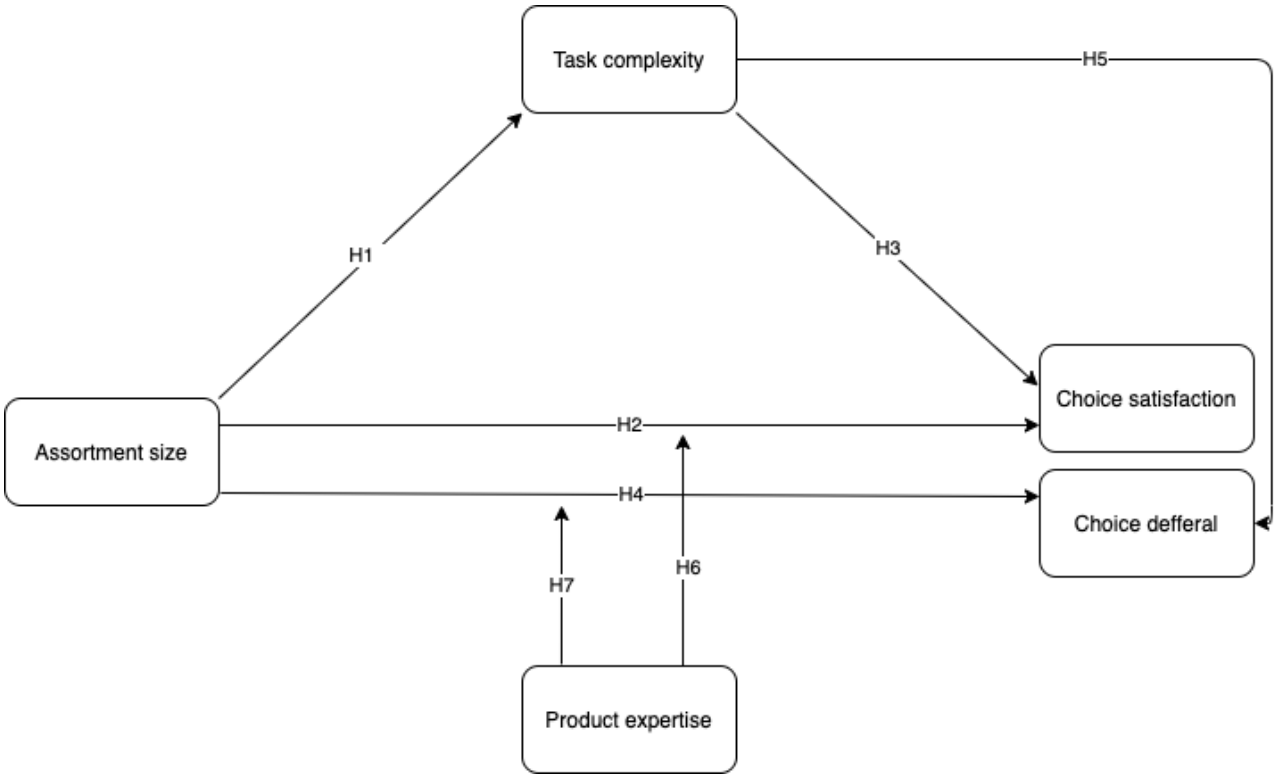


*Figure 1. Research model testing whether Task complexity mediates the relationship between assortment size, choice satisfaction and choice deferral. Furthermore, the moderating effect of product expertise is tested.*

# Methodology

## Research design

Malhorta and Birks (2012) claim that it is important to select an appropriate research design in order to gather the accurate information and to minimize the experimental errors. This research investigates the effect between assortment size, task complexity, product experience, choice satisfaction and choice deferral. This research can be classified as a causal research as it tests a cause effect relationship. In order to test the theoretical framework an online experiment is conducted, as it is reliable, valid and the most appropriate method to test causality (Malhorta and birks, 2012).

The online experiment setting is similar to an online digital camera's store. This looked very much like an actual web shop in order to create a "real" decision-making process. Participants were asked to assume that were going to purchase a digital camera from an online electronic products retailer. Participants were presented to a reproduction of an actual online shop resembling an online electronic retailer. Participants were asked to consider choosing a digital camera to their preference. In order to test choice deferral, they were presented to an option "not choosing/postpone my choice". Afterwards the participants were asked to answer a few survey questions. This was required in order to test their choice satisfaction, product experience and demographics.

In order to test the hypotheses a full factorial 2 X 2 between subject design is used (Table 1). A between subject design is used, as each participant is exposed to a different condition, which lowers the possibility of carry over effects (Field and Hole, 2003). By assigning participants to random conditions, causal inference will be guaranteed (Mutz and Permantle, 2015). This will eventually increase the reliability of the study.

| | | ***Task complexity*** | |
|---|---|---|---|
| | | **High** | **Low** |
| ***Assortment size*** | **High** | Condition 1 | Condition 2 |
| | **Low** | Condition 3 | Condition 4 |

*Table 2: Experimental conditions*

## Variables

### Independent variables

*Assortment size*

Assortment size is the dependent of the study and was manipulated by testing two assortment sizes. In order to test the small assortment size, 6 choices were presented to the participants, this is coherent with the existing studies on choice overload. A study conducted by Miller (1994) has shown that consumers' maximum process capacity is seven products. Moreover, previous studies on choice overload also used a small assortment size set of 6 products and large assortment of 20 products in their experiments (Iyengar and Lepper, 2000; Oppewal and Koelemeijer, 2005; Fasolo et al., 2009). Participants were randomly exposed to either a small assortment size or a large assortment size.

To test the assortment size manipulation, the method of Iyengar et al. (2000) was used. Respondents were asked to rate a 7-point likert scale whether they felt that the assortment size was too little or too much (Table 3). This manipulation check gives an indication whether participants perceived the assortment size as small or large.

| **Variable** | **Question** |
|---|---|
| Assortment size | Please indicate your opinion about the number of products presented on the webpage. |

*Table 3: Measurement assortment size*

*Task complexity*

Task complexity mediates the relationship between assortment size and choice satisfaction. In order to test this variable, the four conditions were considered. The conditions with high task complexity displayed 9 attributes under each product, whilst the low task complexity displayed 4 attributes. These numbers of these attributes are based on the methods used by previous studies (Greifeneder, 2010). In order to choose the right attributes for the conditions, insights from Gourville & Soman, 2005 were applied, which used digital cameras as the product category. Based on this study it was decided which attributes are important for purchasing a digital camera. A complete overview of which attributes were included in which condition, can be found in Figure 2 and 3.

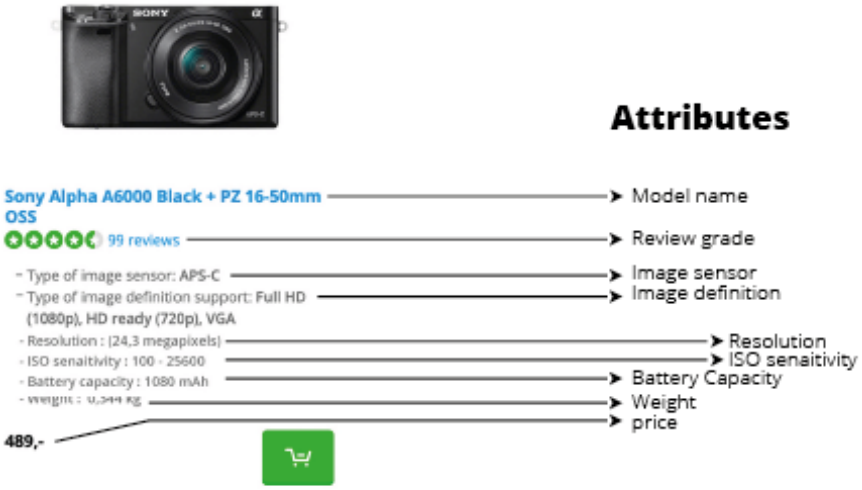


*Figure 2: overview of attributes in a high task complexity condition*


*Figure 3: overview of attributes in a low task complexity condition*

The task complexity variable was measured by adding a manipulation check in which the participant indicated the perceived task complexity. Following the method used by (Scheibehenne, Greifeneder and Kleber, 2010) participants were presented two 9-point likert scale questions. The questions read: ‘‘How complex was it to make a choice?” (1, not at all complex, to 9, very complex), and ‘‘To what extent were you overtaxed by the choice task?” (1, not at all overtaxed, to 9, very overtaxed) (table 4). The objective of this manipulation check is to measure whether participants perceived any task complexity due to the attributes added to the conditions, and whether this influences the choice satisfaction.

| **Variable** | **Question** |
|---|---|
| Task complexity | How complex was it to make a choice? |
| Task complexity | To what extent were you overtaxed by the choice task? |

*Table 4: Measurement task complexity*

## Dependent variables

### *Choice satisfaction*

In order to measure choice satisfaction a two-item scale of Scheibehenne, Greifeneder and Kleber (2010) is used. The participants were presented two questions which measure their level of choice satisfaction (table 5). Each question was measured on a nine-point Likert scale, the

questions read: “How satisfied are you with your choice?” and “How satisfied would you be if you actually received this digital camera?” both questions were scaled from 1, not satisfied at all, to 9, very satisfied.

| Variable | Question |
|---|---|
| Choice satisfaction | How satisfied are you with your choice? |
| Choice satisfaction | How satisfied would you be if you actually received this digital camera? |

*Table 5: Measurement choice satisfaction*

### *Choice deferral*

In order to test choice deferral, the participants were presented with a button stating: ‘I would like to search for other digital cameras or search in a later moment’ This choice was added as an option in all conditions. This method is validated before by Godinho et al (2016).

## Moderators

### *Product expertise*

In order to measure product expertise a six-item scale of Kleiser and mantel (1994) is used. The participants were presented six items which examine their level of product expertise (table 6). Participants were asked to rate a 7-point likert scale from 1, strongly disagree, to 7, strongly agree.

| Variable | Question |
|---|---|
| Product expertise | I enjoy learning about digital cameras. |
| Product expertise | I consider myself knowledgeable on digital cameras. |
| Product expertise | My knowledge of digital cameras helps me understand very technical information about this product. |

| | |
|---|---|
| Product expertise | I can recall almost all existing brands of digital camera from memory. |
| Product expertise | I will search for the latest information on digital cameras before I purchase a brand. |
| Product expertise | I can recall product-specific attributes of digital cameras. |

*Table 6: Measurement product expertise*

## Manipulation checks

### *Decision time*

In order to test the effect of assortment size and task complexity decision time was added as a manipulation check. This variable was measured in seconds by measuring the first and last click. Each respondent was exposed to a different condition in which decision time was measured. To avoid time pressure, the time spent on their decision was hidden and only shown in the results.

## Experimental design

The experiment is conducted in an online setting, by using the Qualtrics software to conduct the online survey experiment. The survey was distributed through friends and family. Also, the Amazon Mechanichal Turk tool was used in order generate a high reach. After clicking on the link, participants can start the experiment. The survey flow starts with an introduction, which includes an appreciation for participating and research background information. Afterwards, the experiment setting is briefly explained. In order to make it as real as possible participants were asked to imagine a real-life situation in which they need to purchase camera for a trip with his/her friend. Before getting to the experiment, participants were asked if they understood the given instructions.

After clicking on “yes, I do understand” participants were shown an assortment set of digital cameras based on the condition they were in. This set looked very similar to a real-life online shopping page. In this step participants are asked to make choice based on the given options. The participants were free to defer their choice or to search for more information by visiting another website as stated in the instructions. Afterwards, participants were asked about their

perceived assortment size and the perceived task complexity. This was added as a manipulation check to test assortment size and task complexity. Next, participants were asked about their satisfaction level with chosen option. In order to test the participants product expertise, participants were asked to fill in a series of questions measuring their expertise. Moreover, participants were asked about their online shopping behavior. Lastly, the participants were asked four demographical questions about their gender, age, education level and nationality. At the end of the survey the attendees were thanked for their participation and effort.

### Data analysis

After acquiring the survey data from 'Qualtrics', the data was imported into IBM SPSS 26 in order to analyze it. In the next step the collected data was cleaned up, outliers were deleted from the data set and new variables were created. To analyze the data several statistical techniques were used. This study applies a significance level of 95% ($p=<0.05$) and marginally significant when p-value is between 0.05 and 0.1.

### Pre-test

Prior to the original experiment, a pre-test is conducted, to check that all variables presented in the model are measured properly based on the above-mentioned measurement scale. Based on the outcomes of the pre-test, the assortment size was increased in order to lower the high levels of choice satisfaction. It was found that assortment size didn't affect choice satisfaction and choice deferral significantly. Therefore, the assortment size was increased to 24 instead of 20 in higher assortment size conditions.

# Results

## Preparing the dataset

The online experiment recorded 374 total responses. In order to prepare the dataset a set of filters was applied to get rid of invalid data. At first, participants with a progress rate less than 100% were removed from the set. These participants didn't answer one or more questions and thus their data is not valid for analysis. Secondly, as expected a few MTurk participants rushed through the questionnaire in order to receive their reward. The data of these respondents is not valid for analysis as they have not exceeded the minimum time limit for this experiment (70 seconds). The survey was expected to be completed within an average of 2 to 3 minutes. However, this is very different as different conditions could take more time to answer. Also having choice deferral as an option does reduce the time if chosen. Next, an attention check was added between a set of Likert scale questions. The check stated "Answer disagree for this question" however, a few participants didn't answer this correctly and thus were removed from the dataset. A further data screening showed no errors in any of the variables. Due to the forced response tool in Qualtrics every question was answered, hence there were no missing data. This led to a final sample size of 326 respondents.

## Descriptive statistics

The 326 respondents were randomly assigned and evenly distributed to one of the four conditions (Hightask_highassortment = 25.2%, Lowtask_Highassortment = 25.2%, Hightask_Lowassortment =24.8% and Lowhtask_Lowassortment =24.8%). The gender of the subjects was split with males forming (59.8%) and females (40.2%). The age of the participants was mostly between 25 to 34 (43.3%) followed by the age category of 35-44 (22.7%). The representation of education in the sample shows that most participants were highly educated, with 74,9% possessing at least a bachelor's degree. Due to the use of the Amazon MTurk platform as the main distribution channel most of the participants were American (53.4%) followed by other (39.9%). It can be said that a big part of the sample is a frequent online shopper as the online shopping frequency is relatively high (M=3.9) and (SD=0.77). The average duration time was around 4 minutes (M=226 seconds), however there was a relatively a high difference between the participants due to the difference in complexity and assortment size of each condition (SD=129 seconds). Product expertise was normally distributed as shown

by the bell-shaped histogram. This shows that the choice of digital cameras as product succeeded for the product expertise distribution (Appendix B).

### Randomization test

The participants of this study were randomly assigned to one of the four conditions. Two of the conditions had 82 participants each, the other two had 81 participants. This number is sufficient according to Simmons et al. (2013) who advised to have at least 50 participants per condition. In order to test the randomization in the study design, a Chi-square test was conducted. The test showed that gender didn't significantly differ across the four conditions ($\chi^2$ =2.036, df=3, $P$=0.565>0.05). Thus, gender was equally distributed among the four conditions (Appendix B).

## Manipulation check

In order to test the manipulation checks an independent sample t-test had been conducted. However, not all the assumptions for this test were met. The Normality test showed that there is no form of normality, thus this assumption was violated. The normality was tested by conducting a Shapirio-Wilk test which shows no form of normality for assortment size and task complexity *(p=0.000<0.05).* Due the assumption violation for an independent t-test, a non-parametric test was conducted instead (Mann Whitney-U) (Appendix D).

### Assortment size

This study consists of two manipulations, first one being assortment size and second being task complexity. In order check if these manipulations were successful different scale questions were added. The manipulation check for assortment size consists of one question measuring the perceived assortment size on a 7-point Likert-scale (1=far too little and 7=far too much).

In order to test the manipulation check, a Mann Whitney-U test was conducted. This test allows to compare the means of two groups and to check whether they are different from one another. The distribution of the mean rank shows that participants who were assigned to high assortment size show a higher mean rank than participants the low assortment condition (*M*-High=212.27, *M*-low=114.13). The results show statistical significance for the mean perceived assortment size between High and low assortments (U=5286.5, *P*=0.00<0.05). Thus, the manipulation of assortment size was successful in the experiment.

Duration time was also added as manipulation check for this study. It was expected that participants in a high assortment setting will spend more time finishing the experiment than participants in low assortment size condition. Therefore, an independent sample test was conducted. This test showed that participant in a high assortment size condition (M=249.4SD=139.3) indeed spent more time than participants in low assortment size condition (M=202.2 SD=113.1). The results show a statistical significance for the difference between both mean ranks *t* (324) =3.352, p=.001<0.05). Thus, the manipulation of assortment size was successful in the experiment.

### Task complexity

Task complexity was measured by two 7-point Liker scale questions. In order to test for the perceived task complexity manipulation a Mann Whitney-U test was conducted. However, this test showed no statical significance difference between the mean ranks of a high task complexity (*M*=161) and a low task complexity (*M*=166) condition (U=12878.5, *P*=0.632>0.05). This manipulation was not successful in the experiment.

Duration time was also added as a manipulation check for task complexity. In order to test for this manipulation an independent sample test was conducted. However, this test showed no statical significance difference between the means of a high task complexity (*M*=235.3, SD= 140.9) and a low task complexity (*M*=216.6 SD= 115.4) condition (324) =1.305, p=.193>0.05). This manipulation was not successful in the experiment.

## Reliability

In order to include the 'product expertise' and 'perceived task complexity' scales into the analysis, these two variables had to be recoded. This was performed by conducting a reliability analysis. The reliability of these two variables scales was tested by examining the Cronbach's alpha. (Malhorta & Birks, 2005) stated that the Cronbach's alpha varies between 0 and 1 and a value of 0.6 or less indicates insufficient internal consistency reliability. The product expertise scale consisting of 6 different items measured a high reliability with a Cronbach's alpha of ($\alpha$ = 0.871). The Cronbach's alpha for 'Perceived task complexity' showed also a sufficient reliability ($\alpha$ = 0.747). This suggests an acceptable internal consistency for both scales, thus both scales were recoded into one variable each. (Appendix E)

## Factor analysis

The measurements scales of this study were based on scales used in previous studies and were reported to have internal consistency. However, using a different sample and adapting these scales to this study could affect the expected validity. In order to measure the validity of the constructs a factor analysis was conducted. At first, it was tested whether the factor analysis was appropriate, which was done by conducting a Bartletts test of sphericity and a Kaiser-Meyer-Olkin test. In order for the factor analysis to be appropriate the Bartletts Test of sphericity has to be significant, which was the case ($P$=0.000<0.05). The Kaiser-Meyer-Olkin test has to be higher than 0.7, which was also the case (KMO=0.804>0.07). This suggests that the factor analysis can be considered appropriate. Furthermore, the communalities are expected to be higher that 0.3 in order to be appropriate. All communalities were higher than 0.3 (Appendix F)**.**

## Hypothesis tests

To evaluate the effects on choice satisfaction and choice deferral, regression models were examined. This is done with help of the regression path analysis "PROCESS", invented by Andrew F. Hayes (2012). With Hayes' PROCESS plugin for SPSS, mediating and moderating effects can be easily found for outcomes, this is very applicable to this study as it uses both mediations and moderations. Hayes Process offers different types of models in order to test mediations and moderations. For this study, Model 4 is used, which is a simple mediation analysis. This model tests the mediating effect of task complexity on the relationship between assortment size, choice satisfaction and choice deferral. Model 1 is also used, which is a simple moderation. This model tests the moderating effect of product expertise on the relationship between assortment size, choice satisfaction and choice deferral.

### Choice satisfaction

Prior to conducting this analysis, a few assumptions had to be tested in order to determine that this data supported the required assumptions for this test. At first, the error terms should be independent. This assumption is met as this study uses a between-subject design with independent samples. Secondly, there must be no multicollinearity problems between the predictor variables. By testing the multicollinearity, it was also concluded that this assumption

is met as all the predictor variables had VIF values greater than 10. Lastly, the linearity of this model is tested. This assumption is also met as the mediation variable 'task complexity' is found to have a linear relationship with choice satisfaction (deviation from linearity *p=0.303>p=0.05)*. Accordingly, conducting the analysis is appropriate. (Appendix G).

**Task complexity mediation effect**

**H1, H2 and H3**

H1: an increase in assortment size leads to an in increase on task complexity.

Based on the outcomes of the model an overall significant regression model is found *(F* (1, 324) = 26.616, *P*=0.000 < .05, $R^2$ = .076). Accordingly, a positive significant effect of assortment size on task complexity was observed (*b* = .827, *t* (324) = 5.159, *p* = .000<0.05). This indicates that assortment size is a significant predictor of task complexity. Therefore, H1 is not rejected, when exposed to a higher assortment size condition, perceived task complexity increases by 0.827. The effects are visualized in figure 4.

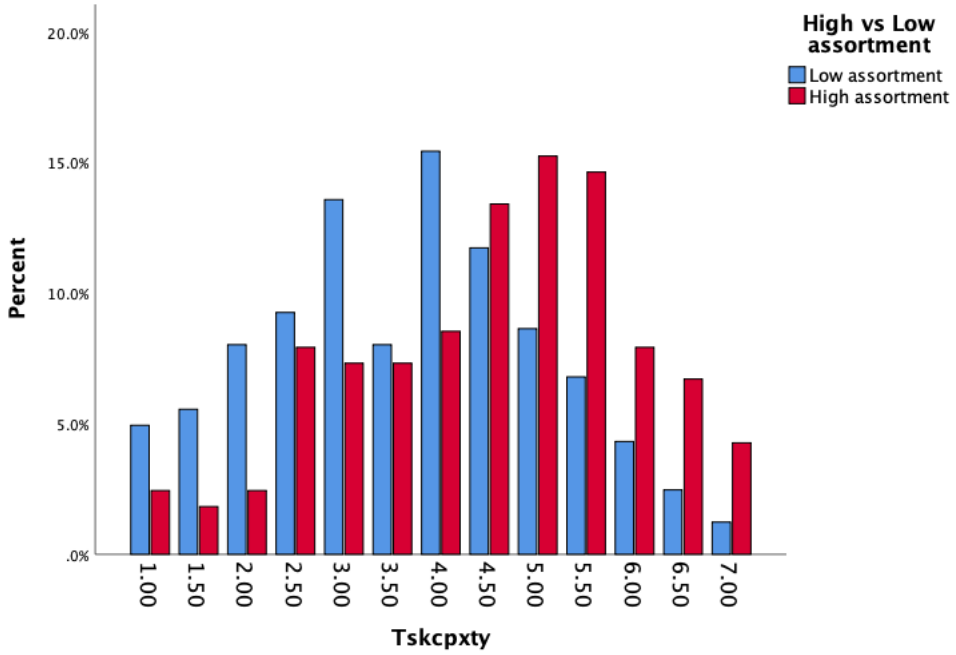


*Figure 4: interaction of assortment size x task complexity*

H2: Main effect of assortment size on choice satisfaction

Based on the outcomes of the model an overall nonsignificant regression model is found *(F* (1, 324) = 0.757, *P*=0.385 > .05, $R^2$ = .0023). Accordingly, the effect of assortment size on choice satisfaction was also not significant (*b* = .114, *t* (324) = .87, *p* = .385>0.05). This indicates that assortment size is a not a significant predictor of choice satisfaction. Therefore, H2 is rejected, when exposed to a higher assortment size condition, choice satisfaction does not decrease significantly. The effects are visualized in figure 5.

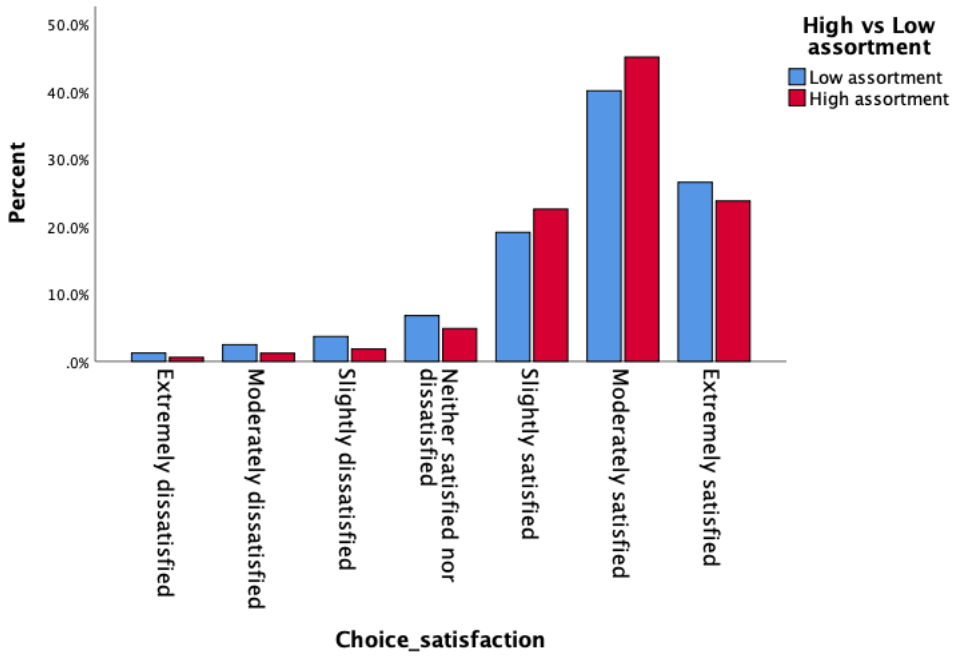


*Figure 5: interaction of assortment size x choice satisfaction*

H3: the effect task complexity on choice satisfaction

In order to test mediation, it must be split into three different paths. Based on the outcomes of the model the first path H1 (assortment size as a predictor for task complexity) indicated a positive and significant effect (*b* = .827, *p* = .000<0.05). The second path (main effect of assortment size on choice satisfaction) indicated a positive and nonsignificant path (*b* = .114, *p* = .385<0.05).

The third path which tests the effect of task complexity on choice satisfaction indicated the following results. Based on the outcomes of the model an overall nonsignificant regression model is found *(F* (2, 323) = 2.045, *P*=0.1311 < .05, $R^2$ = .0125). However, the effect of task complexity on choice satisfaction was negative and *marginally* significant (*b* =-.0842, *t* (323)

= -1.824, $p$ = .069<0.1). This indicates that task complexity is a significant predictor of choice satisfaction. Therefore, H3 is not rejected.

In order to test the mediation, the main effect is compared to both situations (with mediation and without mediation. The total effect without mediation was already tested and indicated a positive nonsignificant effect ($b$ = .114, $p$ = .385<0.05). Based on the results of the model adding the mediation to the test does not lessen the total effect. However, this effect turned out to be positive but not significant ($b$ = .1820, $p$ = .181<0.05). To determine whether there is a form of mediation the difference between these two paths must be significantly different. The indirect effect was tested using non-parametric bootstrapping at a confidence interval of 95%. By comparing both paths it is shown that the difference between both paths does cross (0) (BOOTLLCI= -.1559, BOOTULCI=.0067). This implies that there is no difference between both paths, thus there is no form of mediation. The effect of assortment size on choice satisfaction was not mediated by task complexity. (Appendix H).

**Choice deferral**

**H4 and H5**

Prior to conducting this analysis, a few assumptions had to be tested in order to determine that this data supported the required assumptions for this test. At first, the error terms should be independent. This assumption is met as this study uses a between-subject design with independent samples. Secondly, there must be no multicollinearity problems between the predictor variables. By testing the multicollinearity, it was also concluded that this assumption is met as all the predictor variables had VIF values greater than 10. Lastly, the linearity of this model is tested. This assumption is also met as the mediation variable 'task complexity' is found to have a linear relationship with choice deferral (deviation from linearity *p=0.533>p=0.05)*. Accordingly, conducting the analysis is appropriate (Appendix G).

H4: Main effect of assortment size on choice deferral

Based on the outcomes of the single logistic regression model the effect of assortment size on choice deferral was significant (*b* = -1.145, *t* (324), s.e.=0.406, *p* = .005<0.05). This indicates that assortment size is a negative significant predictor of choice deferral. Although this effect is significant, the hypothesis is having to be rejected. The reason behind this is that the effect of assortment size effects choice deferral negatively, meaning that a higher assortment size leads to lower levels of choice deferral. The hypothesis however states "*a higher assortment size leads to higher levels of choice deferral.",* thus H4 is rejected. The effect is visualized in figure 6.

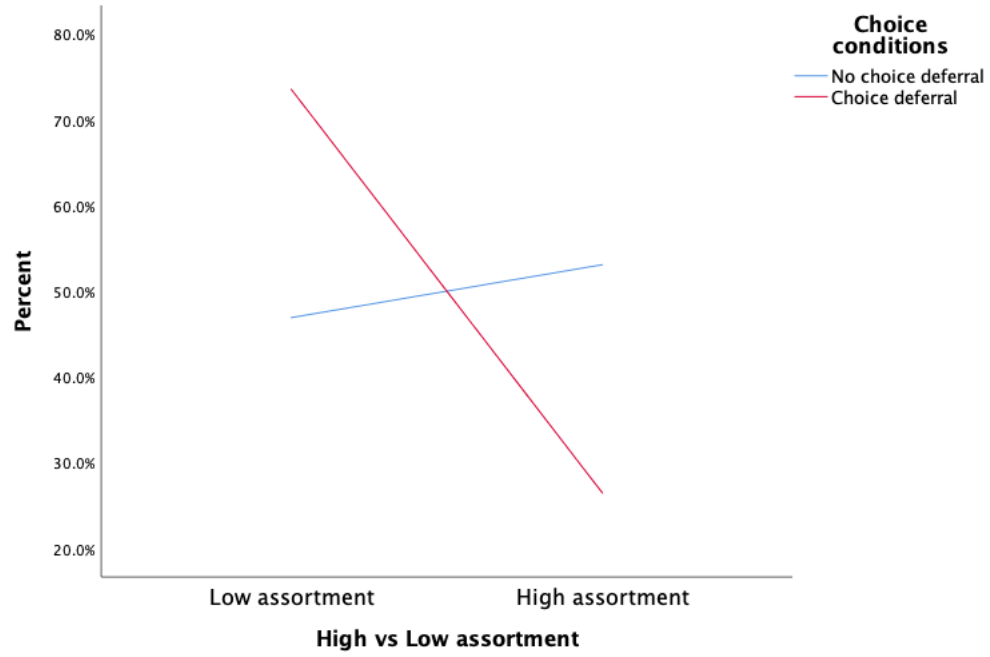


*Figure 6: interaction of assortment size x choice deferral.*

H5: higher task complexity leads to higher levels of choice deferral.

Identical to the previous mediation analysis, the mediation is split in three different paths. Based on the outcomes of the model the first path H3 (assortment size as a predictor for task complexity) indicated a positive and significant effect ($b$ = .827, $p$ = .000<0.05). The second path H4(main effect of assortment size on choice deferral) indicated a negative and significant path ($b$ = -1.145, $p$ = .005<0.05).

The third path which tests the effect of task complexity on choice deferral indicated the following results. Based on the outcomes of the model the effect of task complexity on choice deferral was negative and not significant ($b$ =-.0682, *s.e.*= 0.1272, $p$ =0.592> .05). This indicates that task complexity not a significant predictor of choice deferral. Therefore, H5 is rejected.

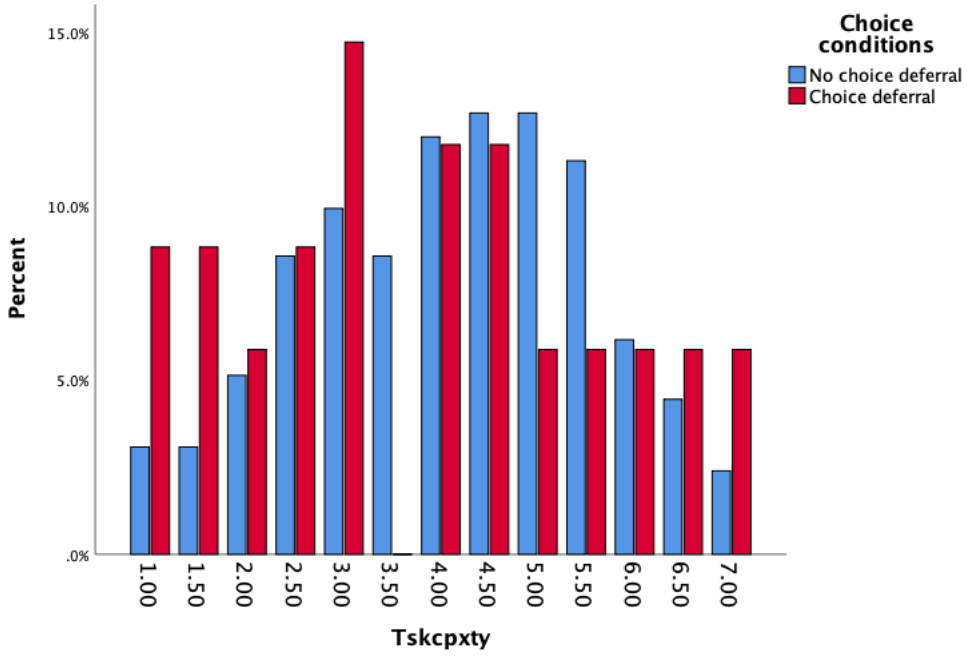


*Figure 7: interaction of task complexity x choice deferral*

In order to test the mediation, the main effect is compared to both situations (with mediation and without mediation. To determine whether there is a form of mediation the difference between these two paths must be significantly different. The indirect effect was tested using non-parametric bootstrapping at a confidence interval of 95%. By comparing both paths it is

shown that the difference between both paths does cross (0) (BOOTLLCI= -0.3391, BOOTULCI=.2018). This implies that there is no difference between both paths, thus there is no form of mediation. The effect of assortment size on choice deferral was not mediated by task complexity. (Appendix I).

**Product expertise**

**H6 and H7**

In order to test the moderation effect of product expertise on the relationship between assortment size, choice satisfaction and choice deferral, the Hayes PROCESS analysis was used again. More specifically, Model 1 is used, which is a simple moderation analysis. This model tests the moderating effect of product expertise on the relationship between assortment size, choice satisfaction and choice deferral (Appendix J&K).

Prior to conducting this analysis, a few assumptions had to be tested in order to determine that this data supported the required assumptions for this test. At first, the error terms should be independent. This assumption is met as this study uses a between-subject design with independent samples. Secondly, there must be no multicollinearity problems between the predictor variables. By testing the multicollinearity, it was also concluded that this assumption is met as all the predictor variables had VIF values greater than 10. Lastly, the linearity of this model is tested. Lastly, this model assumes linearity. This assumption is also met as the mediation variable 'product expertise' is found to have a linear relationship with choice satisfaction (deviation from linearity *p=0.121>p=0.05)* and with choice deferral (deviation from linearity *p=0.785>p=0.05)*. Accordingly, conducting the analysis is appropriate. (Appendix G).

**H6:** *Product expertise moderates the relationship between assortment size and choice satisfaction; when product expertise is high, the effect of assortment size on choice satisfaction is weaker.*

Based on the outcomes of the regression model an overall significant regression model is found *(F* (3, 322) = 7.74, *P*=0.000 < .05, $R^2$ = .067). However, the interaction variable of product expertise and assortment size on choice satisfaction is found to be positive but not significant (*b* = 0.135, *t* (322), *p* = .19>0.05). Therefore, H6 is rejected, product expertise does not moderate the relationship between assortment size and choice satisfaction. The interaction effects are visualized in figure 8.

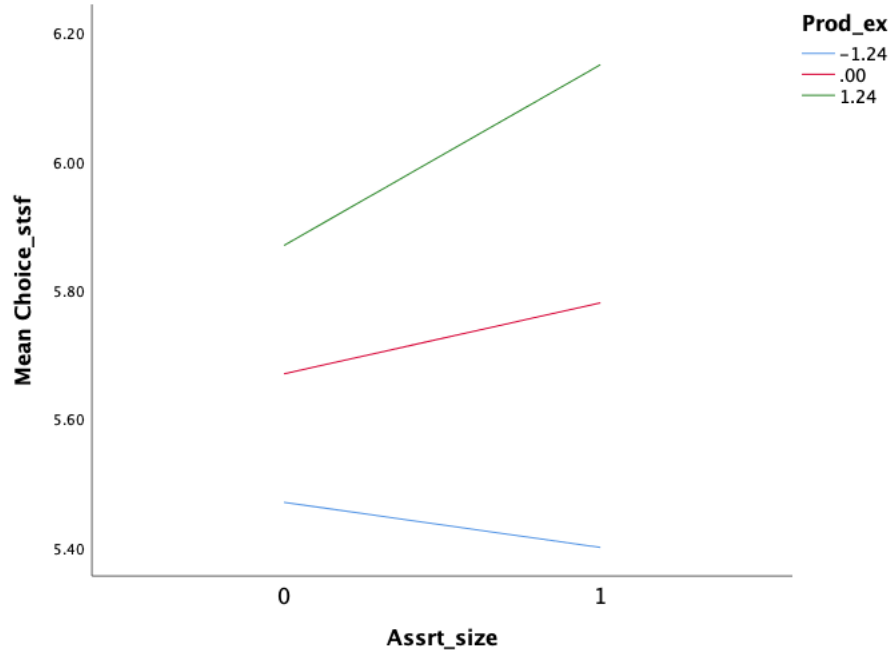


*Figure 8: moderation interaction of product expertise on the relationship between assortment size and choice satisfaction*

**H7:** *Product expertise moderates the relationship between assortment size and choice deferral; when product expertise is high, the effect of assortment size on choice deferral is weaker.*

Based on the outcomes of the regression model an overall significant regression model is found *(df* (3, 322), *P*=0.013 < .05). However, the interaction variable of product expertise and assortment size on choice deferral is found to be negative and not significant (*b* = -.048, *t* (322), *p* = .88>0.05). Therefore, H7 is rejected, product expertise does not moderate the relationship between assortment size and choice deferral. The interaction effects are visualized in figure 9.

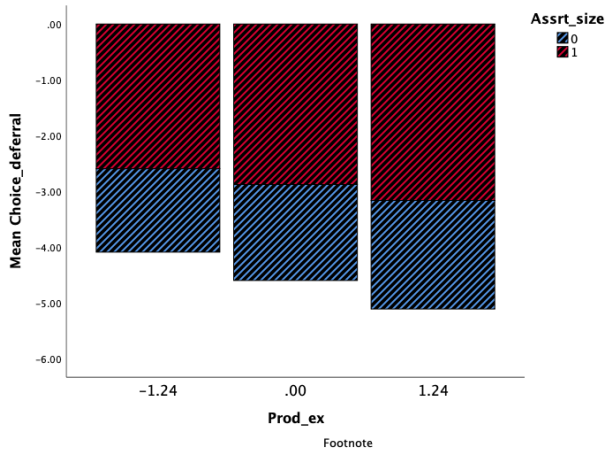


*Figure 9: moderation interaction of product expertise on the relationship between assortment size and choice deferral*

## Additional analysis

After running the 4 PROCESS-models it was found that there was no form of mediation or moderation. However, there might be different factors that might affect the results of these models. Therefore the 4 models were run again by adding the demographics as control variables. After including the control variables in the first mediation model, it was found that the $R^2$ increased from 0.0023 to 0.084, meaning that adding the control variables to the mediation accounted for about 8% extra variance in choice satisfaction. The control variables online shopping ($b$ = .299, $P$= 0.000< .05), age ($b$ = .013, $P$= 0.02< .05) and nationality ($b$ = .186, $P$= 0.008< .05) were found to be significant and positive predictors of choice satisfaction. This indicates that participants that are frequent online shoppers as well as older participants were found to have higher choice satisfaction levels. Adding the control variables resulted in in higher significance level on the relationship between task complexity and choice satisfaction (b = -0.082, p = .069) to be more significant (b = -.881., p = .069). Adding the control variables did not change the outcome of the mediation, there was still no form of mediation found.
Running the second mediation model with choice deferral as the y-variable showed no significance difference between with and without control variables.

Running the first moderation model (the moderation of product expertise on the relationship between assortment size and choice satisfaction) showed an increase in the $R^2$ as it increased from 0.067 to 0.142, meaning that adding the control variables to the moderation accounted for about 7.5% extra variance in choice satisfaction. The control variables online shopping ($b$ = .27, $P$= 0.001< .05), and age ($b$ = .018, $P$= 0.001< .05) were found to be significant and positive predictors of choice satisfaction. Running the second moderation model with choice deferral as the y-variable showed no significance difference between with and without control variables. (Appendix L,M, N & O).

## Summary of hypotheses

| Hypothesis | Description | Result |
|---|---|---|
| H1 | *An increase in assortment size leads to an in increase on task complexity.* | ***Supported*** |
| H2 | *A higher assortment size leads to a decrease in choice satisfaction.* | ***Not supported*** |
| H3 | *A higher task complexity leads to a decrease in choice satisfaction.* | ***Supported**** |
| H4 | *A higher assortment size leads to higher levels of choice deferral.* | ***Not Supported*** |
| H5 | *A higher task complexity leads to higher levels of choice deferral.* | ***Not supported*** |
| H6 | *Product expertise moderates the relationship between assortment size and choice satisfaction; when product expertise is high, the effect of assortment size on choice satisfaction is weaker.* | ***Not supported*** |
| H7 | *Product expertise moderates the relationship between assortment size and choice deferral; when product expertise is high, the effect of assortment size on choice deferral is weaker.* | ***Not supported*** |

*Table 6: overview of hypotheses results*

**Marginally supported when the p-value is between 0.05 and 0.1.*

# Discussion

In the conducted experiment, the effect of assortment size and, and task complexity have been manipulated. The effects of these manipulations on choice satisfaction and choice deferral were analyzed. This section of the study will focus on the finding of the experiment and the managerial relevance of these findings. Moreover, the limitations and the future research will be discussed.

## 5.1 General discussion

### 5.1.1 Choice satisfaction

Prior literature suggested an effect of assortment size on choice satisfaction. The prior studies were mainly conducted in an offline environment. Unlike previous studies this study was conducted in an online environment. The main effect of this study is the effect of assortment size on choice satisfaction. When analyzing this main effect, it is found that there is a positive non-significant relationship between both variables. This effect was argued about by different studies, Iyengar and Lepper (2000) found that an increase in assortment size led to consumer dissatisfaction. In line with the results of this study, other studies found out that increasing assortment size leads to an in increase in satisfaction (Chernev, 2003).

Task complexity was manipulated in the experiment by adding more attributes to the choice set. The manipulation check of this variable didn't succeed as the perceived task complexity did not correlate with the manipulated attributes. The reason behind this could be the different interpretations of the term 'task complexity', participants might evaluate this term by the level of assortment size rather than the number of presented attributes. Another reasoning might be the mistake of not asking the participants to take the attributes into recommendation before getting exposed to the experiment. However, task complexity is also measured by the number of options presented in a choice set. Along the same lines as assortment size, the hypothesis for task complexity has been developed. Prior studies found that an increase in assortment size increased the complexity of the task. This in line with this study as it was found that a higher assortment size led to significantly higher perceived task complexity. The interaction between assortment size and task complexity was tested and it showed a significant interaction between both variables. The effect of task complexity on choice satisfaction was also measured, this hypothesis stated that higher task complexity leads to lower levels of choice satisfaction. The

results of this study confirmed this statement as task complexity had a significant negative effect on choice satisfaction.

To test whether task complexity mediated the main effect of assortment size on choice satisfaction a mediation analysis was conducted. Unlike the study conducted by Greifeneder et al. (2010) who found that an increase in assortment size didn't influence satisfaction, but when the available options were presented on many attributes' levels, satisfaction decreased, this study found no form of significant mediation on this relationship.

However, a notable finding was that adding control variables to the model accounted for 8% more variance within the choice satisfaction. The variance was mainly due to the significant control variables online shopping, age and nationality. This indicates that participants that are frequent online shoppers as well as older participants were found to have higher choice satisfaction levels

### 5.1.2 Choice deferral

Prior literature suggested an effect of assortment size on choice deferral. Choice deferral has been neglected by previous studies; researchers assumed that decision maker simply chooses the highest utility alternative. The no-choice option was not considered in the choice set (Dhar, 1997). The prior studies on choice deferral were mainly conducted in an offline environment. However, this study examined the effects on choice deferral in an online environment. conducted in an online environment. The main effect of this study is the effect of assortment size on choice deferral. When analyzing this main effect, it is found that there is a negative but significant relationship between both variables. This is not in line with previous studies as it was expected to have significant positive effect on choice deferral. Previous literature claimed that higher assortment sizes lead to higher levels of choice deferral. A study conducted by Iyengar & Lepper (2000) found that increasing the choice set lead to an increase in choice deferral. Unlike this study, where an increase in the choice set led to a decrease in choice deferral. Although this option was explained to the participants and was visually clear, only a small number of participants (34) chose to defer their choice. This might be a small number to make strong statistical claims about choice deferring.

The effect of task complexity on choice deferral was also measured, this hypothesis stated that higher task complexity leads to higher levels of choice deferral. Prior studies showed that complexity of the task leads to a higher choice deferral (Tversky and Shafir, 1992). However,

this study showed no significant effect for this relationship. To test whether task complexity mediated the main effect of assortment size on choice deferral a mediation analysis was conducted. Unlike the study conducted by Dhar (1997a, 1997b) who proposed that consumers will choose to defer their choice when the choice environment becomes more complex, this study found no form of significant mediation on this relationship.

### 5.1.3 Product Expertise

Product expertise was added in this study to moderate the two main effects of this study. The product used for this study was digital camera. Previous research mainly used products like jam or pens as the product of the study (Shah & Wolford 2007; Iyengar & Lepper, 2000). However, in order to increase the reality of the experiment's online environment, digital cameras were added as the main product of this experiment. This product category was expected to split the data into highly experienced and somewhat experienced participants. This was indeed in line with this study as there were different level expertise among the participants. To test whether product expertise moderated the main effect of assortment size on choice satisfaction a moderation analysis was conducted. Unlike the study conducted by Hoeffler and Ariely, 1999 who found that Customers with high product experience, are likely to be satisfied with larger assortment and may see it easy to choose from such large assortments, in contrast this study found no form of significant moderation on this relationship.
Prior studies have shown that for consumers who are unfamiliar with the product category, choices from larger choice sets are more likely to result in choice deferral (Chernev, 2015). However, this study showed no form of moderation on choice deferral.

## Managerial implications

Nowadays, retailing is rapidly changing from offline to online. With the tremendous growth of the online market and the virtual possibility for retailers to offer more products than offline, retailers and marketers need information which helps improve and enhance their online sales. This study shows that retailers should be careful when designing their web shop, the number of products and attributes must be well researched before deciding for this strategy. It has been shown that assortment size does indeed affect the complexity of the task. Moreover, it has been found that the task complexity effects the consumers choice satisfaction. Therefore, the assortment should be presented clearly, and only the most relevant options should be shown to minimize the assortment size. The attributes did not affect the choice satisfaction outcome. Therefore, retailers can provide more attributes without effecting the task complexity. This, however, might be different for a different product category as previous studies showed different results with different product types. The effects were different for certain groups, such as older participants or online frequent shoppers. This is useful for marketeers in order to get a deeper and clear understanding of how certain participants might react based on their age or shopping experience. The effects on choice deferral were not significant, which showed that a higher assortment size doesn't necessarily lead to choice deferral. In general, I think that the insights of this study will help marketers to design and provide more efficient online shopping experiences, which eventually will help to increase customer satisfaction.

## Limitations

The outcome of the research was not like the outcome of previous studies. This due to different factors, one of those is the limitations found in the studies. The first limitation is the selected research method. This research was conducted by an online lab experiment, which leads to a few disadvantages. For example, online lab experiment has lower external validity compared to field experiments. Moreover, the response on the survey is not fully controlled, meaning that some respondents might participate without taking the right time to fully understand and fill in the survey.

Although many participants were deleted as they were seen as outliers, but this is still a potential problem of the online experiment. To avoid these type participants, time was measured. However, this showed that a lot of the participants were not taking the experiment as seriously as expected, therefore about 40 participants were deleted. Moreover, an attention check was added to avoid fast clickers, this also showed that not all participants were taking their time to fully understand the questions. The experiment itself did not have a minimum time, which made a few participants rush through the questions. This affects the total outcome of the study.

One of the main limitations of this study was the perceived task complexity. Task complexity was added as a manipulation in this study, by increasing the number of attributes per product. It was expected that a higher number of attributes presented in a choice set, will increase the perceived task complexity. In contrast with this, the study didn't find any significant effect of the number attributes presented on the perceived complexity. However, assortment size did affect the perceived complexity significantly. Due to this limitation, task complexity could only account for the assortment size and not for the number of attributes in this study.

Moreover, one of the main effects of this study, is the effect of assortment size on choice overload. It was expected that a higher assortment size will lead to higher levels of choice deferral. However, this study showed the opposite of this expectation, it was found that assortment size had a negative significant effect on choice overload. Meaning that a higher assortment size led to lower levels of choice deferral. This limitation had a big impact on the mediation and moderation tests, as the main effect was already the opposite of what was

expected. Choice deferral was added as the first option in the experiment and was explained to the participants. The reason behind this limitation might be that participants in a high assortment size condition with 24 different products had to scroll down to review all the given options, which eventually led them to choose one of the last options under in the page instead of scrolling back up to choose choice deferral. It might have been inconvenient for them to scroll back up as they must scroll down to click on the 'next' button. Participants in lower assortment size could review all the six presented options in one page, which made it easier for them to review the choice deferral option. Another reason for this limitation might be the low number of digital cameras presented in the low assortment size conditions, which eventually led to choice deferral.

Although this experiment was conducted in an online environment, it still lacked the reality of a real web shop. The participants are aware that this is an experiment although the main idea is not explained to prevent bias, the participants are still aware that they are in an experiment environment. The web shop was presented as a part of a survey, although the presented options looked like an official web shop, it still lacked the reality of being on a real web shop.

The following limitation is about the product used for this study. Digital cameras are quite a mature test product in the choice overload research field. Prior studies on choice overload focused on grocery products, this could be one of the reasons why the outcome of this study is different than prior studies on choice overload.

Another limitation was the use of Amazon Mechanical Turks tool, which allows to pay respondents in order to participate in the online experiment. The monetary incentives cause the participants to finish the survey in shorter time. The participants want finish as much tasks as possible in the smallest amount of time, which ultimately effects the quality of the research.

## Future research

The limitations as described in the previous chapter, create opportunities for future research. It is recommended to conduct the future research in an online environment with more reality. This could be done by conducting the experiment under real online shopping circumstances. For example, such study could be conducted among real online shoppers who use a real retail webstores. This will give the researchers the highest quality outcomes as the participants behavior is the closest to their real-life behavior. Future research can add choice deferral as a possibility without making it a visible option. This closer to a real shopping environment, where choice deferral is not a visible that is clicked on. Future studies could focus on different products in one study. This gives researchers better insight in variables such as product expertise and involvement. Adding two different products with different involvement or expertise gives researchers better insights. For example, the difference between mobile phones and electric drills (High vs low product expertise). Future research could increase the number of attributes in order to increase the perceived task complexity. Studies could also focus on one type of overload. For example, a study can focus on the effect of assortment size on choice satisfaction, without adding task complexity (attributes) to the conditions. This will give researchers better insight in one specific field. It has been found that certain demographics have different outcomes, this could be investigated by future studies. By focusing on the demographics of the participants, which might lead to interesting outcomes. Research can also focus more on the consumer characteristics and the effect of that on perceived overload. This will give e-managers a better understanding in the consumers behavior.

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# Appendices

## Appendix A- survey

**Please read the instructions below carefully before going to the next questions**

In the following page you will be exposed to an online assortment of digital cameras. Suppose that you want to purchase a digital camera for a trip you will soon be taking. One day, you visit an online electronic store with the intent of buying a camera that day. Once you have familiarized yourself with one of the options you are supposed to make a choice.

**Please Imagine that this is a real scenario, and that you are actually browsing on an online electronic store.**

Enjoy your shopping.

Do you understand the instructions above?

- ◯ Yes
- ◯ No

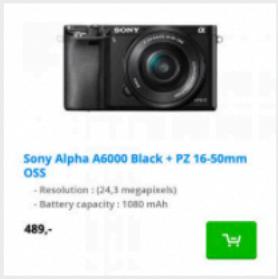
The website presents the following digital cameras

Which digital camera would you use?

When making a choice please consider all products and attributes.

If you don't want to make a choice or want to visit other online stores you can do this by selecting the first option "I would like to search for other digital cameras or search in a later moment"

| | |
|---|---|
| ○ I would like to search for other digital cameras or search in a later moment | ○  **Panasonic Lumix DMC-FZ1000G9** - Resolution : (20,1 megapixels) - Battery capacity : 1200 mAh **562,-** |



Sony Alpha A6000 Black + PZ 16-50mm OSS

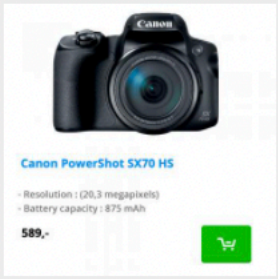
- Resolution : (24,3 megapixels)
- Battery capacity : 1080 mAh

489,-

Panasonic Lumix DC-FZ1000 II

- Resolution : (20,1 megapixels)
- Battery capacity : 1150 mAh

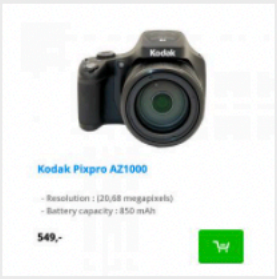
696,-



Canon PowerShot SX70 HS

- Resolution : (20,3 megapixels)
- Battery capacity : 875 mAh

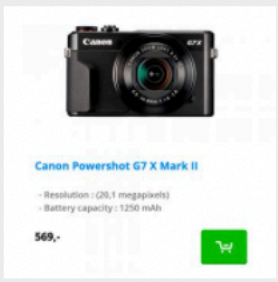
589,-



Kodak Pixpro AZ1000

- Resolution : (20,68 megapixels)
- Battery capacity : 850 mAh

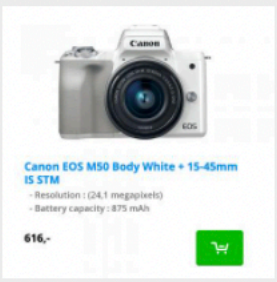
549,-



Canon Powershot G7 X Mark II

- Resolution : (20,1 megapixels)
- Battery capacity : 1250 mAh

569,-



Canon EOS M50 Body White + 15-45mm IS STM

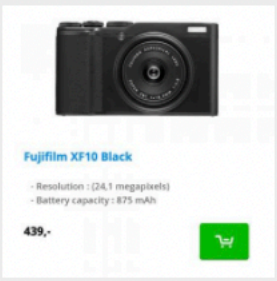
- Resolution : (24,1 megapixels)
- Battery capacity : 875 mAh

616,-

Canon EOS 2000D + 18-55mm f/3.5-5.6 DC III

- Resolution : (24,1 megapixels)
- Battery capacity : 860 Ah

449,-



Fujifilm XF10 Black

- Resolution : (24,1 megapixels)
- Battery capacity : 875 mAh

439,-

Sony CyberShot DSC-RX100III

- Resolution : (20,1 megapixels)
- Battery capacity : 1250 Ah

499,-

Sony Alpha A6100 + 16-50 mm f / 3.5-5.6 OSS

- Resolution : (24 megapixels)
- Battery capacity : 1080 mAh

797,-

Canon EOS 250D White + 18-55mm f / 4-5.6 IS STM

- Resolution : (24,1 megapixels)
- Battery capacity : 1040 Ah

659,-

Olympus OM-D E-M10 Mark IV Body Silver

- Resolution : (20,3 megapixels)
- Battery capacity : 1175 mAh

679,-

Panasonic Lumix DMC-LX15

- Resolution : (20,1 megapixels)
- Battery capacity : 680 mAh

459,-

Panasonic Lumix DMC-FZ300

- Resolution : (12,1 megapixels)
- Battery capacity : 1200 mAh

419,-

Panasonic Lumix G100 + 12-32mm f/3.5-5.6 ASPH Mega O.I.S.

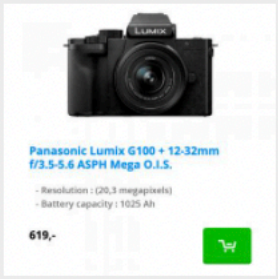
- Resolution : (20,3 megapixels)
- Battery capacity : 1025 Ah

619,-

Panasonic Lumix DMC-G7 Black + 14-42mm

- Resolution : (16 megapixels)
- Battery capacity : 1200 mAh

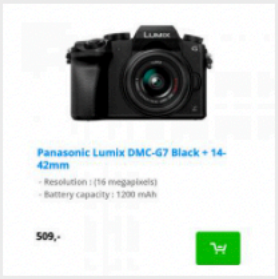
509,-



Panasonic Lumix G100 + 12-32mm f/3.5-5.6 ASPH Mega O.I.S.

- Resolution : (20,3 megapixels)
- Battery capacity : 1025 Ah

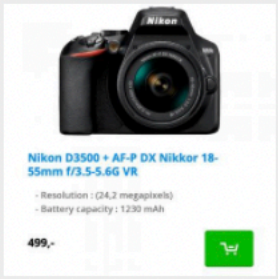
619,-



Panasonic Lumix DMC-G7 Black + 14-42mm

- Resolution : (16 megapixels)
- Battery capacity : 1200 mAh

509,-



Nikon D3500 + AF-P DX Nikkor 18-55mm f/3.5-5.6G VR

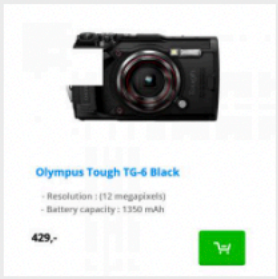
- Resolution : (24,2 megapixels)
- Battery capacity : 1230 mAh

499,-

Fujifilm X-T200 Silver + XC 15-45mm f/3.5-5.6 OIS PZ

- Resolution : (24,2 megapixels)
- Battery capacity : 1250 mAh

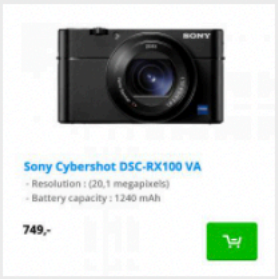
699,-



Olympus Tough TG-6 Black

- Resolution : (12 megapixels)
- Battery capacity : 1350 mAh

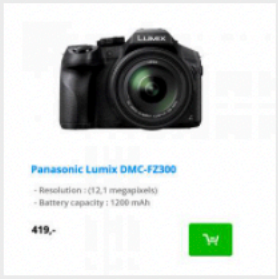
429,-



Sony Cybershot DSC-RX100 VA

- Resolution : (20,1 megapixels)
- Battery capacity : 1240 mAh

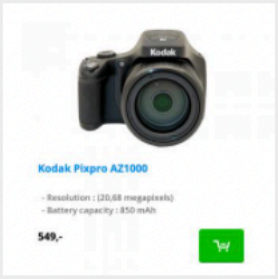
749,-



Panasonic Lumix DMC-FZ300

- Resolution : (12,1 megapixels)
- Battery capacity : 1200 mAh

419,-



Kodak Pixpro AZ1000

- Resolution : (20,68 megapixels)
- Battery capacity : 850 mAh

549,-

## Please fill in

| | Far too little | Moderately too little | Slightly too little | Neither too much nor too little | Slightly too much | Moderately too much | Far too much |
|---|---|---|---|---|---|---|---|
| Please indicate your opinion about the number of products presented on the webpage. | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

→

## Please fill in

| | Not at all complex | Moderately easy | Slightly easy | Neither complex nor easy | Slightly complex | Moderately complex | Very complex |
|---|---|---|---|---|---|---|---|
| How complex was it to make a choice? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Please fill in

| | Not at all overtaxed | Moderately easy | Slightly easy | Neither overtaxed nor easy | Slightly overtaxed | Moderatley overtaxed | Very overtaxed |
|---|---|---|---|---|---|---|---|
| To what extent were you overtaxed by the choice task? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Please fill in the following two questions

| | Extremely dissatisfied | Moderately dissatisfied | Slightly dissatisfied | Neither satisfied nor dissatisfied | Slightly satisfied | Moderately satisfied | Extremely satisfied |
|---|---|---|---|---|---|---|---|
| How satisfied are you with your choice? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

→

**Please indicate the extent to which you agree or disagree with each of the following statements**

| | Strongly disagree | Disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Agree | Strongly agree |
|---|---|---|---|---|---|---|---|
| I enjoy learning about digital cameras | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I consider myself knowledgeable on digital cameras | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| My knowledge of digital cameras helps me understand very technical information about this product | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I can recall almost all existing brands of digital camera from memory | ○ | ○ | ○ | ○ | ○ | ○ | ◉ |
| Answer disagree to this question | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I will search for the latest information on digital cameras before I purchase a brand | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I can recall product-specific attributes of digital cameras. | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Please fill in

| | Very rarely | Rarely | Sometimes | Often | Very Often |
|---|---|---|---|---|---|
| How often do purchase products online | ○ | ○ | ○ | ○ | ○ |

→

## What is your gender?

○ Male

○ Female

## What is you age?

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

- ◯ Primary school
- ◯ Secondary school
- ◯ High school
- ◯ Bachelor degree
- ◯ Masters degree
- ◯ Other

What is your nationality

- ◯ Dutch
- ◯ German
- ◯ French
- ◯ American
- ◯ Other

→

## Appendix B- Descriptives

### Conditions

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Hightask_Highass | 82 | 25.2 | 25.2 | 25.2 |
| | Lowtask_Highass | 82 | 25.2 | 25.2 | 50.3 |
| | Hightask_Lowass | 81 | 24.8 | 24.8 | 75.2 |
| | Lowtask_Lowass | 81 | 24.8 | 24.8 | 100.0 |
| | Total | 326 | 100.0 | 100.0 | |

***Table 7***

### What is your gender?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 195 | 59.8 | 59.8 | 59.8 |
| | Female | 131 | 40.2 | 40.2 | 100.0 |
| | Total | 326 | 100.0 | 100.0 | |

***Table 8***

### Age group

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 18-24 | 32 | 9.8 | 9.8 | 9.8 |
| | 25-34 | 141 | 43.3 | 43.3 | 53.1 |
| | 35-44 | 74 | 22.7 | 22.7 | 75.8 |
| | 45-54 | 42 | 12.9 | 12.9 | 88.7 |
| | 55-64 | 37 | 11.3 | 11.3 | 100.0 |
| | Total | 326 | 100.0 | 100.0 | |

***Table 9***

## Education level

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Primary school | 1 | .3 | .3 | .3 |
| | Secondary school | 3 | .9 | .9 | 1.2 |
| | High school | 67 | 20.6 | 20.6 | 21.8 |
| | Bachelor degree | 177 | 54.3 | 54.3 | 76.1 |
| | Masters degree | 67 | 20.6 | 20.6 | 96.6 |
| | Other | 11 | 3.4 | 3.4 | 100.0 |
| | Total | 326 | 100.0 | 100.0 | |

***Table 10***

## What is your nationality

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Dutch | 17 | 5.2 | 5.2 | 5.2 |
| | German | 2 | .6 | .6 | 5.8 |
| | French | 3 | .9 | .9 | 6.7 |
| | American | 174 | 53.4 | 53.4 | 60.1 |
| | Other | 130 | 39.9 | 39.9 | 100.0 |
| | Total | 326 | 100.0 | 100.0 | |

***Table 11***

## Online shopping behavior

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Very rarely | 3 | .9 | 1.0 | 1.0 |
| | Rarely | 5 | 1.5 | 1.6 | 2.6 |
| | Sometimes | 67 | 20.6 | 21.8 | 24.4 |
| | Often | 162 | 49.7 | 52.8 | 77.2 |
| | Very Often | 70 | 21.5 | 22.8 | 100.0 |
| | Total | 307 | 94.2 | 100.0 | |
| Missing | System | 19 | 5.8 | | |
| Total | | 326 | 100.0 | | |

***Table 12***

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Duration (in seconds) | 326 | 70.00 | 679.00 | 225.9509 | 128.94699 |
| Valid N (listwise) | 326 | | | | |

***Table 13***

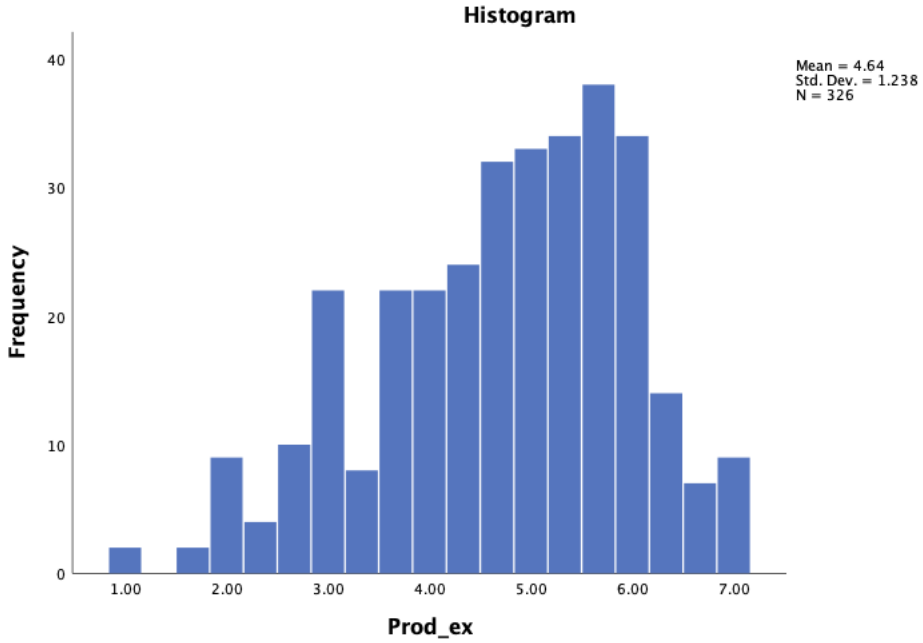



**Figure 10**

## Appendix C-Randomization test

## Chi-Square Tests

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 2.036[a] | 3 | .565 |
| Likelihood Ratio | 2.016 | 3 | .569 |
| N of Valid Cases | 326 | | |

***Table 14***

**Appendix D-Manipulation checks**

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Assortment_perception | .149 | 326 | .000 | .940 | 326 | .000 |

***Table 15***

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Tskcpxty | .096 | 326 | .000 | .974 | 326 | .000 |

***Table 16***

# Mann-Whitney Test

**Ranks**

| | High vs Low assortment | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Assortment_perception | High assortment | 164 | 212.27 | 34811.50 |
| | Low assortment | 162 | 114.13 | 18489.50 |
| | Total | 326 | | |

***Table 17***

**Test Statistics[a]**

| | Assortment_perception |
|---|---|
| Mann-Whitney U | 5286.500 |
| Wilcoxon W | 18489.500 |
| Z | -9.640 |
| Asymp. Sig. (2-tailed) | .000 |

***Table 18***

**Group Statistics**

| | High vs Low assortment | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Duration (in seconds) | High assortment | 164 | 249.3780 | 139.31349 | 10.87856 |
| | Low assortment | 162 | 202.2346 | 113.09341 | 8.88546 |

***Table 19***

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | |
|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) |
| Duration (in seconds) | Equal variances assumed | 6.842 | .009 | 3.352 | 324 | .001 |
| | Equal variances not assumed | | | 3.356 | 312.308 | .001 |

***Table 20***

Mann-Whitney Test

**Ranks**

| | High vs Low task complexity | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Taskcomplexity | High task complexity | 163 | 161.01 | 26244.50 |
| | Low task complexity | 163 | 165.99 | 27056.50 |
| | Total | 326 | | |

***Table 21***

**Test Statistics[a]**

| | Taskcomplexity |
|---|---|
| Mann-Whitney U | 12878.500 |
| Wilcoxon W | 26244.500 |
| Z | -.479 |
| Asymp. Sig. (2-tailed) | .632 |

***Table 22***

# T-Test

**Group Statistics**

| | High vs Low task complexity | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Duration (in seconds) | High task complexity | 163 | 235.2638 | 140.93137 | 11.03860 |
| | Low task complexity | 163 | 216.6380 | 115.41711 | 9.04017 |

***Table 23***

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | |
|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) |
| Duration (in seconds) | Equal variances assumed | 4.496 | .035 | 1.305 | 324 | .193 |
| | Equal variances not assumed | | | 1.305 | 311.883 | .193 |

***Table 24***

**Appendix E-Reliability**

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .871 | .867 | 6 |

***Table 25***

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .747 | .747 | 2 |

*Table 26*

## Appendix F-Factor analysis

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .804 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1295.236 |
| | df | 28 |
| | Sig. | .000 |

*Table 27*

**communalities**

| | Initial | Extraction |
|---|---|---|
| Product_expertise_enjoy learning | 1.000 | .654 |
| Product_expertise_know ledge | 1.000 | .819 |
| Product_expertise_techi nfo | 1.000 | .790 |
| Product_expertise_bran ds | 1.000 | .623 |
| Product_expertise_latest info | 1.000 | .152 |
| Product_expertise_attrib utes | 1.000 | .727 |
| Taskcomplexity_percept ion1 | 1.000 | .802 |
| Taskcomplexity_percept ion2 | 1.000 | .796 |

Extraction Method: Principal Component Analysis.

*Table 28*

# Appendix G-Process assumptions

**Multicollinearity**

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Prod_ex | .988 | 1.012 |
| | High vs Low assortment | .903 | 1.107 |
| | Tskcpxty | .918 | 1.090 |
| | Choice conditions | .967 | 1.034 |

***Table 29***

**Coefficients[a]**

| Model | | Collinearity Statistics: Tolerance | VIF |
|---|---|---|---|
| 1 | Prod_ex | .929 | 1.076 |
| | High vs Low assortment | .918 | 1.089 |
| | Choice_satisfaction | .923 | 1.083 |
| | Tskcpxty | .904 | 1.106 |

***Table 30***

**Linearity assumption**

**ANOVA Table**

| | | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|---|
| Choice_satisfaction * Tskcpxty | Between Groups | (Combined) | 21.020 | 12 | 1.752 | 1.269 | .236 |
| | | Linearity | 3.172 | 1 | 3.172 | 2.297 | .131 |
| | | Deviation from Linearity | 17.848 | 11 | 1.623 | 1.175 | .303 |
| | Within Groups | | 432.134 | 313 | 1.381 | | |
| | Total | | 453.153 | 325 | | | |

***Table 31***

**ANOVA Table**

| | | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|---|
| Conditions * Tskcpxty | Between Groups | (Combined) | 34.499 | 12 | 2.875 | 2.413 | .005 |
| | | Linearity | 22.593 | 1 | 22.593 | 18.959 | .000 |
| | | Deviation from Linearity | 11.906 | 11 | 1.082 | .908 | .533 |
| | Within Groups | | 372.989 | 313 | 1.192 | | |
| | Total | | 407.488 | 325 | | | |

***Table 32***

**ANOVA Table**

| | | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|---|
| Choice_satisfaction * Prod_ex | Between Groups | (Combined) | 79.711 | 32 | 2.491 | 1.954 | .002 |
| | | Linearity | 27.277 | 1 | 27.277 | 21.401 | .000 |
| | | Deviation from Linearity | 52.435 | 31 | 1.691 | 1.327 | .121 |
| | Within Groups | | 373.442 | 293 | 1.275 | | |
| | Total | | 453.153 | 325 | | | |

***Table 33***

## ANOVA Table

| | | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|---|
| Choice conditions * Prod_ex | Between Groups | (Combined) | 2.509 | 32 | .078 | .822 | .743 |
| | | Linearity | .178 | 1 | .178 | 1.869 | .173 |
| | | Deviation from Linearity | 2.331 | 31 | .075 | .788 | .785 |
| | Within Groups | | 27.945 | 293 | .095 | | |
| | Total | | 30.454 | 325 | | | |

***Table 33***

## Appendix F-Logistic regression

## Variables in the Equation

| | | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|---|
| Step 1[a] | High vs Low assortment | -1.145 | .406 | 7.954 | 1 | .005 | .318 |
| | Constant | -1.701 | .217 | 61.180 | 1 | .000 | .182 |

***Table 34***

# Appendix H-Task complexity mediation on choice satisfaction

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : Chce_stf
    X  : Has_Lwas
    M  : Tskcpxty

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 Tskcpxty

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2755      .0759     2.0952    26.6161     1.0000   324.0000
.0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    3.6698      .1137    32.2691      .0000     3.4460     3.8935
Has_Lwas     .8272      .1603     5.1591      .0000      .5118     1.1426

**************************************************************************
OUTCOME VARIABLE:
 Chce_stf

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .1118      .0125     1.3854     2.0449     2.0000   323.0000
.1311

Model
             coeff         se          t          p       LLCI       ULCI
constant    5.9691      .1898    31.4439      .0000     5.5956     6.3426
Has_Lwas     .1820      .1356     1.3418      .1806     -.0848      .4488
Tskcpxty    -.0824      .0452    -1.8242      .0690     -.1713      .0065

************************ TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 Chce_stf

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .0483      .0023     1.3954      .7567     1.0000   324.0000
.3850

Model
             coeff         se          t          p       LLCI       ULCI
```

```
constant     5.6667      .0928    61.0579      .0000     5.4841     5.8492
Has_Lwas      .1138      .1308      .8699      .3850     -.1436      .3712

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI
c_ps
      .1138      .1308      .8699      .3850     -.1436      .3712
.0964

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI
c'_ps
      .1820      .1356     1.3418      .1806     -.0848      .4488
.1541

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Tskcpxty     -.0682      .0419     -.1559      .0067

Partially standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Tskcpxty     -.0577      .0356     -.1330      .0058

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```

# Appendix I-Task complexity mediation on choice deferral

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : CHOICE
    X  : Has_Lwas
    M  : Tskcpxty

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 Tskcpxty

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .2755      .0759     2.0952    26.6161     1.0000   324.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     5.3241      .2531    21.0399      .0000     4.8263     5.8220
Has_Lwas     -.8272      .1603    -5.1591      .0000    -1.1426     -.5118

**************************************************************************
OUTCOME VARIABLE:
 CHOICE

Coding of binary Y for logistic regression analysis:
    CHOICE  Analysis
       .00       .00
      1.00      1.00

Model Summary
       -2LL    ModelLL        df         p   McFadden   CoxSnell   Nagelkrk
```

```
   208.8191     9.2213     2.0000      .0099      .0423      .0279      .0572

Model
              coeff         se          Z          p       LLCI       ULCI
constant    -3.6333      .9742    -3.7294      .0002    -5.5428    -1.7239
Has_Lwas     1.0897      .4186     2.6031      .0092      .2692     1.9101
Tskcpxty     -.0682      .1272     -.5367      .5915     -.3175      .1810

These results are expressed in a log-odds metric.

****************** DIRECT AND INDIRECT EFFECTS OF X ON Y *****************

Direct effect of X on Y
     Effect         se          Z          p       LLCI       ULCI
     1.0897      .4186     2.6031      .0092      .2692     1.9101

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Tskcpxty      .0565      .1317     -.2022      .3285

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

NOTE: Total effect model not available with dichotomous Y

NOTE: Direct and indirect effects of X on Y are on a log-odds metric.

------ END MATRIX -----
```

# Appendix J-Product expertise moderation on choice satisfaction

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : Chce_stf
    X  : Has_Lwas
    W  : Prod_ex

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 Chce_stf

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2593      .0673     1.3127     7.7401     3.0000   322.0000
.0001

Model
             coeff         se          t          p       LLCI       ULCI
constant    5.6690      .0900    62.9740      .0000     5.4919     5.8461
Has_Lwas     .1073      .1269      .8456      .3984     -.1424      .3570
Prod_ex      .1662      .0726     2.2892      .0227      .0234      .3090
Int_1        .1349      .1027     1.3136      .1899     -.0672      .3370

Product terms key:
 Int_1    :        Has_Lwas x        Prod_ex

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0050     1.7255     1.0000   322.0000      .1899
----------
    Focal predict: Has_Lwas (X)
          Mod var: Prod_ex  (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   Has_Lwas   Prod_ex    Chce_stf   .
BEGIN DATA.
      .0000    -1.2376     5.4633
     1.0000    -1.2376     5.4037
      .0000      .0000     5.6690
     1.0000      .0000     5.7763
      .0000     1.2376     5.8747
     1.0000     1.2376     6.1490
END DATA.
GRAPH/SCATTERPLOT=
 Prod_ex  WITH     Chce_stf BY       Has_Lwas .
```

```
************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

NOTE: The following variables were mean centered prior to analysis:
          Prod_ex

------ END MATRIX -----
```

# Appendix K-Product expertise moderation on choice deferral

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : CHOICE
    X  : Has_Lwas
    W  : Prod_ex

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 CHOICE

Coding of binary Y for logistic regression analysis:
    CHOICE  Analysis
       .00       .00
      1.00      1.00

Model Summary
       -2LL    ModelLL         df          p   McFadden   CoxSnell
Nagelkrk
   207.2674    10.7730     3.0000      .0130      .0494      .0325
.0667

Model
              coeff         se          Z          p       LLCI       ULCI
constant    -1.7213      .2211    -7.7837      .0000    -2.1548    -1.2879
Has_Lwas    -1.1582      .4169    -2.7782      .0055    -1.9753     -.3411
Prod_ex      -.1820      .1708    -1.0650      .2869     -.5168      .1529
Int_1        -.0480      .3182     -.1508      .8802     -.6716      .5757

These results are expressed in a log-odds metric.

Product terms key:
 Int_1    :        Has_Lwas x        Prod_ex

Likelihood ratio test(s) of highest order
unconditional interactions(s):
        Chi-sq         df          p
X*W      .0227     1.0000      .8802
----------
    Focal predict: Has_Lwas (X)
          Mod var: Prod_ex  (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   Has_Lwas   Prod_ex    CHOICE     prob       .
BEGIN DATA.
      .0000    -1.2376    -1.4962      .1830
     1.0000    -1.2376    -2.5950      .0695
      .0000      .0000    -1.7213      .1517
```

```
     1.0000      .0000    -2.8796      .0532
      .0000     1.2376    -1.9465      .1249
     1.0000     1.2376    -3.1641      .0405
END DATA.
GRAPH/SCATTERPLOT=
 Prod_ex  WITH     CHOICE   BY       Has_Lwas .
GRAPH/SCATTERPLOT=
 Prod_ex  WITH     prob     BY       Has_Lwas .

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

NOTE: The following variables were mean centered prior to analysis:
          Prod_ex

------ END MATRIX -----
```

# Appendix L-task complexity mediation on choice satisfaction （With control variables)

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : Chce_stf
    X  : Has_Lwas
    M  : Tskcpxty

Covariates:
 On_shop  Gender   Age      Educatn  Ntionlty

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 Tskcpxty

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2977      .0886     2.0987     5.1693     6.0000   319.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     2.4357      .7472     3.2597      .0012      .9656     3.9058
Has_Lwas      .8649      .1646     5.2551      .0000      .5411     1.1887
On_shop       .0065      .1052      .0616      .9509     -.2004      .2134
Gender        .1713      .1668     1.0272      .3051     -.1568      .4994
Age           .0038      .0069      .5584      .5769     -.0097      .0174
Educatn       .1765      .1044     1.6913      .0918     -.0288      .3818
Ntionlty      .0222      .0880      .2524      .8009     -.1509      .1953

**************************************************************************
OUTCOME VARIABLE:
 Chce_stf

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3093      .0957     1.2887     4.8056     7.0000   318.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3.8140      .5952     6.4082      .0000     2.6430     4.9850
Has_Lwas      .0781      .1344      .5808      .5618     -.1864      .3426
Tskcpxty     -.0881      .0439    -2.0070      .0456     -.1744     -.0017
On_shop       .2996      .0824     3.6350      .0003      .1374      .4617
```

```
Gender       -.1811      .1309    -1.3832      .1676     -.4386      .0765
Age           .0134      .0054     2.4884      .0133      .0028      .0240
Educatn       .0027      .0821      .0324      .9742     -.1590      .1643
Ntionlty      .1882      .0689     2.7302      .0067      .0526      .3239

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 Chce_stf

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2902      .0842     1.3009     4.8888     6.0000   319.0000
.0001

Model
             coeff         se          t          p       LLCI       ULCI
constant    3.5996      .5883     6.1187      .0000     2.4422     4.7570
Has_Lwas     .0019      .1296      .0149      .9881     -.2530      .2569
On_shop      .2990      .0828     3.6111      .0004      .1361      .4619
Gender      -.1961      .1313    -1.4938      .1362     -.4545      .0622
Age          .0131      .0054     2.4155      .0163      .0024      .0237
Educatn     -.0129      .0822     -.1568      .8755     -.1745      .1488
Ntionlty     .1863      .0693     2.6893      .0075      .0500      .3226

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI
c_ps
      .0019      .1296      .0149      .9881     -.2530      .2569
.0016

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI
c'_ps
      .0781      .1344      .5808      .5618     -.1864      .3426
.0661

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Tskcpxty    -.0762      .0422     -.1636      .0045

Partially standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Tskcpxty    -.0645      .0358     -.1386      .0038

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```

# Appendix M-task complexity mediation on choice deferral (control variables)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5.3 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : CHOICE
    X  : Has_Lwas
    M  : Tskcpxty

Covariates:
 On_shop  Gender   Age      Educatn  Ntionlty

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 Tskcpxty

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2977      .0886     2.0987     5.1693     6.0000   319.0000
.0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    2.4357      .7472     3.2597      .0012      .9656     3.9058
Has_Lwas     .8649      .1646     5.2551      .0000      .5411     1.1887
On_shop      .0065      .1052      .0616      .9509     -.2004      .2134
Gender       .1713      .1668     1.0272      .3051     -.1568      .4994
Age          .0038      .0069      .5584      .5769     -.0097      .0174
Educatn      .1765      .1044     1.6913      .0918     -.0288      .3818
Ntionlty     .0222      .0880      .2524      .8009     -.1509      .1953

**************************************************************************
OUTCOME VARIABLE:
 CHOICE

Coding of binary Y for logistic regression analysis:
    CHOICE  Analysis
       .00       .00
      1.00      1.00

Model Summary
       -2LL    ModelLL         df          p   McFadden   CoxSnell
Nagelkrk
   204.4816    13.5587     7.0000      .0596      .0622      .0407
.0835

Model
             coeff         se          Z          p       LLCI       ULCI
constant     .2707     1.6511      .1640      .8698    -2.9654     3.5069
```

| | | | | | | |
|---|---|---|---|---|---|---|
| Has_Lwas | -.9975 | .4304 | -2.3175 | .0205 | -1.8411 | -.1539 |
| Tskcpxty | -.0775 | .1318 | -.5877 | .5568 | -.3358 | .1809 |
| On_shop | -.3857 | .2242 | -1.7206 | .0853 | -.8251 | .0537 |
| Gender | .1427 | .3809 | .3745 | .7080 | -.6039 | .8892 |
| Age | .0109 | .0149 | .7348 | .4625 | -.0182 | .0400 |
| Educatn | -.0245 | .2517 | -.0974 | .9224 | -.5179 | .4689 |
| Ntionlty | -.1833 | .1853 | -.9894 | .3225 | -.5464 | .1798 |

These results are expressed in a log-odds metric.

********** DIRECT AND INDIRECT EFFECTS OF X ON Y **********

Direct effect of X on Y

| Effect | se | Z | p | LLCI | ULCI |
|---|---|---|---|---|---|
| -.9975 | .4304 | -2.3175 | .0205 | -1.8411 | -.1539 |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| Tskcpxty | -.0670 | .1594 | -.4221 | .2151 |

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

NOTE: Total effect model not available with dichotomous Y

NOTE: Effect size option not available with dichotomous Y

NOTE: Direct and indirect effects of X on Y are on a log-odds metric.

------ END MATRIX -----

# Appendix N-Product expertise moderation on choice satisfaction (with control variables)

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : Chce_stf
    X  : Has_Lwas
    W  : Prod_ex

Covariates:
 On_shop  Gender   Age      Educatn  Ntionlty

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 Chce_stf

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3772      .1422     1.2262     6.5713     8.0000   317.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3.2517      .6471     5.0248      .0000     1.9785     4.5250
Has_Lwas     -.6605      .4825    -1.3688      .1720    -1.6098      .2889
Prod_ex       .1667      .0718     2.3212      .0209      .0254      .3081
Int_1         .1407      .1002     1.4049      .1610     -.0563      .3377
On_shop       .2711      .0807     3.3588      .0009      .1123      .4299
Gender       -.1326      .1284    -1.0327      .3025     -.3853      .1200
Age           .0182      .0054     3.3845      .0008      .0076      .0287
Educatn      -.0828      .0812    -1.0199      .3086     -.2426      .0769
Ntionlty      .1131      .0692     1.6348      .1031     -.0230      .2492

Product terms key:
 Int_1    :        Has_Lwas x        Prod_ex

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0053     1.9739     1.0000   317.0000      .1610

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

------ END MATRIX -----
```

# Appendix O-Product expertise moderation on choice deferral (with control variables)

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : CHOICE
    X  : Has_Lwas
    W  : Prod_ex

Covariates:
 On_shop  Gender   Age      Educatn  Ntionlty

Sample
Size:  326

**************************************************************************
OUTCOME VARIABLE:
 CHOICE

Coding of binary Y for logistic regression analysis:
    CHOICE  Analysis
       .00       .00
      1.00      1.00

Model Summary
       -2LL    ModelLL         df          p   McFadden   CoxSnell
Nagelkrk
   204.0042    14.0361     8.0000      .0808      .0644      .0421
.0864

Model
              coeff         se          Z          p       LLCI       ULCI
constant      .4861     1.7819      .2728      .7850    -3.0063     3.9784
Has_Lwas     -.8513     1.5147     -.5620      .5741    -3.8201     2.1175
Prod_ex      -.1256      .1771     -.7090      .4783     -.4727      .2215
Int_1        -.0488      .3321     -.1470      .8831     -.6998      .6021
On_shop      -.3583      .2244    -1.5971      .1103     -.7981      .0814
Gender        .0912      .3826      .2384      .8116     -.6587      .8412
Age           .0081      .0151      .5340      .5933     -.0215      .0377
Educatn      -.0167      .2479     -.0673      .9464     -.5026      .4693
Ntionlty     -.1545      .1914     -.8070      .4197     -.5297      .2207

These results are expressed in a log-odds metric.

Product terms key:
 Int_1    :        Has_Lwas x        Prod_ex

Likelihood ratio test(s) of highest order
unconditional interactions(s):
        Chi-sq         df          p
X*W      .0216     1.0000      .8832

********************** ANALYSIS NOTES AND ERRORS ************************
```

```
Level of confidence for all confidence intervals in output:
  95.0000

------ END MATRIX -----
```