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# **The effect of choice options in e-commerce**

Influence of high and low entropy options on choice behavior of people  
with different personalities

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Thesis presented to earn the degree Master of Science in International Management at  
the HFU Business School Furtwangen University

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## **Abstract**

This thesis investigates the effect choice options in e-commerce applications have on consumers' decision making. Previous research showed that a large number of options can affect consumers negatively. However, the conditions for such choice overload are unclear. After reviewing the existing research, the amount of information (entropy) contained in a choice set and individual differences were determined as possible influencing factors in an online environment. In a choice experiment, choice sets with varying information loads and an assessment of the Big Five personality traits were used to test the impact of the two identified factors on choice avoidance behavior. Results from chi-square-tests and a logistic regression model suggest choice overload but without entropy having an effect. A logistic regression model revealed that extraverted consumers are easier overloaded. A low Neuroticism score was found to be related to less occurrence of a too-much-choice-effect. Consumers with a high Openness score on the other hand choose one of the presented options more often and were therefore less often overwhelmed by the assortment. An interaction effect between personality and the amount of entropy was not found. These findings extend the research on choice overload and offer valuable input for marketers targeting consumers online.

**Keywords:** Choice overload; Too-much-choice-effect; Choice complexity  
E-commerce; Online shopping; Entropy; Information load; Personality;  
Big Five Inventory; Five Factor Model

## **Statutory Declaration**

I hereby certify this thesis is my own work and contains no material that has been submitted previously, in whole or in part, in respect of any other academic award or any other degree. To the best of my knowledge all used sources, information and quotations are referenced as such.

Place: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Timo Kienzler

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# 1 Introduction

In the age of online shopping consumers are offered a sheer endless number of products and services. However, in William Shakespeares *As you like it* the character of Rosalind already asks: "... can one desire too much of a good thing?" (Act IV, Scene I, p. 103). Around 400 years later consumer researchers answered that question with a yes. Experimental evidence suggests that although larger product assortments draw more attention than small assortments, relatively fewer consumers tend to buy from the larger assortment (Iyengar and Lepper, 2000). This effect of being overwhelmed by a vast selection is called *choice overload*. Although evidence for choice overload was found in prior research, it is unclear when it occurs since replication studies did not come to the same results as their predecessors (Scheibehenne, 2008). Therefore, the effect of choice overload seems to be complex in its causes, in that sense that other variables than just the size of the assortment needs to be considered.

Especially over the internet where physical space is not a restriction for businesses to present their goods, consumers are confronted with a plethora of options to choose from. E-commerce applications offer businesses the chance to reach consumers everywhere. But at the same time, they bare new obstacles. Consumers do not experience products online the same way they experience them in brick-and-mortar-stores. Sense of taste, smell, and touch are unavailable since consumers do not have the physical product in front of them. Instead all products and features have to be conveyed through mostly written information, which must be processed and understood. Another downfall for online marketers is the largely unmediated context of the internet. Sales clerks can aid consumers in evaluating the assortment. On the internet, such mediation is missing and consumers have to find out about the products by themselves. Furthermore, consumers process information differently. Consumers who are open to new experiences might want to know about every existing option and its features while neurotic consumers could become indecisive when presented with many similar choices. Thus, the unmediated content of online-shops can vary in presenting an optimal assortment from consumer to consumer. It is therefore important to know how assortments with high and low information load influence consumers with different personalities.



## **1.1 Research objectives**

The goal of this thesis is to investigate which effect complex choice situations in an online environment have on consumer decision making. At the core stands the aim to find out when and how choice overload occurs for consumers buying over the internet. The research focuses on two main factors, which are assumed to have a major impact on the choice behavior of consumers.

The first factor is the amount of information, also known as entropy, which needs to be processed by the consumer before reaching a decision. Lending from information load theory (Shannon, 1948) choice behavior in conditions with different entropy levels is investigated under the theory of limited human information processing capabilities (Streufert and Driver, 1965).

The second factor considered influential for choice overload are differences in personality. Consumers perception of the environment is influenced by their individual differences, which in turn leads them to act differently (Tybout et al., 1981). Personality, one specific individual difference, assessed with the help of the Five-Factor-Model (Goldberg, 1981) is thus used to investigate the relation between personality traits and choice behavior.

## **1.2 Outline of the thesis**

After this brief introduction, the thesis will continue according to the following structure. In Chapter 2 the topics of choice overload and e-commerce will be discussed. By reviewing previous research on the too-much-choice-effect, factors that could have an impact in an online environment will be identified. Subsequently the developed research approach to test the influence of the identified factors will be explained in Chapter 3. The gathered data will be analyzed and results will be presented in Chapter 4. A discussion of the findings will follow in Chapter 5. Chapter 6 will conclude the thesis by outlining the contributions and implications for further research.

## **2 Theoretical background and hypothesis development**

This chapter discusses the positive and negative effects choice has on people and their decision making. The phenomenon of choice overload will be presented and previous research outlined. Further, information about e-commerce will be provided and the proliferation of choice on the internet will be discussed. Probable influencing factors for choice overload will be presented. At the end of the chapter the research hypotheses will be formulated.

### **2.1 The effect of choice**

Choice is generally seen as something good. Choice as the opportunity to decide constitutes an important factor for personal well-being. Between two situations in which one either gets an option assigned or has the right to choose, the latter is preferable because one has control over the outcome. Having choice therefore also means having the freedom to choose. Having no choice makes people frustrated and helpless because they want to live a self-determined life (Taylor, 1979). Thus, choice is a key-element in self-fulfillment and life satisfaction (Ryan and Deci, 2001).

From a psychological perspective, it seems that having the opportunity to choose regardless of the alternatives or outcomes of the decision has a positive effect already. Langer and Rodin (1976) found a significant improvement in alertness, activity and overall well-being for inhabitants of a nursing home who were allowed to choose trivial things in their daily life and Zuckerman et al. (1978) found evidence that the possibility to choose is connected to higher intrinsic motivation.

But having plenty of options to choose from has a positive effect too. In a commercial context, various alternatives offer consumer the chance to find products which match their preferences (Lancaster, 1990). Because western countries like Germany or the United States are highly individualistic societies (Hofstede, 1983) consumers are encouraged through slogans like “Have it your way” from Burger King to express their individuality through consume. Retailers which provide large assortments are preferred by consumers

(Oppewal and Koelemeijer, 2005) because a greater possibility exists that consumers find products which match their self-concept.

However, having options to choose from can also have bad implications. A famous German proverb says “Wer die Wahl hat, hat die Qual” which translates to the one with the choice is the one tormented. It means that a decision process can put the decision maker under emotional or psychological distress when the alternatives are equally tempting. This notion of negative effect from choice opportunities which is known among the general public is also supported by scientific findings. Greenleaf and Lehmann (1995) found out that one of the main reason consumers delay buying decisions is that they cannot decide on a single option of the choice set. The more options a choice set consists of the more options need to be eliminated during the decision process. Eliminating options needs reasoning but weighing the advantages and disadvantages of options against each other becomes more difficult with an increasing number of option, which results in a decreasing willingness to choose (Shafir et al., 1993). Hafner et al. (2012) also shows that choosing from a larger choice set increases counterfactual thinking about the forgone alternatives which results in regret and less satisfaction with the chosen option.

Such detrimental psychological effects arising from a provision of extensive choice options are often referred to by choice overload (Iyengar and Lepper, 2000). However, other terms are used to refer to the same effect such as too-much-choice-effect (Scheibehenne, 2008; 2010) or excess choice effect (Hafner et al. 2012). During this work, the terms choice overload and too-much-choice-effect will be used only. What exactly constitutes extensive choice is unclear but Iyengar and Lepper (2000) operationalized it as “...reasonably large, but not ecologically unusual, number of options” (p. 996.).

### **2.1.1 Findings of an excessive choice effect**

Because several negative effects are summarized under the choice overload term the research methods and findings of a selection of studies, which found an effect will be presented in the following part.

### **2.1.1.1 Iyengar and Lepper (2000)**

In a North American supermarket Iyengar and Lepper (2000) conducted an experiment about the effect of the number of choice options on consumer behavior. On two separate days in two separate supermarkets the researchers displayed one time six different types of jam and on the other day 24 different types. A rather unknown brand of jam with exotic flavors was used because consumers with prior preferences for brand or flavor would simply match them to an option which would prevent the occurrence from overload. Although from 242 people passing by 145 stopped to look at the extensive display of 24 jams only four purchased jam, whereas from the 260 people who passed by the limited choice of six jams displayed only 104 took a closer look but 31 purchased a jar of jam. The authors concluded that this huge difference between conversion rates from 3 % for the extensive display and almost 30 % of the limited display shows that although consumers are initially more interested in a high number of choice options—see the number of people who stopped at the display—it can result in a lower number of actual sales.

In a second experiment, Iyengar and Lepper (2000) offered students from an introductory social psychology class at Stanford University the opportunity to gain two extra-credit points for an additional assignment. The assignment consisted of watching a movie and then writing a short essay about the movie in relation to one of the offered topics. Without the students knowing they were grouped into a large and a small choice condition by the number of offered topics (either 6 for the small choice condition or 30 for the large choice condition). The topics were psychological concepts discussed in class and the students were told that in order to gain the credits they had to write the essay and submit it. Because Iyengar and Lepper were interested in the intrinsic motivation of the students when they encounter large and small choice conditions, they were told that the essays would not be graded. However, the essays were graded and the scores were used as one of the dependent measures. The other was the number of students who submitted the essay. The result showed that a higher number of students from the small choice condition submitted their essays and that their work was also slightly better in terms of content quality.

Iyengar and Lepper conducted a third study as a laboratory experiment to investigate the “mediating mechanisms underlying choice overload” (Iyengar and Lepper, 2000, p. 999). In this experiment participants choose a chocolate from either a large (30 chocolates) or a small (6 chocolates) assortment. Later participants of the experimental groups tried their chosen chocolate and participants from a control group tried chocolate randomly assigned to them. After the participants in the experimental conditions chose chocolates to sample they were asked how enjoyable, difficult and frustrating the selection process was for them, what expectations they had for their chosen sample and what they expected for the chocolate tasting. The questions about the selection process had the purpose to find out whether people could find the selection process both enjoyable and overwhelming at the same time. The questions about the expectations of the sampling were to answer if participants in the small choice condition were likelier to optimize and participants in the large choice condition were likelier to satisfice. If people had no high expectation for their sample they were to be believed to have opted for the first acceptable options. Expectations about the testing of the chocolate were aimed to investigate if people in the large assortment group would experience higher levels of regret with their choices. After all participants tasted the chocolate, they were asked how satisfied they were with the chocolate they tasted. After those questions, they were told that the experiment was over and that they could go into the next room to receive their compensation. There they were offered to take 5 dollars which was initially promised for the participation or they could take a box of four chocolates also worth 5 dollars. This last choice was another dependent variable. According to the authors the results suggested that participants can indeed find choosing from a large assortment more enjoyable but at the same time more difficult and frustrating. Participants in the small choice condition were also more satisfied with the chocolate they tasted than participants from the large choice condition, while both of those groups were more satisfied than the participants in the control group. Much like in the first study the participants in the small choice condition took the product significantly more often (48 % in the small condition, 12 % in the large condition and 10 % in the no-choice condition).

### **2.1.1.2 Chernev (2003)**

In a laboratory experiment Chernev (2003) investigated the effect of small and large choice sets on confidence with which participants made their choice. Participants had to choose a chocolate either from a small assortment consisting of four different chocolates or from a large assortment consisting of 16 chocolates. In both assortments, the chocolates were described on 4 attributes. Around half of the participants were asked to consider their ideal point, which is their ideal combination of attribute levels, before making their choice. After they made their choice they were asked if they would like the chosen kind of chocolate as compensation or rather switch to one of the most popular flavors. The switching was seen as a measure of preference strength. The results showed that participants without an ideal point switched more often when they had to choose from the large assortment (38 % of participants) than when they chose from the small assortment (9 % of participants). Participants who articulated their ideal point beforehand, however, were less likely to switch when they chose from the large assortment (13 % of participants) than from the small assortment (27 % of participants). Thus, Chernev concluded that large assortments have a decreasing effect on the confidence with which one chooses an option when there are no clear prior preferences.

### **2.1.1.3 Reutskaja and Hogarth (2005)**

Reutskaja and Hogarth (2005) found empirical evidence that unlike assumed in classic economic theories an increasing number of choice options does not result in an increasing level of consumer satisfaction. Instead they propose an inverted U-shape form, where consumer satisfaction increases together with the number of choice options up to a maximum after which it decreases with every additional choice option. In their experiment, they showed participants pictures of gift boxes, which differed in color, shape, or in both. Their experimental design differed from previous studies in that sense that they utilized not just a small and a large choice condition but intermediate values too. Participants were asked to choose one of either 5, 10, 15 or 30 gift boxes which they would likely buy to wrap a present for a friend. Using similar items like Iyengar and

Lepper (2000) the participants were subsequently asked about their satisfaction with the choice they made and the selection process, and the difficulty they experienced while making their decision. In order to find out about cultural differences the study was conducted with a Western European sample (Spain) and an Eastern European sample (Ukraine and Belarus). Reutskaja and Hogarth summarize in the results that in the Western Europe sample satisfaction was the highest for the 10-option sets while participants in the Eastern European sample were most satisfied with the 15-option sets. The mean satisfaction ratings for both samples showed an inverted U-shape. The ratings for the selection process followed a similar U-shape while the perceived difficulty of the task rose continually together with the number of options to choose from.

#### **2.1.1.4 Shah and Wolford (2007)**

Much like Reutskaja and Hogarth (2005) Shah and Wolford (2007) were interested in finding out more about the point when consumers experience the adverse effects of choice overload. They used an experimental design with ten choice sets ranging from 2 choice options in the smallest set with increments of 2 options to the largest choice set with 20 options. In a field study, they asked bypassing students, who were unaware of the ongoing research, to help decide on a type of pen to buy for the faculty. They asked the students to look at the pens and then decide which one they liked the best. After that the students were told that all of the pens were in the price range of two dollars but because of their help the students could buy as many pens as they want for one dollar each. The number of students who bought a pen was the dependent measure. The researchers combined the choice sets into three groups, the lowest three (2 to 6 pens), the middle four (8 to 14 pens) and the highest three (16 to 20 pens) and calculated the number of students who bought a pen. In the lowest group 47 % (N = 30) bought a pen but in the highest group only 33 % (N = 30). However, 70 % (N = 40) of the students in the middle group acquired a pen. The researchers argued that the inverted U-shaped relationship between assortment size and buying decision supports the theory of an optimal number of choice options after which consumer become overloaded.

The above presented studies investigated what effects overly large assortments have on consumers. The found effects range from increased difficulty of the choice situation and decreased satisfaction with the choice made choose (Study 3, Iyengar and Lepper, 2000; Reutskaja and Hogarth, 2005) to lower confidence in the option selected (Chernev, 2003), post choice regret (Study 3, Iyengar and Lepper, 2000) and a lower propensity to buy or use the presented options (Study 1 and 2, Iyengar and Lepper, 2000; Shah and Wolford, 2007).

### **2.1.2 Studies without an excessive choice effect**

The finding of adverse effects for consumers through larger assortments and its implications for retailers, which do not support an ever-growing number of product alternatives, are contrary to general belief. Although the empirical evidence of the above presented studies supports the choice overload theory the same can be said about the positive effect of variety on purchasing behavior since retailers which offer many options within one product group enjoy large market shares (Huffman, and Kahn, 1998). Consequently, the effect of choice overload and its underpinning psychological processes are questioned.

#### **2.1.2.1 Scheibehenne (2008)**

Especially the findings of Iyengar and Lepper (2000) with their large effect sizes draw a lot of attention to the topic. Thus, in an effort to ensure the robustness and replicability of choice overload Scheibehenne conducted field and lab experiments, which were similar in their structure to previous research.

#### **Jam study**

As an initial effort to assess the validity of choice overload research, Scheibehenne (2008) tried to replicate Iyengar and Lepper's Jam study (2008). With only 3 % buying



consumers in the large assortment condition against 30 % in the small assortment condition, the study showed a large effect size with a Cohen's  $d$  of .77 (Cohen, 1977). Due to this large effect, a successful replication of the results was deemed to be likely by Scheibehenne.

The original experiment was situated in the United States in California and the replication in Berlin, Germany. Similar to the original study the experiment took place on two consecutive Saturdays in an upscale supermarket well-known for its great product variety. In the entrance area of the store a table was set up where consumers could try exotic jam flavors of the high-quality brand *Lafayette Confiture*. Likewise, the choice condition sets were the same size with 24 different jams in the large assortment and 6 different jams in the small assortment. The displayed assortments were switched hourly over 8 hours each day. Consumers could taste as much jam as they liked and were given a coupon for a discount afterwards. They were given a coupon even if they only stopped at the table but did not taste any jam. Consumers who wanted to buy one of the jams had to go to the shelf inside the store where all available flavors were displayed and take one jar from there. The coupon was valid for one week. Differences pointed out by Scheibehenne in the replication study and the original study are as follows. First the coupon value was 1 euro on the first Saturday and 0.5 euro on the second while it was always a \$ 1-discount in Iyengar and Lepper's experiment and second Scheibehenne used two different small assortments during the four hours the small assortment condition was displayed. Prior to the experiment Scheibehenne used a method similar to the one used in the original study for selecting jams for the small assortment. Students had to "...indicate the four "best-sounding" flavors, four "good- but not excellent-sounding" flavors, and four "worst-sounding" flavors" (p. 43). Iyengar and Lepper used the two best, the two worst and two moderately rated options to create their small choice set but in Scheibehenne's case some of the flavors were perceived as equally attractive and unattractive. He therefore created a second small set of six randomly selected flavors. The two assortments were each displayed for two hours per day in total.

Although the experiment design was similar to the original one the result was different. From the 239 consumers who saw the large assortment 32 % used the coupon in

comparison to 33 % from the 265 consumers who saw the small assortment<sup>1</sup>. Thus, there was no significant effect between the assortment size and the purchasing behavior,  $t(504) = 0.19$ ;  $p = .85$ . The manipulation via the coupon value showed a main effect with 46% of consumers who redeemed a coupon worth 1 euro while only 24 % made use of the 0.5 euro coupon,  $t(504) = 5.07$ ;  $p < .001$ . However, Scheibehenne conjectured that the result could be influenced by the day of the study. Because the 1 euro coupon was used on the first Saturday when people tasted more jams on average than on the second Saturday when the 0.5 euro coupon was used (1,9 jams versus 1,6 jams,  $t(502) = 6.75$ ;  $p < .001$ ). On the first Saturday 193 consumers came to the set up while 311 came on the second Saturday. Scheibehenne therefore hypothesizes that consumers on the second Saturday could have forgone the chance of tasting as much jam as they wanted to make space for other consumers. Because there was a small but positive relation between the number of tasted jams and the likelihood of redeeming the coupon ( $r = .26$ ) Scheibehenne stated that the result of the coupon value cannot be clearly interpreted. However, it was clear to him that on none of the two days an effect of assortment size on redeeming the coupon could be witnessed.

### **Wine Study**

Due to the strong effect size in Iyengar and Lepper's study (2000) and no effect in his replications study Scheibehenne proposed a couple of factors that could explain the different results.

One of the factors he proposed could have been that in the replication study the store was located in a central area that, especially on the weekends when the experiment took place, is frequented by many tourists. The supermarket in the original study was placed in a residential area where people go for their weekly groceries shopping. Thus, Scheibehenne conjectured that the participants of the two experiments could have had different expectations when approaching the tasting booth. Possibly tourists were looking for new experiences and were therefore more open to the variety of the large assortment while

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<sup>1</sup> The two small assortments showed almost no difference in the gender of the taster, the number of tasted jams and the number of used coupons which is why the data were collapse into one small assortment.

weekly shoppers were more inclined to stick to their pre-determined shopping list. Scheibehenne addressed this issue of different expectations through another study. The so-called wine study took place at a supermarket in a residential area. The experiment design was again similar to the Jam study however the small choice set consisted of three different wines and the large set of twelve. The rest of the design was like the design used in previous experiments with a set up where consumers could taste the products and got a discount coupon that they could redeem within one week which served as the main dependent variable. Much like in the first study by Scheibehenne no effect between assortment size and the number of redeemed coupon could be seen. From the 139 consumers who saw the large assortment 54 (38 %) used their coupon to buy wine from the assortment whereas from the 141 consumers who saw the small assortment only 48 (35 %) made use of the discount,  $t(278) = 0.55$ ;  $p = .58$ ;  $d = -.10$ .

Another explanation offered by Scheibehenne for the opposing results of the jams studies from him and Iyengar and Lepper could have been differences in the small choice sets. As explained before the small choice sets consisted in both studies of two of the most, least and moderately attractive sounding options to display a varied assortment to the consumers. However, Scheibehenne found out that the ranking of the flavors established prior to the experiment did not match with the preferences of the consumers. Two of the flavors which were perceived as least attractive during the name-rating in the pretest where among the six most tasted and bought flavors and the most attractive rated flavor of the small set was tasted the least often in store. Still the attractiveness of the flavors in the small choice sets differed in tasting and purchasing frequency, but because of the low validity of the pretest Scheibehenne argued that this must be seen as a random occurrence. Unfortunately, there is no data available for the frequency with which each flavor was purchased in the original study but because the pretest for determining the small choice set was based on only the names of the different jams as well Scheibehenne noted that it is possible that Iyengar and Lepper ended up with six of the most popular flavors in their small choice set by chance. That means that "...the probability of purchase from the small set could have been artificially increased in their study, which would then be interpreted as a too-much-choice effect" (Scheibehenne 2008, p. 46).

In both studies the consumers had to go to the shelf in the store to get a jar of jam to purchase where they encountered the whole assortment with every flavor present. This led Scheibehenne to the question why consumers from the large choice condition should experience the too-much-choice-effect at the tasting booth albeit consumers from the small choice condition were confronted with the large choice set at the shelf as well but were not affected by overloading. An explanation provided by him is that consumers could have made up their mind about the flavor they wanted to purchase after they left the tasting booth. As mentioned before Iyengar and Lepper did not record which flavors were purchased however Scheibehenne recorded the flavors purchased for each consumer in the jam as well as in the wine study. Those records showed that in the jam study 19 % of the consumers from the small condition did not purchase a flavor which was displayed at the tasting booth and even 60 % of the consumers in the wine study respectively. The author concluded that this means that a substantial number of consumers made their final decision with the large assortment in front of them without being overwhelmed.

Because of the different results Scheibehenne decided to replicate another study. This time because of the multitude of unpredictable confounding variables, which can arise in a field experiment, the well-controlled environment of a lab-study was chosen by him.

### **Jelly Bean Study**

With the jelly bean study Scheibehenne aimed to reproduce the results from Iyengar and Lepper's (2000) third study also known as the chocolate study. The experimental design followed the original study again closely with its main differences being that instead of *Godivia* Chocolate, *Jelly Belly* jelly beans had to be chosen, eaten and rated by the participants. Like in the chocolate study the participants were asked before the experiment if they knew jelly beans and how often they consumed them. In order to exclude prior preferences only participants who did not know or only occasionally consumed the sweets were recruited. In the two choice conditions either six jelly beans or 30 jelly beans were presented to the participant on a tray. There was a total of five small assortments, which consisted of a subset of the large assortment. Each jelly bean was equally often presented in the small assortment during the whole study. As in the original study participants had

to indicate the perceived variety on 9-point Likert scale from 1 (too few jelly beans) to 9 (too many jelly beans), choose a jelly bean they would like to sample and then before sampling rate the difficulty, frustration and enjoyment of the selection process and their expectations of the taste. After tasting the bean they were asked to rate their satisfaction and regret with their choice, the possibility that there would be a better tasting bean on the tray and the how good the overall taste of the assortment they saw in front of them would be. All ratings were made on a 9-point Likert scale from 1 (not at all) to 9 (very much). Additionally, to the measures used in the original study the participants in the replication study were asked how much they would pay for a box of 50 jelly beans with the flavors presented in front of them in euro. After the procedures participants received a coupon valid for a small box of jelly beans which they could redeem at an office in another wing of the building. The study took place consecutive to another unrelated study and participants were monetarily compensated for the whole time they were in the lab.

Overall 66 persons, who were mainly students, participated in the study; 33 in each choice condition. 23 participants had never heard of jelly beans before, 24 had never ate them before and 19 participants consumed the sweets occasionally. There were no significant differences between participants who had never eaten jelly beans before and participants who had. The manipulation of the participants showed an effect as the small assortment was on average perceived as smaller than the large assortment albeit none of them were perceived as extreme (4.2 in the small condition and 5.6 in the large condition). The ratings of the choice process showed similar results as the ones from Iyengar and Lepper (2000). The participants in the large condition experienced the choice task as more difficult, more frustrating but at the same time as more enjoyable. They also had slightly higher expectations for their chosen jelly bean but unlike in the original study the two groups did not differ in their actual satisfaction with the taste of chosen jelly bean. If anything, contrary to Iyengar and Lepper's (2000) findings the participants of the large choice condition were a little bit less disappointed than the participants from the small choice condition. Scheibehenne also reported that the participants regretted their choice less albeit they had a stronger believe that there were better options available on the tray and they evaluated the whole assortment as better tasting than their counterparts from the small choice condition. Participants valued a small box of jelly beans with 1.60 euro in the small set and 1.70 euro in the large set at roughly the same price. Also, there was no

major difference at the number of the redeemed coupons. In the small choice condition 21 (64 %) participants used their coupon to get the small box of jelly beans while 26 (79 %) from the large assortment did so,  $t(64) = -1.1$ ;  $p = 0.28$ . Although the numbers are not significant the fact that more people from the large assortment redeemed their coupons stand in a sharp contrast to findings supporting choice overload (Iyengar and Lepper, 2000; Chernev, 2003).

Scheibehenne (2008) replicated Iyengar and Lepper' (2000) experiments closely following their original design. However, he was not able to replicate the results. Neither in the field study nor in the laboratory experiment could Scheibehenne find a too-much-choice effect. Because of the strong effect sizes found by Iyengar and Lepper (2000) it is odd that the results could not be reproduced. Scheibehenne (2008) offers two possible explanations for the diverging results. According to him it could either be that the actual effect of choice overload is much smaller than found in the original studies and that the different findings arrive from unsystematic sampling or random errors. The second explanation could be that there are systematic differences in the studies.

#### **2.1.2.2 Scheibehenne et al. (2010)**

In order to scrutinize the real effect size of the choice overload phenomenon, Scheibehenne et al. (2010) conducted a meta-analysis, which investigated the too-much-choice effect across several studies. In the meta-analysis Scheibehenne et al. (2010) compared data from 50 published and unpublished experiments ( $N = 5036$ ). They calculated the effect sizes of every experiment and weighted them with the number of participants divided by the total number of participants of all considered experiments. The resulting overall effect size was  $d = .02$ . According to the authors this close to zero effect size suggests that the too-much-choice effect is not a robust phenomenon. However, both Scheibehenne et al. (2010) and Chernev et al. (2010) who commented on these findings remarked that a meta-analysis might not be the right approach because of the different underlying conditions in the experiments. As an example, Chernev et al. (2010) used data from Chernev (2003) to argue that participants without a prior articulated

preference (ideal point) were less likely to change their initially chosen chocolate when confronted with a small assortment than participants who faced a large assortment (9 % of responses vs. 38 % of participants;  $p < .05$ ;  $d = .71$ ). Moreover, participants who articulated their preference were more likely to switch when they had to choose from a small set than participants who chose from a large set (27 % vs. 13 %;  $p < .25$ ;  $d = -.36$ ). Chernev et al. (2010) argued that both examples support choice overload. The first shows post-choice-regret as a negative effect of large assortments through the switching behavior and the second shows the directionally opposite effect under the prior preference condition. By adding the two data points their effect sizes cancel each other out because of the different directions which leads to an overall null effect (18 % vs. 21 %;  $p > .40$ ;  $d = .16$ ) although they both support the too-much-choice-effect.

This means that because of the variety of different factors which moderate the effect of assortment size on choice behavior the meta-analysis approach is insufficient to establish an overall effect size of choice overload. Instead it makes sense to identify variables and factors, which influence the occurrence of choice overload.

## **2.2 E-commerce**

E-commerce (short for electronic commerce, the trading of goods and services via the internet) is a constantly rising sector. For example, in the first quarter of 2007, only 3.2 % of the U.S. retailer revenue was generated through e-commerce. However, in the fourth quarter of 2016, this amount rose to 8.3 %, which translates to almost \$ 102 billion in retailer revenue (U. S. Census Bureau News, 2017). While this still constitutes only a small fraction of the total retail sales e-commerce is on the steady rise and online retailers like *Amazon* which started a simple online bookshop makes nowadays billions of dollars of revenue without a net of brick-and mortar stores (O'Brien, 2017; Dastin and Tharakan, 2017).

### 2.2.1 The role of e-commerce

The internet provides its users with an infinite amount of transaction option. Most retailers with an online representation have also an online shop included into their site. Nearly every product, which one can buy in brick-and-mortar stores, is available online as well. Revenues from products like music, movies, software and videogames, which can be distributed in digitalized form, move from hardcopies sold to download and streaming services. In the areas of music and movies the part of revenue generated through online channels already overtook the part of revenue from traditional channels. (PWC, 2017a; PWC, 2017b). Companies like *Zalando* or *About You* which sell apparel and accessories online take over revenue from brick-and-mortar-stores as well, by offering consumers the opportunity to try on clothes at home and returning them without a specific reason and any additional costs. Even supermarkets and discounters use online applications to extend their customer base and increase their sales. German supermarket chains like *Rewe*, *Edeka* or *Kaiser's Tengelmann* display parts of their assortment on their websites where consumers can buy products directly over the internet (Grimm, 2015) and *Aldi Süd* launched an online shop with the aim to increase their international customer base by tapping into the vast Chinese market (Focus, 2017).

Moreover, the share of purchases made through e-commerce will further rise because online applications serve the need for flexibility and convenience of modern consumers (Walters, 2013). Assortments are available to the consumer at every time. Whether it be day or night, products can be found, compared and ordered online. Admittedly, buying online has the disadvantage that the order first has to be processed and then delivered to the consumer whereas customers from brick-and-mortar-shops are directly in the possession of the products. However, many big online retailers have optimized their processes to decrease delivery times. *Amazon* even offers its *Amazon Prime* members in some locations same day delivery every day of the week for free (Chowdhry, 2016) which together with the fact that the goods are delivered to one's home almost offsets the disadvantage of not having the products right after the purchase.



Still the largest part of total retail revenue may still come from traditional stores but online product displays influence offline shopping as well. E-commerce application not only lead to steadily growing revenue numbers but are also used to inquire about products.

Even consumers who prefer to buy in brick-and-mortar-stores seek out online stores in order to plan their offline shopping (Rohm and Swaminathan, 2004) But not only young consumers use the internet for commercial tasks. A German study about buying behavior of heavy online shoppers, which are defined as consumers who buy at least once a week online and make half of their purchases (excluding groceries) over the internet, found out that 46 % of heavy online shoppers are between 30 and 49 years old (Mertens and Bolz, 2016). Another study about the online shopping behavior of U.S. adults between the age of 18 and 65 showed that while in the year 2000 only 22 % purchased goods online this number steeply rose to 79 % for the year 2015 (Smith and Anderson, 2016). Because the revenue made through e-commerce will further increase and because consumers buy online more often and use the internet to gather product information a large part if not even all of the choice process happens in front of a screen. Product assortments displayed online therefore play a crucial role in conveying consumer interest into purchases.

### **2.2.2 The abundance of choices on the internet**

Even though product assortments in brick-and-mortar-stores can consist of vast numbers of options they are eventually limited by the physically available space on the store shelves. Furthermore, after the number of stock keeping units (SKU) escalated from 6000 SKUs at the end of the 1980s to more than 30,000 SKUs in the early 1990s (Broniarczyk and Hoyer, 2005) retailers are interested in streamlining their assortments to optimize the usage of their storage space and reduce costs (Oppewal and Koelemeijer, 2005). On the internet on the other side assortments sizes have no physical boundaries since every online shop regardless of the size can display many thousand products. Similarly, SKUs do not pose such a great challenge either since the offered products do not need to be available in several stores. Instead the bundled demand can be satisfied from a distribution center where the goods are stored. Therefore, online shops are predestined to offer large assortments.

Moreover, another advantages of the internet is that high amounts of information can be transferred at low cost to the consumer, making it easier for them to consider a large number of product options and thus the likelihood to find the right product increases (Alba et al., 1997). Search engines help to identify relevant online shops and search options in the shops let consumer find the right products within seconds thus facilitating the search process immensely (Chen et al., 2009). Comparing products presented in two different online shops is easier as well since the assortments are only a couple of clicks away from each other.

Rohm and Swaminathan (2004) point out that people who buy over the internet do so because they are looking for a great variety of choices and favor additional information provided about the product. Displaying a high number of options therefore match consumers' interest. This can also be seen in the great success of websites from companies like *Amazon, ebay or Aliexpress*. On those sites which act as an online market place retailers can present their products to a larger customer base which results in an assortment variety of millions of options for the consumer to choose from. For example, for the search term "watch" amazon.com provides 1,293,885 options, ebay.com offers 1,167,483 options and aliexpress.com shows 488,938 results. These numbers for a single product are way beyond the possibility of every brick-and-mortar-store.

Because of less physical restriction and lower cost for providing product options online shops can display larger assortments then it would be possible in regular shops. Consumers therefore find themselves confronted with a much greater choice task online.

### **2.3 Choice overload in e-commerce**

As shown in the previous chapter the number of choice options presented in assortments online are likely to surpass assortments presented in brick-and-mortar-stores. The chance that consumers become overloaded while online shopping is therefore high. However, previous research did not always find detrimental effects of large assortments on choice behavior. It is therefore important to consider other possible factors which could induce

overload on the internet than only the number of alternatives in an assortment. Chernev et al. (2010) wrote that:

“...choice overload can be represented as a function of the fit between [...] the decision maker’s ability to deal with complexity (e.g., preferences, expertise, and individual-difference factors) and [...] the complexity of the decision problem (e.g., number of attributes, number of attribute levels, and time pressure)” (p. 428).

As was mentioned by other researches (Iyengar and Lepper, 2000) clear prior preferences prevent consumers from becoming overwhelmed even when confronted with large assortments because of simple preferences matching. The same goes for expertise about the product. Having high expertise is probably connected to preferences for certain features of the products group as well. The absence of those two factors is therefore a precondition for the occurrence of choice overload. Although these two factors have a clear impact on choice overload they cannot be the only factor since Iyengar and Lepper (2000) controlled for product familiarity in their chocolate study and still found a clear effect. Thus individual-differences must have an impact as well.

Individual differences could explain when and why people become overloaded. One such difference in personality is described by the satisficing vs. maximizing theory. Schwartz et al. (2002) define maximizers as persons who search for the best available option and thus maximize their outcomes. Decision makers who stop searching after finding a satisfactory option are called satisficers. This construct seems to be appealing to partly explain choice overload because maximizers enjoy large assortments to choose from albeit having problems deciding on an option. They also tend to be less satisfied with their final choice (Dar-Nimrod et al., 2009). This pattern matches the findings of previous studies like the Chocolate study (Iyengar and Lepper, 2000) and the Jelly Bean Study (Scheibehenne 2008), in which participants enjoyed the larger choice set more but found it at the same time more difficult to choose from. However, while post choice satisfaction in the large set was lower than in the small set in Iyengar and Lepper’s chocolate study (2000) it was the other way around in the Jelly Bean Study by Scheibehenne (2008), which does not fit the satisficing behavior. Moreover, Scheibehenne (2008) scrutinized the relation between choice overload and maximizing in an additional study in which he

utilized the maximization scale created by Schwartz et al (2002) but found no supporting evidence either.

However, satisficing and maximizing constitute only one of many psychological constructs which could moderate the effect of choice overload. It thus, might be good to identify differences in personality with a broader approach. The Five Factor model (FFM), which assesses individuals on five broad personality dimensions, is such an approach. The model and the theory behind the model will be presented in further depths in Chapter 2.5.

In the decision problem part mentioned by Chernev et al. (2010), time pressure is mentioned. Although probably a valid factor in traditional shopping time pressure is not seen as a major influence in e-commerce. Shopping in brick-and-mortar-stores is limited by the business hours. Shoppers therefore must consider the closing times when making purchases at a physical location. Over the internet however online shops can be entered and browsed even at midnight. Further, the search process can be paused and later continued since the assortment stays open in a browser window. Time pressure is consequently unlikely to be an influencing factor in online shopping.

Chen et al. (2009) mention that search mechanism and filtering tools can facilitate the handling of available online options however because of the vast assortments even after filtering an extensive number of options is likely to remain. It is thus necessary to consider the different influence factors such as number of alternatives, attributes and attribute levels.

In previous research, mostly the number of alternatives were considered. Chernev (2003) also controlled for attributes and attribute levels and it seems that the number of attributes with which a choice option is described plays an important role in the occurrence of overload. Although Scheibehenne's jam study (2008) closely followed the design of the original chocolate study (Iyengar and Lepper, 2000) they differed in the name giving stimuli. Jelly beans only vary in their color and taste. The chocolates used by Iyengar and Lepper however additionally differ in their shape, texture and filling and while the taste of jelly beans can mostly be described by one or two words (e.g. "Melon" or "Tutti-Frutti") each *Godiva* chocolate consists of several ingredients which results in elaborate

product names (e.g. “Dark Chocolate Vanilla Mousse Truffle”). Thus, a rather simple stimulus was used in the replication experiment in comparison to the complex options presented to the participants in the original study. It could thus be that choice complexity mediates the effect of assortment size on choice behavior. As it is mentioned in Chernev et al.’s (2010) commentary, sheer difference in assortment size seems to be a bad predictor for overload as there are studies which had extensive choice sets with rather few options, which found an effect, and studies with many options which did not find an effect.

Scheibehenne (2008) addressed this problem in another study in which he presented the participants with choice options, which were described on several attributes and thus more complex. In this restaurant study participants were asked to look at a list of local restaurants, which were described, by a short narrative paragraph and ratings about the quality of food, drinks, service and atmosphere. The main dependent variable was the number of participants who chose the coupon and the choice sets consisted of 5 restaurants in the small set and 30 restaurants in the large set respectively. The manipulation check showed that participants perceived a significant difference in the size of the two choice sets with a rating of 4.9 for the large set and 3.1 for the small set on a 7-point Likert scale (4.9 vs. 3.1),  $t(78) = 5.61$ ;  $p < 0.01$ . Although the choice environment was created so that different choice behaviors between the small and large choice condition would arrive easily there still was no significant difference. With 14 of the 40 (35 %) participants from the large condition more chose the restaurant coupon than in the small condition where only 12 of the 40 (30 %) participants chose the restaurant coupon and therefore once again no too-much-choice effect was found.

However, it is unclear what too much choice is and because prior research suggests that rather than the number of choice options, the complexity of the choice situation needs to be considered it is necessary to use a method with which the complexity can be measured. Without being able to determine in which way alternative, attributes and attribute level contribute to the complexity of a choice situation it remains impossible to evaluate whether the situation was complex enough for overload to occur. The concept of Shannon Entropy which is used in calculating information overload could serve as a fitting measurement for the complexity of the decision problem in choice overload as well. The theory behind information overload will be outlined in chapter 2.4.

## 2.4 Entropy as a measure of choice complexity

As outlined above one problem of choice overload theory is the lack of a fitting measurement to control for the complexity of the assortment. The sheer number of alternatives is insufficient to capture the cognitive effort needed by the consumers to deal with the decision problem. Additional factors such as the number of attributes or the different attribute levels increase the complexity of the choice situation as well. Therefore, they should be considered when talking about choice complexity. One way to do so would be to treat the product assortment as a message, which is communicated to the consumer. When the product assortment is seen as a message to the consumer the concept of Shannon Entropy can be used to calculate the complexity of the assortment.

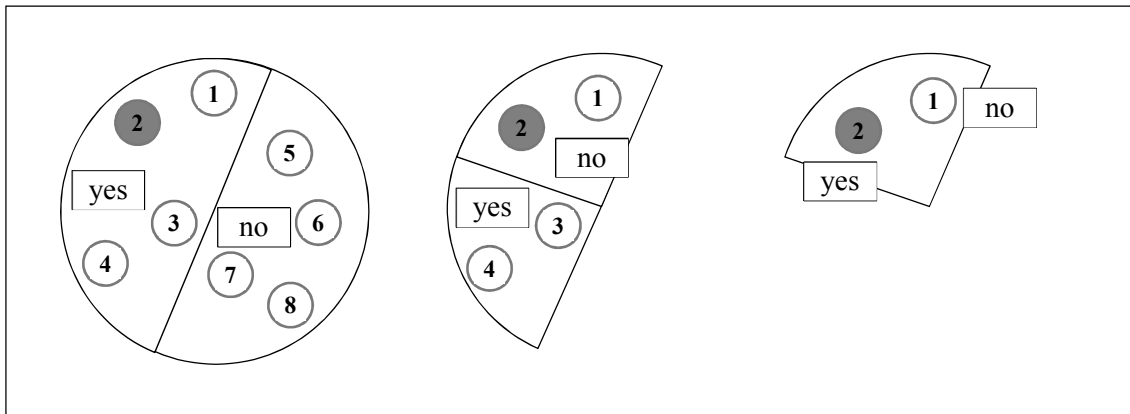
### 2.4.1 Shannon Entropy

The concept of Shannon entropy goes back to the mathematician Claude E. Shannon, who started, with his fundamental paper *A Mathematical Theory of Communication* (1948), modern Information Theory. In his work, Shannon defines entropy as measure for the mean information content per signal of a source, which constitutes a system or an information string. His original intention was to use entropy as a measure to define the needed bandwidth of a communication channel. However, entropy was further applied to different fields of research and used as a measure for information content (Cover and Thomas, 2006).

Information in this context is a way to quantify resolved uncertainty. The more signals are sent from a source the more information is received and the less uncertain is the actual message, which is meant to be transferred. Therefore, the information content of a signal depends on the amount of uncertainty it can resolve and this depends on the possible values a signal could take on. If a value, which the signal can take on with the probability of  $p_i$ , is actually taken on, then a value from the hypothetical set of  $\frac{1}{p_i}$  equally likely stochastically independent values is taken on (Shannon, 1948). In order to distinguish the

actual value taken from the other possible values, one needs to inquire about that value with the so-called optimal binary questions. Such an optimal binary question is defined as a question which can only be answered with yes or no and both answers are equally likely while the answer will divide the set of possible values in half (Bischof, 1995). Figure 1 illustrates the usage of optimal binary questions. In the example, there are eight possible values of which the signal has taken on the value of two. To identify the taken-on value three optimal binary questions are needed. The questions could be: “Is the value below five?” (yes); „Is the value higher than two?” (no); „Is it one?” (no) (Bischof, 1995).

**Figure 1: Reduction of possible values with optimal binary questions**



*Source: Bischof, 1995 p. 61.*

Generally speaking, the number of needed binary question for a set of  $n$  possible values is given by  $H_{max} = \log_2(n)$ . The decision content of the signal  $H_{max}$  is a dimensionless quantity but in order to differentiate it from other dimensionless numbers and quantities the symbolic unit “bit”, which is short for binary digit, is often added (Shannon, 1948). If the possible values of a signal are all equally likely then the decision content is equal to the mean information content (entropy).

If assumed that a signal can take on  $n$  different values which are described by  $\{x_1, x_2, \dots, x_n\}$  and the probability with which each value  $x_i$  is selected was  $p(x_i)$ , while for every value  $p(x_i) = \frac{1}{n}$  applies, then the decision content is the same as the mean information content and can be calculated with the below formula (Bischof, 1995).

$$H_{max} = -\log_2 \left( \frac{1}{p(x_i)} \right) [\text{bit}]$$

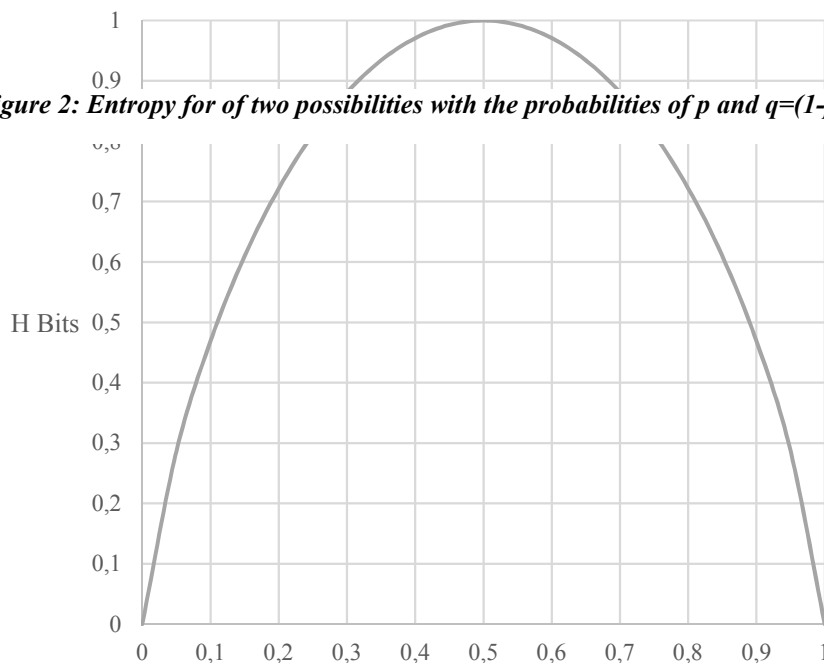
**Formula 1: Decision content. Source: Bischof, 1995 p. 62,**

However, Formula 1 is only applicable when each value is equally likely. If one of the values is more likely to occur than the others, then the probability of each value to be taken on must be considered. After Shannon (1948), the entropy  $H$  of a discrete random variable  $X$  with possible values  $\{x_1, x_2, \dots, x_m\}$  is defined as follows: First each probability  $P(x_i)$  of a possible value gets assigned its information content  $I(x_i) = -\log_2 P(x_i)$ . Then the entropy of a signal with unequally likely possible values is defined as the expected value of the information content:

$$H(X) = \sum_{i=1}^n P(x_i) I(x_i) = - \sum_{i=1}^n p(x_i) \log_2 p(x_i) [\text{bit}]$$

**Formula 2: Mean information content. Source Bischof, 1995 p. 63.**

One of the properties of entropy is that it is highest when the value the signal takes on is most uncertain. This is the case when all values are equally likely. In the case of a coin



**Figure 2: Entropy for of two possibilities with the probabilities of p and q=(1-p).**

**Source: Shannon 1949 p.11.**



toss with a fair coin the event that the coin shows heads will on average happen as often as it will for tails. The chance of occurrence for either of those two events is therefore

$p = .5$  and the entropy is 1 bit which is the maximum amount of bit for an event with two possible outcomes (Shannon, 1948). This circumstance is shown in Figure 2 where the entropy for two possibilities with the probabilities  $p$  and  $q = (1-p)$  is calculated with  $H = -(p \log_2 p + q \log_2 q)$  and plotted as a function of  $p$ . As can be seen the entropy is highest when both possibilities are equally probable, like in the case of a coin toss with a fair coin. If the coin however is biased so that for example heads occurs with  $p=0,7$ , then the outcome of the coin toss is less uncertain because heads is more likely. Thus, the entropy is less than 1 bit; to be precise it is .88 bits. In cases where the probability of an event or value is  $p = 1$  and therefore the outcome is certain the entropy drops to 0 bit. This is only logical since in such a case no uncertainty is resolved. If there is only one value no new information is transmitted with the signal and the situation after receiving the signal is the same as it was before (Shannon 1948).

As mentioned above Shannon's original aim was to create a measure to determine the maximum needed bandwidth of a communication channel but entropy was generalized as a way to quantify messages through their mean information content. Soon researchers from the social sciences applied the concept to their research in order to gain new insights in human information processing and decision making (Pollock, 1953; Klemmer and Frick, 1953). It was suspected that the human brain, much like a communication channel, was limited in the amount of information, which could be process at one time. The field of research that arose from this assumption is called information overload theory.

#### **2.4.2 Information overload theory**

Information overload theory assumes that people's cognitive capabilities are limited in the amount of information, which can be processed at a time. If people are confronted with too much information they become overloaded and cannot process them properly (Streufert and Driver, 1965). Adverse effects of information overload are confusion and

suboptimal decisions of the overloaded person. Information overload theory thus is highly similar to choice overload theory and might be able to explain the occurrence of a too-much-choice-effect.

One of the first researchers who proposed a limitation of the cognitive ability was Miller in 1956. In his work *The magical number seven, plus or minus two*, which became one of the most cited articles in the field of psychology, he suggests that the human brain can only process approximately seven (plus or minus two) information at a time. He arrives to this conclusion after reviewing empirical evidence from experiments on the absolute judgments of unidimensional stimuli. In those experiments participants had to distinguish stimuli such as the loudness or frequencies of tones, the taste intensities of salt solutions, or the intensity of a vibrator on the chest region. The mean across all those experiments corresponds to 6.5 categories with a total range from 3 to 15 categories. These numbers seem small however one must consider that they stand for the absolute judgement of a unidimensional stimuli which is quite rare in every day's life. Instead people are confronted with multidimensional stimuli in most real-world environments. For the judgment of multidimensional stimuli such as tones which not only differed in their frequency but also in their loudness the number of correctly identified tones increased. When tones were presented with six different attributes such as for example rate of interruption or on-time fraction participants could identify around 150 categories without fault. To this finding Miller wrote that these numbers come closer to what would one expect considering that people are able identify any one out of several hundreds of faces or any one word out of several thousand. Although Miller initially showed limits of the human cognitive capabilities the results are only valid for the case of absolute judgment. For the relative comparison, it is therefore necessary to look at later research.

### **2.4.3 Information overload in consumer choice**

One such work was provided by Jacoby et al. (1974a) where they tested the effect of information load in a choice set on choice quality and consumer satisfaction as well as confusion. In their experiment with a between-subject design they randomly assigned 153 students to one of nine conditions in which the participants had to choose the best option

for themselves from a number of bogus detergent brands. The best option for each participant was determined prior to the choice part of the study through an analysis of the personal preferences every participant indicated for the different product attributes. The conditions varied in their information load through the number of alternatives (4, 8, 12) and the number of attributes (2, 4, 6), or information items as Jacoby et al. (1974a) called them. They found evidence that selecting the best option is inversely related to the number of alternatives and positively related to the number of information items. While participants indicated that they were less confused and more satisfied the more information they had, the actual relation between information and choice quality was curvilinear. Up to the point of 24 information (calculated by multiplying the number of alternatives with the number of information items) the amount of correct choices increased but then dropped again for conditions with more information. The researchers concluded that the cognitive capabilities must be limited by a certain threshold after which additional information affect the outcome of the decision-making process negatively although consumers believed that they made better choices.

In the same year, the researchers extended their experiment (Jacoby et al., 1974b). In this replication study, instead of college students a sample of 192 housewives served as test subjects. Further differences between the experiment designs were new products (rice and prepared dinners instead of laundry detergents), the increased number of utilized brands (4, 8, 12, 16) and the number of product information per brand (4, 8, 12, 16). Also, the researchers changed the product information dimension from items per brand to bits of information by using dichotomous information dimensions. This means that every information dimension such as for example amount of calories was simplified. Jacoby et al. (1974b) wrote that normally such dimensions could vary in their values between one of the 128 whole integer values between 50 and 178 calories. According to the authors in order to determine the specific value as much as up to seven bits of information could be required. By using only dichotomous dimensions (either high or low amount of calories) the amount of bits required was reduced to one per dimension. This approach made the information of the choice set more controllable. Thus, the maximum information load was extended from 72 items to 256 bits. The participants had once again the task to choose the best available option for themselves, which was previously determined through a weighted additive model of their indicated personal preferences for each dimension. The

results supported the prior findings that participants were better able to select the best option with additional information until a certain amount after which their decision quality decreased again.

Indeed, those findings make a strong case for information overload theory however the research was heavily criticized. Wilkie (1974) commented on the first study of Jacoby et al. (1974a) and did not dispute the information overload premise but disagreed that the data supported the conclusion of Jacoby et al. (1974a, 1974b) that too much package information leads to poorer consumer choices. According to Wilkie the assumption that number of brands and number of information per brand contribute equally to information load is erroneous. He suggested an alternative approach in which the number of information per brand are a more important variable and thus the total information load should not be determined by simply multiplying the two dimensions with each other. A second problem with the initial research brought up by Wilkie (1974) was the missing adjustment of correct choices for chance factors. The probability of randomly choosing the correct product naturally decreases in larger choice sets. The decrease of correct choices in the 16 brands condition which was seen as a sign of information overload by Jacoby et al. were thus according to Wilkie partly due to a smaller chance of randomly selecting the correct option. Under the consideration of the criticized points Wilkie inferred that: "Results for these analyses show more items of information per brand generally to *improve* decisions" (1974, p. 466). Russo (1974) also reanalyzed both of the studies by Jacoby et al. (1974a, 1974b) and came to the same conclusion as Wilkie that the collected data did not support the conclusion of Jacoby et al. because of the incomparability between the two variables and the fact that chance factors were not taken into account. Russo additionally emphasized his criticism on the artificial decision situation in which participants took up to five minutes to complete the given choice task on one product. He thinks that in a real shopping situation consumers would hardly take so much time to comprehend every given information, which is why the results would not have any real-life implication.

Another methodological problem was pointed out by Meyer and Johnson (1989) who saw fault in determining information overload through the errors consumers make while using an inferred choice error model. According to them the method of predicting the right

choice for a decision maker based on an attribute model of prior weighted personal preferences would be inept because of inherent measurement errors which arose from the instability and lability of the decision maker's preferences. They proposed to measure choice errors through different methods like for example a dominant option model, where a deviation from the best choice can be objectively determined.

Malhotra (1984) and Malhotra et al. (1982) also argued that the findings were not valid since Jacoby et al. did not control for chance factors in their research. Because the probability of randomly selecting the right choice decreases with an increasing choice set the findings cannot be assigned to an effect of information overload. The difference between the two dimensions of brands and information per brand was addressed in Malhotra et al (1982) as well. The researchers presented a logit regression model to determine the occurrence of information overload since they saw the approach used by Jacoby et al. unfitting to capture interaction effects between the variables of alternative brands and information per brand. Utilizing the logit framework, they determined the probability of making the correct choice while considering chance factors and interaction effects. Their reanalysis of the laundry detergent data (Jacoby et al., 1974a), the pre-cooked diner data and the rice data (Jacoby et al., 1974b) did not support the previous conclusion that providing more information to consumer will result in poorer choice behavior.

Although reanalyzing the data of Jacoby et al. (1974a, 1974b) dismissed the claims of Jacoby et al. to have found evidence of information overload, Malhotra (1982) found evidence for the phenomenon in his own research. Picking up on a suggestion of Wilkie (1974), that the in prior research used stimuli are too weak to induce information overload, Malhotra expanded the range of product alternative to either 5, 10, 15, 20 or 25 and the attributes for each product to either 5, 10, 15, 20 or 25. In his experiment homeowners had to rank a selection of houses after the probability with which they would buy those houses. Afterwards they had to imagine their ideal house and indicate the desired attribute level of the provided attributes. If they made the correct choice was then once again determined through a weighted additive model of the personally preferred attribute levels of the participants. Malhotra calculated the probabilities of making a correct choice with the above-mentioned logit model accounting for chance factors. He found that

participants made significantly poorer decisions when the number of alternatives increased. Similarly, their likeliness to choose the correct house decreased significantly when the number of attributes increased from 10 attributes upwards. Another interesting observation made by the author was that the detrimental overload effects stayed stable even when the information load further increased. As an explanation, Malhotra proposed that once overload occurred participants made use of a simplifying strategy or heuristics to shield themselves from becoming more overloaded.

Although the original work of Jacoby et al. (1974a and 1974b) was heavily criticized it still drew a lot of attention to the information overload paradigm and helped to draw scholars to the field of research. Subsequent research, which considered these critical points, was conducted by Lurie (2004). In his research, he utilized a dominant option model to investigate the effect of information structure on information overload. Unlike researchers before him he did not simply derive the information load from the product of alternative brands and information per brand. Instead he reapplied the mean information load formula from Shannon to product dimensions:

$$I(A) = - \sum_{i=1}^m p(a_i) \log_2 p(a_i)$$

*Formula 3: Information load in consumer choices. Source: Lurie, 2004 p.474.*

Here  $a_i$  ( $a_1, a_2, \dots, a_m$ ) stand for the attribute levels of attribute  $A$  (described as information per brand in the research of Jacoby et al. 1974a, 1974b). The part of  $p(a_i)$  is the frequency of  $a_i$  in relation to all other alternatives. This structural approach considers not only the number of choice options and the number of attributes per choice options for determining the amount of information a consumer must process while making a decision but also other important dimensions such as the number of different attribute levels of each attribute and the distribution of attribute levels among the choice options (Lurie, 2004). As mentioned above information load is highest when all possible outcomes are equally likely which is why choice sets with evenly distributed attributes levels are highest in information load. If, however one of the attribute level appears more frequent than the others the information load decreases due to less uncertainty. Lurie showed this effect of information structure in a choice experiment with a 2 (18 or 27 product alternatives) x 2

(even or uneven distribution of attribute levels) between-subjects-design. The information loads of the uneven choice sets were 36.28 bits for the 18 alternatives condition and 41.37 bits for the 27 alternatives condition. The even conditions had 46.26 bits of information in the 18 alternatives and 52.75 bits in the 27 alternatives condition. In this framework, the attribute distribution contributes more to the information load than the number of alternatives does since the information load is higher in the even distribution with 18 alternatives than in the uneven distribution with 27 alternatives. The choice task consisted of selecting the dominant option among a selection of pocket calculators described on seven different attributes with each attribute having three possible attribute levels. The results support the information overload paradigm in that way that participants in the conditions with higher information loads made worse decisions.

Lurie's experiment was replicated by Lee and Lee (2004). In a study, where they used CD players instead of calculators as a stimulus. They changed the manipulation by varying the number of attributes (either 9 or 18 per product) as well. With the manipulation of number of alternatives (either 18 or 27) and distribution of attribute levels (either equal or unequal) they extended Lurie's experiment. The results of Lee and Lee confirm the effects of information load measured with the structural approach proposed by Lurie (2004).

The results of Lurie (2004) and Lee and Lee (2004) support the claim that the number of product alternatives in an assortment is not the only and not even the main factor which puts cognitive strain on consumers. Additionally, they build a bridge to overload research in an online environment. Lurie administered tests on a computer screen and so did Lee and Lee. Thus, these studies show that consumers can become overloaded from information displayed on a screen. However, choice overload is not the same as information overload. The occurrence of information overload depends on the cognitive abilities with which information can be assessed. In information overload theory, it is not the question if a decision is reached but of which quality the decision is. In Lurie's experiment, everyone who was not able to make a choice within the given time limit was eliminated. However, these participants probably suffered the most from the amount of information they had to process. Higher uncertainty which comes with larger choice sets increases the reluctance to choose (Shafir et al., 1993) and since higher entropy is

equivalent to higher uncertainty a mediating factor of information load in choice overload can be expected.

## **2.5 Five Factor model**

The second mediator for choice overload which is investigated is the personality. As shown above researchers turned to personal differences as explanatory variables before. But because of the specific nature of hypothesized constructs in previous research it seems necessary to look at individual differences from a broader view point. The Five Factor model (FFM) of personality provides such an approach.

### **2.5.1 Lexical theory and discovery of the Big Five**

The FFM classifies personality and psych of individuals with the help of natural language and thus is based on lexical theory. John et al. (1988) defines the two basic assumptions of lexical approaches as follows:

“Those individual differences that are most salient and socially relevant in people’s lives will eventually become encoded into their language; the more important such a difference, the more likely is it to become expressed as a single word” (p. 174).

Such lexical approaches of personality description were first used in the field of psychology at the end of the 19<sup>th</sup> and beginning of the 20<sup>th</sup> century. According to Allport and Odbert (1936) the first complete classification of personality traits which satisfied psychological principals was created by Baumgarten (1933) for the German language. She created a list of 1,093 separate terms gathered from various dictionaries and writings of characterologists. The selection was based on her own definition of trait which is described as a “constant and directed psychical force (Richtkraft) which determines the active and reactive behavior of a man in his environment” (Allport and Odbert, 1936, p. 23). Following Baumgarten’s work Allport and Odbert created their own list of personality-describing words however they included every term which could be used to



“distinguish the behavior of one human being from that of another” (1936, p. 24). Their effort amounted to a compilation of almost 18,000 terms which sheer size rendered it almost useless. They therefore categorized the terms into four major groups by the way they described a person. The first group consisted of personality traits such as aggressive, introverted or sociable. The second group included temporary states of mind and mood like abashed, rejoicing and frantic. The third group consisted of evaluations of personal conduct or reputation. Examples of terms are insignificant, acceptable and worthy. The last group is a gathering place for all the terms unfitting for the first three groups. Subgroups are physical qualities, capacities and talents to which come several terms with miscellaneous nature. As pointed out by the authors themselves many of the terms in the last group are highly in doubt to be relatable to human personality. Building on the work of Allport and Odbert, Cattell (1943) took the 4,500 terms of their trait category and reduced them to 35 variables. After conducting a number of factor analyses he found a dozen factors which he used in his subsequent research (Cattell et al., 1970). Benefitting from the manageable size of Cattell’s variable list several researchers investigated the dimensional structure of trait rating as well (John et al., 2008). Fiske (1949) assessed clinical trainees via self-ratings, peer-ratings and evaluation of professional psychologists on 22 scales of surface behavior, which were based on Cattell’s list. In all three assessments, he found four similar factors, which he named Social Adaptability, Emotional Control, Conformity, and Inquiring Intellect. Tupes and Christel (1961) used previously collected data of eight different samples taken by different researchers to investigate the occurrence of factors when applying the same principles of analysis. They found five recurrent and strong factors in all samples besides one were “the fifth factor split into two highly related factors” (Tupes and Christel, 1961, p. 14). They named their factors Surgency, Agreeableness, Dependability, Emotional Stability and Culture. Until then the field of trait psychology was regarded as little promising because of the unstable results and differing research methods. However, Tupes and Christel’s model of five main personality factors marked a point for consolidation of the field. Other researchers replicated the same five factors among which Norman (1963) received the most attentions. Although Tupes and Christel (1961) found and named the five factors first Norman’s labeling became the established nomenclature.

### 2.5.2 The five factors

The FFM has its name from the five dimensions on which a person's personality is described in the model. Norman (1963) labeled the factors as shown in Table 1.

*Table 1: Initial factor labeling*

<b>Factor</b>	<b>Labeling</b>
<b>I</b>	Extraversion or Surgency (talkative, assertive, energetic)
<b>II</b>	Agreeableness (good-natured, cooperative, trustful)
<b>III</b>	Conscientiousness (orderly, responsible, dependable)
<b>IV</b>	Emotional Stability versus Neuroticism (calm, not neurotic, not easily upset)
<b>V</b>	Culture (intellectual, polished, independent-minded)

*Source: Norman, 1963 quoted after John and Srivastava 1999 pp. 6.*

The factors subsequently became known as the “Big Five” (Goldberg, 1981) a name, which derived not from greatness but from the broad nature of each of the factors. Thus, the model is not meant to fully describe differences in human personality on only five traits but to provide a representation on a broad level of abstraction with more underlying distinct characteristics (John and Srivastava, 1999). The assigned labels to the factors are meant to give a basic notion however it is impossible to precisely represent every aspect of the dimension in just one or two words which is why they were re-labelled various times over the years. Nowadays the dimensions are most commonly labeled Openness, Conscientiousness, Extroversion, Agreeableness, and Neuroticism, which is why the acronym OCEAN is often used to refer to the model. John and Srivastava (1999) argue that Norman's (1963) label for Factor V “Culture” was quickly replaced by other researchers because it is way too narrow whereas at the same time stating that the replacement Openness while vast enough was a little bit vague. Since labels fail to specify the factors they need to be defined by their components and underlying characteristics. Therefore, the explanations of the factors given by John et al. (2008) are presented in Table 2.

Table 2: Factor explanation of Big Five

	<b>Factors</b>				
	<i>E (Factor I)</i>	<i>A (Factor II)</i>	<i>C (Factor III)</i>	<i>N (Factor IV)</i>	<i>O (Factor V)</i>
<b>Verbal labels</b>	Extraversion Energy Enthusiasm	Agreeableness Altruism Affection	Conscientiousness Constraint Control of impulse	Neuroticism Negative Emotionality Nervousness	Openness Originality Open-Mindedness
<b>Conceptual definition</b>	Implies an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality.	Contrasts a prosocial and communal orientation toward others with antagonism and includes traits such as altruism, tender-mindedness, trust, and modesty.	Describes socially prescribed impulse control that facilitates task- and goal-directed behavior, such as thinking before acting, delaying gratification, following norms and rules, and planning, organizing, and prioritizing tasks.	Contrasts emotional stability and even-temperedness with negative emotionality, such as feeling anxious, nervous, sad, and tense.	Describes the breadth, depth, originality, and complexity of an individual's mental and experiential life.
<b>Behavioral examples</b>	Approach strangers at a party and introduce myself;  Take the lead in organizing a project;  Keep quiet when I disagree with others (R)	Emphasize the good qualities of other people when I talk about them;  Lend things to people I know (e.g., class notes, books, milk);  Console a friend who is upset	Arrive early or on time for appointments;  Study hard in order to get the highest grade in class;  Double-check a term paper for typing and spelling errors;  Let dirty dishes stack up for more than one day (R)	Accept the good and the bad in my life without complaining or bragging (R);  Get upset when somebody is angry with me;  Take it easy and relax (R)	Take the time to learn something simply for the joy of learning;  Watch documentaries or educational TV;  Come up with novel set-ups for my living space;  Look for stimulating activities that break up my routine
<b>Examples of external criteria predicted</b>	High pole: Social status in groups and leadership positions; selection as jury foreperson; positive emotion expression; number of friends and sex partners  Low pole: Poorer relationships with parents; rejection by peers	High pole: Better performance in work groups  Low pole: Risk for cardiovascular disease, juvenile delinquency, interpersonal problems	High pole: Higher academic grade-point averages; better job performance; adherence to their treatment regimens; longer lives  Low pole: Smoking, substance abuse, and poor diet and exercise habits; attention-deficit/hyperactivity disorder (ADHD)	High pole: Poorer coping and reactions to illness; experience of burnout and job changes  Low pole: Feeling committed to work organizations; greater relationship satisfaction	High pole: Years of education completed; better performance on creativity tests; success in artistic jobs; create distinctive-looking work and home environments  Low pole: Conservative attitudes and political party preferences

Note: R indicates a reverse-keyed item; that is, an item with a negative correlation with the factor.

Source: John et al., 2008 p. 120.

### 2.5.3 External Validity

The purpose of every psychological model is to explain the mental underlying processes, which result in real life behavior patterns. The usefulness of the Big Five as a very wide structural model therefore depends on its ability to predict certain life outcomes. Without any predictive power the model loses its social relevance which is why Eysenck (1991) demanded to measure the validity of the Big Five against criteria like criminality, mental illness, academic aptitude and achievement, and professional success.

Several studies found relations between the dimensions of the FFM and the criteria proposed by Eysenck. John et al. (1994) undertook a large-scale longitudinal study (N = 508) with boys between the age 12 and 13 to investigate juvenile delinquency, childhood psychopathology, and academic performance. The boys were first assessed at the age of 10 and after around two years later a second time. The researchers found out that low Agreeableness and Conscientiousness scores are indicators for later juvenile crime. Internalizing disorders are predicted by Neuroticism and low Conscientiousness while Conscientiousness and Openness are related to school performance. Thus, the results showed how the Big Five can help as an early risk indicator for social maldevelopment.

Komarraju et al. (2009) found links between the Big Five dimensions and academic motivation and achievement among college students. The results suggest that students who score high on Conscientiousness have higher intrinsic and extrinsic motivation and receive better grades. Furthermore, they found out that intrinsic motivation can also be linked to high Openness scores suggesting that curious students have more joy while learning. Extrinsic motivation was positively related to Extraversion, which implies that those students seek a college education for social recognition.

Further evidence for the validity of the Big Five model was provided by studies about job performance by Barrick and Mount (1991). Conscientiousness was the only dimension, which was a consistent indicator for high job performance criteria across all examined profession categories (professionals, police, managers, sales and skilled/semi-skilled) while the relation of other dimensions varied between occupations. Extraversion for example was as a valid predictor of good performance in sales and management where social interactions are part of the job (Barrick and Mount, 1991). Mount et al. (1998)

found that in professions where group work played a central role Agreeableness and Neuroticism were related to high job performance.

The finding of significant relations between real life achievements as well as behavior and the specific Big Five factors demonstrate the external validity of the FFM. Especially the results of John et al. (1994) on the development of juveniles show the predictive capability of the model on human behavior.

#### **2.5.4 Reliability**

Another important factor, which needs to be considered, is reliability. According to Saunders et al. “[r]eliability refers to whether your data collection techniques and analytic procedures would produce consistent findings if they were repeated on another occasion or if they were replicated by a different researcher” (2012, p. 192). Therefore, the FFM needs to be assessed on its stability over time and the replicability of the five dimensions through independent researchers.

Rammstedt and John (2007) conducted a correlation analysis of the results for their six and eight-week test-retest data. They reported mean retest stability coefficients of .83 to .85 for the samples of US-American and German college students, which signify a good stability. Moreover, a longitudinal study conducted by Costa and McCrea (1988) over a time-frame of seven years found stability coefficients for peer ratings of the five factors between .63 and .81. Finn (1986) found stability coefficients of .56 for the dimensions of Neuroticism and Extraversion in a sample of middle-aged men which were retested after 30 years. When interpreting these numbers it needs to be considered that personality itself is not fixed but changes overtime. Especially the dimensions of Conscientiousness, Agreeableness and Neuroticism are affected by the experiences made throughout adulthood (Srivastava et al., 2003). It is thus not surprising that the stability coefficients for retests decline as the timespan between the measuring points increases. Nonetheless, the coefficients show that the dimensions of the FFM constitute real and stable aspects of personality and not just random emotional states.

Furthermore, several independent researchers found evidence for the five prototypical personality dimensions proposed by the FFM. John et al. (2008) provides an overview of

those findings which is described in this paragraph. Tupes and Christal (1961) were the first researchers who found five strong factors in their analyzed samples. The same five factors were replicated by Norman (1963), Borgatta (1964), and Digman and Takemoto-Chock (1981). However, because those researchers used variations of Cattell's 35 variables list (1943), Goldberg (1990) tested the generalizability of the Big Five by using another set of more common trait terms. He found additional evidence for the five factors by comparing the structure of peer and self-ratings which showed the structure of the Big Five. Moreover, Saucier (1997) searched for additional factors but was only able to consistently replicate the Big Five. Thus, the Big Five are consistent personality traits which makes the FFM an appropriate method to assess individual differences.

## **2.6 Research questions and hypotheses**

The reviewed literature reports diverging findings for the effect of extensive assortment sizes on choice behavior. While studies reported strong effect sizes for experiments conducted in both, natural environments (Iyengar and Lepper, 2000; Shah and Wolford, 2007) and controlled settings (Chernev, 2003; Reutskaja and Hogarth, 2005), others did not find any effect at all in similar situations (Scheibehenne 2008). Because of the unclear evidence and because of the unlimited choice options provided by the internet the objective of this thesis is to investigate the occurrence of choice overload in an online environment. Following the notion of Chernev et al. (2010) the focus lays on identifying factors under which the effect occurs.

When looking at the decision problem a first factor is the choice complexity. So far, the occurrence of choice overload has been linked to the number of alternatives in a choice set but previous research was only conducted for offline choice situations. The negative effect of high numbers of alternatives on the decision behavior has thus to be verified in an online situation. The first hypothesis therefore reads as follows:

- H1: Increasing the number of alternatives will increase the number of choice avoidance.

Many researchers see the pure number of choice alternatives as insufficient and other factors are assumed to impact the complexity of a choice situation (Iyengar and Lepper, 2000; Chernev, 2003; Chernev et al., 2010; Huffman, and Kahn, 1998). Chernev (2010) sees the number of attributes a choice option is described on as another important factor, which adds to the complexity of a choice set. Research on information overload showed, that a higher number of attributes decreases the likeliness that a dominant option from a choice set was selected (Malhotra 1982). If choice overload, much like information overload, does not only depend on the number of alternatives but also on the number of attributes the second hypothesis should hold true.

H2: Increasing the number of attributes will increase the number of choice avoidance.

The complexity of choice sets however, arises from the combination of all influence factors. In order to investigate an overall mediating effect of choice complexity on the decision behavior the complexity of a choice set needs to be determined through a single measurement. Such a measurement is Shannon entropy as it is utilized within the information structure approach (Lurie, 2004), which takes into account the different factors of a choice set like number of alternatives, attributes and attribute levels through the probability of outcomes of each factor within the choice set. Entropy as a measure of choice complexity is therefore supposed to have a negative impact on a consumer's ability to decide on an option. This assumption is reflected in the third hypothesis.

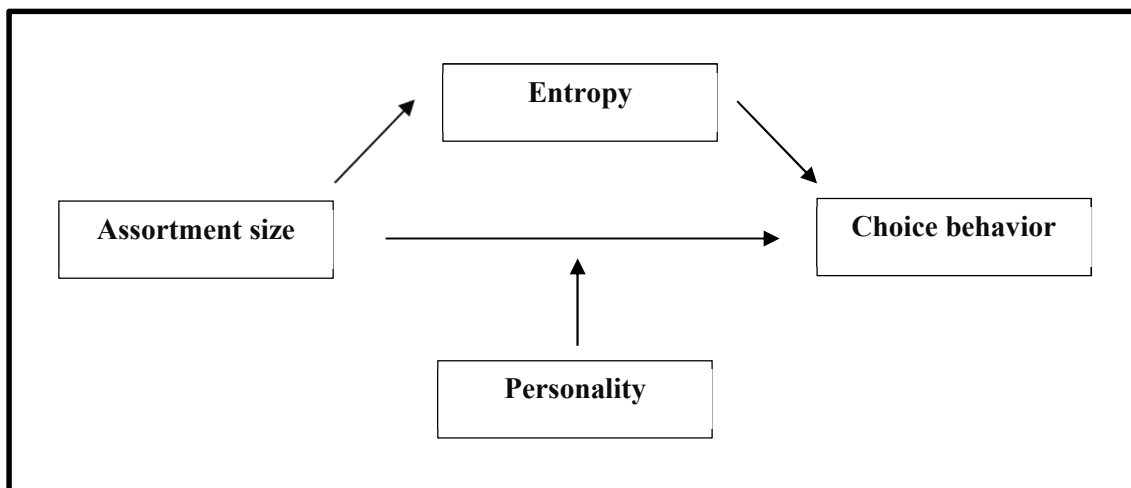
H3: Choice environments of options with higher entropy will lead to more choice avoidance.

Besides the factors, which contribute to the complexity of the choice situation another important factor, could be found within the person who faces the choice situation. Personality traits of the FFM such as Conscientiousness, Extraversion, Neuroticism and Openness to new experiences have been shown to be related to consumer behavior and decision making (Matzler et al., 2006; Badgaiyan et al., 2016; Raja and Malik, 2014). Further, personality traits are related to information processing (e.g., DeYoung et al., 2010). Therefore, personality traits could also moderate how consumers react to different assortments. Hypothesis four therefore reads as follows:

H4: Certain personality traits are related to choice avoidance.

The complete research approach is summarized in Figure 3. The objective is to investigate the effect of choice options on the decision behavior in e-commerce applications. To do so, the influence assortments with small and high numbers of choice options have on consumer decision making will be investigated. Entropy is used as a measure of choice complexity and supposed to mediate the effect assortment size has on the ability of consumers to decide on an option. Further the role of individual differences will be examined in the form of an assessment of personality. Personality, measured within the frame of the FFM, is assumed to moderate the effect choice set complexity has on consumers' propensity to select one of the presented assortment options.

*Figure 3: Moderator and mediator variables for choice overload*



By reviewing previous research possible important moderator and mediator variables were identified. Moreover, literature on the identified variables was used to build a theoretical framework within which the influence of those variables on the occurrence of choice overload can be tested. In the next chapter the implementation will be described. Further, the experimental design to test the choice behavior will be developed and the measuring instruments chosen to assess the personality traits of the participants will be explained in more detail



## **3 Method**

An online survey was chosen to collect data for the study. The online survey consisted of two major parts. The first part was a choice experiment and the second part was an assessment of the participant's personality. The survey was constructed in English but because of the risk of too few participants a German version was created as well to be able to use a larger sample. The English versions of the survey is presented in Appendix C and the German version in Appendix D. For coding and analyzing the data Statistical Package for Social Sciences (SPSS) was used.

### **3.1.1 Participants**

The participants were students contacted through an e-mail distributed by the assistant of the rectorate of Hochschule Furtwangen and through a message in a *Facebook* group for students from Hochschule Karlsruhe. The e-mail reached 6,700 students and the message in the Facebook group was visible to 580 members.

### **3.1.2 Choice experiment**

The choice experiment in the first part of the online survey was created to test the impact of the prior identified influence factors on choice behavior. Because overload was hypothesized to be related with cognitive effort the experiment was placed at the beginning of the survey to ensure that the participants had a fresh mind for the choice task. In the following the design and procedure of the experiment will be explained in detail.

### 3.1.2.1 Design

For the choice experiment a 2 (number of presented watches: either 9 or 18 alternatives) x 2 (number of attributes by which the watches were described: either 5 or 7) between subjects design way chosen. A between subjects design was chosen over a within subject design because of the problem of demand artifacts which could arise if participants would face the choice scenario more than once (Sawyer, 1975). Additionally, the effort used to assess choice set could result in mental fatigue and influence or distort the assessment of later choice sets. Thus, a between subject design where the participants were evenly and randomly allocated to one of the four conditions was preferred.

### 3.1.2.2 Procedure

For the choice experiment participants were asked to imagine a scenario in which the participant had been invited to the birthday party of a friend who was a fan of classical watches. Therefore, the participant together with other invited friends decided to give the birthday boy a watch as a present. The other friends already selected some watches but the participant should make the final decision which watch to give as a present. The product group of watches was chosen for the experiment because a watch is a product of which everybody has a clear understanding but only few people have strong preferences for features of a watch. Next the participants were given a short explanation about each attribute by which the watches were later described but without stating the different attribute levels. This was to ensure that every participant could understand the information provided during the choice situation. Table 3 shows the attributes and attribute levels which were used to describe the choice options. The attributes casing material, wrist band leather, wrist band color, wrist band design and numbers were used in the choice condition with five attributes and the attributes casing color and display were added in the seven attributes condition. Attributes with ordinal character or which could have been perceived to be of higher quality were not used for the description<sup>2</sup>.

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<sup>2</sup> For example, swiss clockworks are renowned for high quality, which is why clockworks were not used as a describing attribute class.

*Table 3: Attributes and attribute levels*

<b>Attribute</b>	<b>Attribute level 1</b>	<b>Attribute level 2</b>	<b>Attribute level 3</b>
<b>Casing material</b>	Titanium	Aluminum	Stainless steel
<b>Wrist band leather<sup>3</sup></b>	Velour	Nappa	Buckskin
<b>Wrist band color</b>	Black	Dark brown	Light brown
<b>Wrist band design</b>	Smooth	Double seam	Croco-pattern
<b>Numbers</b>	Roman	Arabic	Stick Marks
<b>Casing color</b>	Black	Gold	Silver
<b>Display</b>	White analog	Black analog	Silver analog

On the one hand this was to ensure that there was no dominant option in the choice set, because a dominant option would have prevented the occurrence of choice overload (Dhar, 1997). On the other hand, it was to avoid distortions of the results arising from different expertise. If participants with a higher expertise were able to identify choice options with superior attributes the considered choice sets for those participants would have decreased while the choice sets for participants unable to identify those options would have stayed the same.

The descriptions of the watches were created randomly to avoid biases through a certain combination of attributes. For the creation, a matrix with the names of the choice options in the top row and the attribute classes in the first column was used. Each attribute was coded with a number from one to three. Then a random number creator was used to select a number between one and three which was subsequently put into the upper left cell of the matrix. This procedure was repeated going from the top left of the matrix to the low right until the matrix was filled out. The different attributes needed to be evenly distributed among the products in that sense, that one-third of the assortment was described by the first attribute, one-third by the second attribute and one-third by the last attribute of one attribute class. To ensure this the sum of each row for each coding number was counted. More present numbers were replaced through less present numbers until every number was presented equally. At the same time, it was ensured that none of the

<sup>3</sup> Wrist band leather was chosen over wrist band material because of the need of three equally used attributes. Leather and metal are frequently used but wristbands made of plastic, textile or rubber are rare.

columns of the matrix had the same combination of numbers. Afterwards the numbers were coded back to the attribute they represented. In the end, the product assortments consisted of nine and 18 objectively equivalent options to choose from.

*Figure 4: Description of a watch from amazon.com*

<b>Product Specifications</b>	
<b>Watch Information</b>	
Brand, Seller, or Collection Name	Aposon
Model number	AP-9058CL
Part Number	7920575601
Item Shape	Round
Dial window material type ▾	mineral glass
Display Type	Analog
Clasp	Buckle
Case material	Stainless steel
Case diameter	1.60 inches
Case Thickness	0.60
Band Material	Leather
Band length	9.45IN / 24CM Total Length, Max Perimeter 22CM
Band width	0.80 inches
Band Color	Brown
Dial color	White
Bezel function ▾	24 hour time display
Calendar ▾	Date
Special features	Roman Number, Calendar-Date
Item weight	2.88 Ounces
Movement ▾	Analog quartz
Water resistant depth	30 Meters

*Source: Amazon (2016).*

On the next page of the questionnaire the participant was confronted with one of the four choice conditions and asked to choose a watch from the assortment. The description of

the watches was provided through a table with the attributes in the left column and the attribute values of each of the watches to the right of it. The depiction of the watches through such a table is similar to the way watches are described on online retailer sites as the screenshot from amazon.com in Figure 4 shows.

For the reason of a better overview the attribute values of a maximum of four watches were presented in one row. For the next four watches a new table with the attribute classes in the left column and attribute values of the watches was created. Through the manipulation of the number of alternatives and the manipulation of the number of attributes the choice conditions had different entropy levels. The amount of information of each assortment was calculated with the following equation from Lurie (2004), which is based on information theory developed by Shannon (1948).

$$I(ASA) = I(AS) * I(A) = \log_2(as) * - \sum_{i=1}^m p(a_i) \log_2(a_i)$$

*Formula 4: Entropy of a product assortment. Based on Lurie, 2004; Shannon, 1948.*

As already explained in Chapter 2.4.3  $I(A)$  calculates the amount of entropy of a choice option. The additional part  $(AS)$  accounts for the information provided by the number of products in the assortment with  $as$  being the number of choice options in a choice set. The product of the two parts amounts to the entropy of the whole product assortment in bits. Therefore, participants in the nine-alternatives-five-attributes condition were confronted with 25.12 bits of information. In the nine-alternatives-seven-attributes condition it were 35.17 bits. In the eighteen-alternatives-five-attributes condition participants faced 33.04 bits and 46.26 bits in the eighteen-alternatives-seven-attributes condition respectively. For sake of readability, the different choice sets will henceforth be referred to by abbreviations (i.e., amount of product alternatives and attributes of each product). Table 4 provides an overview over the choice sets and their information load.

*Table 4: Abbreviation of choice sets and information loads*

	<b>18 alternatives</b>	<b>9 alternatives</b>
<b>7 attributes</b>	18/7 (46.26 bits)	9/7 (35.17 bits)
<b>5 attributes</b>	18/5 (33.04 bits)	9/5 (25.12 bits)

Assuming that information load plays a role in the occurrence of choice overload more people in the 18/7 condition should become overloaded than in the 18/5 condition. Although the 18/5 condition has nine more alternatives than the 9/7 condition the same number of participants should experience choice overload because the two conditions have around the same amount of information load.

At the end of the assortment display participants were provided with the choice task. They were told they could either choose a watch or take a coupon with which the birthday boy could select a watch by himself. Taking the coupon meant to avoid one's own choice, one of the most adverse effects of choice overload. Therefore, the dependent variable was the relative number of participants who took the coupon. There was no time limit set for the choice task because time pressure is unlikely to play a role in online shopping. Visiting an online store does not depend on opening hours thus consumers can search the assortments as long as they want.

After the choice task the participants were questioned about the reason behind their choice. If they decided on selecting a watch they were first asked to select the watch they would like to give as a present from a list of all the names of the watches, which were displayed to them before. After selecting the watch, they were asked why they chose this specific watch. One of the answer options was "I have a similar watch". This option was used to control for prior preferences. Participants who selected this answer option were therefore excluded from the analysis because they engaged in preference matching. Participants who chose a coupon were asked for the reason of their choice as well. The data sets in which the answer option "There were too many good options" was selected were further investigated since the answer constitutes a self-reported measure that the participant was overloaded.

### **3.1.3 Assessment of personality traits**

Choice overload could not only depend on external factors but also on certain personality traits. Komarraju et al. (2009) found significant relations between students' personalities and their academic achievement and motivation. Conscientiousness and Openness was positively correlated to intrinsic motivation and better grades while Conscientiousness and Extraversion was positively connected to extrinsic motivation. Further, Blumenthal (2001) found out that highly extroverted people are easier distracted and less able to focus their attention than introverted people. Matzler et al. (2006) explored the connection between openness and extraversion on brand affect. They found that the personality traits are positively related to hedonic product value. The results showed that brand affect is directly influenced by openness and indirectly by extraversion through hedonic value. It is thus, possible that the personality of a consumer also plays a role in the way an assortment is perceived.

In order to investigate the relation between choice avoidance as an effect of choice overload and personality traits, the second part of the online survey consisted of an assessment of participants' character according to the FFM. The FFM with its five defined dimensions constitutes a taxonomy of human personality on which individuals are assessed. Since the conceptualization, spread and acceptance of the model among research psychologists, numerous instruments were created to measure personality according to the defined dimensions. In the following part the measuring instruments selected for this research and the reason for the selection are shortly explained.

#### **3.1.3.1 Big Five Inventory (BFI)**

For the personality assessment, the Big Five Inventory (BFI) designed by the American research psychologist Oliver John was used to score the participants on the FFM. The BFI is an item battery consisting of 44 short statements (John and Srivastava, 1999; Benet-Martinez and John 1998). Every item starts with the same first part which is "I see myself as someone who ..." and is then followed by a statement which describes a personality aspect through an adjective phrase such as "... is talkative". For each item the participants

are asked to indicate how strongly they agree or disagree that they are described by that statement by using a 5-point Likert scale (1 = disagree strongly, 2 = disagree a little, 3 = neither agree nor disagree, 4 = agree a little, 5 = agree strongly).

The BFI was selected because it is a well-established instrument that provides valid and reliable results. Other instruments, which are comparable in their validity, reliability and which are generally accepted, are the 100-item battery called Trait Descriptive Adjectives (TDA) (Goldberg, 1992) and the NEO-FFI (Costa and McCrea, 1992). The BFI was chosen before the TDA and the NEO-FFI because it is a rather brief instrument with comprehensible and precise items. Answering every one of the 100 items of the TDA on a 9-point Likert scale requests a lot of time and effort from respondents. Additionally, the items of the TDA only consist of a single adjective, which in some cases can lead to different interpretations. Compared to the items of the TDA the BFI items offer more context (TDA: Relaxed; BFI: Is relaxed, handles stress well). However, the BFI still takes only five minutes to be filled out and thus only around half the time of the NEO-FFI (Rammstedt and John, 2007). In regard to keeping the survey at an acceptable length and complexity the BFI was selected.

### **3.1.3.2 German Version of BFI**

The assessment of participants who chose the German Version of the survey was conducted with a translated item battery of the BFI. The *Deutsche Version des BFI* is based on a translation by Oliver John and Beatrice Rammstedt, two experts in the field of personality psychology, and was blindly back translated by bilingual psychologists. The equivalence of the English and German version of the BFI was proven in a bilingual sample (Rammstedt, 1997). Rammstedt's version was revised by Lang et al. (2001) who adjusted nine of the items. Four items were either shortened or extended by a word and five items were rephrased. However, two of the five rephrased items were taken off from the questionnaire because the rephrasing changed their meaning. The validation of the item battery yielded satisfying results. Especially in the group of young adults (20 to 40 years old), which is relevant for this study, only one item had the highest load on a dimension contrary to the dimension it should have measured. Because of the good results



the BFI version of Lang et al. (2001) was used for the German version of the survey. However due to the bilingual nature of the survey the German as well as the English BFI had to consist of the same number of items. Thus, the German item battery was complemented by new translations of the two excluded items. The two items were translated from English to German and then blindly back translated from German to English by a fluent in English and German PhD student. Table 5 shows the result of the translation process.

**Table 5: Item translation**

<b>Original item from John and Srivastava (1999)</b>	<b>German translation</b>	<b>Back translation</b>	<b>Final item in survey</b>
I see myself as someone who ...	Ich sehe mich selbst als jemand, der ...	I see myself as someone who ...	Ich sehe mich selbst als jemand, der ...
Can be moody	launisch sein kann	can be moody	launisch sein kann
Likes to cooperate; goes along with others	sich kooperativ verhält, gut mit anderen auskommt	is cooperative, gets along with others	sich kooperativ verhält, gut mit anderen auskommt

As in the English version the participants indicated how well the statements applied to them on a 5-point Likert scale (1 = not at all (überhaupt nicht), 2 = a little (wenig), 3 = partly (teils/teils), 4 = well (gut), 5 = very well (sehr gut)).

By adding the two items to the German version of the BFI by Lang et al. (2001) it is ensured that the two version of the survey have the same structure. The two item batteries with 44 items each and the same answering scale make collapsing the gathered data possible should the analysis show no different results for the two versions.

## 4 Results

In total 974 survey interviews were started which translates to a response rate of 13,4 %. Of the 699 finished interviews only 677 were filled out completely. However, five interviews were excluded from the analysis because of their nature. In two cases the participants made inappropriate statements, which suggested that they took the survey not seriously. In three cases participants were excluded because their indicated age was higher than 40 years, which would call for a separate assessment of their personality (McCrae et al. 1999; Lang et al. 2001) which is not possible because of the small number of cases and thus those three cases were dropped. Moreover 27 participants had prior preferences and thus had to be excluded from the analysis. From the 645 eligible interviews 605 (93.8 %) were filled out in German while 40 (6.2 %) were filled out in English. Slightly more women than men took part in the survey with 346 (53.6 %) to 299 (46.4 %) participants. The age of participants ranged from 17 to 37 years with a median age of 22 years ( $SD = 2.97$ ). 95.2 % of the participants were younger than 29 years old. The vast majority of the participants were Germans ( $N = 589$ , 91.3 %). The second largest group consisted of Indians with a total of 11 participants (1.7 %) while the remaining 45 (7.0 %) participants came from 30 different countries. Gender, age, education, and nationality of the participants had not a significant impact on choice behavior, which is why those variables will not be mentioned in the subsequent analysis.

### 4.1 Entropy

In the first part of the survey the choice experiment was conducted where the influence of complexity of the choice situation on decision behavior was tested. Before presenting and analyzing the findings of this first part, it will be assessed if the construction of the experiment conditions was successful in providing a situation in which choice overload was possible.

#### 4.1.1 Manipulation Check

One of the necessary preconditions for choice overload to occur is the absence of a dominant option (Dhar, 1997). If the presented choice sets would include an option that is clearly superior to the other options, the choice task would have been facilitated. Although the choice sets consisted of watches which were not described by any attribute with ordinal character and therefore could not have been ranked and because the choice sets were further created through a randomized process to prevent preferable attribute combination through personal bias, it would have been possible that one of the sets contained a choice option of outstanding attractiveness. However, an examination of the chosen products showed that there was no such product. Albeit some of the options were more popular than others no option was the single most chosen and each of the offered watches was chosen at least once.

*Table 6: Distribution of chosen options*

Option	18 option conditions (N = 137)		9 option condition (N = 173)	
	Frequency	Percentage	Frequency	Percentage
<b>C-09</b>	3	2.2	22	12.7
<b>Q-33</b>	3	2.2	14	8.1
<b>Z-56</b>	6	4.4	28	16.2
<b>G-96</b>	5	3.6	14	8.1
<b>U-38</b>	14	10.2	31	17.9
<b>K-02</b>	4	2.9	25	14.5
<b>V-78</b>	7	5.1	20	11.6
<b>M-86</b>	2	1.5	12	6.9
<b>J-87</b>	3	2.2	7	4.0
<b>Q-30</b>	17	12.4		
<b>E-49</b>	18	13.1		
<b>Z-84</b>	7	5.1		
<b>R-04</b>	19	13.9		
<b>P-65</b>	2	1.5		
<b>W-08</b>	1	.7		
<b>Y-04</b>	2	1.5		
<b>V-40</b>	21	15.3		
<b>F-12</b>	3	2.2		

To check if the position of the option in the assortment influenced the participants' choices correlation analysis was used. Two correlation tests were run, one for each assortment size (either 9 or 18 options). The tests showed that there was no significant relation between the position of the option in the assortment and its likeliness to be chosen ( $r = 0,19^4$ ,  $p < .45$  for the 18-option condition and  $r = -0,34$ ,  $p < .38$  for the 9-option condition).

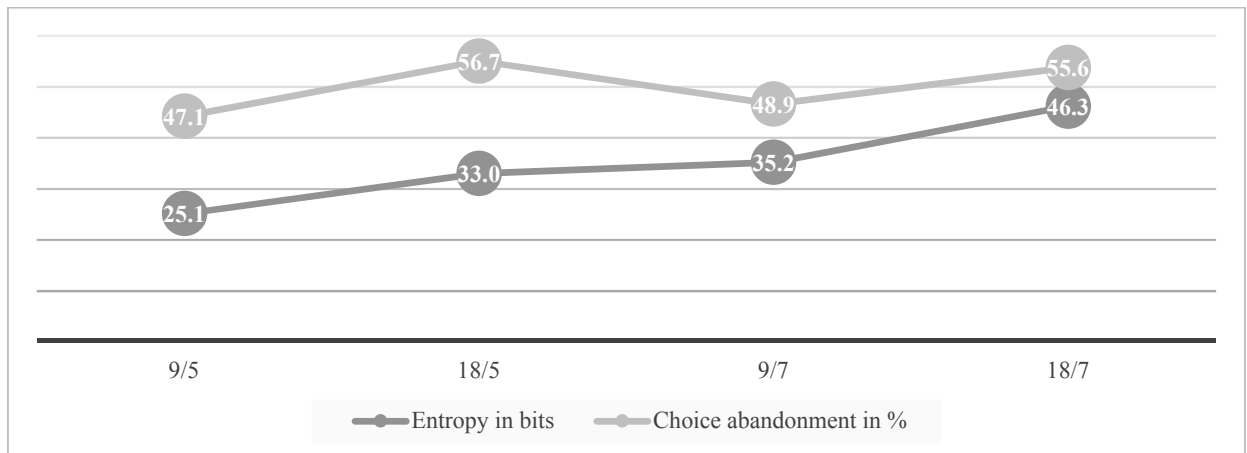
#### 4.1.2 Choice behavior

The number of participants who would avoid their choice possibility by taking the coupon was the dependent variable to determine choice overload during the experiment. In the 9/5 choice set 74 out of 157 participants avoided their choice (47.1 %). From the 150 participants in the 18/5 condition 85 forwent their possibility to choose a watch (56.7 %). From the 176 participants in the 9/7 condition 86 chose a coupon (48.9 %) and in the 18/7 condition 90 out of 162 participants did so (55.6 %). One way of testing H1: "Increasing the number of alternatives will increase the number of choice avoidance." is to hold the number of attributes steady which is why condition 9/5 was compared to 18/5 and condition 9/7 was compared with 18/7. As can be seen in Figure 5 an increase in assortment size from nine to 18 options was accompanied by a higher percentage of choice avoidance. The results indicate that increasing assortment size has an effect on choice behavior, although only significant at the 10 % level with  $\chi^2 (1, N = 307) = 2.79$ ,  $p < .09$  in the five-attribute conditions. In the seven-attributes condition the effect is not significant with  $\chi^2 (1, N = 338) = 1.51$ ,  $p > .22$ . However, if the two conditions with many choice options and the two conditions with few choice options are collapsed into one group each, a significant difference in the choice behavior can be witnessed,  $\chi^2 (1, N = 645) = 4.17$ ,  $p < .04$  Thus, the data at hand supports Hypothesis H1.

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<sup>4</sup> Correlation coefficient after Pearson. The closer the number is to 1 or -1 the higher is the correlation.

**Figure 5: Choice avoidance and entropy levels**



For the examination of H2: “Increasing the number of attributes will increase the number of choice avoidance” condition 9/5 must be compared to condition 9/7 and 18/5 must be compared to 18/7. In both cases the effects are not even close to reaching significance with  $\chi^2(1, N = 333) = .10, p > .75$  in the nine option conditions and  $\chi^2(1, N = 312) = .04, p > .84$  in the eighteen option conditions respectively. This does not change if the data is collapsed into two groups with either many attributes or few attributes since the test shows  $\chi^2(1, N = 645) = .01, p > .94$ . The percentage of participants in the eighteen option conditions who avoided the possibility to choose is even larger in the five-attribute condition than in the seven-attribute condition which not only does not support H2 but also contradicts it.

Figure 5, shows that although choice avoidance initially increases together with the entropy level it suddenly declines from condition 18/5 to condition 9/7 while the entropy level still increases. To test the role of entropy as a mediator several regression models were facilitated according to the method proposed by Baron and Kenny (1986). First entropy was regressed on the number of alternatives. The regression equation was significant ( $F(1, 643) = 431.34, p < .00$ ). Second choice behavior was regressed on number of alternatives. Because of the binary nature of the dependent variable, choice behavior, a logistic regression was used. The regression equation was also significant ( $B = 0.32; SD = .16; Wald \chi^2(1, N = 645) = 4.16, p < .04$ ). Third choice behavior was regressed on number of alternatives and entropy. For entropy to be a mediator the variable would need to affect choice behavior significantly while the impact of number of

alternatives on choice behavior declined. As can be seen by the lower B-coefficient of the Alternatives-variable in Table 7 the impact of the number of alternatives actually declines however, entropy does not have a significant impact on choice behavior. Therefore, one cannot attest entropy a mediating effect because it does not meet the necessary conditions (Baron and Kenny, 1986).

*Table 7: Entropy as a mediator*

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>sig.</b>	<b>Exp(B)</b>
<b>Alternatives</b>	.31	.21	2.38	1	.12	1.371
<b>Entropy</b>	.00	.01	.00	1	.95	1.001
<b>Constant</b>	-.10	.41	.06	1	.80	.904

**Notes:** Significant at \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ ;  $-2 \log \text{likelihood} = 889.01$ ; Cox and Snell  $R^2 = 0.01$ ; Percentage of correctly predicted cases = 54; The dependent variable was binary, with 1 indicating choice avoidance and 0 indicating an active choice.

One might argue that the proportion of the participants which abandoned their choice still mostly increased but even if the 18/7 condition, which contained the most information with 46.26 bits, is compared to the 9/5 condition with the lowest entropy level of 25.12 bits, the result is not statistically significant with  $\chi^2(1, N = 319) = 32.26, p > .15$ . Thus, the results do not support H3 “Choice environments of options with higher entropy will lead to more choice avoidance”.

From the performed examination it can be said that the data does not support information overload as a mediator variable for the occurrence of choice overload. Although the comparison between the conditions 9/5 and 18/5 showed an effect significant at the 10 % level, the difference in entropy levels between those two assortments was only of 7.92 bits of information. If information load would play a role a similar or larger effect between the conditions 9/5 and 9/7 or 9/5 and 18/7 should have occurred since the difference in the entropy levels of those assortments is up to twice as high. Moreover, unlike in the research of Lurie (2004) and Lee and Lee (2004) not the number of attributes showed a strong effect on choice behavior but the number of alternatives.

An alternative measure to investigate the effect of entropy on choice overload is provided by querying respondents for their reason to choose the coupon. Participants who checked the option that “there were too many good options” indicated that they were overwhelmed

by the assortment and hence could not decide on a product. If more people in a high entropy condition had been overwhelmed it would be a strong argument for information overload as a mediator. However, this was not the case. The 80 participants which admitted being overwhelmed were almost perfectly even distributed over the different choice conditions (21 (26.3 %) in the 9/5 condition; 20 (25.0 %) in the 18/5 condition; 17 (21.3 %) in the 9/7 condition; 22 (27.5 %) in the 18/7 condition)). Consequentially it needs to be concluded that the second measure for choice overload does not support information load as a mediator either.

In this first part of the analysis choice overload was found. It was showed that participants in the high alternative conditions avoided their choice significantly more often while the number of attributes had no observable effect on choice behavior. Further the overall complexity defined as the amount of entropy of the presented assortments was tested for mediation but also found to have no impact on choice behavior. So far, the examination points towards a pure too-much-choice-effect depending only on the number of choice options. However, in the next part of the analysis the results of the personality assessment and possible relations between salient traits and choice behavior will be scrutinized and possible interaction effects between personality and entropy will be investigated.

## **4.2 Personality**

Before relating the personality traits of the participants to their respective choice behavior the used tools for the personality assessment needed to be checked for their reliability and internal validity.

### **4.2.1 Reliability**

One common method to determine the reliability of a multi-item-scale is the computation of Cronbach's alpha (Kuß et al., 2014). Cronbach's alpha is a reliability coefficient, which tests the internal consistency of a psychometrical instrument. Scales are seen as internally consistent with a Cronbach alpha score above .70. Scores above .80 are generally seen as a good indication of a reliable scale and scores above .90 show an excellent reliability (Kline, 2002). However, it needs to be noted that the value of Cronbach's alpha depends

on the number of items. Cortina (1993) showed that the more items are considered the higher the alpha value will be, even if the items measure unrelated constructs. In order to account for this shortcoming, the Mean-Inter-Item-Correlation (MIC) will be used as an additional measure for internal consistency since it is unrelated to the number of items in the scale. As can be seen in Table 8 the alpha scores of the five dimension scales show good scores for Conscientiousness, Extraversion, Neuroticism and Openness and an acceptable scale score for Agreeableness. The effect of the number of items on Cronbach's alpha can be seen when the alpha scores are compared to the MICs. The Openness scale has only a minimally smaller score than the scale for Neuroticism; however, the difference between the two MICs is disproportionately larger. This is because the Openness scale consists of ten items, which are more inconsistent than the eight items of the Neuroticism scale. Nonetheless all of the MICs show a relatively strong consistency of the items (Gerlitz and Schupp, 2005). Only the Extraversion scale, with a score of .44 shows signs for very similar items, which cover merely a small bandwidth of the construct. The rest of the correlations have values between .20 and .40, which is described as ideal by Piedmont (2014) because they are not too homogenous but also represent the same constructs which would not be the case if the scores were below .20. Hence the items of each dimension scale of the BFI are strongly correlated while covering enough aspects of the constructs, which makes them a reliable measuring instrument.

*Table 8: Internal consistency scores*

	<b>N</b>	<b>Items</b>	<b>MIC</b>	<b>VIC</b>	<b>Alpha</b>	<b>Std. Alpha</b>
<b>Agreeableness</b>	645	9	.25	.01	.75	.75
<b>Conscientiousness</b>	645	9	.33	.01	.81	.82
<b>Extraversion</b>	645	8	.44	.01	.87	.86
<b>Neuroticism</b>	645	8	.35	.01	.81	.81
<b>Openness</b>	645	10	.30	.02	.81	.81

MIC = Mean Inter-Item Correlation; VIC = Variance Inter-Item Correlations

However, the above reported results are for both the English and the German version of the BFI. Although both versions should theoretically be equally suited for the assessment in reality they could lead to different results. Therefore, the reliabilities of the two BFIs



were tested separately. The procedure was the same as for the combined sample and the results are reported in Table 9.

*Table 9: Reliability of German and English BFI*

Factor	Items	N		MIC		VIC		Alpha		Std. Alpha	
		Ger	Eng	Ger	Eng	Ger	Eng	Ger	Eng	Ger	Eng
A	9	605	40	.26	.25	.01	.03	.75	.73	.76	.75
C	9	605	40	.33	.40	.01	.03	.80	.85	.81	.86
E	8	605	40	.45	.41	.02	.03	.87	.85	.87	.85
N	8	605	40	.34	.40	.01	.03	.81	.84	.81	.84
O	10	605	40	.29	.38	.02	.03	.80	.85	.80	.86

MIC = Mean Inter-Item Correlation; VIC = Variance Inter-Item Correlations

The MICs of both item batteries show similar values to the MIC of the combined sample. Besides the value for the Extraversion items all MICs have values in the ideal range between .20 and .40. For the Extraversion items of the English version the correlation value is on the edge of the ideal range. The German version of the assessment suggests more similar items although the value is not too far off. Important is that both item batteries are still very close to the ideal range. Just like the individual MICs have acceptable values the Cronbach alphas also show satisfying values. While the values for the factors of Conscientiousness, Extraversion, Neuroticism and Openness show good reliabilities the values of Agreeableness fall a little off for both version but still signify internal consistency. The important insight of the individual analysis is that none of the two versions had unreliable items, which were set off by the items of the other version. All in all, the facilitated assessment instruments show a good reliability and measured the same constructs with the same items which allows further analysis to proceed with the collapsed data set.

#### 4.2.2 Internal Validity

The high Cronbach's alpha scores show the reliability of the BFI but what they do not show is the internal validity. Although many researchers infer a unidimensional construct from high alpha scores this is not correct because a scale can be multidimensional and

still have high alpha scores because of the sheer number of items. For assessing validity, a factor analysis with varimax rotation was applied.

Because the BFI should assess the personality of the participants within the FFM a factor analysis should extract those five factors from the gathered data. The extraction of the factors is also called variable reduction because several similar variables (in this case the items of the BFI) are reduced to new and from each other distinctly different variable constructs (factors). The factor analysis is a highly complex mathematical procedure. The explanation of this procedure would exceed the extent of this work. Thus, each step will only be described briefly. In a first step the metrical scores of the items are transformed to standardized Z-scores. Next the standardized scores are analyzed on their correlation to each other and those bivariate correlation coefficients are put into a correlations matrix. In a third step the eigenvalues and eigenvectors are computed with the principal component method. In this case, the eigenvalues are statistics that state which part of the total variance of all the standardized item scores is explained solely by a newly computed factor. The eigenvalues are sorted in descending order and build the basis for the factor extraction. It is common procedure to extract each factor which eigenvalue is higher than 1 (Eckstein, 2012). The eigenvectors of the items are correlation coefficients between the standardized items and the extracted factors. They can take on values between -1 and 1 and signify the factor load (Eckstein, 2012; Abdi, 2010). An item loads high on a factor when the absolute value of its eigenvector (factor load) is higher than .50. It is important to mention that an item can exceed this critical value and thus load high on several factors. After the extraction of meaningful factors with the factor analysis those factors need to be interpreted. Interpretation of a factor is easy if some items load only high on one factor while other items only load high on another factor. To achieve such a *simple solution*, it can make sense to rotate the extracted factors because the rotation maximizes the variance and results in items that load only high on a small number of factors (Abdi, 2010).

When applying the conventional method of extracting each factor with eigenvalue higher than 1 the factor analysis determines nine separate dimensions for the data gather with the BFI. Those nine dimensions explain 59 % of the total variance. When looking at the rotated factor matrix in Appendix A one can see that every Conscientiousness item except one loads high on Factor 2, thus Factor 2 can clearly be interpreted as the

Conscientiousness dimension of the FFM. The same goes for Factor 1 where all items except two load high and hence can be read as Extraversion and Factor 3 which can be interpreted as Neuroticism since all items of the respective scale besides two load high on this factor. The remaining two personality dimensions are not represented in a single factor. Most items of the Openness scale load high on Factor 4 and 7. Factor 4 could be interpreted as intelligence or mental creativity while Factor 7 comprises items with cultural aspects. While the interpretation of those two factors makes logical sense, and is not at all surprising because intelligence and culture were formerly used labels for the construct instead of Openness (John et al., 2008), it is unfortunate that the Openness dimensions is not replicated in a single factor. A similar situation arises for the Agreeableness dimension where the scale items load high on Factor 5, 6, 8 and 9. Most of the items load high on Factor 5 which can be interpreted as sociability or good-naturedness, however the high loading items of Factor 8 also fit into this picture. Besides items of the Agreeableness scale the items “Can be somewhat careless” of the Extraversion scale and the item “Can be moody” of the Neuroticism scale are also loading high on Factor 6, which hence could be interpreted as reluctance. Factor 9 with the items “Tends to find fault with others” and “Likes work that is the same every time (routine)” is not logically interpretable in an obvious way.

The factor analysis failed to replicate the conceptualize five personality dimensions of the FFM when applying the conventional Kaiser criterion of extracting factors with eigenvalues higher than 1. However, another common approach is the limitation of the extraction of factors. Such an approach is justified when the eigenvalues of the extracted dimensions show a sharp decline from one to another and therefore can be classified as meaningful and meaningless (Eckstein, 2012). The eigenvalues of the first five factors are 7.35, 3.77, 3.75, 3.06 and 2.41. The eigenvalues of the factors six to seven are only 1.59, 1.24, 1.16 and 1.03 respectively. These differences in eigenvalues justify a limitation to five main factors (Lang et al., 2001).

When limiting the analysis to five principle factors, the extracted dimensions explain 46.8 % of the total variance. The rotated factor matrix in Appendix B shows that the Big Five dimensions are almost perfectly replicated. All the items of the Agreeableness scale load highest on Factor 5 and all but two surpass the critical mark of .50. The same goes

for the items of the Conscientiousness scale and Factor 2, where all but one item have a high load. Factor 1 represents Extraversion. All but one item reach a load higher than 0.50. The Neuroticism dimension is represented through Factor 4. Six of the eight items of the scale exceed the critical value and one item is close to doing so. However, the item “Is depressed, blue” has the highest load on a different factor. Instead of Factor 4 it loads negatively high on Factor 1 Extraversion although not reaching the critical value. At last the items of the Openness scale load high on Factor 3. Only the item “Likes work that is the same every time (routine)” has a scattered load over all five factors without being close to the critical value once. Nonetheless, the items replicate the five dimensions properly. Under the prerequisite of five dimensions the scale items show a good item-correlation, which makes the BFI a suitable instrument for a personality assessment and thus the gathered data valid.

As shown above reliability and validity of the personality assessment are constituted through the applied tests in an adequate manner. Therefore, the participants individual scores can be computed and used for further investigation of choice overload.

### **4.2.3 Individual assessment scores**

For evaluating the personality trait scores and relating them to the results of the choice experiments the individual items of each dimension needed to be aggregated to one single dimension scale score. For this task, the reversed items such as item 02 “Tends to find fault with others” of the Agreeableness scale needed to be recoded before computing the overall score. Otherwise the score would be distorted since participants who are generally agreeable and accommodating would strongly disagree with the statement and their responses to reversed and normal items would negate themselves resulting in only a moderate score. Therefore, reversed items were recoded so that a 5 on the Likert scale became a 1 and a 4 became a 2 and vice versa (John and Srivastava, 1999; John et al. 2008). Reversed items, which were scored with a 3, stayed the same. Afterwards the total scale scores were computed. The total scale scores were then used to relate the personality traits to the choice behavior to identify possible correlations. The rationale behind this is that participants who avoided their choice might do so because a certain feature of their

character lets them act differently. Such people thus could have high or low scores on one or more of the personality dimensions.

Before such a connection could be identified it needed to be clarified what constitutes a high or low score. Because personalities change over time it is important to compare the scores within the sample. A comparison to a constant number would not reflect the fact that young people are generally more extroverted and open to new experiences while older people tend to be more agreeable and conscientious (McCrea et al., 1999; McCrea et al., 2004). That means that someone of the age of 25 who is very conscientious would not be identified so if his or her score would be compared to a constant calculated with a sample of 65-year-old participants. Thus, boundary values to identify participants with salient personality traits need to be defined within the sample. In this sample, participants evaluated themselves by indicating how much they agree that the statements applied to them. Because they could report their answer on a 5-point Likert scale one could set the boundary value at a score of four points. A score higher than four means that they reported that the items applied to them more than well. However, self-evaluations are generally biased because people are influenced by social standards and thus tend to report themselves more fitting to those standards than they actually are (Paulhus and John, 1998; Paulhus, 2002). This can be seen in Table 10, which shows the mean scores and the quartile values for each Big Five dimension scale. The mean of the Agreeableness scale, which has items in it like item 07: “Is helpful and unselfish with others” or item 17: “Has a forgiving nature” which reflect socially appreciated behaviors, is 3.57. The mean of the Neuroticism scale on the other hand which consist of items such as item 04: “Is depressed, blue” and item 14: “Can be tense” which have a negative connotation is only 2.85. A four on one scale is therefore not the same as a four reported on another. Hence the value of the upper and lower quartile was chosen as the boundary score. Each participant who had a scale score value lower than the value of 25<sup>th</sup> quartile and higher than the value of the 75<sup>th</sup> quartile was identified as a person where the respective dimension constitutes a salient personality trait. The choice behavior of those identified participants was then tested for significant differences.

*Table 10: Personality scores*

		<b>Factors</b>				
		<b>Extraversion</b>	<b>Agreeableness</b>	<b>Conscientiousness</b>	<b>Neuroticism</b>	<b>Openness</b>
<b>N</b>	<b>Valid</b>	645	645	645	645	645
	<b>Missing</b>	0	0	0	0	0
<b>Mean</b>		3.23	3.57	3.48	2.85	3.42
<b>S.D.</b>		.76	.57	.65	.70	.65
<b>Percentiles</b>						
<b>25</b>		2.63	3.22	3.11	2.37	3.00
<b>50</b>		3.25	3.67	3.56	2.88	3.40
<b>75</b>		3.75	4.00	3.89	3.38	3.90

The chi-square-test showed that of the 162 participants with an Extraversion scale score in the lower quartile 75 (46.3 %) avoided their choice by selecting the coupon,  $\chi^2 (1, N = 645) = 2.76, p > .10$ . While having a low Agreeableness score 67 (51.1 %) of the 131 participants decided to take the coupon,  $\chi^2 (1, N = 645) = .04, p < .84$ . From the 143 participants with a low Conscientiousness scale score 73 (51.0 %) avoided their choice,  $\chi^2 (1, N = 645) = .06, p < .81$ . Participants with a salient low Neuroticism score were identified 145 times. Of those 145 participants 63 (43.4 %) took the coupon,  $\chi^2 (1, N = 645) = 5.40, p < .02$ . A low Openness score had 148 participants of which 90 (60.8 %) selected the coupon,  $\chi^2 (1, N = 645) = 6.06, p < .02$ . Thus, the analysis showed that a low score in two of the personality dimensions, namely, Neuroticism and Openness, are related to a significantly different choice behavior. The same test was run with the participants with a high score.

154 participants were in the upper quartile on the Extraversion scale score of which 86 (55.8%) chose the coupon. The chi-square-test showed no significant difference in the behavior of those participants,  $\chi^2 (1, N = 645) = 1.24, p < .27$ . Of the 127 participants with a high Agreeableness score 67 (52.8 %) avoided their choice,  $\chi^2 (1, N = 645) = .04, p < .84$ . A high Conscientiousness score had 157 participants of which 80 (51.0 %) chose the coupon,  $\chi^2 (1, N = 645) = .08, p < .78$ . Of the 129 participants who scored high on the Neuroticism scale 68 (52.7 %) avoided their choice,  $\chi^2 (1, N = 645) = .04, p < .84$ . By selecting the upper quartile of the Openness scale 136 participants were identified as high

scorer. Of those 136 participants 60 (44.1 %) chose the coupon and thus showed a significantly different behavior,  $\chi^2 (1, N = 645) = 4.22, p < .04$ . For the participants with high scores the analysis showed that only Openness is related to different choice behavior since participants who are highly open to new experiences decided on one of the presented watches more often. Thus, for the factor Openness high scorers and low scorers acted in the opposite way.

Moreover, to further investigate the influence of the personality construct a logistic regression model was deployed. The constructed model was statistically significant ( $\chi^2 (5, N = 645) = 16.48 p < .01$ ) and thus qualified for further analysis.

*Table 11: Logistic regression model*

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>sig.</b>	<b>Exp(B)</b>
<b>Extraversion</b>	.271	.116	5.439	1	.02 **	1.311
<b>Agreeableness</b>	.022	.154	.021	1	.89	1.022
<b>Conscientiousness</b>	.026	.137	.036	1	.85	1.026
<b>Neuroticism</b>	.218	.124	3.103	1	.08 *	1.244
<b>Openness</b>	-.435	.130	11.274	1	.00 ***	.647
<b>Constant</b>	-.102	.901	.013	1	.91	.903

**Notes:** Significant at \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ ;  $-2 \log \text{likelihood} = 876.72$ ; Cox and Snell  $R^2 = .03$ ; Percentage of correctly predicted cases = 56.4; The dependent variable was binary, with 1 indicating choice avoidance and 0 indicating an active choice.

The logit model confirms the results from the chi-square-test, that an open personality affects the occurrence of choice overload negatively. This time it is even highly significant at the 1 % level with  $p < .00$  and therefore very unlikely to be the result of mere chance. While Agreeableness and Conscientiousness have an impact close to zero, Neuroticism shows a positive B-coefficient which means that a high Neuroticisms score favors the occurrence of choice overload. However, since the effects is only significant at the 10% level with  $p < .08$ , it is not a strong indicator which needs to be considered when the result is interpreted. Interestingly the Extraversion score shows a positive effect as well which is even significant at the 5 % level with  $p < .02$ . Similarly, to Neuroticism the B-coefficient signifies stronger choice avoidance for people with high Extraversion scores. Although the model shows some clear effects of personality on choice behavior its overall quality is low. Generally, the  $R^2$  after Coy and Snell does not take on high

values but with a value of .03 the model shows a very low goodness of fit. In a next step additional variables were introduced to improve the model.

A main effect model and an interaction model which considered the effect of the number of choice alternatives (Alternatives) was devised in order to test whether personality moderates the effect of assortment size on choice behavior. The additional variable was constructed as a dummy variable. For the Alternative-variable the cases in which the participant was confronted with the high number of alternatives were coded with 1 and for the low number they were coded with 0. For the case that choice behavior would only differ if a participant with a salient personality trait were at the same time confronted with either a high or a low number of alternatives interaction terms were created. In order to avoid problems with multicollinearity the interaction terms were created by multiplying the centered scores of the Big five scale scores with the dummy variables. Through subtracting the mean scores of each scale score from the original score and thus centering it a correlation of the interaction term with the original independent variables was prevented (Aiken and West, 1991; Judd and McClelland, 1989). One of the personality traits could have been identified as a moderator variable if its interaction term would have been significant. However, none of the terms reached significance and neither did the interaction model as whole ( $\chi^2 (17, N = 645) = 24.01$   $p > .12$ ). The main effect model on the other hand was significant ( $\chi^2 (7, N = 645) = 20.58$   $p < .00$ ) and therefore its coefficients will subsequently be further discussed.

*Table 12: Extended logistic regression model*

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>sig.</b>	<b>Exp(B)</b>
<b>Extraversion</b>	.276	.117	5.594	1	.02 **	1.318
<b>Agreeableness</b>	.022	.155	.019	1	.89	1.022
<b>Conscientiousness</b>	.041	.138	.088	1	.77	1.042
<b>Neuroticism</b>	.221	.124	3.169	1	.08 *	1.248
<b>Openness</b>	-.431	.130	11.001	1	.00 ***	.650
<b>Alternatives</b>	.325	.161	4.083	1	.04 **	1.384
<b>Constant</b>	-.346	.913	.144	1	.71	.707

**Notes:** Significant at \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ ;  $-2 \log \text{likelihood} = 872.62$ ; Cox and Snell  $R^2 = 0.03$ ; Percentage of correctly predicted cases = 60.3; The dependent variable was binary, with 1 indicating choice avoidance and 0 indicating an active choice.

Table 12 shows that the introduction of the new variable improved the regression model a little. The number of correctly predicted cases rose to 60.3 % but the Cox and Snell  $R^2$



stayed at .03. Of the five personality dimensions Neuroticism, Extraversion and Openness are still significant at an  $\alpha$ -level of 10 %, 5 % and 1 % and they still have the same B-coefficients as well. Agreeableness and Conscientiousness on the other side remain insignificant. The variable for the number of choice alternatives shows a positive effect on choice avoidance, which is significant at the 5 % level. The variable for the number of alternatives is considered in the model with the low number of alternative condition as a reference point. The positive B-coefficient therefore means that a high number of choice options favors choice avoidance. The complete logistic regression equation is following:

$$\text{Logit} = - .346 + .276 * \text{extraversion} + .022 * \text{agreeableness} + .041 * \text{conscientiousness} \\ + .221 * \text{neuroticism} - .431 * \text{openness} + .325 * \text{alternatives}$$

However, because it is a logit regression the meaning of the coefficients is difficult to read and thus the Exp(B) values need to be considered for interpretation. The Exp(B) represent the antilogarithm coefficients as odd ratios. A value of 1 means no change and therefore no influence of the regressor. This is the case for Agreeableness and Conscientiousness. A value higher than 1 means that the probability of becoming overload increases and a value lower than 1 means the probability decreases. In the case of Extraversion as a regressor the probability of the participant increase about 1.318 times for each scale unit or  $100 * (1.318 - 1) = 31.8$  %. Neuroticism similarly increases the likeliness of becoming overloaded by 24.8 %. The Exp(B) value for Openness on the other side is .650 and therefore and increase by one unit on this scale decreases the likeliness of overloading by  $100 * (.650 - 1) = -35.0$  %. Because for the Alternative-variable the low number of alternatives condition was chosen as the reference point the likeliness of participants becoming overload increases by 38.4 % only when they are confronted with the high number of alternatives.

Unlike previously hypothesized the number of alternatives had a stronger effect on choice behavior than the number of attributes. Moreover, the number of attributes in a choice set had no effect on choice behavior at all. One of the main aspects of the research was to determine the mediating influence of entropy on the effect of assortment size on choice behavior. However, under thorough examination no such influence was found. Besides the influence of entropy, the other main research objective was to establish whether

personality plays a role in the occurrence of choice overload. While none of the assessed psychological constructs were moderating the effect of assortment size on choice behavior, direct effects of the personality dimensions Extraversion, Neuroticism and Openness were found. Table 13 provides an overview for the results of the tested hypotheses. A discussion of the findings follows in the next part.

*Table 13: Overview of hypothesis testing.*

<b>Hypothesis</b>	<b>Description</b>	<b>Result</b>
<b>H1</b>	Increasing the number of alternatives will increase the number of choice avoidance.	Supported
<b>H2</b>	Increasing the number of attributes will increase the number of choice avoidance.	Not supported
<b>H3</b>	Choice environments of options with higher entropy will lead to more choice avoidance.	Not supported
<b>H4</b>	Certain personality traits are related to choice avoidance.	Supported

## 5 Discussion

The analysis of the gathered data showed some interesting findings. The research objective was to investigate what factors would influence choice overload in an online setting however, it was not clear if the researched effect would even occur at all. The results of the choice experiment show the occurrence of choice overload in an online environment. The effect was identified for choice sets between 9 and 18 alternatives and thus lies in the same range of 15 to 24 alternatives for which previous studies reported the effect as well (Iyengar and Lepper, 2000; Chernev, 2003; Reutskaja and Hogarth, 2005; Shah and Wolford, 2007). However, because Scheibehenne (2008) was not able to replicate the effect additional variables were tested on their influence.

One such variable was the number of product attributes which was controlled for in the choice set but contrary to previous findings of information overload (Lurie, 2004; Lee and Lee 2004) the results of this choice overload experiment attest that the number of choice alternatives has a stronger impact on choice behavior than the number of product attributes. The performed  $\chi^2$  -tests even showed that the number of attributes had no impact on the choice behavior at all. Likewise, no effect of entropy on choice behavior was found either. Neither the  $\chi^2$  -tests nor the logit regression model provided support for entropy as a mediator. This result is surprising since the similarities between choice overload and information overload and the clear influence of entropy on choice behavior found in information load research (Malhotra, 1982; Lurie, 2004; Lee and Lee, 2004) made a strong point for a mediating effect on choice overload. Alike Lurie, who utilized choice sets between 36.28 bits and 52.75 bits, the choice sets in this experiment ranged from 25.12 bits to 46.26 bits. More importantly the spread between the sets with the lowest and the highest information load was with 21.12 bits even higher than the spread of 15.47 bits in Lurie's sets. Thus, an influence of entropy on choice behavior would have been likely to be witnessed between those two choice sets.

One possible explanation for these diverging findings could be that in the information overload studies the impact of information load was determined through choice quality. Because there was a dominant or best option present in the choice set information overload was determined by whether or not participants were able to select or at least

consider this best option. The higher the entropy level was the worse the choices made by the participants became. Participants in this choice experiment might have made worse choices in the high entropy conditions as well but because there was no best option, choice quality cannot be assessed. What can be said though, is that a higher information load did not prevent participants from deciding on a product in a significant way.

This fact leads to the question why there was no such effect? Since the experiment was conducted in an online environment both choice options and attributes were presented in text form. It could be that participants reacted to the higher number of alternatives because they first considered the number of choice options before making a more detailed comparison of the individual options thus not processing the information from the attributes in the same way they processed the information provided by the number of choice options.

Another explanation could be that the information structure model (Lurie, 2004) in which the number of attributes contributes a different amount of information than the number of alternatives does not apply here. When calculating the information load of the assortments like Jacoby et al. (1984a; 1984b) by simply considering the number of pieces of information in the different choice sets the high alternative choice sets provided more pieces of information than the high attribute choice sets ( $9/5 = 45$  pieces;  $9/7 = 63$  pieces;  $18/5 = 90$  pieces;  $18/7 = 126$ ). Calculating the information load like this would mean that the high entropy choice sets were the two high alternative choice sets. Thus, an impact of entropy on choice behavior could be attested. However, the choice behavior in the low alternative conditions and the behavior in the high alternative conditions were very similar. In the  $9/5$  condition 47.1 % avoided to make a choice and in the  $9/7$  condition 48.9 %. In the  $18/5$  condition 56.7 % did not choose and 55.6 % in the  $18/7$  condition. While the difference between the two low alternative conditions was 18 pieces of information they only differed in 1.8 % of choice avoidance. The two high alternative conditions also only differed in 1.1 % of choice avoidance but in 36 pieces of information. These numbers do not make a strong case for entropy either. It could only be that the increase of pieces of information from the  $9/7$  condition to the  $18/5$  condition marked a threshold after which overload occurred but that no other threshold was reached from the  $18/5$  to the  $18/7$  condition. Malhotra (1982) also found evidence that information overload

could be related to a first threshold after which negative effects occur but stay constant until a second critical point is reached which would result in a break down.

Besides the amount of information personality was also assumed to play a role in the occurrence of choice overload. After assessing the personalities of the participants with the FFM and calculating their factor scores significantly different choice behavior was found for the factors Extraversion, Neuroticism and Openness. Before discussing these findings some remarks about the two remaining dimensions seem appropriate. For the factor Agreeableness, none of the statistical analyses showed any effect. This is not further surprising since the factor reflects inter-personal relations (McCrae and Costa, 2008) and thus was not expected to have an impact on choice behavior. Conscientiousness on the other hand was expected to play a vital role in the occurrence of choice overload, because of previous findings in consumer research. Badgaiyan et al. (2016) found a negative relationship between impulsive buying behavior and conscientiousness, which according to them stems from a need for appropriate information. Conscientiousness was also found to have a decreasing effect on confusion by over-choice (Raja and Malik, 2014). Because the factor summarized self-control tendencies and task and goal oriented behavior it seems odd that it had no effect at all in the conducted choice experiment.

For the dimension of Neuroticisms an effect was found. The examination of factor scores of participants with salient traits revealed that a low Neuroticisms score was linked to lower choice avoidance while a high score did not lead to significantly different behavior however the regression model showed that an increasing Neuroticism score was related to more choice avoidance. A logical explanation for these findings is that calm and emotionally stable consumers are better able to decide on a choice because they do not suffer from conflicting thoughts when comparing options. Lauriola and Levin (2001) found out that people with higher emotional stability (low Neuroticism) are more willing to take risky decisions which fits to the current findings under the reflection that a larger choice set offers more risk to choose the wrong option. With an increasing number of choice options a comparison of the options need more focus but because neurotic consumers lack self-control and are more prone to frustration they are likely to opt out avoiding making a choice (McCrae and John, 1992).

Another factor with clear effect on the choice behavior is Openness. Because participants with a high Openness score avoided their choice less often and participants with a low score avoided it more often it can be concluded that people who have an open personality tend to be more resistant to choice overload. One explanation why people with high Openness scores are less prone to choice overload could therefore be that they have a higher intrinsic motivation for comparing the options. As John et al. (2008) writes behavioral examples of open people include taking time to learn about new things and looking for stimulating activities. It could thus be that they are used to exploring new things and taking in new information more and thus opt out of such situation less often. Narrow-minded people on the other side are not interested in considering all the options offered to them. Another logical explanation could lay in the fact that a lower order trait of the Openness dimension is intelligence or cognitive complexity (John and Srivastava, 1999). Considering this notion of the factor high scores on Openness could therefore be better equipped with the mental capabilities to process the choice set and reason for a decision. Low scores however would lack capabilities and thus avoid deciding more often. This explanation makes especially sense when taking into account that significantly different behavior was found for both groups of high and low scorer.

The result for the dimension Extraversion offers none such obvious interpretation since the trait mostly manifests in behavior of social context like for example the way one interacts with peers (John et al., 2008). However, since highly extroverted people are assertive in their action it might be that because of their energetic nature they do not want to spend too much time on reaching a decision. A larger assortment demands a focused evaluation because it offers higher numbers of options which are more similar but extraverts are easier distracted and less able to hold their attention on a task (Blumenthal, 2001). Thus, choice avoidance as a negative effect of choice overload would stem from the narrow focus of extroverts with which they are not able to concentrate on a proper evaluation of the options. DeYoung et al. (2010) argue that Extraversion is linked to brain regions responsible for processing reward information and that extroverts are very reward sensitive. A reward in the given choice experiment would have been to decide on a good choice which was more difficult to do in the high option condition. Because of the higher

effort needed to achieve the reward extroverts were probably less motivated to make a choice.

## **6 Conclusion**

The objective of this thesis was to investigate the occurrence of choice overload in e-commerce and possible influence factors of the effect. Unlike conjectured by many researchers (Iyengar and Lepper, 2000; Chernev, 2003) the number of attributes played no role in the occurrence of choice overload. Taking up the need for a way to measure not only number of alternatives and attributes but the overall complexity of a choice set Lurie's (2004) information structure approach was utilized. However, the amount of bits in a choice set had no mediating effect and instead only the number of choice options affected the occurrence of choice overload. Individual differences in the personality of the participants were suspected to further influence choice behavior. Effects were found for three of the Big Five personality traits of the FFM. Highly extraverted and narrow-minded participants were found to be overwhelmed by large assortments more often while participants which were open to new experiences could decide on an option even in the presence of additional alternatives. Further emotional stability was also found to decrease the chance of the participant to become overloaded.

### **6.1 Contribution and implications**

The presented work contributes to choice overload research by finding the effect in an online environment. Further information load was shown to have no effect on the occurrence of choice overload thus showing distinct differences to findings of information overload. Additionally, the conducted research shows a relation between becoming overloaded and an individual's personality indicating individual differences as a promising area for further research.

Implication from the presented work arise for markets who present their goods and services in online shops. As the competition for consumers becomes fiercer retailers need to appeal by personalizing the shopping experience according to consumers' needs. The results of the present study suggest that choice overload can also occur in e-commerce, thus markets need to find ways to avoid the negative consequences of choice overload



like regret, dissatisfaction, doubt or the most severe choice avoidance which results in real life shopping situations in postponing or cancelling a purchase (Iyengar and Lepper, 2000; Huffman, and Kahn, 1998; Chernev, 2003). One of the preconditions for choice overload is the absence of strong preferences and expertise about the product. It therefore makes sense to ensure that new customers do not become overloaded when first browsing through the online shop.

Since choice overload not only depends on the number of presented choice alternatives but also on individual factors a promising remedy to protect the consumer from adverse effects could be to customize the product display. Because consumers with different personality traits are affected differently by choice overload it could make sense to assess the personality of a consumer and then alter the display accordingly. Low Openness and high Extraversion were shown to favor the occurrence of choice overload. Consumers with such traits are likely to profit from a reduction of the options which are presented to them at once. Consumers who are open for new experiences on the other side are likely to prefer comparing many options at the same time, thus needing a different display. Consumer interaction interfaces where online shoppers communicate with a virtual human avatar are a possible opportunity for a quick assessment of the individual. Researchers develop even shorter personality instruments than the BFI which could easily be incorporated into the online registration process (Rammstedt and John, 2007; Gosling et al., 2003). Especially in shops that are frequently used such a procedure could pay out for both sides in the long run.

## **6.2 Limitations and future research**

Although utmost care was taken while constructing and conducting the experiment to ensure validity and reliability nonetheless some limitation remain.

The first limitation comes from the nature of the deployed choice situation. In order to control for a number of variables an online survey was used in which the participants were confronted with a choice scenario. However, this scenario included a choice situation, which had non-consequential character for the participants. Such scenarios are

prone to hypothetical bias. Research on willingness-to-pay (Müller, 2007; Hensher, 2010) and stated behavior (Fifer et al., 2014) show evidence that the behavior indicated in experiments can differ from actual behavior. It is therefore possible that the presented findings would not have been obtained if participants had to select a watch, which they actually gave to their friend as a present.

Moreover, although the way the product descriptions were presented in the choice experiment was similar to the presentation in real-life online shops, such shops usually utilize pictures of the products promoted. However, besides the depictions of some of the attribute levels in the introduction part of the choice experiment, pictures were not used in this research. This was to control for the amount of information in the choice sets since it is unclear how much information is contained in a picture and thus added to the choice set. It is clear that a depiction of the product constitutes an important factor for the consumers; however, it is unclear whether product depictions play a role for choice overload.

Another issue, which needs to be addressed when talking about the validity of the findings is the used sample. Because of the limited resources a convenient sample of university students was utilized and thus it was clear right from the start that the findings would not be representative for the whole population of online shoppers. Samples of students are often used in consumer behavior research because they are easily accessible; however, they have the disadvantage that findings may not be generalizable. The findings are therefore first and foremost applicable for young and highly educated consumers.

The above-mentioned points of limitation offer a start for further investigations. Because of the homogenous sample of university students research could be extended with samples for different demographics. Likewise, the findings concerning a relation between the personality traits of Extraversion, Neuroticism and Openness to new experiences and choice overload should be confirmed through replication. The reliability of the personality traits could further be increased by an additional personality assessment of the participants through peers. Moreover, the Big Five dimensions should be examined more profound. Because of the broad nature of the factors and their different facets it makes sense to look deeper into subconstructs to pinpoint triggering factors for becoming overwhelmed.

Despite these limitations, the present study offers valuable new insights for choice overload research. The fact that the number of alternatives was the only external influence factor for choice overload shows the need for a differentiation between choice overload and information overload. For online retailers, the found relation between the personality traits and their different impacts on choice avoidance offer an opportunity to further engage consumers by customizing the offered options according to the customers individual needs.

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## Appendix

### A

<b>Rotated Factor Matrix (9 Factors)</b>									
	<b>Factor</b>								
	1	2	3	4	5	6	7	8	9
[A] Item 02(-): Tends to find fault with others	0.072	-0.019	-0.019	0.168	-0.270	0.313	-0.076	-0.163	0.569
[A] Item 07: Is helpful and unselfish with others	0.037	0.165	0.030	0.139	0.604	-0.078	-0.017	0.278	-0.003
[A] Item 12(-): Starts quarrels with others	0.128	-0.051	-0.187	-0.039	-0.649	0.268	0.009	0.144	0.163
[A] Item 17: Has a forgiving nature	-0.065	-0.049	0.181	0.009	0.157	-0.139	-0.055	0.661	-0.005
[A] Item 22: Is generally trusting	0.194	0.047	0.027	0.031	0.258	-0.163	0.055	0.558	0.107
[A] Item 27(-): Can be cold and distant with others	-0.195	0.033	0.106	-0.015	-0.054	0.659	0.026	-0.294	0.002
[A] Item 32: Is considerate and kind to almost everyone	0.009	0.167	-0.094	0.060	0.640	-0.168	0.104	0.265	0.051
[A] Item 37(-): Is sometimes rude to others	-0.012	-0.128	0.024	0.013	-0.244	0.711	0.022	-0.160	0.068
[A] Item 42: Likes to cooperate; goes along with others	0.268	0.210	0.067	0.027	0.646	-0.036	-0.048	0.236	-0.088
[C] Item 03: Does things carefully and completely	0.020	0.700	0.004	0.163	0.312	-0.090	-0.059	-0.095	0.076
[C] Item 08(-): Can be somewhat careless	0.034	-0.351	0.029	0.051	-0.222	0.543	-0.044	0.226	-0.053
[C] Item 13: Is a reliable worker	0.044	0.670	0.007	0.154	0.436	0.025	-0.096	-0.052	0.057
[C] Item 18(-): Tends to be disorganized	0.106	-0.616	-0.030	0.162	0.104	0.257	-0.133	-0.076	-0.088
[C] Item 23(-): Tends to be lazy	-0.173	-0.602	0.124	0.090	0.130	0.319	-0.049	-0.012	0.220
[C] Item 28: Keeps working until things are done	0.082	0.632	0.088	0.157	0.089	0.066	-0.054	0.028	-0.106
[C] Item 33: Does things efficiently (quickly and correctly)	0.140	0.659	0.087	0.011	0.172	0.007	-0.062	0.150	-0.057
[C] Item 38: Makes plans and sticks to them	0.243	0.582	0.027	0.138	0.214	0.110	0.066	-0.073	0.024
[C] Item 43(-): Is easily distracted; has trouble paying attention	-0.032	-0.555	-0.228	0.037	0.110	0.236	-0.007	0.049	0.165
[E] Item 01: Is talkative	0.789	0.044	-0.029	0.100	0.191	0.042	0.070	0.045	0.020
[E] Item 06(-): Reserved; keeps thoughts and feelings to self	-0.794	-0.048	-0.020	0.014	0.075	0.061	-0.022	0.057	0.028
[E] Item 11: Is full of energy	0.347	0.462	0.071	0.247	-0.008	0.047	0.005	0.395	-0.307
[E] Item 16: Generates a lot of enthusiasm	0.499	0.292	0.072	0.267	0.166	0.140	0.118	0.175	0.024
[E] Item 21(-): Tends to be quiet	-0.846	-0.066	-0.006	-0.027	-0.084	0.065	-0.012	0.023	0.063
[E] Item 26: Takes charge, has an assertive personality	0.531	0.355	0.141	0.240	-0.056	0.273	-0.050	-0.037	0.056

[E] Item 31(-): Is sometimes shy, inhibited	-0.701	-0.027	-0.170	-0.032	0.290	0.165	0.043	0.031	0.025
[E] Item 36: Is outgoing, sociable	0.812	0.056	0.061	0.013	0.082	-0.022	0.018	0.186	-0.056
[N] Item 04: Is depressed, blue	-0.391	-0.279	-0.304	-0.079	-0.089	0.122	0.175	-0.183	0.287
[N] Item 09(-): Is relaxed, handles stress well	0.009	0.027	0.792	0.109	0.015	0.151	-0.007	0.062	-0.020
[N] Item 14: Can be tense	-0.032	0.030	-0.524	0.017	-0.261	0.429	0.034	0.074	0.197
[N] Item 19: Worries a lot	-0.145	-0.005	-0.621	0.017	0.301	0.127	0.143	-0.119	0.165
[N] Item 24(-): Doesn't get easily upset, emotionally stable	0.020	0.054	0.771	0.086	0.133	-0.047	0.012	0.084	0.066
[N] Item 29: Can be moody	0.037	-0.076	-0.399	-0.040	0.058	0.583	0.114	-0.092	0.089
[N] Item 34(-): Stays calm in tense situations	0.015	0.130	0.791	0.081	0.121	0.062	0.057	0.053	0.041
[N] Item 39: Gets nervous easily	-0.396	-0.120	-0.583	-0.106	0.109	0.066	0.072	0.087	0.113
[O] Item 05: Is original, comes up with new ideas	0.102	0.130	0.101	0.793	-0.091	-0.020	0.109	0.071	-0.033
[O] Item 10: Is curious about many different things	0.147	0.246	0.125	0.325	0.284	0.164	0.292	0.186	-0.231
[O] Item 15: Is clever, thinks a lot	-0.108	0.078	-0.050	0.503	0.382	0.018	0.226	-0.081	0.195
[O] Item 20: Has an active imagination	0.131	-0.001	-0.050	0.644	0.096	0.054	0.250	0.023	-0.028
[O] Item 25: Is creative and inventive	0.041	0.078	0.178	0.821	-0.058	-0.032	0.097	0.006	-0.033
[O] Item 30: Likes artistic and creative experiences	0.015	0.030	-0.075	0.281	0.081	0.040	0.790	-0.050	-0.004
[O] Item 35(-): Likes work that is the same every time (routine)	-0.146	-0.155	-0.109	-0.182	0.060	-0.023	-0.079	0.211	0.697
[O] Item 40: Likes to think and play with ideas	0.082	0.019	0.128	0.695	0.233	0.007	0.116	0.010	-0.050
[O] Item 41(-): Doesn't like artistic things (plays, music)	-0.001	-0.056	0.111	-0.274	0.022	0.090	-0.790	-0.006	0.089
[O] Item 44: Knows a lot about art. Music, or books	0.036	-0.122	0.053	0.098	-0.018	0.086	0.754	0.015	-0.008

Note: Extraction method: Principle component analysis; Rotation method: Varimax with Kaiser-Normalization; Rotation converged at 9 iterations. Eigenvalue  $\geq 1.03$ ; 59.0 % of total variance explained.

**B****Rotated Factor Matrix (5 Factors)**

	<b>Factor</b>				
	1	2	3	4	5
[A] Item 02(-): Tends to find fault with others	-0.039	0.064	-0.089	-0.070	-0.505
[A] Item 07: Is helpful and unselfish with others	-0.020	-0.233	-0.255	-0.008	0.533
[A] Item 12(-): Starts quarrels with others	-0.205	0.182	0.132	-0.149	-0.541
[A] Item 17: Has a forgiving nature	-0.004	0.093	-0.019	0.196	0.462
[A] Item 22: Is generally trusting	-0.229	-0.010	-0.117	0.003	0.487
[A] Item 27(-): Can be cold and distant with others	0.219	-0.046	-0.123	0.034	-0.567
[A] Item 32: Is considerate and kind to almost everyone	0.021	-0.224	-0.249	-0.161	0.610
[A] Item 37(-): Is sometimes rude to others	0.009	0.157	-0.111	-0.029	-0.666
[A] Item 42: Likes to cooperate; goes along with others	-0.242	-0.290	-0.174	0.014	0.537
[C] Item 03: Does things carefully and completely	-0.008	0.750	0.152	0.003	-0.154
[C] Item 08(-): Can be somewhat careless	0.091	-0.396	0.087	-0.033	0.369
[C] Item 13: Is a reliable worker	0.011	0.739	0.186	0.019	-0.185
[C] Item 18(-): Tends to be disorganized	0.085	-0.545	0.133	0.015	0.093
[C] Item 23(-): Tends to be lazy	-0.215	-0.570	0.155	-0.055	0.111
[C] Item 28: Keeps working until things are done	0.106	0.642	0.128	-0.121	0.013
[C] Item 33: Does things efficiently (quickly and correctly)	0.163	0.659	0.029	-0.087	-0.135
[C] Item 38: Makes plans and sticks to them	0.224	0.601	0.223	0.004	0.003
[C] Item 43(-): Is easily distracted; has trouble paying attention	-0.055	-0.532	0.111	0.274	0.045
[E] Item 01: Is talkative	0.763	0.059	0.187	0.062	-0.118
[E] Item 06(-): Reserved; keeps thoughts and feelings to self	-0.780	-0.036	0.026	0.021	-0.018
[E] Item 11: Is full of energy	0.439	0.427	0.213	-0.163	-0.112
[E] Item 16: Generates a lot of enthusiasm	0.508	0.281	0.357	-0.057	-0.062
[E] Item 21(-): Tends to be quiet	-0.824	-0.081	-0.042	0.002	0.101
[E] Item 26: Takes charge, has an assertive personality	0.535	0.345	0.208	-0.148	0.260
[E] Item 31(-): Is sometimes shy, inhibited	-0.711	0.013	0.107	0.220	-0.086
[E] Item 36: Is outgoing, sociable	0.817	0.043	0.054	-0.053	-0.160
[N] Item 04: Is depressed, blue	-0.428	-0.299	0.029	0.375	0.219
[N] Item 09(-): Is relaxed, handles stress well	0.003	0.011	0.133	-0.760	0.054

[N] Item 14: Can be tense	0.009	-0.030	0.056	0.533	0.438
[N] Item 19: Worries a lot	-0.188	0.042	0.188	0.687	-0.042
[N] Item 24(-): Doesn't get easily upset, emotionally stable	-0.005	0.047	0.116	-0.724	-0.148
[N] Item 29: Can be moody	0.024	-0.072	0.172	0.482	0.367
[N] Item 34(-): Stays calm in tense situations	-0.009	0.117	0.156	-0.730	-0.059
[N] Item 39: Gets nervous easily	-0.388	-0.117	-0.004	0.613	-0.055
[O] Item 05: Is original. comes up with new ideas	0.142	0.127	0.635	-0.229	0.087
[O] Item 10: Is curious about many different things	0.169	0.251	0.526	-0.119	-0.149
[O] Item 15: Is clever, thinks a lot	-0.159	0.131	0.611	0.082	-0.140
[O] Item 20: Has an active imagination	0.138	0.012	0.663	-0.006	0.009
[O] Item 25: Is creative and inventive	0.068	0.090	0.654	-0.303	0.084
[O] Item 30: Likes artistic and creative experiences	-0.005	-0.033	0.673	0.156	-0.001
[O] Item 35(-): Likes work that is the same every time (routine)	-0.184	-0.204	-0.148	0.230	-0.093
[O] Item 40: Likes to think and play with ideas	0.077	0.072	0.657	-0.193	-0.101
[O] Item 41(-): Doesn't like artistic things (plays, music)	-0.006	0.024	-0.610	-0.150	0.044
[O] Item 44: Knows a lot about art. music, or books	0.024	-0.212	0.504	0.049	0.038

Note: Extraction method: Principle component analysis; Rotation method: Varimax with Kaiser-Normalization; Rotation converged at 6 iterations. Eigenvalue  $\geq 2.41$ ; 46.8 % of total variance explained



## C

Dear participant,

thank you for taking part in this online survey investigating buying behavior for the purpose of my master thesis.

An increasing part of consumers is buying products over the internet. The survey aims to understand how consumers make decisions without a physical product in front of them.

In the survey, you will be asked to consider a buying decision and answer questions regarding this decision and yourself. Please answer all questions seriously and truthfully. You will remain anonymous and your responses will be treated confidentially.

I believe it should only take about 10 minutes to complete the survey.

Should you have any remaining questions about this study, please do not hesitate to contact me ([timo.kienzler@hs-furtwangen.de](mailto:timo.kienzler@hs-furtwangen.de)).

Sincerely,

Timo Kienzler  
Master Student  
HFU Business School, Hochschule Furtwangen

Next

**Please consider following scenario:**

You are invited to a birthday party of a good friend. He is a fan of classic watches, which is why you and some other friends decided to give him a new watch as a present. Your friends selected some watches the birthday boy could like, but they want you to make the final choice about which one to give your friend as a present.

Here are some general information about watches:

**Casing material**

The casing is the part of the watch which has all the mechanical parts like the clockwork inside. Most of the time it is made of some type of metal.

**Casing color**

Often the casing has a different color than the material it is made of. For example an aluminium casing can be golden in color.

**Wrist band leather**

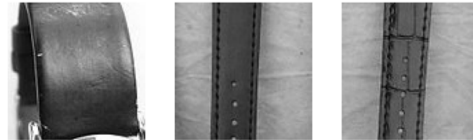
Leather is a frequently used material for the wrist bands of watches. Different kinds are Nubuk, Velour and Buckskin. Nubuk is a fine leather which is made from the skin of cows. Velour leather has a rougher surface than Nubuk. Buckskin leather is leather from a deer.

**Wrist band color**

Classical colors for wrist bands are Black, Light Brown or Dark Brown

**Wrist band design**

Wrist bands can vary in their design. To the right you can see a smooth, a double-seamed and a croco-pattern wrist band.

**Numbers**

The display design can vary through the typ of numbers on the display. To the right you see Arabic and Roman Numerals and Stick Marks.

**Display**

The display of the watch, which is also called dial, shows the time.

**Instructions:**

On the next page, you will see the descriptions of the watches your friends selected.

Please read the descriptions and choose a watch, which you think your friend could like.

Please remember the name of the watch.

Next

Here you can see the descriptions of the watches. Please read the descriptions and think about which watch you want to choose for your friend.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Casing material</b>	Aluminium	Stainless Steel	Titanium	Stainless Steel
<b>Wrist band leather</b>	Velour	Nappa	Velour	Buckskin
<b>Wrist band color</b>	Dark Brown	Black	Light Brown	Light Brown
<b>Wrist band design</b>	Double Seam	Croco-pattern	Smooth	Croco-pattern
<b>Numbers</b>	Stick Marks	Stick Marks	Stick Marks	Roman
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Casing material</b>	Titanium	Aluminium	Stainless Steel	Aluminium
<b>Wrist band leather</b>	Nappa	Buckskin	Nappa	Buckskin
<b>Wrist band color</b>	Black	Light Brown	Dark Brown	Black
<b>Wrist band design</b>	Double Seam	Smooth	Double Seam	Smooth
<b>Numbers</b>	Roman	Roman	Arabic	Arabic
<b>Name</b>	<b>J-87</b>			
<b>Casing material</b>	Titanium			
<b>Wrist band leather</b>	Velour			
<b>Wrist band color</b>	Dark Brown			
<b>Wrist band design</b>	Croco-pattern			
<b>Numbers</b>	Arabic			

1. If you are not sure which watch you should pick you can take a gift coupon. With the gift coupon your friend can get a watch by himself.

- I choose a watch
- I choose the coupon

Next

Here you can see the descriptions of the watches. Please read the descriptions and think about which watch you want to choose for your friend.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Casing material</b>	Aluminium	Stainless Steel	Titanium	Stainless Steel
<b>Casing color</b>	Black	Silver	Silver	Black
<b>Wrist band leather</b>	Velour	Nappa	Velour	Buckskin
<b>Wrist band color</b>	Dark Brown	Black	Light Brown	Light Brown
<b>Wrist band design</b>	Double Seam	Croco-pattern	Smooth	Croco-pattern
<b>Display</b>	Black Analog	White Analog	Black Analog	White Analog
<b>Numbers</b>	Stick Marks	Stick Marks	Stick Marks	Roman
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Casing material</b>	Titanium	Aluminium	Stainless Steel	Aluminium
<b>Casing color</b>	Silver	Gold	Black	Gold
<b>Wrist band leather</b>	Nappa	Buckskin	Nappa	Buckskin
<b>Wrist band color</b>	Black	Light Brown	Dark Brown	Black
<b>Wrist band design</b>	Double Seam	Smooth	Double Seam	Smooth
<b>Display</b>	Silver Analog	Silver Analog	White Analog	Silver Analog
<b>Numbers</b>	Roman	Roman	Arabic	Arabic
<b>Name</b>	<b>J-87</b>			
<b>Casing material</b>	Titanium			
<b>Casing color</b>	Gold			
<b>Wrist band leather</b>	Velour			
<b>Wrist band color</b>	Dark Brown			
<b>Wrist band design</b>	Croco-pattern			
<b>Display</b>	Black Analog			
<b>Numbers</b>	Arabic			

1. If you are not sure which watch you should pick you can take a gift coupon. With the gift coupon your friend can get a watch by himself.

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Here you can see the descriptions of the watches. Please read the descriptions and think about which watch you want to choose for your friend.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Casing material</b>	Aluminium	Stainless Steel	Titanium	Stainless Steel
<b>Wrist band leather</b>	Velour	Nappa	Velour	Buckskin
<b>Wrist band color</b>	Dark Brown	Black	Light Brown	Light Brown
<b>Wrist band design</b>	Double Seam	Croco-pattern	Smooth	Croco-pattern
<b>Numbers</b>	Stick Marks	Stick Marks	Stick Marks	Roman
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Casing material</b>	Titanium	Aluminium	Stainless Steel	Aluminium
<b>Wrist band leather</b>	Nappa	Buckskin	Nappa	Buckskin
<b>Wrist band color</b>	Black	Light Brown	Dark Brown	Black
<b>Wrist band design</b>	Double Seam	Smooth	Double Seam	Smooth
<b>Numbers</b>	Roman	Roman	Arabic	Arabic
<b>Name</b>	<b>J-87</b>	<b>Q-30</b>	<b>E-49</b>	<b>Z-84</b>
<b>Casing material</b>	Titanium	Stainless Steel	Titanium	Aluminium
<b>Wrist band leather</b>	Velour	Velour	Buckskin	Nappa
<b>Wrist band color</b>	Dark Brown	Dark Brown	Black	Light Brown
<b>Wrist band design</b>	Croco-pattern	Smooth	Double Seam	Double Seam
<b>Numbers</b>	Arabic	Stick Marks	Arabic	Roman
<b>Name</b>	<b>R-04</b>	<b>P-65</b>	<b>W-08</b>	<b>Y-04</b>
<b>Casing material</b>	Stainless Steel	Titanium	Aluminium	Aluminium
<b>Wrist band leather</b>	Buckskin	Nappa	Velour	Nappa
<b>Wrist band color</b>	Black	Light Brown	Dark Brown	Black
<b>Wrist band design</b>	Double Seam	Croco-pattern	Croco-pattern	Croco-pattern
<b>Numbers</b>	Roman	Stick Marks	Arabic	Roman
<b>Name</b>	<b>V-40</b>	<b>F-12</b>		
<b>Casing material</b>	Titanium	Stainless Steel		
<b>Wrist band leather</b>	Buckskin	Velour		
<b>Wrist band color</b>	Dark Brown	Light Brown		
<b>Wrist band design</b>	Smooth	Smooth		
<b>Numbers</b>	Arabic	Stick Marks		

1. If you are not sure which watch you should pick you can take a gift coupon. With the gift coupon your friend can get a watch by himself.

- I choose a watch
- I choose the coupon

Next

Here you can see the descriptions of the watches. Please read the descriptions and think about which watch you want to choose for your friend.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Casing material</b>	Aluminium	Stainless Steel	Titanium	Stainless Steel
<b>Casing color</b>	Black	Silver	Silver	Black
<b>Wrist band leather</b>	Velour	Nappa	Velour	Buckskin
<b>Wrist band color</b>	Dark Brown	Black	Light Brown	Light Brown
<b>Wrist band design</b>	Double Seam	Croco-pattern	Smooth	Croco-pattern
<b>Display</b>	Black Analog	White Analog	Black Analog	White Analog
<b>Numbers</b>	Stick Marks	Stick Marks	Stick Marks	Roman
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Casing material</b>	Titanium	Aluminium	Stainless Steel	Aluminium
<b>Casing color</b>	Silver	Gold	Black	Gold
<b>Wrist band leather</b>	Nappa	Buckskin	Nappa	Buckskin
<b>Wrist band color</b>	Black	Light Brown	Dark Brown	Black
<b>Wrist band design</b>	Double Seam	Smooth	Double Seam	Smooth
<b>Display</b>	Silver Analog	Silver Analog	White Analog	Silver Analog
<b>Numbers</b>	Roman	Roman	Arabic	Arabic
<b>Name</b>	<b>J-87</b>	<b>Q-30</b>	<b>E-49</b>	<b>Z-84</b>
<b>Casing material</b>	Titanium	Stainless Steel	Titanium	Aluminium
<b>Casing color</b>	Gold	Black	Silver	Black
<b>Wrist band leather</b>	Velour	Velour	Buckskin	Nappa
<b>Wrist band color</b>	Dark Brown	Dark Brown	Black	Light Brown
<b>Wrist band design</b>	Croco-pattern	Smooth	Double Seam	Double Seam
<b>Display</b>	Black Analog	Black Analog	Black Analog	Silver Analog
<b>Numbers</b>	Arabic	Stick Marks	Arabic	Roman
<b>Name</b>	<b>R-04</b>	<b>P-65</b>	<b>W-08</b>	<b>Y-04</b>
<b>Casing material</b>	Stainless Steel	Titanium	Aluminium	Aluminium
<b>Casing color</b>	Gold	Silver	Silver	Gold
<b>Wrist band leather</b>	Buckskin	Nappa	Velour	Nappa
<b>Wrist band color</b>	Black	Light Brown	Dark Brown	Black
<b>Wrist band design</b>	Double Seam	Croco-pattern	Croco-pattern	Croco-pattern
<b>Display</b>	White Analog	Black Analog	White Analog	Silver Analog
<b>Numbers</b>	Roman	Stick Marks	Arabic	Roman
<b>Name</b>	<b>V-40</b>	<b>F-12</b>		
<b>Casing material</b>	Titanium	Stainless Steel		
<b>Casing color</b>	Gold	Black		
<b>Wrist band leather</b>	Buckskin	Velour		
<b>Wrist band color</b>	Dark Brown	Light Brown		
<b>Wrist band design</b>	Smooth	Smooth		
<b>Display</b>	White Analog	Silver Analog		
<b>Numbers</b>	Arabic	Stick Marks		

1. If you are not sure which watch you should pick you can take a gift coupon. With the gift coupon your friend can get a watch by himself.

- I choose a watch
- I choose the coupon

Next

**2. Which watch did you choose?**

Please enter the name of the watch.

[Please choose]

Next

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**2. Why did you choose the coupon?**

- There were too many good options.
- It is better if my friend chooses a watch.
- Other reason

Next

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**3. Why did you decide on the watch you chose?**

- I think my friend will like the watch I chose.
- I do not want to give a coupon as a gift.
- I have a similar watch.
- I just chose a random watch and went through with it.
- Other reason

Next

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You made it through the first part of the survey. In the next part, you will be asked some questions about yourself. After those questions the main part of the survey will be over and there will only be a few short questions about personal details.

[Next](#)

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**4. Here are some statements that may or may not describe what you are like.**

Please indicate how much you agree or disagree with the following statements. For example, do you agree that you are someone who is bossy? Write a 1 if you disagree strongly, a 2 if you disagree a little, a 3 if you neither agree nor disagree, a 4 if you agree a little, or a 5 if you agree strongly.

I see myself as someone who...	strongly disagree			strongly agree	
	1	2	3	4	5
Is talkative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tends to find fault with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Does things carefully and completely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is depressed, blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is original, comes up with new ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reserved; keeps thoughts and feelings to self	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is helpful and unselfish with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Can be somewhat careless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is relaxed, handles stress well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is curious about many different things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is full of energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Starts quarrels with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is a reliable worker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Can be tense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is clever, thinks a lot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Generates a lot of enthusiasm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Has a forgiving nature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tends to be disorganized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worries a lot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Has an active imagination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tends to be quiet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is generally trusting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tends to be lazy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doesn't get easily upset, emotionally stable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is creative and inventive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Takes charge, has an assertive personality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Can be cold and distant with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeps working until things are done	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Can be moody	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Likes artistic and creative experiences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is sometimes shy, inhibited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is considerate and kind to almost everyone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Does things efficiently (quickly and correctly)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stays calm in tense situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Likes work that is the same every time (routine)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is outgoing, sociable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is sometimes rude to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Makes plans and sticks to them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gets nervous easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Likes to think and play with ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doesn't like artistic things (plays, music)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Likes to cooperate; goes along with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is easily distracted; has trouble paying attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knows a lot about art, music, or books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Next](#)

**5. What is your gender?**

[Please choose]

**6. How old are you?**

I am  years old

**7. What is your highest level of educational achievement?**

Please select the highest level of qualification you have obtained. (If you are studying in a master program your highest qualification is probably your bachelor's degree.)

- Higher education entrance qualification (in Germany Abitur)
- Completed apprenticeship
- Bachelor's degree
- Master's degree
- Other degree:

**8. What do you do professionally?**

- Pupil/in school
- Training/apprenticeship
- University student
- Employee
- Civil servant
- Self-employed
- Unemployed/seeking employment
- Other:

**9. In which country did you grow up?**

Country:

Next

**Thank you for completing this questionnaire!**

I would like to thank you very much for helping me.

Your answers were transmitted, you may close the browser window or tab now.

Timo Kienzler, Hochschule Furtwangen – 2017

**D**

Sehr geehrter Teilnehmer,

Vielen Dank für die Teilnahme an dieser Onlineumfrage zum Thema Kaufverhalten, welche ich für meine Masterthesis durchführe.

Ein immer größer werdender Teil der Konsumenten kauft Produkte über das Internet. Diese Umfrage soll helfen zu verstehen, wie Konsumenten Entscheidungen treffen, ohne ein physisches Produkt vor sich zu haben.

Während der Umfrage wirst du gebeten, dir eine Kaufentscheidung vorzustellen und Fragen zu dieser Entscheidung und dir selbst zu beantworten. Bitte beantworte alle Fragen gewissenhaft und ehrlich. Die Umfrage erfolgt anonym und deine Antworten werden vertraulich behandelt.

Die Befragung dauert ca. 10 min.

Solltest du Fragen bezüglich dieser Umfrage haben, kannst du mich gerne anschreiben ([timo.kienzler@hs-furtwangen.de](mailto:timo.kienzler@hs-furtwangen.de)).

Mit freundlichen Grüßen,

Timo Kienzler  
Master Student  
HFU Business School, Hochschule Furtwangen

Weiter

**Bitte stell dir folgendes Szenario vor:**

Du wurdest zu dem Geburtstag eines guten Freundes eingeladen. Er ist ein Fan von klassischen Armbanduhren. Deshalb haben du und ein paar Freunde entschieden, ihm eine neue Armbanduhr zu schenken. Deine Freunde haben ein paar Uhren ausgesucht, die dem Geburtstagskind gefallen könnten. Aber sie möchten, dass du die Uhr wählst, welche ihr verschenken werdet.

Hier sind ein paar grundlegende Informationen über Uhren:

**Gehäusematerial**

Das Gehäuse einer Uhr beinhaltet die ganzen mechanischen Bauteile wie z.B. das Uhrwerk. Meistens besteht es aus Metall.

**Gehäusefarbe**

Oft besitzt das Gehäuse eine andere Farbe als das Material aus dem es besteht. Beispielsweise kann ein Aluminium Gehäuse golden sein.

**Armbandleder**

Leder wird häufig genutzt um Armbänder für Uhren herzustellen. Verschiedene Arten von Leder sind Nubuk, Velour und Wildleder. Nubuk ist ein weiches Leder welches aus Kuhhaut gefertigt wird. Velourleder hat eine rauere Oberfläche als Nubuk. Wildleder wird aus der Haut eines Hirsches gewonnen.

**Armbandfarbe**

Klassische Armbandfarben sind z.B. Schwarz, Dunkelbraun oder Hellbraun.

**Armband-Design**

Armbänder können sich in ihrem Design unterscheiden. Rechts siehst du ein glattes, ein doppelnähtiges und ein Armband mit Krokomuster.

**Ziffern**

Für das Zifferblatt können verschiedene Zifferarten verwendet werden. Rechts siehst du arabische und römische Ziffern und Strichmarkierungen.

**Zifferblatt**

Das Zifferblatt der Uhr, welches auch Gesicht genannt wird, zeigt die Zeit an.

**Anleitung:**

Auf der nächsten Seite siehst du die Beschreibungen der Uhren, welche deine Freunde ausgewählt haben.

Bitte lies dir die Beschreibungen durch und wähle eine Uhr aus, von der du denkst, sie könnte eurem Freund gefallen.

Bitte merke dir den Namen der Uhr.

Weiter

Hier siehst du die Beschreibungen der Uhren aufgelistet. Bitte lies dir die Beschreibungen durch und überlege dir, welche Uhr du für deinen Freund auswählen willst.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Gehäusematerial</b>	Aluminium	Edelstahl	Titan	Edelstahl
<b>Armbandleder</b>	Velour	Nappa	Velour	Wildleder
<b>Armbandfarbe</b>	Dunkelbraun	Schwarz	Hellbraun	Hellbraun
<b>Armband-Design</b>	Doppelnah	Krokomuster	Glatt	Krokomuster
<b>Ziffern</b>	Striche	Striche	Striche	Römisch
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Gehäusematerial</b>	Titan	Aluminium	Edelstahl	Aluminium
<b>Armbandleder</b>	Nappa	Wildleder	Nappa	Wildleder
<b>Armbandfarbe</b>	Schwarz	Hellbraun	Dunkelbraun	Schwarz
<b>Armband-Design</b>	Doppelnah	Glatt	Doppelnah	Glatt
<b>Ziffern</b>	Römisch	Römisch	Arabisch	Arabisch
<b>Name</b>	<b>J-87</b>			
<b>Gehäusematerial</b>	Titan			
<b>Armbandleder</b>	Velour			
<b>Armbandfarbe</b>	Dunkelbraun			
<b>Armband-Design</b>	Krokomuster			
<b>Ziffern</b>	Arabisch			

1. Wenn du dir nicht sicher bist welche Uhr du aussuchen sollst, kannst du auch einen Gutschein wählen. Mit dem Gutschein kann dein Freund sich selbst eine Uhr aussuchen.

- Ich wähle eine Uhr
- Ich wähle den Gutschein

Weiter

Hier siehst du die Beschreibungen der Uhren aufgelistet. Bitte lies dir die Beschreibungen durch und überlege dir, welche Uhr du für deinen Freund auswählen willst.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Gehäusematerial</b>	Aluminium	Edelstahl	Titan	Edelstahl
<b>Gehäusefarbe</b>	Schwarz	Silber	Silber	Schwarz
<b>Armbandleder</b>	Velour	Nappa	Velour	Wildleder
<b>Armbandfarbe</b>	Dunkelbraun	Schwarz	Hellbraun	Hellbraun
<b>Armband-Design</b>	Doppelnaht	Krokomuster	Glatt	Krokomuster
<b>Zifferblatt</b>	Schwarz Analog	Weiß Analog	Schwarz Analog	Weiß Analog
<b>Ziffern</b>	Striche	Striche	Striche	Römisch
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Gehäusematerial</b>	Titan	Aluminium	Edelstahl	Aluminium
<b>Gehäusefarbe</b>	Silber	Gold	Schwarz	Gold
<b>Armbandleder</b>	Nappa	Wildleder	Nappa	Wildleder
<b>Armbandfarbe</b>	Schwarz	Hellbraun	Dunkelbraun	Schwarz
<b>Armband-Design</b>	Doppelnaht	Glatt	Doppelnaht	Glatt
<b>Zifferblatt</b>	Silber Analog	Silber Analog	Weiß Analog	Silber Analog
<b>Ziffern</b>	Römisch	Römisch	Arabisch	Arabisch
<b>Name</b>	<b>J-87</b>			
<b>Gehäusematerial</b>	Titan			
<b>Gehäusefarbe</b>	Gold			
<b>Armbandleder</b>	Velour			
<b>Armbandfarbe</b>	Dunkelbraun			
<b>Armband-Design</b>	Krokomuster			
<b>Zifferblatt</b>	Schwarz Analog			
<b>Ziffern</b>	Arabisch			

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Weiter



Hier siehst du die Beschreibungen der Uhren aufgelistet. Bitte lies dir die Beschreibungen durch und überlege dir, welche Uhr du für deinen Freund auswählen willst.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Gehäusematerial</b>	Aluminium	Edelstahl	Titan	Edelstahl
<b>Armbandleder</b>	Velour	Nappa	Velour	Wildleder
<b>Armbandfarbe</b>	Dunkelbraun	Schwarz	Hellbraun	Hellbraun
<b>Armband-Design</b>	Doppelnah	Krokomuster	Glatt	Krokomuster
<b>Ziffern</b>	Striche	Striche	Striche	Römisch
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Gehäusematerial</b>	Titan	Aluminium	Edelstahl	Aluminium
<b>Armbandleder</b>	Nappa	Wildleder	Nappa	Wildleder
<b>Armbandfarbe</b>	Schwarz	Hellbraun	Dunkelbraun	Schwarz
<b>Armband-Design</b>	Doppelnah	Glatt	Doppelnah	Glatt
<b>Ziffern</b>	Römisch	Römisch	Arabisch	Arabisch
<b>Name</b>	<b>J-87</b>	<b>Q-30</b>	<b>E-49</b>	<b>Z-84</b>
<b>Gehäusematerial</b>	Titan	Edelstahl	Titan	Aluminium
<b>Armbandleder</b>	Velour	Velour	Wildleder	Nappa
<b>Armbandfarbe</b>	Dunkelbraun	Dunkelbraun	Schwarz	Hellbraun
<b>Armband-Design</b>	Krokomuster	Glatt	Doppelnah	Doppelnah
<b>Ziffern</b>	Arabisch	Striche	Arabisch	Römisch
<b>Name</b>	<b>R-04</b>	<b>P-65</b>	<b>W-08</b>	<b>Y-04</b>
<b>Gehäusematerial</b>	Edelstahl	Titan	Aluminium	Aluminium
<b>Armbandleder</b>	Wildleder	Nappa	Velour	Nappa
<b>Armbandfarbe</b>	Schwarz	Hellbraun	Dunkelbraun	Schwarz
<b>Armband-Design</b>	Doppelnah	Krokomuster	Krokomuster	Krokomuster
<b>Ziffern</b>	Römisch	Striche	Arabisch	Römisch
<b>Name</b>	<b>V-40</b>	<b>F-12</b>		
<b>Gehäusematerial</b>	Titan	Edelstahl		
<b>Armbandleder</b>	Wildleder	Velour		
<b>Armbandfarbe</b>	Dunkelbraun	Hellbraun		
<b>Armband-Design</b>	Glatt	Glatt		
<b>Ziffern</b>	Arabisch	Striche		

1. Wenn du dir nicht sicher bist welche Uhr du aussuchen sollst, kannst du auch einen Gutschein wählen. Mit dem Gutschein kann dein Freund sich selbst eine Uhr aussuchen.

- Ich wähle eine Uhr
- Ich wähle den Gutschein

Weiter

Hier siehst du die Beschreibungen der Uhren aufgelistet. Bitte lies dir die Beschreibungen durch und überlege dir, welche Uhr du für deinen Freund auswählen willst.

<b>Name</b>	<b>C-09</b>	<b>Q-33</b>	<b>Z-56</b>	<b>G-96</b>
<b>Gehäusematerial</b>	Aluminium	Edelstahl	Titan	Edelstahl
<b>Gehäusefarbe</b>	Schwarz	Silber	Silber	Schwarz
<b>Armbandleder</b>	Velour	Nappa	Velour	Wildleder
<b>Armbandfarbe</b>	Dunkelbraun	Schwarz	Hellbraun	Hellbraun
<b>Armband-Design</b>	Doppelnaht	Krokomuster	Glatt	Krokomuster
<b>Zifferblatt</b>	Schwarz Analog	Weiß Analog	Schwarz Analog	Weiß Analog
<b>Ziffern</b>	Striche	Striche	Striche	Römisch
<b>Name</b>	<b>U-38</b>	<b>K-02</b>	<b>V-78</b>	<b>M-86</b>
<b>Gehäusematerial</b>	Titan	Aluminium	Edelstahl	Aluminium
<b>Gehäusefarbe</b>	Silber	Gold	Schwarz	Gold
<b>Armbandleder</b>	Nappa	Wildleder	Nappa	Wildleder
<b>Armbandfarbe</b>	Schwarz	Hellbraun	Dunkelbraun	Schwarz
<b>Armband-Design</b>	Doppelnaht	Glatt	Doppelnaht	Glatt
<b>Zifferblatt</b>	Silber Analog	Silber Analog	Weiß Analog	Silber Analog
<b>Ziffern</b>	Römisch	Römisch	Arabisch	Arabisch
<b>Name</b>	<b>J-87</b>	<b>Q-30</b>	<b>E-49</b>	<b>Z-84</b>
<b>Gehäusematerial</b>	Titan	Edelstahl	Titan	Aluminium
<b>Gehäusefarbe</b>	Gold	Schwarz	Silber	Schwarz
<b>Armbandleder</b>	Velour	Velour	Wildleder	Nappa
<b>Armbandfarbe</b>	Dunkelbraun	Dunkelbraun	Schwarz	Hellbraun
<b>Armband-Design</b>	Krokomuster	Glatt	Doppelnaht	Doppelnaht
<b>Zifferblatt</b>	Schwarz Analog	Schwarz Analog	Schwarz Analog	Silber Analog
<b>Ziffern</b>	Arabisch	Striche	Arabisch	Römisch
<b>Name</b>	<b>R-04</b>	<b>P-65</b>	<b>W-08</b>	<b>Y-04</b>
<b>Gehäusematerial</b>	Edelstahl	Titan	Aluminium	Aluminium
<b>Gehäusefarbe</b>	Gold	Silber	Silber	Gold
<b>Armbandleder</b>	Wildleder	Nappa	Velour	Nappa
<b>Armbandfarbe</b>	Schwarz	Hellbraun	Dunkelbraun	Schwarz
<b>Armband-Design</b>	Doppelnaht	Krokomuster	Krokomuster	Krokomuster
<b>Zifferblatt</b>	Weiß Analog	Schwarz Analog	Weiß Analog	Silber Analog
<b>Ziffern</b>	Römisch	Striche	Arabisch	Römisch
<b>Name</b>	<b>V-40</b>	<b>F-12</b>		
<b>Gehäusematerial</b>	Titan	Edelstahl		
<b>Gehäusefarbe</b>	Gold	Schwarz		
<b>Armbandleder</b>	Wildleder	Velour		
<b>Armbandfarbe</b>	Dunkelbraun	Hellbraun		
<b>Armband-Design</b>	Glatt	Glatt		
<b>Zifferblatt</b>	Weiß Analog	Silber Analog		
<b>Ziffern</b>	Arabisch	Striche		

1. Wenn du dir nicht sicher bist welche Uhr du aussuchen sollst, kannst du auch einen Gutschein wählen. Mit dem Gutschein kann dein Freund sich selbst eine Uhr aussuchen.

- Ich wähle eine Uhr
- Ich wähle den Gutschein

Weiter

**2. Welche Uhr hast du ausgewählt?**

Bitte trage den Namen der Uhr ein.

[Bitte auswählen]

Weiter

Timo Kienzler, Hochschule Furtwangen - 2017

**2. Warum hast du den Gutschein gewählt?**

- Es gab zuviele gute Optionen.
- Es ist besser wenn mein Freund sich eine Uhr aussucht.
- Andere Gründe

Weiter

Timo Kienzler, Hochschule Furtwangen - 2017

**3. Warum hast du dich für die Armbanduhr die du gewählt hast entschieden?**

- Ich denke meinem Freund wird die Uhr gefallen.
- Ich möchte keinen Gutschein verschenken.
- Ich habe eine ähnliche Uhr.
- Ich habe irgendeine Uhr gewählt und bin bei meiner Entscheidung geblieben.
- Andere Gründe

Weiter

Timo Kienzler, Hochschule Furtwangen - 2017

Du hast den ersten Teil der Umfrage geschafft. Im zweiten Teil wirst du gebeten ein paar Fragen über dich selbst zu beantworten. Danach ist der Hauptteil der Befragung vorbei und es bleiben nur noch fünf kurze Fragen zu deiner Person.

[Weiter](#)

Timo Kienzler, Hochschule Furtwangen - 2017

**4. Im folgenden findest du eine Reihe von Aussagen, die auf dich zutreffen können oder nicht.**

Bitte gib an, inwieweit die Aussagen auf dich zutreffen. Zum Beispiel, trifft es auf dich zu, dass du rechthaberisch bist? Wähle eine 1 wenn es überhaupt nicht zutrifft, eine 2 wenn es ein wenig zutrifft, eine 3 wenn es teils/teils zutrifft, eine 4 wenn es gut zutrifft oder ein 5 wenn es sehr gut zutrifft.

	trifft überhaupt nicht zu			trifft sehr gut zu	
	1	2	3	4	5
<b>Ich sehe mich selbst als jemand der,...</b>					
gesprächig ist, sich gerne unterhält	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
dazu neigt, andere zu kritisieren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aufgaben gründlich erledigt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
deprimiert, niedergeschlagen ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
originell ist, neue Ideen entwickelt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
eher zurückhaltend und reserviert ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hilfsbereit und selbstlos gegenüber anderen ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
etwas achtlos sein kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
entspannt ist, sich durch Stress nicht aus der Ruhe bringen lässt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
vielseitig interessiert ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
voller Energie und Tatendrang ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
häufig in Streitereien verwickelt ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zuverlässig und gewissenhaft arbeitet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
leicht angespannt reagiert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tiefsinnig ist, gerne über Sachen nachdenkt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
begeisterungsfähig ist und andere mitreißen kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nicht nachtragend ist, anderen leicht vergibt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
dazu neigt, unordentlich zu sein	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
sich viele Sorgen macht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
eine lebhafte Vorstellungskraft hat, phantasievoll ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
eher still und wortkarg ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
anderen Vertrauen schenkt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bequem ist und zur Faulheit neigt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ausgeglichen ist, nicht leicht aus der Fassung zu bringen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

erfinderisch und einfallsreich ist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
durchsetzungsfähig und energisch ist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
sich kalt und distanziert verhalten kann	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
nicht aufgibt ehe die Aufgabe erledigt ist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
launisch sein kann	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
künstlerische und ästhetische Eindrücke schätzt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
manchmal schüchtern und gehemmt ist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
rücksichtsvoll und einfühlsam zu anderen ist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
tüchtig ist und flott arbeitet	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
ruhig bleibt, selbst in angespannten Situationen	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
routinemäßige und einfache Aufgaben bevorzugt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
aus sich herausgeht, gesellig ist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
schroff und abweisend zu anderen sein kann	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Pläne macht und diese auch durchführt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
leicht nervös und unsicher wird	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
gerne Überlegungen anstellt, mit Ideen spielt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
nur wenig künstlerische Interessen hat	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
sich kooperativ verhält, gut mit anderen auskommt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
leicht ablenkbar ist, nicht bei der Sache bleibt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
sich gut in Musik, Kunst und Literatur auskennt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

Weiter

**5. What is your gender?**

[Please choose]

**6. How old are you?**

I am  years old

**7. What is your highest level of educational achievement?**

Please select the highest level of qualification you have obtained. (If you are studying in a master program your highest qualification is probably your bachelor's degree.)

- Higher education entrance qualification (in Germany Abitur)
- Completed apprenticeship
- Bachelor's degree
- Master's degree
- Other degree:

**8. What do you do professionally?**

- Pupil/in school
- Training/apprenticeship
- University student
- Employee
- Civil servant
- Self-employed
- Unemployed/seeking employment
- Other:

**9. In which country did you grow up?**

Country:

Next

**Vielen Dank für das Ausfüllen des Fragebogens!**

Du hast mir damit sehr geholfen

Deine Antworten wurden übertragen, du kannst das Browser-Fenster oder den Tab jetzt schließen.