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Choice Overload in Music

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Abstract

Nowadays there is an impressive amount of streaming services allowing everybody with an internet connection to listen to a huge music catalog almost instantly. But how do we as persons react to so many possibilities for our ears? Browsing through an almost infinite catalog might be overwhelming and confusing to say the least. This work aims to find the correct assortment size for a song pool that is able to provide the consumer with the best compromise between the positive effects from a large assortment and the negative effects from the cognitive load that is the result of from choosing from a large assortment.We hypothesized that there is a curvilinear relationship between assortment size and a positive experience while choosing. Results have shown that there is an assortment size that was able to deliver the best choosing experience. We hypothesized that the participants with a higher subjective knowledge or higher musical sophistication would be able to select from larger assortments without experiencing choice overload. Results have shown that, in fact, said participants were able to benefit from larger assortments and did indeed use more attributes and resort less to an elimination strategy in order to choose one of the songs in the assortment. We also tested the effect of decision goals through the participant's Maximizing/Satisficing profile. For this case, we predicted that maximizers would experience choice overload with smallers assortments. In the case of this study no significant relationship between the maximizing/satisficing profile could be found. Furthermore, an evaluation on the effects of different playlist themes with different decision accountability levels was carried out. As predicted, the choice overload phenomenon appeared in different assortment sizes but differently to expected. Further research should focus on the most effective number and type of attributes describing each of the songs in order to make choice in music a more satisfactory experience.

Zusammenfassung

Heutzutage gibt es eine beeindruckende Anzahl von Streaming-Diensten, die es jedem mit einer Internetverbindung ermöglichen, einen riesigen Musikkatalog fast sofort zu hören. Aber wie reagieren wir als Menschen auf so viele Möglichkeiten für unsere Ohren? Diese Arbeit zielt darauf ab eine Sortimentsgröße für einen Songpool zu finden, die dem Konsumenten die Anzahl an Liedern anbietet bei der die positiven Effekte den negativen Effekten der kognitiven Belastung überwiegt. Wir stellten die Hypothese auf, dass es eine Beziehung in Form eines invertierten Us zwischen der Sortimentsgröße und einer positiven Erfahrung bei der Auswahl gibt. Die Ergebnisse haben gezeigt, dass es eine Sortimentsgröße gibt, die in der Lage war, die beste Wahlerfahrung zu liefern. Gleichzeitig hypotethisieren wir, dass Teilnehmer mit höherem subjektivem Wissen oder höherer musikalischer Reife in der Lage sein würden, aus größeren Sortimenten auszuwählen, ohne eine Überlastung der Auswahl zu erfahren. Die Ergebnisse haben gezeigt, dass besagte Teilnehmer tatsächlich in der Lage waren, von größeren Sortimenten zu profitieren und tatsächlich mehr Attribute verwendeten und weniger auf eine Eliminationsstrategie zurückgriffen, um einen der Songs im Sortiment auszuwählen. Wir testeten auch den Effekt von Entscheidungszielen durch das Maximizing/Satisficing-Profile der Teilnehmer. Für diesen Fall sagten wir voraus, dass Maximierer bei kleineren Sortimenten eine Überlastung der Auswahl erleben würden. Im Fall dieser Studie konnte kein signifikanter Zusammenhang zwischen dem Maximizing/Satisficing-Profilen gefunden werden. Des Weiteren wurde eine Auswertung zu den Auswirkungen verschiedener Playlist-Themen mit unterschiedlichen Entscheidungsverantwortungsgraden durchgeführt. Wie vorhergesagt, trat das Choice-Overload-Phänomen bei unterschiedlichen Sortimentsgrößen auf, jedoch anders als erwartet. Weitere Forschungen sollten sich auf die effektivste Anzahl und Art der Attribute konzentrieren, die die einzelnen Songs beschreiben, um die Musikauswahl zu einem befriedigenderen Erlebnis zu machen.

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1 Introduction and Motivation

"Learning to choose is hard. Learning to choose well is harder. And learning to choose well in a world of unlimited possibilities is harder still, perhaps too hard."

—Barry Schwartz, The Paradox of Choice: Why More Is Less[Schwartz, 2003]

Choice Overload can be defined as the adverse situation in which a person selecting an item from a collection of options has difficulties to decide which to choose because from a large volume of viable options. This phenomenon was first described by Alvin Toffler in his book "Future Shock" in 1970 [Toffler, 1970] in which the dangers of choice overload (overchoice) are depicted. The Author portrays a future society in which, because of a "super Industrial Revolution" and the "paralyzing surfeit" of options as an aftermath, give way to overchoice.

Technology advancements have enabled companies to create a much more wider spectrum of options for consumers. Using Toffler's Mustang example, nowadays the several hundred thousand different equipment combinations available for a single car model like the Ford Mustang [Ford Motor Company, 2020] represents an instance to an overchoice situation where the amount of decisions to be taken and the amount of information to process is of an overwhelming nature. The consumer's problem of choice is now much more challenging as each of the available options can be compared in different levels which, as a result, demand for more information and the need for more decisions and subdecisions.

The way we listen to music has also changed because of technology. A disruption in the industry started with the first successful personal portable music player: the walkman (1979) (actually, the stereobelt was patented in 1972 and was the first portable music player but it failed to become popular[Pothitos, 2017]) allowed a person to listen to music almost everywhere. This impulsed the transition from, as de facto listening place, the living room and opened the possibility to listen to music almost everywhere. This revolution allowed music to be present for a longer time of the day. This tendency continued with the iterations of personal portable music players, as the discman and the iPod, where quality and quantity of available music titles increased in an unexpected almost magic way.

As a result, the amount of information to process when selecting which music to listen to also changed throughout the years. Before, buying a record was a decision not to be

taken lightly because it was a very expensive medium [Payling, 2016]. Later on, came cassette players and mixtapes, which allowed the listener to have a wider and more personal selection of songs. CD players worked in a similar manner, the only difference is, that it took more than a decade for domestic recording of this type of media to be open to the masses. MP3 Players such as the iPod gave the consumer the option to store several thousand songs in one device which started to make the choice overload in music a much more visible issue.

Enter streaming services, nowadays there is an impressive amount of streaming services that allow everybody with an internet connection to listen to a huge music catalog almost instantly. But how do we as persons react to so many possibilities for our ears? Are we still interested on going through the hassle to browse such a huge catalog to find new songs? How does impair our satisfaction while listening to music? Browsing through an almost infinite catalog might be overwhelming and confusing to say the least.

1.1 Objective

In recent years, at least three fourths of internet users in the USA are streaming music [Stutz, 2019] and at least a third of the total internet users in the world have an account to a music streaming service [Statista, 2020]. What happens when, nowadays, the user has the opportunity to choose from a bigger pool of artists and genres? Does the moment come in which, due to the enormous possibilities and the resulting undesired cognitive load to make choice, the listener is no longer interested on browsing such a large collection of songs? Would this mean that the listener prefers to keep listening familiar songs to avoid choice overload?

The aim of this work is to find out what is the exact amount of songs in an assortment that is the best compromise between the positive effects and negative effects resulting from a large assortment. In other words: Optimise the amount of songs that are normally displayed in order to allow the listener choose a song whilst also providing a pleasant experience by reducing the level of cognitive stress that the decision entails. This is specially relevant since nowadays streaming users are browsing a huge catalog (i.e. Apple Music has over 60 Million songs available for streaming) [Apple, 2020].

1.2 Scope

Choice overload is a special case of information overload that results from the increment in the information to be processed as the amount of choices grows. [Bollen et al., 2010, p. 36] In this work, only the effects of assortment size will be explored. This means that the only variable that will be directly changed is going to be the amount of options presented to the person making the choice. No other variable such as presentation form or information describing each of the options will be changed. Nevertheless, other factors such as Subjective Knowledge, Maximizing/Satisficing Index and Musical Sofistication Index are going to be measured. Other indicators such as satisfaction, enjoyment, difficulty and frustation are going to be measured to assess choice overload. Perceived variety and quality are going to be measured as part of the manipulation check.

In order to better understand the different factors affecting the choice overload phenomenon, we need to classify them. This can be better achieved by separating said factors depending on where these are found. With this in mind, we can divide them into two main types: Extrinsic and Intrinsic factors.

Extrinsic factors are factors that are implicit in the decision process and, hence, do not change from individual to individual. In contrast, intrinsic factors are unique to every individual and are related to the individual's idiosyncratic knowledge and motivation [Chernev et al., 2015, p. 336].

1.2.1 Extrinsic (Objective) Factors

Choice Set Complexity refers to the characteristics of the decision task that have an effect on the values of the choice options presented to the consumer without influencing the structural aspects of the decision situation. Some of the factors that are included in choice set complexity are the presence of a dominant option or the attractiveness of the choice options. [Chernev et al., 2015, 337-39]

Decision Task Difficulty. In contrast to choice set complexity, this decision task difficulty refers to the structural characteristics of the decision task that don't influence the values of the choice options. Some examples of the included factors in decision task difficulty are decision accountability, number of attributes describing each option, presentation format and time constraints. [Chernev et al., 2015, 337-39]

1.2.2 Intrinsic (Subjective) Factors

Preference Uncertainty is related to the articulated preferences that the test subject has related to the decision to be taken. This means that the decision maker has the possibility of understanding the benefits of the choice options and can prioritise them while selecting one of the choice options. [Chernev et al., 2015, 337-39]

Since preference uncertainty refers to the level of how articulated the decision maker is in the realm of the options where they are making the choice I consider subjective knowledge and the Musical Sophistication Index as two subfactors that should be included in this section.

Subjective Knowledge. Participants with high and low subjective knowledge differentiate themselves, between other things, on how they are affected by choice overload phenomenon. A low subjective knowledge person is especially willing to purchase o make a choice when more options are available. The situation is reversed for high subjective knowledge test subjects, where a large assortment impairs the willingness to purchase or, in our case, decide. [Hadar and Sood, 2014, 1739-46]

Goldsmiths Musical Sofistication Index describes musical skills, expertise, achievements, and related behaviours. Similar to the Subjective Knowledge, I expect this to be a factor that affects the way and with which assortment size the choice overload phenomenon appears in the different test subjects. [Müllensiefen et al., 2014, p.2]

Decision Goal is a factor that refers to which degree the decision maker tend to minimize the cognitive effort that making a choice entails. This is an important factor to choice overload because choice overload as such is driven in part by the consumers' difficulties to finally choose one of the available options after analysing and prioritising them in the assortment. [Chernev et al., 2015, 337-39]

Because of the nature of decision goal, the maximizer or satisficer profile of the consumer should be included here, being that the maximizer or satisficer profile can help better discribe how much of the available cognitive resources the decision maker is willing to invest.

Maximizers vs. Satisficers. Users can be divided into two different decision profiles: Maximizers, which it the profile to people that tend to aim to choose the best option in the assortment and Satisficers, which are people that are happy with choosing a good enough option. I expect this to directly affect the choice assortment size with which the choice overload phenomenon appears in the different test subjects. [Schwartz et al., 2002, 1179]

1.2.3 Subjective State Consequences

Choice Overload Indicators from Iyengar and Lepper. These indicators on frustation, satisfaction, difficulty and enjoyment are factors that have been confirmed as main indicators for choice overload and its negative consequences. With these factors in mind I plan to measure the choice overload in the test subject. [Iyengar and Lepper, 2001, pp.1001-03]

Choice experience Satisfaction. The overall satisfaction experience during the decision process has at least 3 different phases: The specific satisfaction with the chosen element, the satisfaction during the decision process and the satisfaction with the experiment as a whole. That the specific choice satisfaction is low does not also mean that the decision process also provides a low satisfaction. It is expected that this three different measures shed more light on what is the relationship of assortment size and the choice experience satisfaction in its three variants. [Scheibehenne et al., 2010, p.421]

Expectation Disconfirmation measures the way that the listener feels about the contradiction between the expectations that arose at the beginning of the selection process and at the end when the listener had already chosen one of the options presented. It is expected for test subjects to have a higher expectation disconfirmation with larger assortments. Additionally, I find this an interesting way to measure the choice overload and interesting for further research in order to manage expectation in the music selection process. [Diehl and Poynor, 2010, pp.31-32]

1.2.4 Behavioural Outcome Consequences

Switching Likelihood. As a result of the consumer's lack of confidence in a chosen item, the decision maker might have a higher chance of changing their mind and reversing the decision for another item in the choice options. Switching likelihood was measured to be higher when the consumer did not have an ideal attribute combination and thus, more likely to a cognitive overload which is expected to be experimented when choice overload exists. [Chernev, 2003b]

Selection Strategy. The test subject is expected to change the selection strategies depending on the assortment size since the amount of information grows together with the amount of options available. [Timmermans, 1993, pp.102-06]

Considered Attributes. As the number of options increases a decrease in the number of attributes considered for solving the decision problem is expected. [Timmermans, 1993, p.95] We expect the test subject to focus on less characteristics on the music once the assortment size grows.

Figure 1.1 describes the different extrinsic and intrinsic factors, as well as the consequences of Choice Overload.

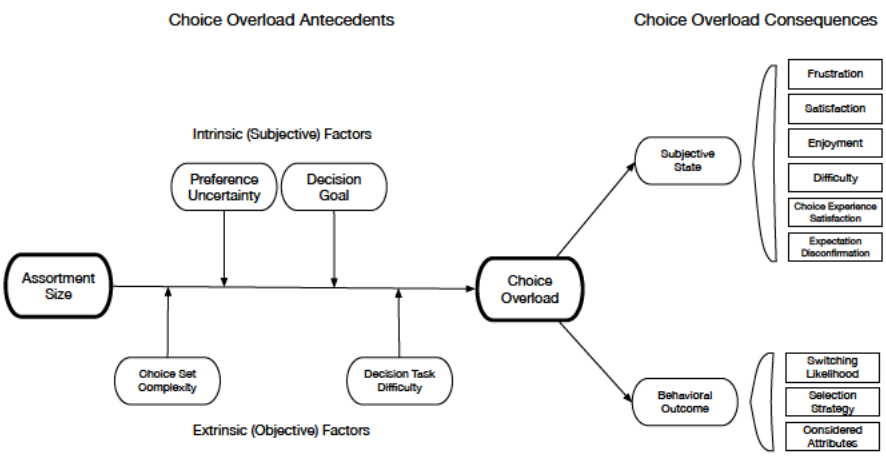

Figure 1.1: Choice Overload Antecedents and Consequences

1.2.5 Manipulation Check

As part of the manipulation check for the increased number of options in the assortment which is the core of this work, two items are included in the experiment:

Perceived Assortment Variety. Variety plays an important role in the way that the listener assesses the assortment. A larger assortment is perceived as having more variety and provides the test subject with a feeling of freedom of choice and, hence, makes larger assortments more attractive. [Chernev, 2003b, pp.171-74]

Perceived Assortment Quality. Quality in an assortment is known to affect the way that the test subject reacts to a specific assortment [Chernev et al., 2015, 338] for this reason measuring the quality in the assortments helps us to rule out a situation of differences in perceived assortment quality. [Hadar and Sood, 2014, pp.1744-45] [Chernev et al., 2015, 337-39]

The inclusion of these two items helps identify if the likability of the songs was similar in order to maintain all options equally attractive to the participants. Additionally, the perceived variety is used to assess the level of rated variety from the participants. The perceived variety should grow as the assortment size grows.

1.3 Outline

This master thesis is separated into 7 chapters.

Chapter 2: Fundamentals and Related Work

This chapter will describe what is the status quo for the choice overload phenomenon. The investigation in this work is structured based mainly on two papers Iyengar and Lepper, 2001 and Chernev et al., 2015 while also using other factors found in other papers such as Maximizing/Satisficing Personality Schwartz et al., 2002, Expectation Disconfirmation Diehl and Poynor, 2010, Overall Satisfaction Scheibehenne et al., 2010 and the Musical Sophistication Index Müllensiefen et al., 2014 which might also affect the way that a person experiences Choice Overload.

Chapter 3 Method

This chapter is dedicated to the structure of the study included the master thesis. Due to the fact that the study has to simulate selecting songs from a digital catalog, the listener will be using a computer to select from different-sized pools of songs. To extend the reach of the experiment the listener will also be presented with three different kinds of playlists and, hence, catalogs.

Additionally, This chapter discusses the way the study has been designed, what questions have been used for the different factors to be analysed and how the questions are structured.

The chapter also clarifies the way that the study was implemented, including the need for JavaScript tools in the survey as well as the logic programmed internally in LimeSurvey.

Chapter 4 Evaluation

This chapter presents the findings obtained after carrying out the survey and interprets the findings obtained after carrying out the survey in the light of what the master thesis was set to prove. In our case the effect of assortment size and a further analysis to see if there is a specific 'sweet spot' for the amount of songs presented. Additionally, if there is a relationship between the subjective knowledge, MSI and Maximizer/Satisficer personality.

Chapter 5 Conclusion

This chapter will be used to summarize the master thesis, describe some of the problems encountered and give an outlook for future work.

2 Fundamentals and Related Work

In order to create a method that is able to study the effects of choice overload while listening to music it is necessary to understand what choice overload is, which are its factors and consequences and, finally, the music choice and listening behaviour.
This chapter will deliver an overview of choice overload, how it affects the decision maker, what are some of the factors of choice overload, its consequences and finally the way that choice overload might affect a person's music listening behaviour.

2.1 Choice Overload

This section describes the historic background of choice overload, what the choice overload phenomenon is, the process-based and outcome-based indicators as well as some conditions and factors to choice overload. Additionally, the intrinsic and extrinsic factors are discussed as well as some specific conditions for choice overload to exist. Next, the importance of a standardized library as well as the relationship between choice overload and satisfaction will be discussed. Finally and most importantly, the curvilinear relationship between assortment size and satisfaction is discussed.

2.1.1 Historic Background of Choice Overload

As a result of the industrialization and throughout the course of history larger assortments have been strived for. As a matter of fact, the economic theory of the past century points out that a larger assortment of options allows the buyer to find a match that is closer to the buyer's purchase goals and, hence, deliver a better buying experience. [Baumol and Ide, 1956, pp. 93-101] [Hotelling, 1929, pp. 41-57]

The idea that larger assortments equal to better customer experience has been embraced from big corporations in many different industries. In a similar fashion as the assembly line technique, which both Henry Ford and his counterpart in the food industry, the McDonald brothers, embraced. An ever-growing catalog of options was also strived for. Ford's most famous cars, the 1909's Model T and the 2020 Ford Mustang, went from 2 different customizations to up to 11 different submodels and several thousand combinations available its customization. In the food industry, McDonald's menu went from 9 items in 1948 to an overwhelming 145 items in 2013. [Ford Motor Company, 2020] [McDowell, 2020]

We can see from the examples above, that the continuous growth of assortments has a very important connection with technology, between other reasons, because of

the better technologies to store and manage products in a more cost effective manner, assortments have grown continuously. In part, this is because the costs of managing a large assortment are no longer linearly more expensive than managing a small one. A clear example is the use of the bar code in supermarkets, which allowed a more effective and permanent control of the goods that come in and come out of the business. [Messinger and Narasimhan, 1996, pp. 13-14]

Another reason for the ever growing assortments is that consumers tend to prefer larger assortments because having a wide variety of viable options in one place is practical. Having a large variety of viable options in one place or what is normally called as "one stop shopping" proves itself efficient. This is, between other reasons, because the time and effort that it would normally take to visit the different distributors is eliminated. [Betancourt and Gautschi, 1990, pp.148-152] [Messinger and Narasimhan, 1996, pp. 14-15]

Nowadays, the preference for larger assortments can be seen in everyday life as many times buyers prefer going to a full-blown supermarket instead of going to the closest small corner store. This is often because the assortment in the supermarket is normally larger and has more options that, at the same time, in the consumers' eyes increase the possibility of a potentially better alternative being represented in the supermarket's assortment.

The consumers' preference for larger assortments was challenged and later confirmed by Iyengar and Lepper with their famous jam experiment. In the experiment, a tasting booth was installed in an upscale supermarket. The tasting booth offered either a limited (6) or an extensive (24) selection of different flavors of jam. Interestingly enough, the attractiveness of the large and small assortments of jams (24 vs. 6) was found to be different. 60% of the customers who passed the extensive selection actually stopped at the booth to select a jam. In contrast, only 40% who passed the limited selection stopped. [Iyengar and Lepper, 2001, p. 997]

In other studies, having a broad selection of options was confirmed to provide the buyer with the perception of freedom of choice [Kahn et al., 1987, pp. 96-100] and enhance the satisfaction in the overall choosing process. This happened as long as the choice set is more preferable or better aligned to the customers expectations. [Botti and Iyengar, 2004, pp. 317-323]

Interestingly enough, the size of the assortments in our music catalog has also changed thanks to technology. The first disruption of the industry happened after the walkman hit the market in 1979 [Pothitos, 2017]. The walkman allowed persons to listen of their personal music library everywhere. Technology kept maturing to finally come to the second breakthrough: the iPod, a personal music player able to store several thousand songs of music in a digital format. The latest breakthrough happened after the streaming technologies such as Spotify or Apple Music, giving any person with an account access to more than 50 million songs [Apple, 2020] became available.

The advantages to the new streaming services are clear, an almost infinite catalog that

can be instantly be accessed. Unluckily, there are also negative effects that need to be mentioned.

2.1.2 The Choice Overload Phenomenon

Unluckily, increasing the size of an assortment has also a negative side to it. As the number of options increases, the decision maker experiences an interesting phenomenon called Choice Overload.

The Choice Overload phenomenon is a result of the increased amount of options and, as a consequence, a larger amount of information that needs to be processed in order to compare and come to a decision. The phenomenon occurs when the augmented complexity in the decision process exceeds the decision maker's cognitive resources. [Toffler, 1970, pp. 138 - 147] [Simon, 1955, pp. 100 - 112]

Since the Choice Overload phenomenon is an mental construct that describes the subjective state of the decision maker, there is not a direct mean to measure it. Nevertheless, Choice Overload can be measured through a group of objective indicators it is reflected on. These indicators can either be process-based indicators and outcome-based indicators. [Chernev et al., 2015, p. 335]

Process-Based Indicators

The Process based indicators are used to describe the subjective state of the decision maker. For this work, the most relevant process based indicators are the following:

Frustration refers to the frustration experienced during the choice making process and was found to be significantly higher for the larger assortments than for smaller assortments in Iyengar and Lepper's study. [Iyengar and Lepper, 2001, pp. 1002 - 1003]

Choice Satisfaction is related to the satisfaction that the test subjects experience during the choice making process. For this indicator the test subjects presented with the smaller assortment were significantly more satisfied with their choice than the participants that were presented with the larger assortment. Participants in the experiment were also more satisfied with their choice than the participants who did not exercise choice at all. From this study it is expected that the satisfaction will be be lower when the choice overload appears.[Iyengar and Lepper, 2001, p. 1003]

Enjoyment concerns to how enjoyable the choice situation for the decision maker is. In Iyengar and Lepper's study it was found that participants that encountered a larger assortment reported enjoying the decision-making process significantly more than the participants who were presented with the small assortment. Interestingly enough, even though one could thing there is a correlation between enjoyment and frustration , no

significant correlation could be proved. [Iyengar and Lepper, 2001, p. 1002]

Perceived Difficulty regards to how difficult is the choice making process perceived and it is expected to rise when the assortment grows. The higher the perceived difficulty, the higher the possibility that the test subject experiences choice overload. In Iyengar and Lepper's experiment this indicator correlated with the extent on how frustrating the decision maker found the choice situation. [Iyengar and Lepper, 2001, p. 1002]

Expectation Disconfirmation is an indicator that refers to how the decision maker's expectations are raised with the increase of the size of the assortment only to be later overturned because a match to the decision maker's expectations was not found. The disconfirmation of the expectations can reduce the decision maker's satisfaction. [Diehl and Poynor, 2010, p.32 - 33].

Note: Even though Diehl et al. consider Expectation Disconfirmation a completely different phenomenon separated from overload it is included here because it can be measured in a similar fashion as a process-based indicator.

Outcome-Based Indicators

Outcome-based indicators describe the decision maker's observable behaviour, this work will be focusing specially on the following indicators:

Choice Deferral refers to the situation in which a no choice option is selected, this means that none of the alternatives appear attractive or that the decision maker expects to find better alternatives by continuing the search. A tendency to defer choice has been proven to be greater when the difference in attractiveness between the presented options is small. This is because the small difference results in a demand for cognitive resources that becomes an unwanted cognitive load. Because of this situation, where an unwanted cognitive load is presented to the decision maker, choice deferral is expected to be higher when the choice overload phenomenon appears. In the second study mentioned in his paper, Dhar could confirm that the percentage of decision makers that deferred choice was significant in 3 of the 4 choice problems and with an average for the 4 studies of 12% increase. [Dhar, 1997, pp. 216 - 217]

Switching Likelihood refers to the propensity to change the previously made decision. The switching likelihood has been proven to be higher in larger assortments when the decision maker did not have a defined expectation (articulated ideal point). In the case the decision maker has a well defined ideal point, they are more likely to be confident about their decision and less prone to switch for another option. In contrast, for consumers without an ideal point the choice selection process proves more difficult as they have to form their ideal attribute combination and search for the option that best matches their ideal point simultaneously. In the study for decision makers without an articulated ideal point were less likely to switch when presented the small sized assort-

ment (9%) than when presented with the large sized assortment (38%). On the other hand, decision makers who articulated their ideal point were more likely to switch when presented with the small sized assortment (27%) than with the large sized assortment (13%). I expect this indicator to be correlated with the expectation disconfirmation that is mentioned later in this text. Additionally, because of the cognitive load the definition of an ideal point implies, it is expected that the switching likelihood will rise with the presence of the choice overload phenomenon. [Chernev, 2003b, pp. 174 - 181]

Selection Strategy is an indicator from a study in which the decision maker was presented with a small (3), medium (6) and large (9) assortments. In the study an interesting discovery was made. Testing subjects tend to simplify their decision making process as the selection process becomes more complex. In Timmermans's experiment 21% of the decision makers presented with the small assortment used an elimination strategy, 31% presented with the medium sized assortment used an elimination process and finally 77% used an elimination strategy when presented with the large assortment. [Timmermans, 1993, pp. 107]

As the choice overload phenomenon takes place and, as a consequence, the decision maker tries to simplify the decision making process by using an elimination strategy. An elimination strategy in the decision is expected to happen for larger assortments where the decision maker is more likely to experience choice overload.

Attributes Considered in Choice. In a similar fashion, the number of attributes considered by the decision maker drops significantly as the problem complexity increases. This is, as the number of alternatives in an assortment increases the average number of attributes used per alternative decreases. In Timmermans study, the number of attributes used showed a sharp decrease between six and nine alternatives in the assortment when these alternatives were described on five attributes. In the case the assortment was described on twelve attributes the sharp decrease was found between the three and six alternatives assortment. This situation suggests that decision makers experience an information overload and change their decision process to a more efficient one by reducing the amount of attributes considered in their choice. [Timmermans, 1993, pp. 101 - 107]

This is in line with the theory from Jacoby et al. where the amount of information to be processed for a decision is calculated as the number of options within an assortment multiplied by the number of attributes on which these options are described. As a consequence, a reduction of the attributes considered for a decision is expected to take place when the decision maker experiences a cognitive overload because of the choice overload phenomenon. [Jacoby et al., 1974, p. 63]

2.1.3 Studies on Choice Overload: Conditions and Factors to it

In order for the choice overload phenomenon to exist there are some conditions that have to be fulfilled. The following studies define some ground conditions to it and help better describe the situations that could enhance the effect of choice overload:

The choice overload phenomenon can only exist when there is more than one viable option, meaning that the person doing the choice has to ultimately analyse and choose the most fitting option in an group of options. This situation was confirmed by Dhar where, in a study, choice deferral as a consequence of choice overload was higher in cases where there was more than one viable or attractive option (47.2% vs 18.2%). [Dhar, 1997, pp. 221 - 222]

Dhar et al. carried out a similar test in which participants were asked to make a selection from either low conflict (one more viable option) or high conflict (no clear viable option) while also having a time pressure. During these tests it was confirmed that the presence of more than one viable option brings to choice deferral (21% vs 36%) which, again, is an indicator for choice overload. [Dhar and Nowlis, 1999, pp. 373 - 382]

Additionally, Dhar et al. suggest that brand managers should not only consider the attribute values of their brands but to also consider the available relationship among the available alternatives. Where choice deferral is expected to be greater when no single alternative is easily seen as the best, i.e. when each of the available options themselves might be attractive. [Dhar and Nowlis, 1999, p. 382]

The past situation can easily be related to Chernev's ideal point availability where the presence of an option ideal to the decision maker can simplify choice even in large assortments, leading to a stronger decision confidence and lower switching likelihood (11% vs 35%). [Chernev, 2003b]

Additionally, even in assortments with no ideal point availability, the large sized assortment presented a higher choice deferral compared to the small sized assortment (38% vs. 27%). In contrast, for assortments without an ideal point availability, the switching likelihood was higher for small assortments than large assortments (13% vs. 27%)

In the same lines as Dhar and Nowlis's experiment above Hsee and Lecrlerc did a series of studies in which the purchasing likelihood (no choice deferral) from the test subjects was measured. A very consistent pattern could be observed: when the focal products are better than the reference the test subject has, they look more attractive and the likelihood of being purchased is higher (92%) when the products are presented separately than when presented jointly (79%). This reflects the drop in purchasing likelihood pertinent of the choice overload phenomenon. [Hsee and Leclerc, 1998, pp. 175 - 183]

Interestingly, when the products that were presented were worse than the tests subject's reference, in case the products were presented together they were perceived more favorably and were more likely to be selected (81%) than when they were presented separately (65%). Chernev et al.'s Meta-analysis from 2015 defines that the impact of assortment size on the consumer decision process is a function of two types of factors: Intrinsic Factors and Extrinsic Factors [Chernev et al., 2015].

Intrinsic Factors

The first kind of factors, Intrinsic Factors, are those related to the qualities of the consumer such as the consumer's knowledge and motivation. Prior research has proven preference uncertainty and decision goals to have a very particular impact on the choice overload phenomenon [Chernev et al., 2015, p. 336].

Preference uncertainty refers to the level to which the decision maker has defined preferences with respect to the choice to be made. This includes the level of product-specific expertise and the accessibility to a defined ideal point.

In his paper from 2003 Chernev, explains that in larger assortments the availability of an articulated ideal point can be associated to a stronger preference for the chosen option. In case that there is no articulated ideal point, the increased number of options in a larger assortment derives in an augmented number of relevant features to be taken into account in the decision. Consequently, the decision process turns into a two-staged process leading to a weaker preference for the choice selected. The decision maker first has to decide which of the features are relevant for the decision and then make the actual decision. Alternatively, when the decision maker has an articulated ideal point, they know which particular features are relevant for the decision and can concentrate more specifically in choosing the option that better matches this ideal point. The positive effects from having a defined (articulated) ideal point was later confirmed by measuring the switching likelihood. [Chernev, 2003b, pp. 172 - 179]

As for preference uncertainty, in the paper's first experiment, test subjects without an articulated ideal point were more likely to switch when presented with the larger assortment (38% vs. 13%).

In the case of ideal point accesibility, in the paper's third experiment, testing subjects' preferences were captured before and then the existance to a defined ideal point was then varied. In choices from large assortments, the decision makers with a high ideal point availability score were less likely to switch than those with a low score (11% vs. 35%). Alternatively, for small assortments, there was an unsignificant effect in the opposite direction. High ideal point availability score test subjects were less likely to switch than the low score test subjects (21% vs. 15%).

The consumer's availability of an articulated point will be estimated by using the

Goldsmith's Musical Sofistication Index and the test subject's subjective knowledge on music.

Subjective Knowledge

In their paper from 2014, Hadar and Sood did a series of experiments on how subjective knowledge would affect the consumer's willingness to choose a specific option in the assortment rather than decide not to exercise choice at all. In the experiments, participants with high and low subjective knowledge differentiated themselves, between other things, on how they were affected by choice overload phenomenon. A low subjective knowledge person was especially willing to purchase o make a choice when more options are available because they would feel more knowledgeable after going through the larger assortment.

In contrast, the person with a higher subjective knowledge in the subject would consider searching for more information related to the product innecesary given their already existing knowledge in the subject.

Hadar and Sood had reported in 2013 that decision makers were more likely to invest in options they felt more knowledgeable about, even when they had less actual knowledge about these options, because they felt more confident that these were better investments [Hadar et al., 2013, p. 313].

High SK decision makers expect choosing from an assortment to be easy because they feel confident that they will be able to make a good choice. Nevertheless, because of this expectations they experience choosing from a large assortment to be more difficult and end up being less knowledgeable and less confident to be able to make a good choice (Schwarz, 2004). Because of this disconfirmation, high SK consumers experience a drop in their subjective knowledge that results in choice deferral.

Hadar and Sood found in their experiments from 2014, found that Low-SK participants were more likely to select an option than not choosing at all when the choice set was large (34%) than when it was small (22%). In contrast, high-SK participants were less likely to select an option when the choice set was large (24%) than when it was small (38%). Hadar and Sood, 2014

In the low-SK condition, the participants rated their absolute subjective knowledge higher when the choice set was large ($M = 5.62$) than when it was small ($M = 4.61$), $F(1, 141) = 7.7$, $p = .006$. In contrast, in the high-SK condition, participants rated their absolute SK lower when the choice set was large ($M = 2.93$) than when it was small ($M = 4.17$), $F(1, 141) = 10.9$, $p = .001$

Hadar et al. found converging evidence that low-SK people are more willing to purchase when choosing from a large set of options than when choosing from a small set of options. This is in line with the previous research from Lichtenstein et al in 1982 that aligns

with the notion of more options being better and that high-SK people are more prone to choice deferral when choosing from a large set of options than when choosing from a small set of options. The studies later in the paper further showed that this pattern is influenced by the informativeness of the descriptions of the presented options and takes place regardless of decision makers' level of actual knowledge. [Lichtenstein et al., 1982]

In conclusion, these findings suggest that SK might play an important role in determining ideal size for choice sets and suggest that more options should be provided in domains in which people often feel ignorant like investments. Conversely, for domains in which people tend to feel knowledgeable, like softdrinks, fewer options should be offered to avoid choice deferral which can be a sign of choice overload.

Goldsmiths Musical Sophistication Index (Gold-MSI)

The Goldsmiths Musical Sofistication Index is an measurement instrument to assess self-reported musical skills and behaviours for multiple dimensions in the general population. This instrument was created using a rather large sample (n=147,636) from people on the internet. This is an index that describes musical skills, expertise, achievements and related behaviours accross a range of facets that are subsequently measured on different subscales. The authors of the index assume that the different possible facets of musical sophistication can be developed through an active engagement with music in its many different possibilities. The level of musical sophistication varies on these different facets. [Müllensiefen et al., 2014, pp. 1 - 21]

The Index is capable of measuring self reported individual differences in skilled musical behaviours in the general or non specialist population. Additionally, the study found that musical listening skills and musical behaviours are clearly related. The data collected in the study is also able to support theories of explicit as well as implicit learning of music and, at the same time, the data is able to demonstrate the extent to which sophisticated engagement with music is continuously present in people's social reality.

Decision goals refers to the level to which a consumer's goal involves choosing from the options in the assortment made available to the consumer as such. In Chernev and Hamilton's paper from 2009, consumers were presented with small and large assortments comprising with either more attractive and less attractive options. In the different experiments in the study it was confirmed that the decision maker's readiness to take on more cognitive demanding tasks affect the way that these manage their decisions. For example, in the experiment where both small and large assortments comprised of less attractive options, only 14.5% of the participants chose the small assortment. In contrast, when both small and large assortments comprised highly attractive options, 50% of the test subjects went for the smaller assortment. Thus, confirming that consumers' prefer to reduce their cognitive load. In this example, by selecting the smaller assortment when there was no evident advantage of choosing the larger assortment since both assortments present (equally) highly attractive options. [Chernev and Hamilton, 2009, pp. 412 - 419]

For this work decision goals will be measured by using the theory exposed in Schwartz et al's paper on the maximizer and satisficer profile of consumers.

Maximizers and Satisficers

It it necessary to take this factor into account because of two reasons; first, the structure of the experiment's questions is strongly connected to media consumption. Second, because of the fact that in the case that the subjective knowledge of two test subjects is similar, the maximizing or satisficing profile of the participant might prove itself an interesting way to better understand why these two subjects react to different sized assortments.

For Schwartz et al individuals in certain choice situations are driven to identify the best possible outcome, thus, maximizing their choice and are, hence, called "Maximizers". The other kind of individuals don't strive to get the best possible outcome and regard more than one possible outcome as "acceptable", thus, being satisfied with a good enough option and, hence, called "Satisficers". [Schwartz et al., 2002, pp. 1178 - 1195]

In order for people to be satisfied with an election, they only have to be able to locate the options on some scale in terms of the degree of satisfaction they will afford and to have a threshold of acceptability. A person with a satisficer profile evaluates the options until an option that exceeds the acceptability threshold is found and then selects it. After this, it might be possible that further encouters with other options in the relevant domain are made and that these options are higher ranked than the previously selected option which would then make the satisficer move in the direction of maximization without having it as a specific goal.

In contrast, the satisficer is looking for something that crosses the threshold of acceptability. The satisficer keeps looking until they find an option that crosses this threshold and then selects it. After finding the previously mentioned option, possible further encounters with other (better) options might simply be ignored. Due to the fact that the criterion is set to "good enough" rather than the "best", the satisficer will be less prone to experience regret in the case that there is a better option than the one selected in the assortment. In the case that there is no satisfactory option in the presented assortment, there is always a chance that adding another option to the assortment will cross the "good enough" threshold. Because of this, adding new options to the presented assortment tend to result in a positive experience for satisficers.

Since maximizers are continuously looking for the best option when making a decision, they try to gather and analyze all the information available. This, in turn, requires an exhaustive search of the possibilities that proves very demanding to the maximizer's cognitive resources. Since such an exhaustive search in all domains is impossible, the maximizer will experience an anticipated regret from possible better options. Maximiz-

ers regularly have very high search costs that in their experience are not paid back from the positive results obtained from the search.

In the study Schwartz et al. also found that there is a significant positive correlation between maximization and perfectionism, maximization and regret and maximization and depression. In contrast, a negative correlation was found between maximization and happiness, maximization and optimism, maximization and satisfaction with life and maximization and self esteem. [Schwartz et al., 2002, pp. 1178 - 1195]

Maximizers were found to be less satisfied than satisficers with their choosing results in the study even though they were generally achieving a better objective outcome. Additionally, maximizers report engaging more comparisons (i.e. social comparisons, counterfactual comparisons and product comparisons) regarding their decisions are consumers and more importantly report experiencing a higher regret and a lower happiness.

Extrinsic Factors

These are the factors specific to the decision problem can be divided into two categories: task factors and context factors [Payne et al., 1993].

Information Presentation Mode is related to the way that the individual options are presented. Diehl confirmed that through an ordered presentation of the items to be chosen from, a benefitial decrease in search costs was experienced by the decision maker. The lower costs allowed the decision maker to search from more unique options but also caused a decline in the choice quality because of the drop of the average quality of all cards inspected. Additionally, the selectivity of the decision maker dropped because of the low search costs. Decision makers spent less time analysing each of the options (cards). [Diehl, 2005, pp. 313 - 316]

Moreover, the presentation mode further refers on how the presentation is transmitted to the test subject: either verbally (text depiction) or in a visual format. In Townsend and Kahn's paper from 2014, the experiments done for this work encountered a preference from the decision maker for a visual presentation of the assortment. Test subjects preferred the visual presentation mode probably because it allowed them to browse the assortment faster than the verbal presentation mode both in small and large assortments. Nevertheless, visual presentation of the choice options could be associated to a less systematic processing of the information. Consequently, visual presentation were more likely to lead to a cognitive overload when larger assortments are presented when compared to its verbal (text depiction) variant. In contrast, the verbal variant allowed for the test subject to process the information in a slower and more systematic processing style which led to better choices. [Townsend and Kahn, 2014, pp. 993 - 1008]

Decision Accountability. Research has found that a preference for larger assortments is higher when the decision maker has to justify the decision to another party.

As the assortment size grows, the possibility of the best options to share similarities is higher and make committing to an option difficult. Since the test subject has difficulties finding good reasons to choose a specific option the possibility of the test subject to commit to a decision drops and might cause choice deferral. [Scheibehenne et al., 2010, p. 420].

Number of Attributes is one of the factors that has been found to clearly influence the impact of assortment size on choice overload. Choice Overload is a specific case of information overload. Choice Overload originates as the number of attributes or dimensions describing the options grow. As a consequence, the amount of information that the decision maker has to filter out before making the choice also grows.

As an example, when making a choice in an assortment in which the only attribute to describe the different options (i.e. size), the cognitive load is expected to be lower than a decision in the same assortment size with more attributes (i.e. size, colour and price). As a result of the lowered cognitive load, the decision is expected to be not as complicated as the one in the assortment with more attributes. [Chernev, 2003b, pp. 313 - 316]

Time Constraints refers to the time that the decision maker has to select one of the options from the assortment. In their paper from 2009, Inbar et al did an analysis on the effects of time pressure in the decision making process and how it might heighten to regret feelings. An interesting discovery was made: as expected, regret was higher with larger assortments but this was because the test subjects experienced time pressure. However, the time they spent in order to make a decision was similar for large and small assortments. However, when the participants were encouraged to take more time to make their decision in the large assortments, the relationship between large assortments and heightened regret was no longer found. Interestingly enough, the feelings of regret also dropped when the participants' perception was changed in that they were convinced that making quick decisions not necessarily lead to bad choice.[Inbar et al., 2011]

Context factors (choice set complexity) relate to the aspects of the decision task that affect the values of the presented choice options but that, at the same time, don't relate to the structural aspects of the decision problem, these include:

Presence of a Dominant Option relates to the fact of the assortment containing a superior option to the rest. As previously mentioned, one of the most important conditions for the existence of choice overload is the presence of more than one viable option in the assortment. As described by Dhar's study from 1997, choice deferral as a consequence of choice overload was higher in cases where there was more than one viable or attractive option (47.2% vs 18.2%). In this vein, the presence of a more dominant option is expected to decrease choice overload. [Dhar, 1997, pp. 221 - 222]

Variety in the Assortment. Variety plays an important part in the way that the consumer evaluates the presented assortment. One of the reasons for this is that an assortment with a high variety has a higher probability of matching the taste of more people. The research done in the paper from [Oppewal and Koelemeijer, 2005, pp. 22 - 23] confirmed that consumers with more experience (knowledge) are more satisfied with larger assortments than with smaller ones. This might be because the more experienced consumers benefit from the larger pool of options since they have a more defined ideal point to compare the options to, resulting in a lower probability of choice overload.

Overall Attractiveness of the Assortment. The attractiveness of the choice options is a factor of the choice overload phenomenon since some assortments that contain high quality options are likely to be perceived as more attractive than elements with lower quality options. In their paper from 2009 Chernev and Hamilton analysed how consumers choose among assortments with different levels of attractiveness. In their experiments smaller assortments were preferred to larger ones when the previous were composed of more attractive options rather than less attractive options. In other words, consumers preferred smaller assortments when these included the most attractive options that were also included in the large assortments. [Chernev and Hamilton, 2009, pp. 5 - 9]

2.1.4 Specific Conditions for Choice Overload in Music

After the review above, there is still the need for a more specific focus on the focus and effects for the choice overload in music. Furthermore, the perception of the presented musical assortment and the difficulty it entails to objectively define the characteristics on music such as quality, variety and attractiveness, creates the need for a standardized stimuli database.

Additionally, the fact that music is a product that is constantly in our life and that it also varies so much, creates need to introduce a way to measure the subjective knowledge of the person in the specific musical area is very necessary. This as an effort to further define what the participants considered to be their expertise on the subject.

Perception of the Distribution and the Importance of a Standardized Library

There is evidence suggesting that consumers are less likely to prefer smaller assortments over larger ones when they assume that the found options in both assortments are of high quality and mostly attractive[Chernev and Hamilton, 2009, pp. 5 - 9]. In the case that the presented options are generally of low quality, consumers prefer larger assortmetns as choosing from a large assortment there is a bigger probability that a somewhat attractive option is found.

For the reason mentioned above, a selection of the music library from Lepa et al's paper from 2020 is being used where with the help of the different descriptors in the

library I was able to select options with similar qualities for the listener such as 'easy going', 'instensity' and 'pop appeal'. It is important to mention that the pop appeal descriptor is of special interest because it allows to avoid popular songs that the listener might have an affective connection to. [Lepa et al., 2020]

The song pool from where the stimuli were chosen consists of 549 musical excerpts that were presented to 10,144 European listeners and from where 487 different audio features were extracted. The pool was organized in ten different musical genres (Blues, Classical, Dance, Folk, Hip-Hop, Jazz, Pop, Rock, Soul/Funk and World Music) and then 61 musical styles such as Fusion, Jazz, etc.

The musical excerpts belong to approximately 30 seconds comprising the first transition from the verse to chorus with the aim to present a short excerpt of the piece where normally most of the energy is and where normally the core of the piece is. The resulting files were then processed to have a similar loudness depending of the different production schemes. Finally all the tracks received a smooth fade in und fade out and got transcoded to MP3 @ 320 Kbps.

2.1.5 Choice Overload and Satisfaction

What happens when the no-choice option leading to choice deferral is left aside and the situation in which the exercise of choice is required? A study by [Botti and Iyengar, 2004, pp. 314 - 323] analysed the effect on satisfaction during the decision process with prefferred and non-preffered alternatives.

In their study from 2004 Botti et al found that in more preferred choice contexts (situations in which choice had a positive result such as choosing a chocolate), the test subjects exercising choice benefit from the prospect of experiencing an option that better matches their preferences and also enjoy the simple fact of contemplating the advantages of the selected option. In contrast, the test subjects not exercising choice feel deprived from the pleasure of making a choice. Interestingly, the test subjects that exercised choice experienced a greater positive effect that might have carried over to the experience of the chosen option, that finally resulted in a higher outcome satisfaction. [Botti and Iyengar, 2004]

In less preferred choice contexts (situations in which choice had a negative result) the situation reversed. I will not continue to elaborate because for our study this is not relevant. Nevertheless, in the following studies in 2004 Botti tested the hypothesis that although individuals prefer to make choices instead of deferring them, choosers experience a greater outcome satisfaction only when the choice sets include more prefferred options. [Botti and Iyengar, 2004, p. 314]

2.1.6 Curvilinear Relationship Between Assortment Size and Satisfaction

As the number of viable options increases the number of attractive options increases and this brings an increased difficulty to the selection process and, as a consequence, the capability to justify a specific option. [Sela et al., 2008]

Larger assortments have been found to decrease satisfaction. The large number of options give the test subject the impression that there is definitely an option that is tailored for the test subject's expectations. When this is finally not the case, there is an expectation disconfirmation which results in a negative experience in which the decision maker's satisfaction is lowered [Boulding et al., 1993] [Diehl and Poynor, 2010].

Additionally, larger assortments might increase the attractiveness of the second-best, nonchosen alternative which might lead to a more conterfactual thinking and regret concerning what was not chosen. [Scheibehenne et al., 2010, p. 411]

With this in mind, some studies have proved that reducing the size of an assortment can have positive consequences in the purchasing likelihood for the presented assortment. In the case of the marmalade experiment from Iyengar and Lepper from 2001 the subjects presented with the reduced assortment of only 6 flavors of jam rather than the 24 flavor assortment were found to be more likely to actually buy the jam. 30% actually bought a jam when presented with the small assortment, whereas only 3% bought a jam when presented with the large assortment [Iyengar and Lepper, 2001]. Similar situations were confirmed by Diehl and Poynor in 2010 with a person selecting a camcorder and Chernev in 2003 with a large and small assortment of chocolates. [Diehl and Poynor, 2010] [Chernev, 2003a]

The corner stone of this work is the existance of a Curvilinear Relationship with Assortment Size. Research suggests that the possible aftermath of the extended options to choose among might follow a curvilinear relationship, such that an initial increase in the assortment size leads to a positive more-is-better effect but a further increase eventually leads to choice overload.

Shah et al proposed an interaction between choice deferral and assortment size, meaning that they expected that an inverted-U-shaped function would present itself as more options would be available for the decision maker. The function would link assortment size and purchasing likeability (inverted choice deferral).

In their experiment the number of options in the assortment was increased in a more parametric manner (starting from 2 options and then increasing 2 by 2 until reaching 20 different options). In the experiment, a curvilinear function between buying behavior and number of choices was found to be true. The highest value of people buying the pens peaked at 10. The experiment also confirmed the existance of an optimal point

where buying probability peaks with a specific number of options in the assorment size. Setting the ground for this work. [Shah and Wolford, 2007, pp. 369 - 370]

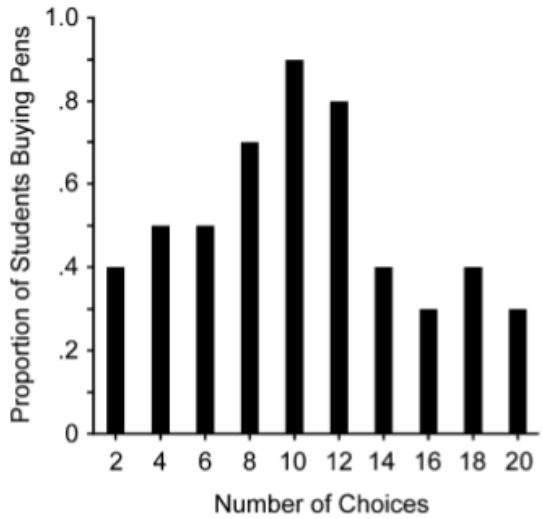

Figure 2.1: Proportion of subjects who bought any pens as function of the number of available choices [Shah and Wolford, 2007]

2.2 Music Choice and Listening Behavior

Listening to one's preferred music has been found to increase the perceived control over painful stimuli and has also been found to reduce anxiety [Mitchell and MacDonald, 2006] [Mitchell et al., 2008]. Along these lines it also has been reported that there larger is a positive mood change when listeners chose what music to listen than from getting the music chosen from somebody else [Sloboda, 2004] [Sloboda, 2010].

With high levels of choice listeners reported relaxation, enjoyment and concentration functions, whereas, with low levels of choice the positive effects mentioned below were very low or inexistant and was even found to be annoying. [Greasley and Lamont, 2011]

This situation was also confirmed with another research made by Krause et al in 2014 where an unifying theme was found: Control. For listeners giving direct input such as personal playlists or selecting a specific song, a positive response such as a contentment mood and positive consequences such as relaxation, relation to positive affective experiences, enjoyment or concentration were able to be met. In the case of not having control on music selection all positive effects mentioned above were lower or non existent to the extent of listeners reporting no longer actively listening to the music being played. [Krause et al., 2014]

In the light of this, we realise how important it is for the listener to have a strong feeling of control during the music selection process. Furthermore, we learn that that choice plays a very important role for satisfaction when actively listening to music.

The audio streaming service is a market that is almost worth 25 billion USD [Grandview, 2020] and customer experience is of paramount importance for delivering a successful product. Streaming service providers have always been careful about having the best catalog or delivering the best UI but little has been said about the customer satisfaction while browsing their huge catalogs [Walters, 2019]. This work is meant to start talking about this important subject.

3 Method

In this chapter an overview of the conducted empirical study that was carried out in the framework of this master thesis is presented. This chapter incorporates the design and the content of the experiment that was executed online with the help of the LimeSurvey 3.0 software.

3.1 Investigation Model

The main idea behind the experiment is to measure and analyse the positive and negative effects of a gradually growing assortment in music. In other words, to find the assortment size in which the positive consequences of its size are not overpowered by the negative consequences of the choice overload phenomenon. Thus, ensuring the best possible experience while selecting music from a catalog.

The aim is to present the test subject with three different-sized assortments and measure how the choice overload indicators described in the status quo, change. Moreover, different characteristics of the participant's characteristics such as subjective knowledge, maximizer/satisficer profile and musical sophistication index are measured in the survey. We expect these characteristics to directly affect the way that choice overload phenomenon appears with the different assortments.

Due to the fact that we are concentrating in choice overload in music and that it is common for it to happen while using (online) music streaming services, it was decided to use LimeSurvey. LimeSurvey is a Web based survey program that allows a quick implementation of surveys. Additionally, LimeSurvey allows for a very simple UI that can also help ensure that the user is not be distracted from the main task with visual diversions.

Because to the current pandemic, the study was carried out entirely in a remote manner. The participant was recommended to use a specific setup by using a computer and headphones while answering the survey. Unluckily, this is a factor that could not be completely controlled. Therefore, at the end of the survey, the test subject was asked to confirm which listening method was used.

In order to avoid possible resource limitations in the user's end, 30 second snippets of the different stimuli were presented. Each snippet contained the first transition to the chorus which allowed for a efficient presentation of the stimuli. The first transition

to the chorus regularly contains the most energy in the song and is, hence, the most representative part of it. This is well-established practice in music pyschology research. [Lepa et al., 2020]

3.2 Survey Design

In this step, it was necessary to define how to measure choice overload while selecting music pieces. There is plenty of information regarding studies for choice overload while selecting jam, chocolate, wine, consumer electronics and other digital commodities such as screensavers but nothing really close to music. For this reason a mixture of different questionnaires measuring different indicators and characteristics was created. Additionally we set off to measure other personal characteristics of the test subject that would eventually affect the way choice overload presents itself while also keeping in mind that the length of the survey should not be that extensive. The indicators and some of the personal characteristics to be assessed were selected in conjunction with another AKT Student, Melanie Schulz, whose work will concentrate on the effect of high and low information on choice overload in music.

The survey consists of three different assortment sized presented to the test subject. In order to have a short break between the decision tasks, some demographical questions were asked. As previously mentioned, the complete survey is a conglomerate of questions from different papers. Expectation Disconfirmation was assessed using only one question from the paper by [Diehl and Poynor, 2010]. Variety in the Assortment was estimated according to [Chernev, 2003b]. Quality of the Assortment was estimated conforming to [Hadar and Sood, 2014]. The assessment for the main Choice Overload indicators such as difficulty in the task, satisfaction with choice, decision task enjoyment were taken from [Hadar and Sood, 2014]. The general enjoyment from the complete survey was also measured according to [Scheibehenne et al., 2010]. The employed searching strategies and amount of attributes considered for choice were expected to change and were measured too. For these two last elements no specific question was used but the theoretical background is to be traced back to [Timmermans, 1993].

In addition to all these indicators, the specific personal psychological characteristics from the test subjects were evaluated, these characteristics included Subjective Knowledge [Hadar and Sood, 2014], their Maximizer/Satisficer Profile was assessed according to [Schwartz et al., 2002], and finally the Musical Sophistication Index (MSI) was estimated according to a simplified version of the General Musical Sophistication questionnary from [Müllensiefen et al., 2014].

For a simpler overview of the questions, the authors and the scales for the questions in the survey, all the questions asked in the survey can be found in the table .1 in the annex.

Participants

For the survey two hundred and five (205) persons were invited to participate in the survey. A total of sixty seven (67) participants from Europe and America with ages between 19 and 77 years old answered the online survey completely. Mean age for these participants was 34,5 years, with the majority of the test subjects being between 26 and 35 years old (n = 45; 67,2 %), the rest of the test subjects was distributed in (n = 7; 10,5 %) being between 19 and 25 years old, (n = 5; 7,5 %) being between 36 - 45 years old, (n = 3; 4,5 %) being between 46 - 55 years old and finally (n = 7; 10,4 %) being fifty (55) years and older.

The test subject sex had a higher representation from more males (n = 39; 58,2%) than females (n = 26; 38,8%) or people with other sexual orientation (n = 2; 3,0 %).

All participants were pre screened to have a good enough command of the english language in order to understand the survey and also informed their consent to provide the information required for this study.

Audio Stimuli

Music was taken from the paper *"A computational model for predicting perceived musical expression in branding scenarios"* Lepa et al., 2020 in which more than 500 different songs were analysed for music branding. The idea behind the paper is to provide an algorithm solution that is able to automatically index music files. From this collection of songs the author took the least popular songs in order to avoid the test subjects knowing the songs. This was done in order to reduce the possibility of the test subjects having a special affective connection. Affective connections to an option could result in a distortion to the selection process.

As previously described in the procedure, there are three playlists that need to be completed by choosing a song in the playlist's corresponding pool. The three different playlists are meant to be heard in different situations that also entail different levels of responsibility. Additionally, because of the different situations that the playlists are designed for, other descriptors were taken into account when creating the song pools.

The different descriptors resulting from the machine learning algorithm I used were the calculated the probability for pop appeal and the probability for intensity. Additionally, the ESEM Value for easy-going was also used for the relaxing and roadtrip playlist as in the opinion of the author these situations demand for music that can be effortlessly listened to.

For the Party Playlist, a new descriptor was originated from the multiplication of mixed the probability for intensity and the probability for pop appeal. In the case of the Roadtrip Playlist, a new descriptor was originated from the multiplication of the

probability for pop appeal and the ESEM value for easy going. Finally, for the case of the relaxing playlist a descriptor was obtained by multiplying the probability for pop appeal and the ESEM value for easy going.

The author did a selection for 48 songs for each of the different playlists and then through the newly generated descriptors took the first 24 based on the new descriptors mentioned before. The Stimuli for the different playlists are as follows:

Table 3.1: Party Playlist Stimuli

Snippet	Style	Artist	Track Title	Intensity Probability	Pop Appeal Probability	Intensity x Pop Appeal
1	Drum&Bass	Rusko	Everyday (Netsky Vip Remix)	1,6267	-1,8678	-1,0127
2	Rare-Groove	Bill Ador	Jungle Fever	1,6267	-1,8678	-1,0127
NA	Electro-Rock	Yeah Yeah Yeahs	Heads Will Roll	1,6267	-1,8678	-1,0127
3	Dubstep	Baauer	GoGo!	1,6267	-1,0880	-0,5899
4	Tech-House	Jon Hopkins	Open Eye Signal (Radio Edit)	1,6267	-1,0880	-0,5899
5	Dubstep	Alt-J	Left Hand Free (Lido Remix)	1,6267	-1,0880	-0,5899
6	EDM	Calvin Harris	This Is What You Came For (R3hab vs Henry Fong Remix)	1,6267	-1,0880	-0,5899
7	EDM	Dimitri Vegas	Tomorrowland Anthem 2012 (Original Mix)	1,6267	-1,0880	-0,5899
8	Electro	Telespazio	Odeon	1,6267	-1,0880	-0,5899
9	UK-Funky	Xxxy	Thinkin Bout	1,6267	-1,0880	-0,5899
10	Tech-House	Marvin & Guy	Egoista	0,7088	-1,8678	-0,4413
11	Deep-House	Harvey Sutherland	Bamboo	-1,1268	-1,0880	-0,4086
12	Tech-House	Cari Lekebusch	Fly (Cari Lekebusch Mix)	0,7088	-1,0880	-0,2571
13	House	Fish Go Deep	Weapon Of Choice (Fish Go Deep Remix)	0,7088	-1,0880	-0,2571
14	House	Kicks	Dream It	0,7088	-1,0880	-0,2571
15	Deep-House	Dark Sky	Rare Bloom	0,7088	-1,0880	-0,2571
16	Deep-House	DJ Koze	La Duquesa	0,7088	-1,0880	-0,2571
17	Electro	Headman - Robi Insinna	Something Rework (Feat. David Shaw)	0,7088	-1,0880	-0,2571
18	House	Motorcitysoul	Deliver Me (Feat. Ernesto)	0,7088	-1,0880	-0,2571
19	Tech-House	Andre Lodemann	Where Are You Now	0,7088	-1,0880	-0,2571
20	Tech-House	Clara Moto	Hedonic Treadmill	0,7088	-1,0880	-0,2571
21	Indie-Pop	Efterklang	Raincoats	1,6267	-0,3082	-0,1671
22	EDM	Zedd	I Want You To Know	1,6267	-0,3082	-0,1671
23	Electro-Rock	American Royalty	Hungry	1,6267	-0,3082	-0,1671
NA	Progressive-Rock	Led Zeppelin	Immigrant Song	1,6267	-0,3082	-0,1671
NA	AOR	Kings Of Leon	Sex On Fire	1,6267	-0,3082	-0,1671
NA	Latin	Tito Puente	Oye Como Va	-0,2090	-1,8678	-0,1301
NA	Hip-Hop	Kendrick Lamar	Money Trees (Feat. Jay Rock)	-1,1268	-0,3082	-0,1158
24	Balearic	Urban Absolutes	Sunbath On Venus (Original)	-0,2090	-1,0880	-0,0758

Table 3.2: Roadtrip Playlist Stimuli

Snippet	Style	Artist	Track Title	Intensity Probability	Pop Appeal Probability	Instensity x Pop Appeal
1	Bossa-Nova	Ike Quebec	Loie	0,7293	-1,0880	0,2645
2	Nu-Jazz	Mocky	Jiinti	0,4588	-1,0880	0,1664
3	Bossa-Nova	Cannonball Adderley & Sergio Mendes	Corcovado (Quiet Nights)	0,4091	-1,0880	0,1484
4	Downbeat	Benji Boko	Slow Junkie	0,3490	-1,0880	0,1266
5	Bossa-Nova	João Gilberto	Você E Eu	0,2068	-1,0880	0,0750
6	Bossa-Nova	Reginaldo Bessa	Gosto De Você Demais	0,5904	-0,3082	0,0607
7	Reggae	Amp Fiddler And Sly & Robbie	This World	0,4022	-0,3082	0,0413
8	Electro-Pop	Chromatics	Lady	0,0990	-1,0880	0,0359
9	Boogie	Sylvia Striplin	You Can't Turn Me Away	0,2870	-0,3082	0,0295
10	Easy-Listening	Orchestra Henry Stone	Coronando 990	0,0790	-1,0880	0,0286
11	Flamenco	Sabicas	Taranta	0,0412	-1,0880	0,0150
NA	Indie-Pop	Arcade Fire	The Suburbs	0,0451	-0,3082	0,0046
12	Blues	B.B. King	Every Day I Have the Blues	0,0212	-0,3082	0,0022
13	Boogaloo	Chico Hamilton Quintet	For Mods Only	-0,1376	-0,3082	-0,0141
14	Electro	Jaakko Eino Kalevi	Poison	-0,0523	-1,0880	-0,0190
15	Boogaloo	Ramsey Lewis Trio	Wade In The Water (Album Version)	-0,0671	-1,0880	-0,0244
16	Classical-Jazz	Dizzy Gillespie	In A Shanty In Old Shanty Town	-0,0741	-1,0880	-0,0269
17	UK-Funky	SKT	Everything You Do (Bee Q & Unique Remix) (Feat. Gudrun Eden)	-0,2666	-0,3082	-0,0274
18	Reggae	Greyhound	Move On Up	-0,2999	-0,3082	-0,0308
19	Disco	Fred Falke	Radio Days	-0,3161	-0,3082	-0,0325
20	Afro	Alex Barck	Oh Africa (Feat. Christine Salem) (Album Version)	-0,3421	-0,3082	-0,0352
21	Reggae	The Heptones	Message From A Black Man	-0,3660	-0,3082	-0,0376
22	Latin	Fania All-Stars	Viva Tirado	-0,4323	-0,3082	-0,0444
23	Broken-Beats	Jazzanova	Dance The Dance (Atjazz Remix)	-0,1762	-1,0880	-0,0639
24	House	Ada	Lovestoned	-0,1913	-1,0880	-0,0694

Table 3.3: Relaxing Playlist Stimuli

Snippet	Style	Artist	Track Title	Easy Listening	Pop Appeal Probability	Pop Appeal x Easy Listening
1	Historical-Classical	Faure	Pavane	0,8608	-1,8678	-0,5359
2	Ambient	Roman Flügel	9 Years	0,7831	-1,8678	-0,4875
3	Downbeat	Mandalay Soundsystem	Sound Of Innocence	1,2440	-1,0880	-0,4512
4	Ambient	Olafur Arnalds & Nils Frahm	a1	0,6882	-1,8678	-0,4285
5	Balearic	Finnebassen	Vi nå	1,1791	-1,0880	-0,4276
6	Contemporary-Classical	Dakota Suite	How Could You Let Me Go	1,1363	-1,0880	-0,4121
7	Ambient	No Logo	Is Anybody Out There (Ambient Mix)	1,0956	-1,0880	-0,3973
8	Classical-Jazz	Miles Davis	Blue In Green	1,0516	-1,0880	-0,3814
9	Dream Pop	Noiserv	Today Is The Same As Yesterday, But Yesterday Is Not Today	0,8819	-1,0880	-0,3198
10	Ambient	Memum	Glows	0,8766	-1,0880	-0,3179
11	Downbeat	Blackfish	Delta	0,8557	-1,0880	-0,3103
12	Asian	Guts	Senza	0,8216	-1,0880	-0,2980
13	Ambient	Andrew Thomas	A Dream Of A Spider	0,7927	-1,0880	-0,2875
14	Downbeat	T.M.G.	Holy Master	0,7277	-1,0880	-0,2639
15	Balearic	Sinitus Tempo	Tainted Flowers	0,7202	-1,0880	-0,2612
16	Nu-Jazz	GoGo Penguin	Branches Break	0,5371	-1,0880	-0,1948
17	Downbeat	Flamingosis	Sunset Park	0,5018	-1,0880	-0,1820
18	Classical-Jazz	John Coltrane	Naima	0,4748	-1,0880	-0,1722
19	Deep-House	Kiasmos	Looped	0,4142	-1,0880	-0,1502
20	Balearic	Dølle Jølle	Balearic Incarnation	0,4070	-1,0880	-0,1476
21	Ambient	Pantha Du Prince	Im Bann	0,2360	-1,8678	-0,1470
22	Ambient	CFCF	Half Dreaming Reprise	0,3468	-1,0880	-0,1258
NA	Smooth-Jazz	Norah Jones	More Than This	1,0209	-0,3082	-0,1049
23	Bossa-Nova	Bebel Gilberto	Nossa Senhora	0,9844	-0,3082	-0,1011
24	Contemporary-Classical	Grandbrothers	Wuppertal	0,2421	-1,0880	-0,0878

Procedure

The participants are first shown the requirements for the survey and a consent form where they are asked if they agree to take part in the survey, additionally they are asked to confirm they are over than 18 years old. Next, some demographics such as age, sex, command of the english language, education are asked. The first assessment on preference uncertainty is made by asking about the test subject's subjective knowledge in music according to the questions from Hadar and Sood, 2014 and adapted to music.

In the next step, the participant is shown the first audio file with a message asking them to adjust the volume of their system. By doing this I make sure that the test subject is paying attention to the survey and that the audio volume of their device is set to a correct level.

Next, the first pool of songs is shown. A random list of songs is presented from a random theme. In this page the test subject has to rate all of the song excerpts in the presented pool and choose only one from it. No further information describing the songs is shown, no time limit is forced and the most simple presentation format is selected in order to reduce the decision task difficulty to only accountability coming from the theme of the playlist. The same test is carried out three times, in each of the three times the participant will be shown a random number of song snippets available in either the small (up to 8), medium (up to 16) or large (up to 24) pool of songs for a specific playlist.

The three different sized pools are only showed once in order for each test subject to select a song in the small, medium and larged sized pool at the end of the test. Additionally, three different playlist themes, which will be mentioned below, are presented to the test subject. In a similar fashion as the pool sizes, the listener ends up selecting from all three different playlist themes. The experiment Stimuli add up to a total of 72 different songs that are available in the survey.

The amount of songs, the theme of the playlist and the order of the pool sizes presented are randomly selected by LimeSurvey. This is carried out by, with the help of JavaScript in the LimeSurvey software, generating a random value for the variables Rand1, Rand2, Rand3, Theme and Size. This procedure ensures two things: First, that the effect of the presentation order of the pool sizes is normalized by variating it for every test. Second, that the effect of the theme order is normalized by variating the order in which they are presented to the test subject. A more thorough description of the different settings and JavaScript elements in the survey can be found in the annex.

The base options for each of the pool sizes are:

- Small Pool: 2
- Medium Pool: 10

- Large Pool: 18

The presented options increase depending on the value that the variables "Rand1", "Rand2" and "Rand3" take. Where "Rand1" affects the size of the small pool, "Rand2" modifies the size of the medium pool and finally the large pool augments its size depending of the value of "Rand3" Moreover, the order in which the pool sizes are presented depend on the value that the variable "Size" takes.

The three different scenarios for the listener to choose a song are:

- Select a song for a Party Playlist
- Select a song for a Roadtrip Playlist
- Select a song for a Relaxing Playlist

The reasons behing choosing these three different scenarios is: First, to measure the choice overload in different areas of expertise in a way that these 3 different playlist themes balance out users preferring to create playlists with a certain theme. Second, to measure different decision accountability levels for the test subject.

The party playlist is expected to have a higher responsability level in comparison to the roadtrip or relaxing playlist. The idea behind this is that the test subject will feel a higher decision accountability because several people will be listening to the song the test subject chose. In a similar way is the roadtrip expected to be of a higher decision accountability level as driving in a car with one or more people provides a higher level of accountability than the relaxing playlist in which the test subject alone is going to be listening to the selected song.

As mentioned in the Status Quo, higher decision accountability levels are expected to drive choice overload feelings such as perceived difficulty to higher levels. I expect the choice overload phenomenon to appear with smaller assortments in the cases of higher accountability when compared with medium or low accountability.

Table 3.4 can be used to get a better overview on the way the songs are presented depending on the variable values:

Table 3.4: Survey Variable Description

Variable				
Rand1	**Rand2**	**Rand3**	**Theme**	**Size**
Presented Options in Pool #1	Presented Options in Pool #2	Presented Options in Pool #3	Order of Pool Theme Presentation	Oder of Pool Size Presentation
1: Base Options	1: Base Options	1: Base Options	1: Relax / Party / Roadtrip	1: Small / Medium / Large
2: Base Options + 2	2: Base Options + 2	2: Base Options + 2	2: Relax / Roadtrip / Party	2: Small / Large / Medium
3: Base Options + 4	3: Base Options + 4	3: Base Options + 4	3: Party / Roadtrip / Relax	3: Medium / Large / Small
4: Base Options + 6	4: Base Options + 6	4: Base Options + 6	4: Party / Relax / Roadtrip	4: Medium / Small / Large
			5: Roadtrip / Relax / Party	5: Large / Medium / Small
			6: Roadtrip / Party / Relax	6: Large / Small / Medium

After each participant rates the song pool presented to them and selects one of the songs in it, they are asked to confirm if they know any of the presented songs or know the artist that playst that song. This is a control feature to reduce the possibility of an affective element to one of the presented items. In case that the number of known elements is too high the sample is removed.

In the next page, the participant is asked to rate the chosen song in order to measure the expectation disconfirmation from Diehl and Poynor, 2010. In the same page participants are asked to evaluate their perception on the presented assortment and assess their satisfaction, difficulty making the choice, frustration and enjoyment while making the choice according to Iyengar and Lepper, 2001, additionally the switching likelihood is measured using a Likert scale with the same depth.

A manipulation check is carried out by measuring the overall quality and the variety of the assortment according to the questions used by Chernev, 2003a. By measuring these two elements we are making sure that the manipulation in the assortment size and type is perceived by the test subject. Additionally, these two questions are also used as an element of control to make sure the three playlist themes are perceived with a similar variety and quality.

Finally the searching strategy and the amount of attributes in the music taken into account for the decision is measured. No standard questions were found for this items but the theory comes from Timmermans, 1993 where a reduction of attributes taken to account is expected to fall with the presence of choice overload and the decision strategy is supposed to change to an elimination strategy in large assortments.

The questions related to the assortment and chosen item characteristics can be found in Table 3.5.

Table 3.5: Assortment and Selection Characteristics Questions

Number	**Concept**	**Question**	**Options in the Question**
1	Expectation Disconfirmation	How would you rate the song that you chose?	1.Much worse than I expected ... 9. Much better than I expected
2	Variety in the Assortment	How much variety did the set of songs offer?	Overwhelming, rather extensive, adequate, somewhat narrow, very limited
3	Quality in the Assortment	How would you rate the overall quality of the song options you were presented with?	1. not at all positive ... 7. very positive
4	Choice Overload Indicators	Did you find it difficult to make your decision of which song to pick?	1. not at all ... 7 extremely
3	Quality in the Assortment	How would you rate the overall quality of the song options you were presented with?	1. not at all positive ... 7. very positive
4	Choice Overload Indicators	Did you find it difficult to make your decision of which song to pick?	1. not at all ... 7 extremely
5		How satisfied are you with the song you chose?	1. not at all ... 7 extremely
6		How frustrated did you feel when making the choice?	1. not at all ... 7 extremely
7		How much did you enjoy making the choice?	1. not at all ... 7 extremely
8		If you had the chance to change your decision, how likely is it that you would do it?	1. not at all ... 7 extremely
9	Searching Strategies	When selecting the song for each of the last playlist, what kind of strategies did you use?	Stop searching after finding a good song, Try them all, Randomly selecting a song, Elimination by aspects, Search for a specific period of time
10	Characteristics in the music	In which characteristics in the music did you concentrate for choosing the songs you chose?	Harmony, Genre, Energy, Rhythm, Dynamics, Tempo, Beat, Timbre, Texture, Melody, Emotional Expression, Sound, Other.

After the decision task, another series of demographical questions are asked. In this

case they relate to the test subject's musical sophistication and the questions are a selection a 7 question selection from the general musical sophistication questionnaire from Goldman's Musical Sophistication Index [Müllensiefen et al., 2014].

In the next page a third and last decision task is presented to the test subject. The questions stays the same.

In the final page, the overall enjoyment during the whole survey is assessed. The intention behind this is to measure the satisfaction with the experience as a whole according to [Scheibehenne et al., 2010]. Next, the listening method is also asked in order to confirm that the test subject used headphones and to remove possible tests from subjects that might have not paid enough attention to the test.

The last question of the survey is to assess the decision goals of the participant. In this work I assume that the maximizer/satisficer profile of the test subject relates how much they are interested on investing their cognitive resources in the decision task. The questions were taken over from [Schwartz et al., 2002]. An overview of all of the questions used to assess the test subjects characteristics can be found in table 3.6

Table 3.6: Test Subject Characteristics Questions

Number	**Concept**	**Question**	Options in the Question
		First Decision Task	
1	Subjective Knowledge	How confident are you that you can make a good choice of music?	1. I know very little ... 7. I know a lot
2		How knowledgeable do you feel about music?	1. not at all ... 7. very much
3		Rate your knowledge of music compared to the average consumer.	1. much less ... 4. average ... 7. very much
		Second Decision Task	
4	Musical Sophistication Index	I spend a lot of my free time doing music-related activities.	1. Completely Agree ... 7. Completely Disagree
5		I can sing or play music from memory.	1. Completely Agree ... 7. Completely Disagree
6		I often read or search the internet for things related to music	1. Completely Agree ... 7. Completely Disagree
7		I don't like singing in public because I'm afraid that I would sing wrong notes.	1. Completely Agree ... 7. Completely Disagree
8		I would not consider myself a musician.	1. Completely Agree ... 7. Completely Disagree
9		I engaged in regular, daily practice of a musical instrument (including voice) for ___ years.	
10		I have had ___ or more years of formal training on a musical instrument (including voice) during my lifetime.	
		Third Decision Task	
11	Maximizer/Satisficer Profile	Streaming videos is really difficult. I'm always struggling to pick the best one.	1. Completely Agree ... 7. Completely Disagree
12		I often fantasize about living in ways that are quite different from my actual life.	1. Completely Agree ... 7. Completely Disagree
13		When I watch TV, I channel surf, often scanning through options while attempting to watch one program.	1. Completely Agree ... 7. Completely Disagree
14		No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.	1. Completely Agree ... 7. Completely Disagree
15		When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I'm relatively satisfied with what I'm listening to.	1. Completely Agree ... 7. Completely Disagree

The survey has a total of 12 pages and 50 questions, a summary of the questions, the papers related to them and the scale used for each of the questions a table including this information has been added to the annex in table .1 for a better overview of the structure of the survey.

3.3 Survey Software

For the online survey I have decided to use LimeSurvey 3.0 because it allowed for a fast and organized implementation of the survey. The LimeSurvey Software is a free open source on-line survey web app that is written in PHP and allows for JavaScript code snippets to do fine adjustments of the behaviour of the survey.

Additionally, the practicity of the AKT Deparment having the application hosted in their servers and the LimeSurvey Software having the functionality of creating an export of a SPSS readable file for the statistic analysis were additional pros that helped take the decision on which software to use for the online survey.

Technical Features

Some of the most important tools required for the correct functionality and correct display of the information in the survey were:

Generation of Random Numbers

In order for the survey to display different playlist themes, different size order and different-sized pools, the equation question type was used. This question type allows for questions to have a specific value that can then be implemented in the logic for modifying the behaviour of the survey. The syntax for generating a random number is the following:

```
if(is_empty(NameOfTheVariable.NAOK),
rand(LowNumberSeed,HighNumberSeed),NameOfTheVariable.NAOK)
```

Listing 3.1: Sourcecode Listing

Conditional text

Limesurvey allows for text to be displayed according to the value of one of the variables defined above, this functionality was used to have one question that would display the specific text to each of the playlist themes.

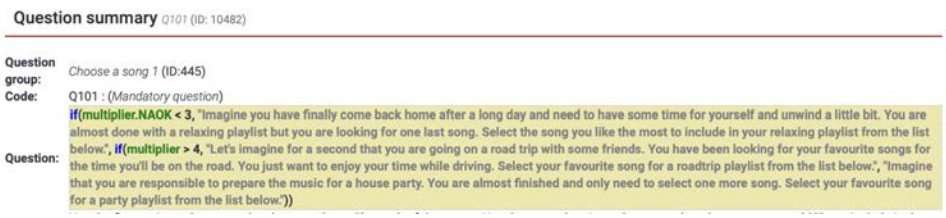

Figure 3.1: Conditional Text Example

Conditional Presentation of Subquestions (Relevance Equation)

Similar to the conditional text, LimeSurvey can display a subquestion depending on the value of a variable. This functionality was used to have the questions display the parametric sized pools. Allowing the same question to show the complete iteration of a pool and complemented with the conditional text formatting, the complete iteration of the playlist themes.

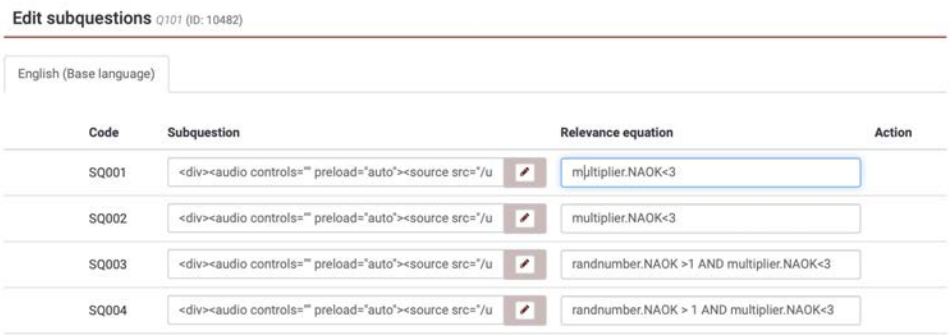

Figure 3.2: Conditional Subquestions Example

Incident Count and Question Validation

Limesurvey allows also for answers in a survey to be counted. This functionality was used to make sure that the test subjects had only selected one song for the displayed playlist. The JavaScript code for counting the amount of selected options is the following:

```
countifop("==","OptionID",QuestionID1.NAOK,QuestionID2.NAOK, ...
QuestionIDn-1.NAOK,QuestionIDn-1.NAOK) == MaxNumberOfSelected\\
```

Listing 3.2: Sourcecode Listing

Preselection

Due to the fact that the survey presents up to 24 different options at times and in order to reduce the amount of clicks from the test subject a preselection of the displayed options was carried out. The JavaScript code for this functionality is the following:

```
QuestionID1="OptionID", ..., QuestionIDn-1="OptionID", QuestionIDn="OptionID".
```

Listing 3.3: Sourcecode Listing

Including Media in LimeSurvey questions

```
<div>
<audio controls="" preload="auto">
<source src="FilePath/FileName.mp3" type="audio/mpeg" >
```

```
</source> [This browser cannot play audio files!]
</audio>
</div>
```

Listing 3.4: Sourcecode Listing

Adding Pop Ups along with questions

```
<script>

jQuery(document).ready(
   function(){
               alert('Text to Display');
   }

);

</script>
```

Listing 3.5: Sourcecode Listing

3.4 Result Analysis Software

In order to carry out the statistical analysis to the resulting information generated by the study I will be using SPSS Statistics 27 (IBM Corp.,US). The information could be directly imported from LimeSurvey 3.0 to SPSS so no other software for the preparation or adjustment of the information is required.

4 Evaluation

This chapter presents the analysis of the resulting dataset originated from the study carried out in LimeSurvey.

In the first part of this chapter the validation reliability of the different questions referring to the indicators and factors mentioned in the chapter 2 will be carried out.

In the second part of this chapter an analysis of the factors to the choice overload in different assortments will be done. Additionally, the different plots regarding the factors and indicators will be presented.

4.1 Validation of the Measured Characteristics

The main goal of this work is to find the correct assortment size for a music playlist that provides the consumer with the best compromise between the positive effects from the large assortment and the negative effects from the unwanted cognitive load that originate from choosing in a large assortment. This is another approach to the inverted-U-function that was previously mentioned by Shah and Wolford, 2007 and Reutskaja and Hogarth, 2009 but in this case the goal is to relate the positive effects of the larger assortment with the assortment size.

In this experiment, the positive results from the large assortment are measured through the perceived variety, the choice satisfaction, enjoyment during choice and overall assortment quality. By doing a Cronbach's Alpha analysis on these questions that consist the "Assortment Size Positive Effects" subscale of the survey we were able to find that the subscale's alpha was .79 which indicates that the subscale has an adequate level of inter-item reliability. A further analysis found that by deleting the question regarding the perceived variety the subscale's alpha would raise to .80. The complete summary on Cronbach's alpha analysis can be found in table 4.1

Table 4.1: Cronbach's Alpha Analysis on Assortment Size Positive Effects

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corr. Item-Total Correlation	C. Alpha if Item Deleted
How much variety did the set of songs offer?	13,7846	18,562	,494	**,801**
How would you rate the overall quality of the song options you were presented with?	11,8410	14,485	,554	,765
How much did you enjoy making the choice?	11,9333	11,238	,759	,653
How satisfied are you with the song you chose?	11,3641	12,728	,671	,705

The negative results from a larger assortments are measured through the perceived difficulty, frustration and the switching likelihood from the test subject. A Cronbach's

alpha analysis results in a subscale alpha level of .62 which indicates an adequate level of inter-item reliability. Further analyses found that deleting any of the other items would not increase the alpha level of this subscale. Further information related to the negative results can be found in table .2 in the Annex.

As previously mentioned, for this work it was considered that there are three other factors that depend on each of the test subjects. This in ordet to better understand why choice overload appears with smaller assortments on some people. Theory indicates that the subjective knowledge could be one of the reasons. The subjective knowledge has been therefore extended to musical subjective knowledge and to musical sophistication according to Hadar and Sood, 2014 and Müllensiefen et al., 2014 respectively.

The Cronbach's alpha analysis on the subjective knowledge questions was carried out and found an alpha level of .87. Further analyses found that deleting any of the other items would not increase the alpha level of this subscale. Further information can be found in table .3 in the annex .

As for the musical sophistication of each of the test subjects, a selection of 6 questions from the general musical sophistication questionnaire was done. The Cronbach's alpha analysis indicates a subscale's alpha level of ,71. After carrying out further analyses it was found that by deleting the question "I don't like singing in public because I'm afraid that I would sing wrong notes." a subscale's alpha level of ,75 could be reached. Further information can be found in table 4.2

Table 4.2: Cronbach's Alpha Analysis on Musical Sophistication Index

Item-Total Statistics				
	Scale M. if Item Deleted	Scale Variance if Item Deleted	Corr. Item-Total Correlation	C.'s Alpha if Item Deleted
I spend a lot of my free time doing music-related activities.	17,3077	38,039	,555	,626
I can sing or play music from memory	17,1846	35,749	,596	,604
I often read or search the internet for things related to music	17,3077	36,369	,573	,614
I don't like singing in public because I'm afraid that I would sing wrong notes (reversed)	17,9077	42,703	,243	**,745**
I would not consider myself a musician (reversed)	18,1692	35,616	,413	,686

Additionally, a theory proposed by Schwartz et al in 2020 indicates that decision making profiles can be affected by the way that people attack the decision as such, by either being maximizers or satisficers. I consider this could also provide an explanation on the assortment size choice overload appears in, for this reason an additional subset measuring the maximizer/satisficer profile of the test subject was taken from Schwarz's paper. Schwartz et al., 2002

An analysis on Cronbach's alpha indicates a subscale's alpha level of ,44 which indicates that the subscale did not have an adequate level of inter-item reliability. Deleting any of the items did not significantly increase the alpha level. It is important to mention that, as in the past subscales, I chose a subset of questions. In this case it appears that the selected questions were not the right ones or not enough as the paper by Schwartz

mentions a subscale's alpha level of 0.71 for all 13 questions listed in the paper. Further details to this analysis can be found in the annex in table .4.

One of the main conditions for choice overload is the presence of more than one viable option in the presented assortment. The average rating of the songs presented in all three playlist themes and along the up to 24 options did not show a significant fluctuation from the average 3.0 rating. There are two specific cases with a rather low rating for song 21 in the party playlist and a case of a rather high rating song for the roadtrip playlists for song 24.

Due to the fact that both of these songs are presented together with other 21 songs (song 21 is presented in the assortment size of 22 songs) and other 23 songs (song 24 is presented in the assortment size of 24 songs) correspondingly, these peaks are not considered as relevant for the experiment as a significant majority of the other songs have a rating of ,5 (M= 2,94; SD=0,27). Figure 4.1 represents the average rating of the songs in each of the playlist themes and plots it according to the assortment size.

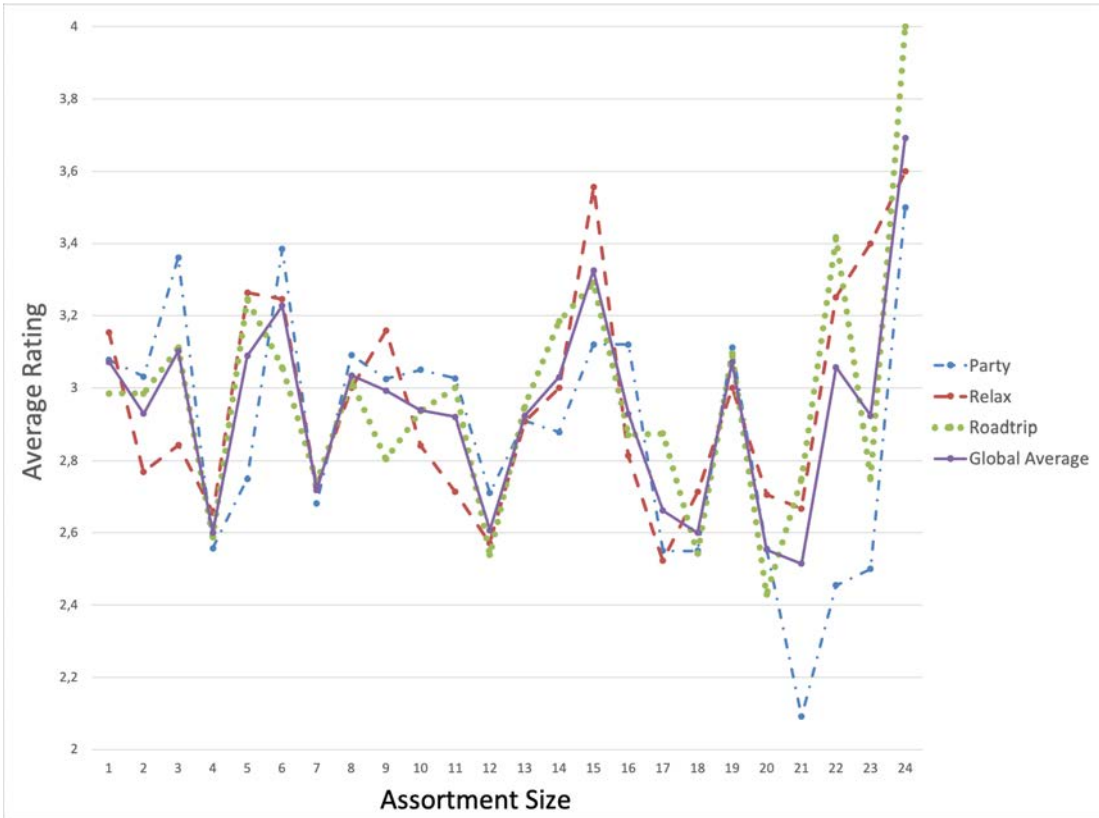

Figure 4.1: Rating vs. Assortment Size

We can now consider that the selection of songs was correct as they present a similar

value in their rating.

Manipulation Check: Quality and Variety of the Assortment

As part of our manipulation check we asked the test subjects to assess the Quality and Variety from each of the different assortments they got presented with. This was done as an effort to make sure that each of the pools had a similar quality.

Similar quality assortments would then ensure that the addition of more options would not affect the perceived quality of the assortment and then affect the predisposition for selecting from large or small assortments. For assessing the Quality in the Assortment the question "How would you rate the overall quality of the song options you were presented with?" was asked.

From figure 4.2 we can confirm that quality was kept that the number of options in the assortment did not significantly affect the decision task and although a constant value was not reached the rated quality from the assortment did not variate more than 10% (0,7) of the 7-Point Likert scala we used.

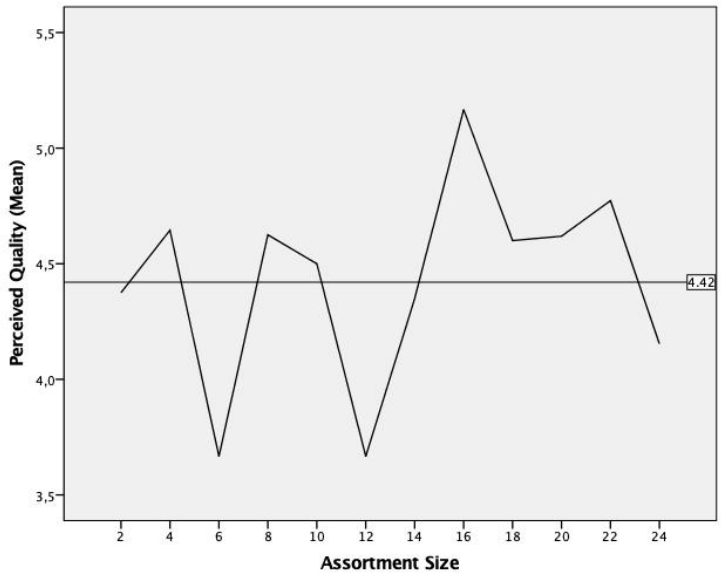

Figure 4.2: Perceived Quality vs. Assortment Size

The variety of the assortment was also used as a manipulation check to see if the test subject was in fact perceiving an increasing variety with every new element that was added to the assortment. Interestingly we found that there was a spike when coming from 16 to 18 elements to then plateau and finally fall after the 20th element.

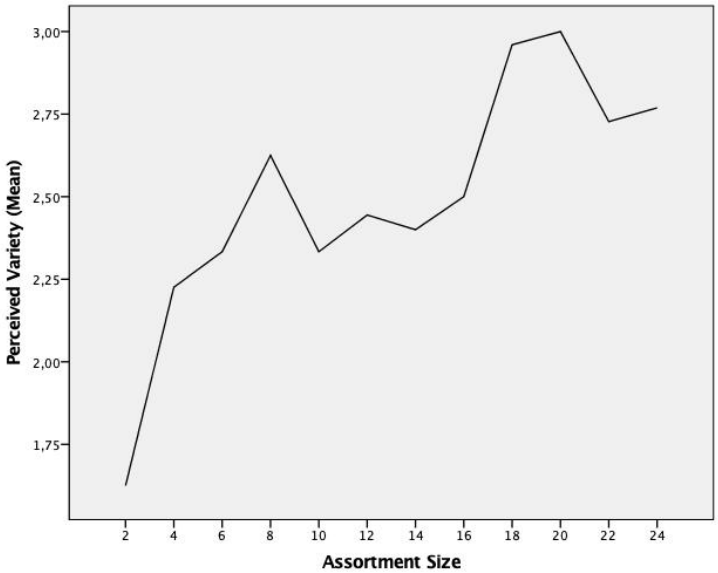

Figure 4.3: Perceived Variety vs. Assortment Size

From these two plots we can confirm that the desired effects in the test subject were successfully achieved. Additionally, all other elements considered in the validation of the information allow us to think that the questions were able to assess the planned items correctly.

4.2 Choice Overload Analysis

Now that we have validated that the different questions to the items that we are measuring are correct, we can start analysing the effects of the assortment size in the participants in the experiment. The effects in the test subject will be divided into "Assortment Size Positive Effects" and "Assortment Size Negative Effects"

For the positive effects of the (large) assortment size the correlation between the questions mentioned in the table 4.1 was analysed. The subscales "How Satisfied are you with the song you chose?" (Satisfaction) and "How much did you enjoy making the choice?" (Enjoyment) was were positively correlated $r(201) = .719$ $p<.01$. Parting from this information, a new variable with the name "Assortment Size Positive Effects" was created by averaging both of the participant's answers to the aforementioned questions.

Regarding the negative effects of the assortment, an analysis of correlation was carried out to the questions "Did you find it difficult to make your decision of which song to pick?" (Difficulty), "If you had the chance to change your decision, how likely is it that you would do it?" (Switching Likelihood) and "How frustrated did you feel when making

the choice?" (Frustration). From the analysis, a low correlation was found $r(201) = .38$ $p<.01$. It was then removed from the item "assortment negative effects".

In contrast, the correlation analysis between difficulty and frustration a found a postive correlation $r(201) = .433$ $p<.01$. For this reason a new variable with the name "Negative Effects" was created by calculating the average for both of the answers to the mentioned questions.

In this case the Pearson correlation value was lower than that of positive effects mentioned above. This was still carried out because the median and standard deviation for both items was very similar. For difficulty ($M = 3.26$, $SD = 1.921$) was very similar to the one of frustration ($M = 3.03$, $SD = 1.930$); Which gives the impression that both items are measuring the same in the experiment.

Furthermore a correlation analysis between the newly created "Assortment Size Positive Effects" and "Assortment Size Negative Effects" values was carried out. Interestingly enough, a correlation was also found between them textitr(201) = .4, $p<.01$. Even though the Pearson correlation value is rather low, a comparison of both of the items shows that there is a strong relationship between the two. This can be confirmed from figure 4.4

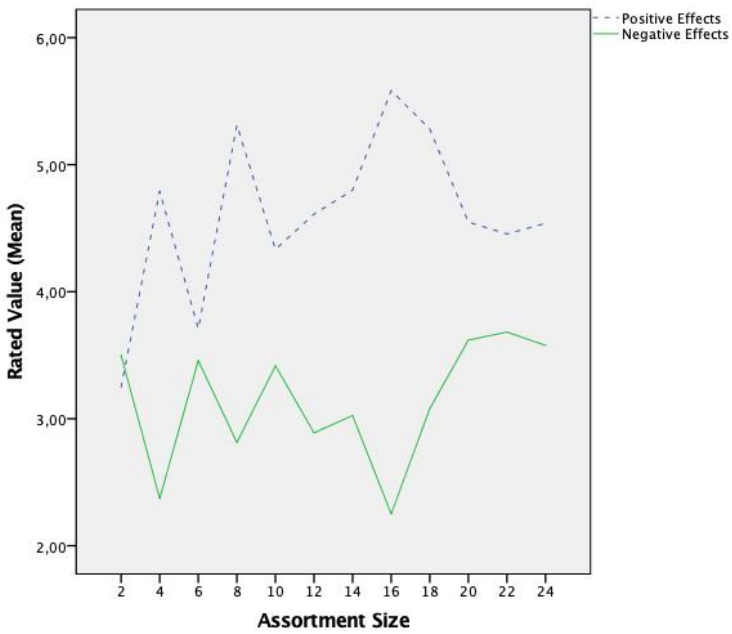

Figure 4.4: Assortment Negative and Positive Effects vs. Assortment Size

For this reason, it was then decided to reverse the "Assortment Size Negative Effects" values and create a new variable with the average of the reversed "Assortment Size

Negative Effects" value with the "Assortment Sized Positive Effects" value. This newly created item was called "Choice Overload (R)".

With this new item it was possible to better depict the relationship between the measured effects of a large assortment and a large assortment. In the newly created item "Choice Overload (R)" the general experience from the choice task has been captured. The higher the score in the scale the more positive is the choice experience. The lower the score the less pleasant is the choice task to the decision maker.

While plotting this "Choice Overload (R) finding the point where choice overload kicks in should be fairly clear as we would expect a swift fall after the all-time maximum.

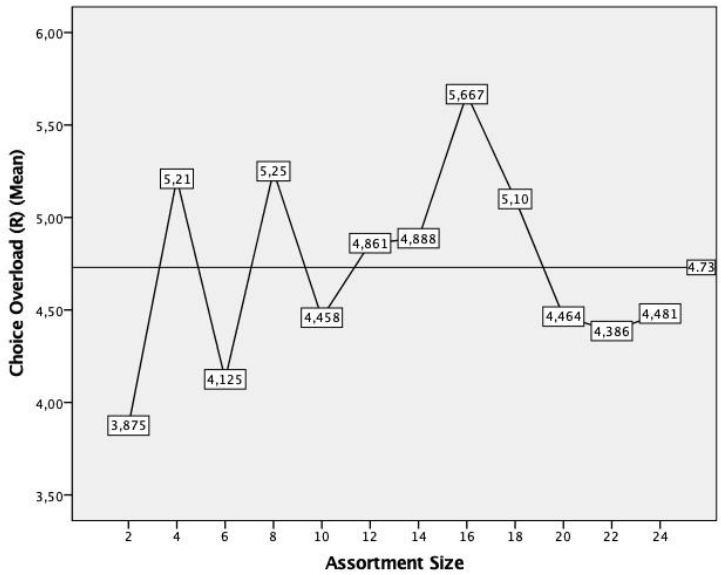

Figure 4.5: Choice Overload vs. Assortment Size

From figure 4.5 we can find that the best experience when regarding the large assortment positive effects in terms of the assortment size is that of the size of 16 elements. As expected we found a maximum and then a quick fall suggesting that the point where choice overload has been reached after the 18 element assortment.

The information before the peak is also very interesting as this would suggest that there is also a minimum with the assortment size of 6 options. When compared with figure 4.1 this is something that is hard to explain since the rating of the songs was specially high with 6 options. There are probably other factors in our experiment that come into play for when the assortment size is below the 10 element mark.

Expectation Disconfirmation: A Quick Choice Overload Test

Another of the considered factors in the choice overload phenomenon was expectation disconfirmation. This factor was measured in order to investigate other mechanisms that might affect satisfaction while choosing from large assortments. The question "How would you rate the song that you chose?" was asked after the test subject had moved on to the page following the decision task. By rating the chosen song directly after finalising the decision task the expectation disconfirmation or the mismatch of what was expected to what was finally chosen, was measured.

Interestingly enough, when compared with expectation disconfirmation a very similar behaviour can be found in the trend: there is an expectation disconfirmation happening with the assortment of 6 options. Meaning that the test subject considers the pool of 6 options a decent sized pool where the possibility of finding a match to expectations should be high, only to find this is not the case. Additionally, the maximum of the trend is found with the assortment size of 16 elements.

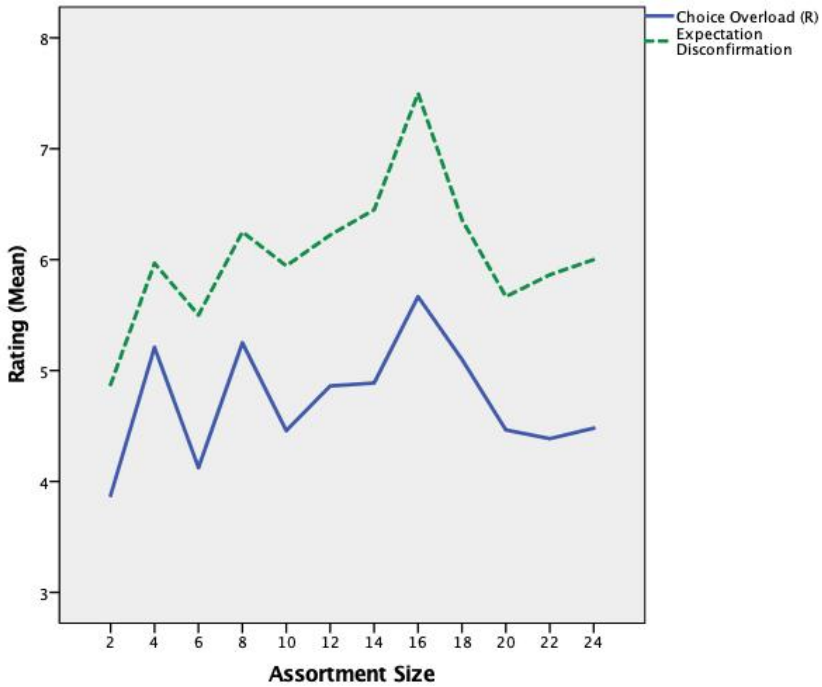

Figure 4.6: Choice Overload and Expectation Disconfirmation vs. Assortment Size

By calculating the correlation between "Choice Overload (R)" and "Expectation Disconfirmation" we find that the Pearson's correlation value is adequate $r(201) = .533$, $p<.01$. This values would be showing that both items are measuring a very similar situation in the test subject. Although the correlation is not specially high, the information

suggests that only asking one question to the test subject could provide us with a quick flag if the subject is experiencing choice overload or not and if the test subject is no longer benefitting from large assortments.

Furthermore, the inverted-u-shaped function mentioned by Shah and Wolford, 2007 is visible in both choice overload and expectation disconfirmation items.

So far we have seen that there is a trend for assortments around the 16 song mark to be the ones to deliver the best experience to the public in general. But what happens when we differentiate our "expert" music listeners from the other less expert ones?

Playlist Theme: Decision Accountability

The other variable manipulated during the experiment is decision accountability, a different decision accountability was expected to change the behaviour of the choice overload phenomenon in the test subjects, where the Party Playlist was expected to have the highest decision accountability and relax the lowest one.

Figure 4.7 summarises graphically the perceived advantages of the larger assortment for the different playlist themes in our experiment.

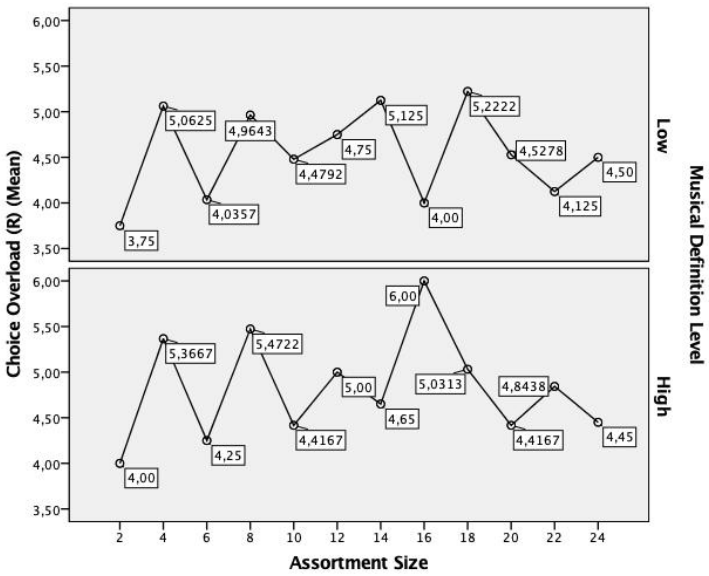

Figure 4.7: Positive Effects on Assortment for the Different Playlists vs. Assortment Size

Contrary to expectation the high decision accountability effect in the Party Playlist did not align with what was expected. In our theory, the presence of more peers listening

to what the test subject chose was expected to cause for choice overload to exist earlier in the assortment. This was not the case.

Interestingly enough, there was a high similarity between the Party and Relax playlist in almost all of the maxima and minima. The main difference between the two was found in the maximum where for the Relax playlist it was found with the assortment size of 16 whereas for the Party playlist it was found in the assortment size of 18.

This would suggest that the decision maker experienced choice overload in the Relax playlist after the 18 song mark whereas the Party playlist choice overload started after the 20 mark. This is exactly the contrary from what we expected, suggesting that the test subject might have been more careful and, hence, used more of their cognitive resources to select a song for only them to listen to. Whereas in the case for the Party playlist, the test subject would have just selected song that they would have expected for the public in general to like

It should be noted that both the Relax and the Roadtrip playlist showed their maximum positive effect on large assortments with the assortment size of 16 songs. However, both trends had little similarities to indicate that the decision accountability would be able to "delay" the choice overload phenomenon in larger assortments. The dynamic of the trends for the three available playlist themes might indicate that there are other factors that could have played a role in this specific scenario that was planned to manipulate decision accountability.

Preference Uncertainty: Happy choosers with larger assortments

As part of the preference uncertainty factors we have included the subjective knowledge in music and the Goldsmith's Musical Sophistication Index. Both items are meant to measure level of the defined preferences from the decision maker. By doing a correlation analysis we found out that both items are measuring a similar characteristic in the decision maker $r(201) = .622$, $p<.01$. For the sake of simplifying the analysis we decided to merge both items into one "Musical Preference Definition".

With this new item we are able to separate our test subjects from "Low Musical Definition Level" and "High Musical Definition Level". This new separation allows also for a better understanding of how the choice overload phenomenon behaves for both of the groups of people mentioned above.

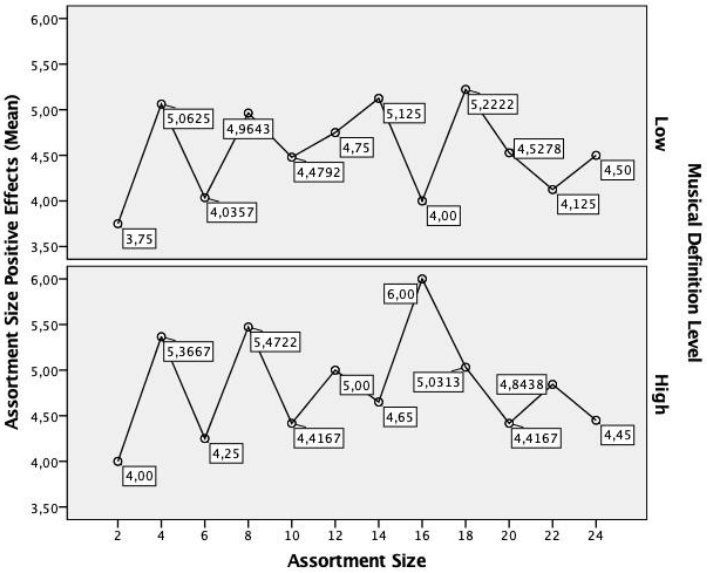

Figure 4.8: Positive Effects on Assortment for the Different Playlists vs. Assortment Size

When comparing both groups we can see that the test subjects with a high musical definition level (n = 33) had a better experience than the users with a low musical definition level (n = 34) in larger assortments where a clear maximum was found with an assortment size of 16 songs.

As for the test subjects with a low musical definition level, no real advantage was found for assortment sizes larger than 16 elements. In the eyes of the author it would be recommended to stay within the assortment values of between 8 and 14 since this is where the highest streak of positive effects for the assortment are found. It is true that the maximum is found in the assortment size of 18 songs but the neighboring assortment sizes have a much lower assortment positive effects as the average found in the 8 to 14 span.

Decision Goal

Regarding the Maximizer and Satisficer profiles coming from the Decision Goal factor, no real correlation to the positive effects in large assortments was found $r(201) = -.041$, $p < .562$. Even though the theoretical background to the theory sounds very interesting to think that some dynamic might exist between choice overload and maximizing/satisficing profiles, the experiment did not provide sufficient evidence to link the two.

Selection Strategy

As expected, the percentage of participants that used the elimination strategy was higher once that the choice overload phenomenon took place. In the case of the low musical knowledge, with the 16-element assortment, over 90% ended up using an elimination strategy. Whereas the average of participants who reported using the elimination strategy over the whole assortment span was of 45%.

In the case of the high musical knowledge participants, the maximum was also found in the 16-element assortment with 60% of the users reporting using the elimination strategy. Nevertheless, the percentage of test subjects had an average of 39% of participants using the elimination strategy. From Figure .1 in the annex we can see that there was a clear difference from the two groups of kinds of participants, where the high musical knowledge group did not resort to the elimination strategy as much as the low musical knowledge group and also did not show that extreme variations such as the experiment by Timmermans, 1993 mentioned in chapter 2.

Considered Attributes in Choice

The considered attributes in choice during the decision task were also analysed in this experiment. When doing an analysis on the amount of considered attributes, it was found that the participants with a higher musical definition considered the most attributes when presented with the 16-element assortment. In the case of the test subjects with a lower musical definition, there was a peak in the 6-element assortment and from the 12- to 14-element assortment.

Interestingly enough, the assortments in which the participants considered the most attributes for their choice were also the assortments in which the most positive effects from the assortment were found in the same assortment sizes as the ones mentioned in figure 4.8. This would suggest that the assortment sizes in which the participants considered the most attributes were also the assortment sizes that provided with the best experience while choosing. A figure regarding the considered attributes in choice vs. the assortment size for the different musical definition levels can be found in figure .2 in the annex.

5 Conclusion

The aim of this work was to find out what is the exact amount of songs in an assortment that is the best compromise between the positive effects that a large assortment offers and the negative effects from the unwanted cognitive load that choosing from a large amount of options means. Choosing a song has become a more demanding task. The amount of songs that streaming services have available at the touch of the consumer's fingertips is overwhelming to say the least.

Iyengar and Lepper and Chernev recently set up complete ground works to better understand how large assortments affect the decision process. They observed that the decision task can be unpleasant depending on the assortment size. There is the moment in which the decision maker comes to a point where the available cognitive resources are surpassed by the decision task due to the great amount of options and the corresponding information to be processed. The information overload resulting from the large amount of options and the resulting cognitive load required to make a decision is called choice overload.

Since choice overload is a mental construct that cannot be directly measured, a group of indicators have been found to denote choice overload. These are frustration, perceived difficulty during the decision task, and switching likelihood. Additionally, satisfaction and enjoyment during the decision have been found to fall when the choice overload phenomenon appears.

Some of the factors that modulate the effect of assortment size on choice overload are Preference Uncertainty, Decision Goal, Choice Set Complexity and Decision Task Difficulty. Iyengar and Lepper, 2001 Chernev et al., 2015

An online survey was created in order to simulate a situation where a consumer is selecting songs from a streaming service. In the survey the test subject had to select a song from three different playlist sizes ranging from 2 to 24. The participant is shown a small sized assortment (up to 8 songs), a medium sized assortment (up to 16 songs) and a large sized assortment (up to 24 songs). Furthermore, the theme of each of the shown playlist was changed in order to change the level of decision accountability (low, medium and high) and to normalise the expertise that the participants might have for creating a specific type of playlists.

The survey also included questions to analyse each of the participants decision goal and preference uncertainty. The decision goal refers to the level on how many cognitive

resources the consumer is ready to invest in the decision process. In the case of the decision goal the maximizer/satisficer profile was assessed according to Schwartz et al. [Schwartz et al., 2002].

Preference Uncertainty factor was the other factors that was analysed during the decision process in the survey. Preference uncertainty is related to the possibilities that the decision maker has to understand the benefits of the options presented in the assortment.

This factor was assessed by using two different elements. The first element was Subjective Knowledge and was taken from Hadar and Sood's paper from 2013 and adapted to music. The Subjective Knowledge is the self assessed level of the decision maker's knowledge on the realm where the decision is to be taken. The second element was the Goldsmith's Musical Sophistication Index taken from Müllensiefen et al's paper from 2014. This is an index created to assess the level of musical sophistication through active engagement. The study used to create this index also demonstrated that there is a relationship between music listening skills and musical behaviours, hence making the index a good reference for the decision makers ability to choose songs for a playlist. [Hadar et al., 2013] [Müllensiefen et al., 2014].

Furthermore, the selection strategy and the considered attributes in choice were analysed. Timmermans did a study in 1993 on the elimination strategy while selecting from different-sized assortments. The amount of participants using this strategy was also measured after each of the participants chose a song. In Timmermans experiment the amount of participants resorting to the elimination strategy rose as the assortment size grew. [Timmermans, 1993]

The considered attributes of choice were also assessed during the experiment, the amount of attributes are expected to fall as the decision task gets more complicated. This is a result of the decision maker redirecting the available cognitive resources in order to make the decision process more efficient. In an experiment done also by Timmermanns the test subjects confirmed a decrease in the considered attributes in choice when the amount of options was increased. [Timmermans, 1993]

The survey was carried out using the LimeSurvey App installed in the AKT Servers. The analysis was done with SPSS 23.

The online survey had 205 participants with only 67 finishing the survey. The participants were either from Europe or America with ages between 19 and 77 years old. The online survey was carried out completely in english and participants were pre-screened to make sure that their command of the language was enough for them to fully understand the survey.

The core question of this master thesis was if there was an assortment size for a music

playlist that would be able to provide the consumer with the best compromise between the positive effects from a large assortment and the negative effects from the unwanted cognitive load that originate from choosing in a large assortment.

In order to do a more simple analysis of the information resulting from the survey, the positive effect indicators from the questions "How Satisfied are you with the song you chose?" (Satisfaction) and "How much did you enjoy making the choice?" (Enjoyment) were integrated to the reversed negative effect indicators coming from the questions "Did you find it difficult to make your decision of which song to pick?" (Difficulty) and "How frustrated did you feel when making the choice?" (Frustration). It is important to mention that the question "If you had the chance to change your decision, how likely is it that you would do it?" (Switching Likelihood) was not included into the final score because it did not show a significant relation to the group of negative effects of the assortment size. The reason behind this is that the switching likelihood might not apply to music because of the instantaneity of playing a song.

Interestingly enough, there is a specific number of elements in an assortment that was able to provide with the best experience. The 16 element assortment showed the highest value of positive effects and the lowest value of negative effects mentioned above. It should be noted that this is a first approach to finding the maximum amount of songs that can be presented before choice overload kicks in. The assortment size should only apply to songs that are presented in the same way that they were presented in this survey: without any further information or written descriptors such as genre, song name, song artist, etc.

Additional to this first approach, further factors were considered in the experiment of this work.

As mentioned above the decision accountability was one of the moderators considered in choice overload for assortment size. In the experiment three different levels of decision accountability were set up for the survey. A low level decision accountability (Relax), a mid level decision accountability (Roadtrip) and a high level decision accountability (Party). Contrary to expectation the Roadtrip and Relax playlist seem to have a higher decision accountability than the Party playlist. It would have been interesting to do a manipulation check by asking the participants about the level of accountability they felt for each of the playlist themes. This was not done because the survey was already too long.

Another important information that this work delivers is that when participants are separated into high and low musical definition levels they have different ideal assortment sizes. The high musical definition participants have a better experience with larger assortments, with the 16 element assortment being the best rated. Low musical definition participants had a better experience with smaller assortments, with the 12 to 14 Ele-

ments assortment scoring best.

Furthermore, both participant groups seem to also consider more attributes when they have the best decision experience. That means that participants considered more attributes for the assortments in which they had the best choice experience. There is a clear relationship between the two for both of the musical definition groups.

The selection strategy was also a good indicator for the presence of choice overload in the case of the low musical definition group. All of the participants belonging to this group resorted to the elimination strategy when presented the assortment of 16 elements. That is, where the choice overload phenomenon was in full swing. In contrast, only 60% of the high musical definition group resorted to it in the 16-element assortment. This leads to think that the elimination is a good indicator for the choice overload phenomenon for the participants scoring low in the preference uncertainty factor.

Finally, the expectation disconfirmation seems to be a very effective method of finding out if the consumer or participant is experiencing choice overload. It appears that both phenomenon although not really connected score similarly throughout the assortment in the experiment. Both Choice Overload (R) and expectation disconfirmation had a very similar behaviour and were able to indicate when the participant was having the best experience while choosing from the assortment. Both trends showed that the 16-element assortment was the most effective one when talking about best choosing experience. Nevertheless, when separately analysing expectation disconfirmation for low and high musical definition groups, both trends showed a maximum with the 16-element assortment. It seems that the expectation disconfirmation can be used as a quick test to know if the participant is experiencing choice overload but is not able to discern between low and high musical definition consumers, however, it remains an effective method to assess choice overload with just one question.

5.1 Outlook

We believe that these findings in relation to choice overload in music can open the way for future investigations in order to strive for the best consumer experience while choosing music from streaming services or selecting from large digital music libraries. Especially when forcing the consumer to solely concentrate on the musical properties of the content without any further information.

We find this a very important study considering that the music streaming services is a market of almost 25 billion USD.[Grandview, 2020]. The music streaming market is a very contested market and the best consumer experience along with the most attractive catalog are decisive factors to the allure customers to the platforms. Furthermore, streaming service providers have always been careful about having the best catalog or delivering the best UI but little has been said about the customer satisfaction while

browsing their huge catalogs [Walters, 2019].

This work focused in only the amount of options in the presented assortment, it would be interesting to investigate the effects of the number of presented attributes describing the options on choice overload. According to Chernev's paper from 2003, the decision maker is expected to experience choice overload with smaller assortments when there is more information presented on the available options [Chernev, 2003b]. Consequently, when options are presented with less information the assortment size where choice overload appears should be larger.

Additionally, an analysis of the most effective attributes describing the songs should also be interesting to study. Spotify nowadays has a "suggested song list" while creating a playlist. In the "suggested song list" the information regarding the title, the artist, the album and the song length are presented. Nevertheless, it could be interesting to know if there is other information that could provide a better experience to the general public.

Furthermore, for these kind of studies it would be necessary to have survey with more participants and more evenly separated in high and low musical definition. This would be specially helpful to help have a more general overview on how choice overload affects the general consumer experience.

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Annex

Table .1: Complete Survey Structure

Question	Concept	Based on Paper	Question	Options in the Question
1	Age	NA	Age	
2	Gender	NA	Gender	
3	Command of the English Language	NA	Command of the English Language	
4	Education	NA	Education	
5	Subjective Knowledge	Hadar & Sood 2014	How confident are you that you can make a good choice of music?	1. I know very little ... 7. I know a lot
6		Hadar & Sood 2014	How knowledgeable do you feel about music?	1. not at all ... 7. very much
7		Hadar & Sood 2014	Rate your knowledge of music compared to the average consumer.	1. much less ... 4. average ... 7. very much
8	Song Selection Task	NA	Please rate the song	
9		NA	Please select the song that you would like to add to the playlist	
10		NA	Did you know any of the songs or artist presented in the selection above	
11	Expectation Disconfirmation	Kristin Diehl, Cait Poynor 2018	How would you rate the song that you chose?	1.Much worse than I expected ... 9. Much better than I expected
12	Variety in the Assortment	Chernev, 2003b	How much variety did the set of songs offer?	Overwhelming, rather extensive, adequate, somewhat narrow, very limited
13	Quality in the Assortment	Hadar & Sood 2014	How would you rate the overall quality of the song options you were presented with?	1. not at all positive ... 7. very positive
14	Choice Overload Indicators	Iiyengar & Lepper 2000	Did you find it difficult to make your decision of which song to pick?	1. not at all ... 7 extremely
15		Iiyengar & Lepper 2000	How satisfied are you with the song you chose?	1. not at all ... 7 extremely
16		Iiyengar & Lepper 2000	How frustrated did you feel when making the choice?	1. not at all ... 7 extremely
17		Iiyengar & Lepper 2000	How much did you enjoy making the choice?	1. not at all ... 7 extremely
18		NA	If you had the chance to change your decision, how likely is it that you would do it?	1. not at all ... 7 extremely
19	Searching Strategies		When selecting the song for each of the last playlist, what kind of strategies did you use?	Stop searching after finding a good song,Try them all,Randomly selecting a song,Elimination by aspects,Search for a specific period of time
20	Characteristics in the music		In which characteristics in the music did you concentrate for choosing the songs you chose?	Harmony, Genre, Energy, Rhythm, Dynamics, Tempo, Beat, Timbre, Texture, Melody, Emotional Expression, Sound, Other.
21- 23	Song Selection Task 2	Same as Song Selection Task		
24-33	Points 11 to 20 from the first Song Selection Task applied to Song Selection Task 2			
34	Musical Sophistication Index	Müllensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I spend a lot of my free time doing music-related activities.	1. Completely Agree ... 7. Completely Disagree
35		Müllensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I can sing or play music from memory.	1. Completely Agree ... 7. Completely Disagree
36		Müllensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I often read or search the internet for things related to music	1. Completely Agree ... 7. Completely Disagree
37		Mullensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I don't like singing in public because I'm afraid that I would sing wrong notes.	1. Completely Agree ... 7. Completely Disagree
38		Müllensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I would not consider myself a musician.	1. Completely Agree ... 7. Completely Disagree
39		Müllensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I engaged in regular, daily practice of a musical instrument (including voice) for ___ years.	
40		Müllensiefen, D., Gingras, B., Musil, J., & Stewart L. 2014	I have had ___ or more years of formal training on a musical instrument (including voice) during my lifetime.	
41-43	Song Selection Task 3	Same as Song Selection Task		
34-43	Points 11 to 20 from the first Song Selection Task applied to Song Selection Task 3			
44	Satisfaction with the Choice Experience	B. Scheibehenne & R. Greifeneder 2010	How much did you enjoy doing this survey?	1. not at all ... 7 extremely
45	Listening Method	NA	How did you listen to the music presented during this survey?	
46	Maximizer/Satisficer Profile	Schwarz et al 2002	Streaming videos is really difficult. I'm always struggling to pick the best one.	1. Completely Agree ... 7. Completely Disagree
47		Schwarz et al 2002	I often fantasize about living in ways that are quite different from my actual life.	1. Completely Agree ... 7. Completely Disagree
48		Schwarz et al 2002	When I watch TV, I channel surf, often scanning through options while attempting to watch one program.	1. Completely Agree ... 7. Completely Disagree
49		Schwarz et al 2002	No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.	1. Completely Agree ... 7. Completely Disagree
50		Schwarz et al 2002	When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I'm relatively satisfied with what I'm listening to.	1. Completely Agree ... 7. Completely Disagree

Table .2: Cronbach's Alpha Analysis on Assortment Size Negative Effects

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corr. Item-Total Correlation	C. Alpha if Item Deleted
Did you find it difficult to make your decision of which song to pick?	5,71	8,567	,510	,386
How frustrated did you feel when making the choice?	5,95	9,399	,411	,537
If you had the chance to change your decision, how likely is it that you would do it?	6,29	10,628	,359	,605

Table .3: Cronbach's Alpha Analysis on Subjective Knowledge

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How confident are you that you can make a good choice of music?	10,48	6,127	,760	,822
How knowledgeable do you feel about music?	9,94	6,305	,774	,805
Rate your knowledge of music compared to the average consumer.	9,86	7,604	,756	,833

Table .4: Cronbach's Alpha Analysis on Maximizing/Satisficing Profile

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corr. Item-Total Correlation	C. Alpha if Item Deleted
When I watch TV, I channel surf, often scanning through options while attempting to watch one program.	15,3231	21,560	,231	,389
When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I'm relatively satisfied with what I'm listening to.	15,0769	20,453	,275	,355
No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.	15,1231	21,078	,229	,391
I often fantasize about living in ways that are quite different from my actual life.	14,9385	21,738	,208	,406
Streaming videos is really difficult. I'm always struggling to pick the best one.	15,7231	22,779	,214	,401

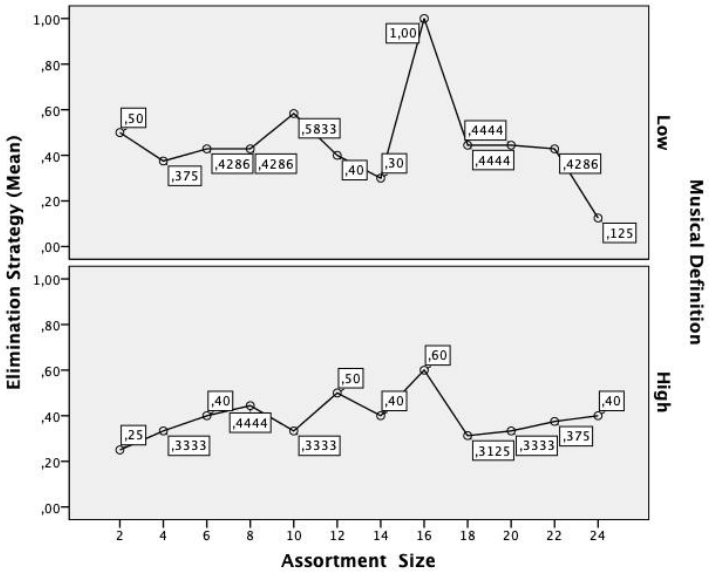

Figure .1: Use of Elimination Strategy (Percentage) vs. Assortment Size

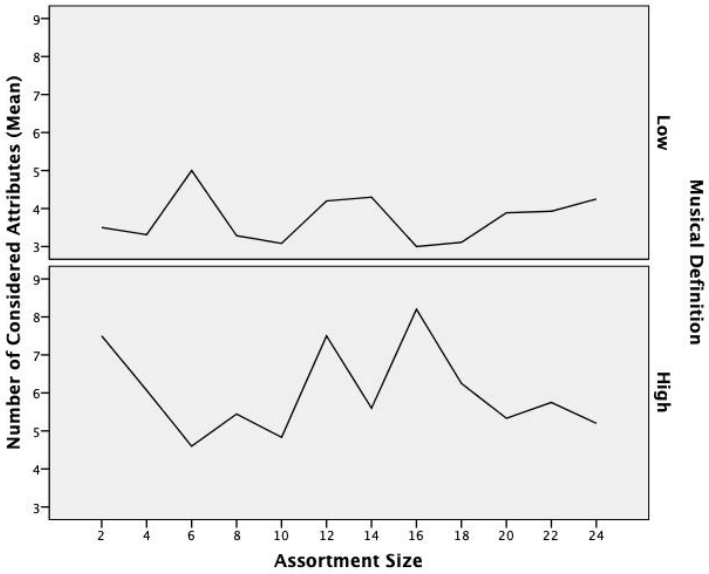

Figure .2: Considered Attributes (Mean) vs. Assortment Size