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Acronyms

MSP Music Streaming Platform. 1–4, 13–16, 18, 20, 24, 31, 32, 34, 36, 41, 47–50, 52–55, 57, 60, 62, 73

PL Playlist. 4, 12–14, 16, 22, 27, 31–36, 40–44, 46–62, 97

UI User Interface. 2, 3, 58, 61, 62

UT User Type. 2, 4, 15, 47–62

1 Introduction

1.1 Problem Statement

Over the last years, new ways of accessing music found their way into society. Through digitalization and new technologies music streaming platforms (MSPs), such as Spotify[1], Apple Music[2] or Amazon Music[3], rose to be a main source of accessing digital music in a fast and easy way. A further aspect that helped those platforms gain popularity is the increasing importance of smartphones. Through them, people can access music via streaming in almost every situation they want to. This provides the user with a vast offer of songs at every given moment in time for every possible situation, which ultimately influenced the way people listen to music [14]. People nowadays tend to spend several hours a day listening to music [26], [33], [50].

This vast amount of songs at one's fingertip, however, can also lead to an overwhelming task in finding the right song for the right moment and place. To help with this, users of streaming platforms employ different selection methods for their choice in tracks [18], [29]. Many people create playlists for everyday situations and activities to make those tasks more entertaining and meaningful and to regulate one's moods and emotions [14], [21], [30], [55].

Studies for music streaming nowadays focus mostly on music recommendation. Prior research in the field of playlists on MSPs mainly looked into automatic playlist generation and continuation, but less on user-generated lists and the reasoning and processes behind them. Only a few studies examined the differences and similarities of users in their creation of playlists (see [21], [45], [46], [55], [68]). They, however, lack in ways to fully understand this process. Some studies only grouped users based on song genres within playlists, such as [45], [46]. Other research based their findings on observations off of very small sample sizes, such as [21], [55]. Further, none of them took the actual playlist creation process into account. This, however, is highly relevant. With a user number as high as music streaming platforms have (see [8] for precise numbers), it is very likely that there is a significant difference in how people use and interact with the platform. This can be especially important with creating playlists, as this seems to be a very personal task [21], [55].

Through being aware of the different ways users tackle this process, the streaming platforms can help ease this task and ultimately the whole experience of the application. Furthermore, those services could leverage the process in a way to get a better understanding of their users and their preferences. This would provide an opportunity to enhance the personalization of music streaming even further as it already is. Moreover, this could be beneficial for more accurate recommendations. Ultimately, this knowledge could be used for their own (automatic) playlist creation and generation processes.

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[1] https://www.spotify.com/
[2] https://music.apple.com/
[3] https://www.amazon.com/music/prime

1.2 Research Question & Aim

As described above, the intricacies of the user-generated playlist creation process are still not fully understood. Therefore, the aim of this research is to get a better understanding of how people create their own playlists on music streaming platforms. The goal is to get more clarity on this very personal but relevant task to ultimately enhance the music streaming experience of users. Therefore, the following main research question arises:

How do users of music streaming platforms create their playlists?

To be able to get this understanding and interpret the findings of this study more clearly, the goal is to derive a variety of different user types. Those will be based on similarities and differences of users in the playlist creation process on MSPs. User types are used to categorize people into groups based on their behaviours. This helps to make different user behaviours more understandable and comprehensible. They can further be used to formulate meaningful suggestions for improvements of the process and streaming experience. Therefore, to tackle this topic and exploratory approach, the following sub-questions will be answered:

RQ1: *Are there any differences in the playlist creation process of users on music streaming platforms?*

RQ2: *Can these differences be explained through classifying the users into types?*

Answering those sub-questions will ultimately help to give meaning to the main question and answer it in a more refined way.

This study uses two distinct methods to answer the research questions. An online survey with a greater sample size is used as a quantitative approach. User tests with a few participants are conducted to get qualitative insights into the process. Both methods are analysed and used to derive meaningful user types. Ultimately, based on those UTs, suggestions for improving aspects of this process and the User Interface (UI) will be formulated.

1.3 Outline

The remainder of this thesis is structured as follows. At first, relevant literature is examined in Section 2. This includes research in the field of music listening behaviour, taste, selection and organization. Furthermore, prior studies in the field of playlist creation are discussed. After that, the methods used in this study are introduced and explained in Section 3. First, the two research methods, online survey and user tests, are introduced. After that, the analysis of the data is explained. In Section 4 the results gathered in this study are presented. It is structured into different topics found within the data of both methods, while

ultimately introducing the derived user types. After this, the given findings and especially the specific user types are discussed and interpreted in Section 5. Furthermore, improvement suggestions for the UI and processes of MSPs are given. Lastly, the whole research is concluded in Section 6.

2 Literature Review

This section gives an overview of and insights into existing research in the area of playlists on MSPs and further relevant research. To start, it is important for this study to give an introduction to the music listening behaviour and the reasons people have for listening, which is done in Section 2.1. Furthermore, the taste and preferences in music are explored in Section 2.2. After that, it is explained how people search for and select their tracks (Section 2.3). Section 2.4 gives information about the fundamentals of collecting and organizing music. Lastly, prior research on playlists is examined (Section 2.5), which ultimately stresses the gap in current research for the topic of this work.

2.1 Music Listening Behaviour & Reasons For Listening

To understand user behaviour in the playlist creation process, we first need to understand the intuitions of people for listening, preferring and selecting music in general. In this first section, the music listening behaviour will be explored. Therefore, two important concepts are elaborated: why and how people listen to music. Moreover, the context for listening will also be elaborated throughout.

Why do people listen to music? Many studies over the past years and decades already shone light on the reasons why people mainly listen to music. A general finding that most, if not all, agree on is that mood and emotion regulation, meaning to cope with, alleviate and relieve negative feelings and tensions, and to increase positive feelings, is one of if not the most important factor music listening is used for [3], [19], [25], [33], [38], [39], [47], [50], [56], [58], [59], [69]. To ward off boredom, pass time, have background music, relax, enhance enjoyment and fulfill self-actualisation are among other often mentioned significant reasons [15], [19], [25], [33], [39], [47], [49], [50], [56], [59], [69]. Fulfilling social needs, helping with social relationships and building one's social identity [58], [59] are further factors often included in studies related to music listening, however are usually perceived as less important by participants [33], [50], [59].

Schäfer [50] showed that past music listening experiences influence what people prefer to listen to in specific situations. They found that the desired goals for music listening and the actual effects of it showed no difference, meaning what people want to achieve with listening to music is usually also achieved.

Tarrant et al. [58] discovered that both English and American adolescents similarly listen to music for the same aforementioned reasons, showing similarities in two different cultures.

In their study Lonsdale and North [33] took a qualitative approach to finding reasons for listening to music with their undergraduate sample. They found seven main reasons for music listening: mood management, background music for other activities, participation in musical behaviours, reflection of past, enjoyment of music, enhancement of social interactivity, and distraction. Although they closely resemble the reasons found in other studies, they also show new

and different reasons for listening to music that might have been overlooked otherwise, such as reminiscing in memories.

Randall and Rickard [48] researched the reasons for listening to music and their frequencies. Further they looked into their affective outcomes, looking at positive and negative mood states of the participants. Their findings revealed that the most frequently used reasons across all moods, unlike many other studies, were music as background, entertainment and to counter boredom. Emotional reasons were only the most utilized when the listener was in a negative mood. This offers an alternative view on the most common findings of other research. As they show that it depends on the initial mood of the person if emotional reasons are the most important listening purpose.

How do people listen to music? To be able to understand how people listen to music we need to distinguish between the two main types of listening experience: active or directed listening and passive or undirected listening. For active listening the main activity is listening to music with the music at its focus. Passive listening is done while being involved in other, mostly everyday activities, with the purpose to regulate moods, relieve boredom, provide background music, etc. [9], [22]

To get a clearer vision on the how, it helps to elucidate the importance of music listening as an aspect of people's life. Therefore, the amount of time people listen to music on a daily basis can give a good estimate about this. This question was part of many studies over the years (see [19], [26], [33], [50], [59]). All their findings indicate that people tend to listen to music every day for several hours. This can span from 1 up to 4 hours, and in some cases even up to 9 hours. This highlights the importance of this rather mundane activity.

They further suggest that listening to music is a huge part of everyday life. In fact, when adolescents were asked to rank the importance of several everyday pastime activities, music listening was rated the highest of all [33].

An indication that listening to music has become a more casual experience integrated into everyday practices is the emergence of digital technology. Specifically digitalization and its easier and quicker accessibility of digital music promotes passive listening [14], [20].

Fuentes et al. [14] developed a new concept of music listening called 'soundtracking'. In their research, they executed 15 substantial interviews with Swedish participants asking and discussing about their daily music consumption habits. Through the interviews and drawing on the concept of *practice theory* (as seen in [51], [52]), the authors revealed that nowadays music is most commonly listened to as a dispersed practice called 'soundtracking'. Here, music is not the main focus of attention, but rather works as a passive activity that is experienced in the background. The authors further argue, that it is mainly used to induce certain moods or feelings and make the main task more meaningful, which aligns with previous findings. However, to be integrated into other practices, soundtracking in many cases needs to be adjusted according the main activity.

This effect was also discovered and further analysed by the study by Ka-

malzadeh et al. [26]. They examined music listening behaviour of over 200 participants, mostly college students, with an online survey. The authors, too, researched about differences in active and passive listening, as well as difference in music listening during attention and non-attention activities. It was found that familiar tracks were the most preferred choice for both types of activities. Further, most people want to match the current mood with the choice of songs in both. Not being distracted by the music was more important for attention practices. Having a high control over their choice of songs was an important aspect for people in both types of activities, especially for high attention tasks. This was supported by the fact that the most popular music listening methods were through listening to and choosing certain playlists, albums, artists, or genres.

A further important aspect, that contributes to the music listening behaviour of people, is the context in where and when music is listened to. This can span over a variety of different scenarios. The most common situations one listens to music are commuting (in car, bus, train), at work or doing homework, while exercising, doing housework, and relaxing [26], [50]. Other activities that are often mentioned by people are browsing the web, before going to bed and playing computer games [26]. Schäfer [50] found in their study that in 60% of music listening situations people were alone and only in 13% they were in the company of friends. Participants responses to Tarrant's et al. [58] research were indicating that 68% spend similar amounts of time listening to music alone or in company. Only about 28% reported to mostly listen to music on their own. These opposing findings might as well be due to the big time gap of 16 years between those two studies. The emergence of digital music, streaming and mobile smartphones in the last decade made music more accessible and increased its consumption [14]. Further, the fact that music is nowadays mostly listened to accompanying other everyday tasks, which are often done alone, promotes a rather private listening.

To summarise, people mainly listen to music to regulate their moods and emotions, for entertainment and enjoyment, to alleviate boredom, and to make everyday activities more meaningful. The latter further became one of the most common practices of how people listen to music over the last years, shifting from a rather active to a passive experience. For this, music is not the main focus of attention but rather recedes into the background. However, people still use this way of listening as a means to induce and regulate their moods and feelings as well as fulfill social needs. Therefore, music listening is not becoming unimportant or a second degree activity. Rather, people changed their relationship to it in a way that it enhances other practices that would otherwise be boring or a chore, while keeping the effects it has as an active experience.

2.2   Taste & Preferences in Music

The behaviour of listening to music is very closely linked to the preferences one has in music. This next section will give an overview of the music taste of people, the factors that influence it, and different types of music preference

behaviours.

Class and social status are influencing aspects for the taste in music, in that people with a higher cultural and social standing have generally more preference for critically acclaimed and consecrated, so called "highbrow", music [1]. This theory was, however, replaced by the concept of "omnivores" [43], which argues that people of higher social status listen to a large variety of different styles and genres of both high- and lowbrow music. Further research found that highly educated young people are often omnivorous listeners [10], [44], [63]. A recent study, however, revealed that the true omnivores align rather at the center of the social class structure [36]. People of higher social status indeed had a more selective taste. They introduced the term "snobivore" for this type of music consumer. Nevertheless, music is enjoyed in similar ways, for the same reasons and with similar effects regardless of class distinction [59].

Education plays a big role in the way people gain and define their music preferences, as it is one of the main aspects with which a more diverse and omnivorous music consumption is achieved [11], [36]. Exposure to music is another highly influencing factor. The more people are exposed to music, especially in the childhood, and the more positive effects they experience with it, the more they might broaden their taste [11], [36]. This goes hand in hand with education, as a better musical education with more exposure to different styles can lead to widening one's music diversity and increasing the omnivorousness of their taste [11], [36]. However, more exposure to music during childhood seem to decrease the diversity in artists liked [36].

The social environment, especially friends and people close to one, can have a big influence in shaping taste in music through their preferences and suggestions [17], [19]. Engagement with music seems to be important as well. In a study by Greasley and Lamont [17], less music engaged participants did not show a strong dedication to a specific genre and were more likely to be influenced and use other people's music and taste. Whereas more engaged participants had meaningful connections to certain styles and indicated the urge to own music. Generally, people of younger age listen to a broader range and diversity of music, often experimenting with different genres and still figuring out their preferences [11], [17]. Whereas older people tend to have more refined and close-minded music preferences and in general listen to less music [11].

A rather drastic influence on music preferences was brought by the Internet and specifically the ability to download music. It makes a vast amount of music available to people, much more than it was possible with CDs, which exposed them to more and different styles of music [17]. Further, people can regulate the level of familiarity to specific songs and thus prevent overexposure and boredom of them [17], as familiarity has strong ties to song preferences [17]. This was further supported by a study by Lamont and Webb [32]. They found that their participants possessed a collection of favourite pieces of music. Depending on the situation and listening intent they choose the fitting tracks out of this. Those were generally pieces heard recently and therefore known well, also being called "daily favourites". New unknown music was chosen far less. However, the more familiar people became with certain songs the less they chose those to listen to.

Through this, they also regulate overexposure.

Context and situational factors are shown to also influence the preferences in music, as already hinted at above. North and Hargreaves [37] have found that different situations bring different preferences in the musical aspects with them. On the one hand, activities that are usually rather arousing, such as running or partying, were shown to relate to music preferences that enhances this arousal. On the other hand, low arousal situations, such as relaxing, influence the music choice to also arousal reducing music.

Music preference, especially for specific situations, is further affected by past music listening experiences and the effects and goals achieved by them [50]. Music listeners learn through past listening sessions, especially positive experiences, about the effects music has on them and through that align their preferences accordingly [50]. This was further shown to also influence the strength of preference for music in specific situations strongly [50].

2.3 Choice of Music

As can be seen in the previous chapter, selecting the right choice of music is affected by many different aspects. Knowing the taste and especially the preferences people have can be used to understand the choices in music people make. However, it does not explain all the aspects of the song selection task. Therefore, in this section I will give a view on the selection of the right songs and its process. The following chapter is divided into, first, the browsing and searching for music and then ultimately the selection.

2.3.1 Browsing & Searching Music

There are patterns in the way people navigate through libraries and retrieve music. The most used parameters that people use to search and browse for music include artist (name), album, song title, release year and genre [6], [66]. In fact, genre is one of the most used and mentioned music retrieval and classification characteristics [66]. However, it is not an objective way of classifying music [66]. People also browse through songs based on aspects such as mood, activity or situation, with the latter being very significant [66]. This again shows the importance of the context in what people want to listen to music, which has been an underlying significant theme in all chapters so far. Interestingly, melody seems not to be an important aspect for retrieval [66].

Hosey et al. [23] showed that searching for music on streaming platforms is depending on the mindset of the user. It affects the way people search and perceive the success of this task. Participants with a focused mindset usually searched for songs in the overall streaming collection, whereas with an open mindset the personal library was looked through. Having an exploratory mindset led to more browsing. In that sense, it means a less directed search and use of different strategies.

Ferwerda et al. [12] found in their study that the classifications used by people in their browsing for music are related to their personality traits. Par-

ticipants with a higher openness to experience base their search more on mood. Conscientious people rather use activity-based browsing. Whereas participants with a higher tendency for neuroticism also tend to look more for music based on activity, as well as genre. The authors further found that being an expert in these classifications helps with overchoice (difficulty to decide due to too many options presented), however not for all. Being experienced with emotions ("e.g., those who easily identify with emotions in music") led to opposite effects. Making a decision out of a bigger music catalogue was harder for them.

Often, the task of browsing is rather erratic, especially in personal music collections. It usually ends not with locating a certain piece of music but when the song is approved and chosen to be listened to [6]. Searching and browsing are shown to be connected and inform how people manage and organize their music libraries [23], [26]. The search properties they use can be utilized as indications on how people structure their music collection [26]. Nevertheless, browsing through one's personal collection was shown to be not very dependent on genre, as artist name contains more information for people [66].

2.3.2 Music Selection

The taste in music, as discussed in 2.2, does not just influence preferences to music but was also shown to influence the music selection of people [18]. This might be an obvious finding, as the very personal task of choosing the right song is closely linked to the style in music an individual prefers. However, against common believe, taste was shown not the be the main factor to influence selection behaviour [18].

Situational factors, meaning the specific situation music will be listened in, are of high importance for and the main influence on music selection behaviour, especially for explaining differences in selections within a person [18], [37], [67]. This could be due to the technological advancements of recent years, such as music streaming, that makes music accessible to almost everyone in almost every situation in life [18]. In general, people tend to choose songs that are congruent with the scenario and enhance their affective states [18], [37]. In that, the preference in music for high arousal situations are arousing tracks, whereas low arousal situations are associated with songs that are also low in arousal [37]. This is related to the current mood of individuals, which is in fact another factor that is highly relevant for music selection [18], [67]. In accordance with this, people usually choose happy and more energetic songs for positive moods [18], [67], and rather sad tracks for negative moods [18]. The latter, however, is a point of discussion. Other findings showed that the music selection of people for situations and moods that are rather negative, low in arousal, or can be perceived as both negative and positive depending on the context can be very fluctuating [67]. For sad and melancholic moods people showed two selection preferences. They either select congruent sad music to enhance the feelings, so that they can be acknowledged and lived out [67]. Or they listen to happier songs to uplift their mood and negate the negative feelings [67]. Further, van den Tol and Edwards [62] found that when people use music as a means to deal

with sad emotions, they mainly use a connection selection strategy. This means they choose songs that they feel a connection to or have a certain affect towards them. Those findings, as well as the aspects discussed in Section 2.1 about moods, indicate that mood-regulation through music, especially when dealing with negative feelings, is a very personal and individual task and people use different strategies for it.

Another factor that can influence the music selection behaviour is the presence of and dynamics with other people in the listening situation [18]. Research found that, in the setting of a party, in general the host selects the music beforehand and invites either everyone or only certain guests to contribute to the music selection [7]. Interestingly, the different personalities of individuals seem to not affect the music selection behaviour of people much [18].

When it comes to the music selection methods research found many different approaches people use. Krause and North [31] studied the use of three different selection strategies, namely "choosing a specific selection, a playlist, or a random/shuffle function", against demographic, technological and psychological aspects of people. They found that participants with a university qualification used the specific selection method more often than other participants. Further, the personality traits 'opinion leader' and 'conscientious' are both connected to using playlists more often. The authors argue that the higher abilities in involvement and technical skill, and planning for those two personality types respectively are the reason behind this. Playlists are associated with more effort and carefulness in crafting, which those traits are good at.

Krause et al. [29] let their participants choose how they select their music to listen to in everyday life. The most chosen method was listening to radio. Selecting a specific album and playing songs at random or on shuffle were the runner ups. They further found that the level of musical experience plays a role in the selection method. Less musically experienced individuals tend to choose more passive methods, such as radio, while more experienced individuals want to have more control over their selections. The authors argued that the conventional ways of selecting and listening to music, radio and specific albums, are still preferred despite newer technological advancements in this area. This was reflected by their results that showed a very low rate for choosing songs via playlist creation, downloading from the Internet or streaming. However, this finding might be an outcome that was only accurate for the point in time of this study. Since then more music streaming platforms have emerged and gained massive popularity and are now the main access point for songs. The authors themselves even partly supported this fact. Their results indicated that younger people, especially students, use the shuffle function and playlists on streaming more often than older participants. This points at a generational shift in music selection methods.

Krause et al. [29] further found that the more choice an individual has over their music selection method, the more positive effects they gain from the listening experience and the more attention they give to it. The authors state that, contradicting to other research, the increase in availability of songs does

not lead to more passive music selection and listening. Rather, this availability makes music even more important to individuals in their everyday lives. The authors further stress that the underlying theme of almost all their results was that with more control over the music selection, the more people associated positive listening experiences to it. The less or someone else having the control over the song selection led to rather negative responses. Thus, the level of choice and control in the selection can lead to great listening experiences with many positive effects on a daily basis.

In general, research shows that music selection methods can be used for more than one specific purpose and that people might have more than one reason in mind when using those strategies [62], [64].

2.4 Music Collection & Organization

As we now better understand how people choose their music, it is further interesting to see how personal collections or libraries are handled. This further can give insights into why and how people use playlists, as they are as well a collection of songs. This section first briefly looks into physical collections and then the digital equivalent.

The physical music collections (mainly contained of CDs) of people have been shown to have certain characteristics in the way they are organized. Cunningham et al. [6] studied people and personal music collection organization and access techniques. They reported that, although the size of collections can span from only a few to several hundred, they tend to be organized in similar ways. People usually have a so-called active set with those CDs that are currently or mainly listened to. Those often contain of newer acquired music that will be played over and over until the person has reached some state of satisfaction or even annoyance and moves on to another CD. Overall, having the right discs in the right spots for the right listening purposes requires some amount of planning. The most common ways to organize (physical) music collections are by date of purchase, date of release, artist (alphabetical), genres, country of origin, degree of favoritism, or by the recency of usage. Interestingly, many people also organize their collections in terms of situation or activity, with a vast amount of such personal categories. The last point shows that even before digital music and music streaming, people already used situational aspects to group their songs. This is a further indication on how important context of use in the field of music access, retrieval and listening is.

Digitalization of music brought some changes with it to the way people manage their personal music collections, now rather be called music libraries. It made the focus on everyday listening and its significance of context and activity factors possible and easier [14]. Now the focus of organizing one's personal music lies also more on individual songs and not full albums or compilations, as digital music makes it possible to access only those tracks of an artist a person truly likes [6], [60]. Further, the issue of having the right music for the right location is solved [6], as mobile devices enable us to have all our music readily available at any time. In terms of organizing a personal music library on a PC

or laptop the classification is often by artist and album, but also genre and sub-genre [66]. The vast amount of music in one's library brings a great effort to users and the systems they used as well as their visualization options, which are mainly list-based [60]. With digital and online music ownership over tracks is not of much importance anymore while accessing and organizing them are [14]. Further, control over songs and their intended uses gain in importance [14]. In fact, music discovery has seen an evolution and trend to personalized music listening and their needs for adjustment to different situations [28]. This also led to people creating (more) personal playlists [60].

2.5 Playlists

This section will give insights into existing research on the topic of playlists on music streaming platforms. New technology in the field of music, especially music streaming, led to new ways of interacting with this media. The affordable and quick access to a vast amount of music is often seen as the main benefit of music streaming [68]. The continuous adaptation of those platforms to the user and the songs shown to them influences the way people interact with it [68]. A good example for this is the use of playlists. Playlists, especially user-generated PLs, are an important part of the music listening experience nowadays. Users spend over a third of their listening time on user-generated PLs [16]. They can be seen as an evolution of mixtapes [55]. Those lists enable listening to a series of songs rather than single entities, which represents the typical music listener nowadays [34]. The playlist generation concept is an important aspect of how users interact with streaming platforms and is different to related aspects such as search [34]. Therefore, in the remainder of this section, a deep dive on playlists and the PL creation process is given, as far as prior research studied it.

Reasons for Creating Playlists People create PLs to represent their moods and emotions [5], [26], [30], [55], [57], [68], to work as musical accompany for activities [5], [21], [30], [55], [68], for a variety of different situations [21], [30], [55], [68], or for a social setting [5], [21], [30], [57]. Playlists can also be created around holidays or seasons [21]. Further, they can be based on genre [26], [55], [57], artist [26], tempo [26], [57], or rhythmic quality [57]. However, the purpose of a PL is not necessarily set in stone, as they might be used or re-used for several different occasions and reasons [5].

As can be seen, playlists offer a vast number of reasons for why they were created. However, as also many of the mentioned literature argues, they mostly can be linked back to being created either for moods, situations/activities, or musical aspects (mostly genres). This makes sense, as the overarching theme of all sections so far showed that the everyday listening experience consists mainly of regulating one's moods or accompanying daily activities and situations. Therefore, playlists need to be catered to those intentions.

Characteristics of Playlists The number of playlists per person can vary quite a lot, spanning from one to 100 [21]. The number of songs a playlist contains can span from a handful to over a thousand [21], however the length should generally match the connected activity [5]. Playlists can also come to an end, meaning their purpose is fulfilled and they are not used anymore or even deleted [21], [55]. In fact, PLs can be "static", meaning they won't be updated in any form, or "dynamic", meaning they will be updated steadily [21]. However, a static playlist does not mean it will not be listened to. Furthermore, dynamic lists can become static and vice versa [21]. Schweiger et al. [54] found in their study that within a PL after approximately eight songs the differences of artists and genres grow.

The similarity of tracks within a playlist further differs depending on the context or genre, indicating that some situations allow for a variety of music styles to fit into one context [4]. Pichl et al. [46] had similar findings. They report in their study that users' playlists contain several genres and that users therefore do not group songs by this means. This is further supported by Siles et al. [55], who drop the known definition of genres as differences in music style. They argue that user-generated PLs are best explained by (affective) genres that are dependent on the contexts of specific listening situations and the moods of the users. Context was further shown to impact song recommendations of MSPs. There is a general bias for popular tracks in recommendations, however if the full context of a playlist is considered, this can be improved [61].

The importance of song order within a PL seems to be a divisive topic amongst users [57]. It is generally only of minor importance, however some give great significance to it. It ranked on fourth place as a quality criterium in the study by Kamehkhosh et al. [27], even though one third of their participants re-ordered songs at least once during a playlist creation task. It appears that here, again, the context of the listening situations plays a role in whether playlists should be ordered or not [57]. Further, the control over the played music, which could be realized as the ability to skip songs in this scenario, is more important [57]. The opposite of an ordered playlist – listening to a playlist on shuffle or random – can depend on the activity in which music is listened to [21], [26]. However, it can also give playlists, especially older overused ones, a new take and lead ultimately to a novel listening experience [6]. It further takes less effort for the user to listen to PLs on shuffle [5]. Although, Hagen [21] argues that maintaining control via playing playlists in this way does indeed require endeavour.

Studies about Playlist Creation Work done by Pichl et al. [45], [46] already aimed to group users of music streaming platforms based on aspects of playlist creation. Their approach, in both studies, was to analyze a vast data set of PLs acquired through the #nowplaying data set scraped from Twitter. They were looking mainly into differences in musical features between user-generated PLs and therefore grouped them together into five different clusters. Those were named "rap cluster", "feel-good music cluster", "folk music cluster" and

"classical music cluster"[4]. Their findings include that a user creates playlists in three different clusters on average, nearly 20% even in all five. Although not even 10% of all lists are within the classical or rap clusters respectively, still almost half of the participants have PLs created containing these kinds of songs. The most popular cluster is the one containing "feel-good" and popular music, with nearly all participants (91%) having PLs in it. Furthermore, almost half of all playlists are within this cluster. The authors argue that people do not necessarily organize their music by genre, as they have many lists in different clusters containing songs with different styles. Therefore, they do not perceive genres in the typical way.

Although these studies already try to categorize users into types for playlist creation, the downside of them is that they are only looking at music features or genres. What is missing here is more insights into the background of why and how people create those playlists.

There are a few studies who investigated playlist creation with a qualitative approach (see [21], [55], [68]). Some important findings that they gathered will be stated in the following. People carefully name their playlists to give them more meaning and might even create their own cover images [55]. Usually PLs are created alone [55]. Social class was shown to explain differences in how those lists are used. Some people use them to present and widen their musical expertise whereas others simply use them for everyday tasks, situations and emotions [68]. The algorithm of MSPs can be used to broaden one's music knowledge and include surprising or new pieces into a playlist [21], [55]. However, the algorithmic aspects of music streaming are generally not perceived as very important to users [21]. Furthermore, people can perceive playlists as valuable and important, as they can have an emotional attachment to them [21], [55]. Some might even turn into collectors of these lists and songs and experience some sense of ownership over them [21]. An underlying theme of PL creation and curation is the control users experience. This can be realized through "claiming" songs for their playlists and having control over what to choose at what specific times for what specific scenario, and ultimately gaining control over one's musical self-identity [21]. Overall, all three studies express the importance of playlists and their connection to everyday life situations, tasks and moods.

These research already give good indications on what users think about while creating playlists and especially for what use cases they create them. However, the process itself is not considered. Moreover, the solely qualitative approach of those studies cane make the findings tough to generalize.

2.5.1 Summary & Gap in Research

To summarize the most important aspects of the discussed literature, it can be said that the music listening experience evolved to a rather passive but not unimportant practice that accompanies different activities and situations in everyday life. People mainly use music to regulate their moods and emotions,

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[4]for cluster 1 no name was given

and to make those everyday tasks more meaningful.

People experience different preferences in songs, selection methods and behaviours, collection and organization behaviours, as well as playlist usages. Nevertheless, the salient theme of all the discussed points is that individuals need their music experiences to be adjusted to their moods and situations. All while mainly maintaining a certain level of control over their choices. Music and all its connected tasks are therefore highly context dependent.

This is especially relevant for user-generated playlists on music streaming platforms. With them users are able to cater their music exactly the way they want and need it to be. Creating playlist is a personal undertaking, however, as some studies already proved, there are similarities between users that can be grouped and leveraged. As discussed above, those studies however are not sufficient enough to fully understand this process and the thinking behind it. Furthermore, they do not allow for deriving and grouping people into specific user types. Therefore, this study aims to fill this research gap and to answer the above stated research questions in Section 1.2. This will be done by deriving meaningful user types based on the results and observations gained from two distinct research methods, that will be presented in the following section. Those UTs can help to understand this very personal process better while still providing a generalizable framework and avoiding a too individualistic view. Based on these findings, suggestions for improvement will be given for the MSPs. Ultimately, the goal is to inform streaming services on how their users create playlists and how this task can be improved upon.

3 Methodology

This study used both quantitative and qualitative research methods, with an online survey and user tests respectively. This approach was chosen to get attitudinal insights from the quantitative method that are more generalizable due to a higher sample number. However, this method leaves gaps in the understanding of why participants state certain aspects. This is where the qualitative method is applied to help to better understand what users do, as it is commonly known that people indicate certain behavioural attitudes but end up behaving differently in reality. Yet solely doing user tests would lead to a very small sample size and might end up not being generalizable and therefore not suited for deriving meaningful user types. In the following, the design and procedure of the two research methods will be explained and discussed in Section 3.1 and 3.2 respectively. The sampling and participants for both will be presented at the end of each section (3.1.4 for survey sample; 3.2.6 for user test sample). Finally, the analysis methods used for interpreting the data gathered from each method will be discussed in Chapter 3.3.

3.1 Online Survey

The first method used in this study was a quantitative approach to get a broad range of attitudinal insights from participants about playlists and their creation process. This was realised through an online survey, which will be described here.

The survey was chosen as a method to get insights from an ample sample size. Applying only a qualitative approach to this research topic would be insufficient in the fact that it would be nearly impossible to derive generalizable user types from a small qualitatively researched sample size. Therefore, with this approach as addition and basis for the following user test, it is assured that the results are applicable to a broader range of people and the findings of the qualitative method will be further interpretable.

3.1.1 Survey Design

At first, the participants had to agree to a privacy statement and consent form allowing their data to be used in the scope of this study. Otherwise, they were not able to continue the questionnaire. Two questions were asked as a participant validity check. Here, people had to indicate if they have an active account on any MSP and if they created at least one PL themselves. If at least one of them was denied, the person was not able to continue the questionnaire.

After this, several questions about playlists and the creation process were asked. A full overview of all questions can be seen in Table 1. The groups indicate the general themes of the questions. The column 'Type' shows what kind of question it was, in that which responses were possible. A more detailed overview including the different response options for each question can be found in Appendix A. Following those, the participants were asked demographic questions

(age, gender, music enthusiasm, music listening frequency, device preference). These can also be found in Table 1. Ultimately, the respondents were asked if they are willing to share their Spotify user name (if available) and through that get access to their (public) playlists for a possible further analysis.

A pre-study was done with four people. Some unclear points were found and suggestions for improvement were given, such as different phrasings or missing options for multiple choice. The questionnaire was updated accordingly to its final version, which will be described below. The results of the pre-study were not included in the final sample.

3.1.2 Details on the Questions

In total the questionnaire contained 49 questions. 33 were mandatory and 16 optional to answer. Three questions were conditional, meaning they were only shown to people who chose specific options in the previous question. They are marked with a ' symbol, e.g. Q8', in Table 1. This was the case for Q8, which was only presented if the respondent chose 'Sometimes', 'Often' or 'Almost always' for Q7. The same applies to Q10, which was only presented if the participant chose those options for Q9. Lastly, it was also the case for Q18, which was not shown if a person chose 'Almost never' for Q17.

The online survey contained a mix of open and closed questions. The latter were, depending on context and appropriateness, presented as either a question or a statement, where the participant had to indicate their opinion via a 5-point Likert scale, stated as 'Likert' in Table 1. Most closed questions used one of two common Likert scales. One is a widely used scale for asking about frequency and has the options 'Almost never', 'Rarely', 'Sometimes', 'Often' and 'Almost always' to choose from (Figure 1a shows an example). The other one is a common scale for asking about agreement and uses the options 'Strongly disagree', 'Disagree', 'Neither agree nor disagree', 'Agree', 'Strongly agree' (Figure 1b shows an example). Eight questions (Q3, Q4, Q5, Q6, Q8, Q10, Q20, Q21) of the survey had customized Likert scales, especially designed for their style of asking and for this study (Figure 1a shows an example). A few other questions were in multiple choice form, e.g. asking for gender (Q27), indicated as 'MC' in Table 1. Two queries (Q30, Q31) had the participants rank different options in importance to them, indicated as 'Ranking' in Table 1.

Some of the questions in this survey were taken or inspired by the questionnaire used and developed in the study of Kamehkosh et al. [27]. They are marked with a * symbol, e.g. Q22_1*, in Table 1. Inspiration was taken from their questions that deal with the satisfaction of playlists and chosen tracks ([27, Table 1, List 1]). They were, however, adjusted in wording and Likert scale to better fit this study. The same goes for their question asking about the perceived difficulty of the playlist creation task ([27, Table 1, List 2, Item 7]). Here the wording and scale were adjusted and more items were added to get a better understanding of this topic. Q28_1 and Q28_2 of this study were taken from their questionnaire as is [27, Table 1, List 4, Item 9 & 10], however the Likert scale was adjusted from a 7-point to a 5-point.

Table 1. Overview of survey questions

ID	Question	Type
Group 1. Participant validity check		
Q1	Do you have an active account on any music streaming platform?	yes/no
Q2	Did you create at least one playlist on your own within your music streaming platform?	yes/no
Group 2. Playlist creation familiarity		
Q3	How often do you create playlists?	MC
Q4	How many self-created playlists do you have currently?	MC
Q5	How many songs (on average) are usually in your self-created playlists?	MC
Group 3. Playlist usage & update behaviour		
Q6	How many of your self-created playlists do you use regularly?	Likert
Q7	How often do you add songs to your self-created playlists?	Likert
Q8'	For how many of your self-created playlists do you regularly add songs?	Likert
Q9	How often do you delete songs from your self-created playlists?	Likert
Q10'	For how many of your self-created playlists do you regularly delete songs?	Likert
Group 4. Playlist creation purposes		
Q11	For what purposes do you mainly create your playlists?	Open
Group 5. Playlist themes & behaviours		
Q12_1	Do you create genre specific playlists?	Likert
Q12_2	Do you create playlists for different moods?	Likert
Q12_3	Do you create playlists for specific scenarios/situations?	Likert
Q12_4	Do you create playlists that are a combination of all or some of the above (genre, mood, scenario/situation)?	Likert
Q13	Can you give examples of those moods?	Open
Q14	Can you give examples of those scenarios/situations?	Open
Group 6. Playlist characteristics		
Q15_1	The songs in my self-created playlists generally have to fit together.	Likert
Q15_2	The songs in my self-created playlists generally have to have appropriate transitions.	Likert
Q15_3	The songs in my self-created playlists generally have to be from the same or similar genre(s).	Likert
Q15_4	My self-created playlists generally have to have an overall theme.	Likert
Group 7. Order & arrangement of songs in playlists		
Q16	The order of the songs in my self-created playlists matters to me.	Likert
Q17	I (re-)arrange the order of the songs in my self-created playlists.	Likert
Q18'	How do you order the songs?	MC
Group 8. Usage of MSP features		
Q19_1	Do you use personalised playlists provided by the music streaming service?	Likert
Q19_2	Do you use curated playlists provided by the music streaming service?	Likert
Q19_3	Do you use the song recommendations provided by the music streaming service for creating playlists?	Likert
Q19_4	Do you use the song recommendations provided by the music streaming service for updating playlists?	Likert

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Table 1. (Continued)

ID	Question	Type
Group 9. Playlist sharing behaviour		
Q20	Do you share your self-created playlists with others?	MC
Q21	Are your self-created playlists public?	MC
Group 10. Satisfaction & liking of created playlists		
Q22_1*	I generally like the playlists I create.	Likert
Q22_2*	I am overall satisfied with the playlists I create.	Likert
Q22_3*	I am overall satisfied with the choice of songs I put in my playlists.	Likert
Q23	Can you elaborate on the above?	Open
Group 11. Perceived difficulty of playlist creation process		
Q24_1	Overall I find it difficult to create playlists on music streaming platforms.	Likert
Q24_2	The playlist creation process is intuitive and easy to learn.	Likert
Q24_3	Adding songs to my self-created playlists is easy and intuitive.	Likert
Q24_4	Deleting songs from my self-created playlists is easy and intuitive.	Likert
Q24_5	Ordering or rearranging songs in my self-created playlists is easy and intuitive.	Likert
Q25	Can you give examples of aspects you find difficult while creating playlists on music streaming platforms?	Open
Group 12. Demographics		
Q26	What is your age?	Open
Q27	Gender: How do you identify?	MC
Q28_1*	I am a music enthusiast.	Likert
Q28_2*	Compared to my peers, I listen to a lot of music.	Likert
Q29	How much do you listen to music on a daily basis?	MC
Q30	What is your preferred device for listening to music?	Ranking
Q31	What is your preferred device for creating playlists on music streaming platforms?	Ranking
Q32	Would you be willing to share your Spotify user name, if applicable?	Open

3.1.3 Technicalities

The survey was created in Qualtrics[5], an online survey tool. The survey was open for responses from March 29 until April 11 2022 (2 weeks). The participants could access the survey via a link that was shared via social media and other platforms. This will be explained in more detail below.

3.1.4 Sampling & Participants

Online Survey Sample For this method, the aim was to get at least 60 and up to 100 valid responses. Related studies had a sample size of around 200 (see [26], [30], [33]), however this did not seem reasonable for the scope of this research project. Therefore, due to limitations in reach and time, a total

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[5]https://www.qualtrics.com/

of up to 100 participants was a more realistic goal for this study. The only participation requirement was that they had to have an account at any music streaming service and have created at least one playlist on their own.

Convenience sampling was used to gather participants. The survey was mainly advertised and spread via social media channels, WhatsApp, Instagram and LinkedIn respectively. The website SurveyCircle[6] was additionally used as a gathering tool. People who are registered on this platform and live in the region of the researcher can access surveys of others and participate.

The idea was to get a diverse population in age and ethnicity. This, however, might have fallen short to the nature of convenience sampling and the university background of the researcher. Meaning, it was expected that most responses will be given by university students in their 20s from mainly Central and Western European countries. However, as literature shows (see [19], [33], [47], [58]), people in this age group and from this background, even if from different countries, tend to have very similar music listening behaviours. Therefore the results will still be generalizable, although possibly not to the older population. Furthermore, the majority of Spotify users in the US (55%) is between 18-35 years old, according to [24]. Hence, a sample population of participants who are mainly in their 20s is in accordance with the main user group of MSPs.

Online Survey Participants In total, 107 responses were gathered for the online questionnaire. 17 responses had to be dropped because the participants answered too few questions. Six participants did not meet the requirements, which was either that they do not have an active music streaming account or did not create at least one playlist themselves. This leaves a final number of 84 valid responses. 58% (49) of respondents were female, 39% (33) male, one preferred not to disclose their gender and another person chose to self-describe and indicated the pronouns "she/they". The participants had an average age of 25.17 (SD=4.23, Min=18, Max=43). One person did not indicate their age.

3.2 User Tests & Interviews

The second research method used for this study were user tests followed by a short interview. This was chosen to get an in-depth qualitative approach to the research topic. The user tests were informed by general findings of the online survey, such as the most mentioned playlist creation purposes. They work as a means to interpret the quantitative results further, as it is commonly known that people can tend to think they behave in certain ways, however in reality they might actually do it differently. Therefore, the stated beliefs of people will be given a deeper look and more meaning. Moreover, the quantitative data can also give more clarity on aspects of the qualitative data. The experiments took place between the 31st of May and 15th of June 2022. Each session lasted around 30-40 minutes, including pre-test questionnaire, user test and interview.

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[6]https://www.surveycircle.com/

How many of your self-created playlists do you use regularly?

I use almost none regularly	I use only a few regularly	I use some regularly	I use most regularly	I use almost all regularly
○	○	○	○	○

How often do you add songs to your self-created playlists?

Almost never	Rarely	Sometimes	Often	Almost always
○	○	○	○	○

(a). Examples of questions with customized Likert scale (first) and frequency Likert scale (second)

Playlist characteristics

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The songs in my self-created playlists generally have to fit together.	○	○	○	○	○
The songs in my self-created playlists generally have to have appropriate transitions.	○	○	○	○	○
The songs in my self-created playlists generally have to be from the same or similar genre(s).	○	○	○	○	○
My self-created playlists generally have to have an overall theme.	○	○	○	○	○

(b). Example of questions with agreement Likert scale

Figure 1. Examples of questions with Likert scales

The participants were given a 10 Euro gift voucher as compensation for their time and participation.

To ensure a safe setting for all parties involved, the tests were solely conducted at the university in a provided space. The participant had to realize the task given on their own preferred device (either Smartphone, Laptop or Tablet) with their own Spotify account. As Spotify is the most used music streaming service to date [35], the task was done on this platform. Therefore, only people with their own valid account were considered for this study. The structure of the test was as follows.

3.2.1 Study Introduction & Pre-Test Questionnaire

Firstly, the participant was greeted and given an explanation and some background information on the study. They were informed about all the necessary implications of participating in this study, such as audio and video recordings, and had to sign a consent form[7] agreeing to those points. Following this, the structure of the experiment was explained.

Before the actual user test was conducted, the participants were asked some questions about themselves as a pre-test questionnaire. These included indications about their age, gender, music enthusiasm, daily music listening hours and their main playlist creation purposes. They can be found in full in Appendix B. After that, the audio and screen recording was set up and started and the user test began.

3.2.2 Playlist Creation Scenarios

The participants were given three predefined scenarios for which a playlist could be created. Two of those scenarios represented specific situations or activities for which a playlist should be created. As discussed in the literature review, this is one of the main purposes PLs are created for [5], [21], [30], [55], [68]. The other scenario was linked more towards the other main purpose for playlist creation that literature revealed, namely mood regulation [5], [26], [30], [55], [57], [68]. Both of them were also supported by the findings from the survey from this study, where specific situations and moods were the most mentioned PL creation purposes.

The first scenario was defined as "Create a playlist that you would listen to during working or studying" ($S_{working}$). This was chosen due to the fact that literature showed that one of the most common activities during which people listen to music is while they are working or studying [26], [50]. This was further supported by the online survey results, as working/studying was one of the most mentioned situations people create PLs for (29).

Scenario number two was "Create a playlist that you would listen to during a stressful time. Think of it as a playlist that would help you deal with stress" ($S_{stressful}$). As findings in the literature discussed above showed, dealing with emotions and alleviating negative feelings are within the main reasons people

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[7]The consent form template can be found in Appendix D

listen to music [19], [33], [47], [50], [59]. Therefore, this scenario was defined to be representing of this important purpose for listening to music and thus also creating playlists.

Lastly, the third scenario was defined as "Create a playlist for doing a road trip. Think of it as a playlist you would like to listen to for driving for a longer time" ($S_{roadtrip}$). Literature showed that commuting is a very common reason for listening to music [26], [50], while the survey results of this study revealed that driving is an important playlist creation purpose (29). Therefore, the road trip was defined as a scenario, as it could represent parts of both intents. It was left up to the participant to decide if they drive alone or with others, as literature is not in agreement if people listen to music more alone or in company (see [50] and [58] for contradicting findings).

3.2.3 Task Procedure

The participants were tasked to choose the scenario that speaks most to them, meaning they created a playlist for the situation they liked the most. This was to ensure that they did not have to create a playlist for a situation they might never find themselves in or they might never make a playlist for otherwise. Further, this selection process already gives valuable insights into what people choose the most and for what reasons.

The participants had to realize the playlist creation task for at least one scenario, but were given the freedom of choice to do more, up to all three, of the scenarios. Taking into consideration the exploratory approach to this study, this gives further insights on the playlist creation behavior of people, specifically the engagement and enjoyment with it. With this, however, there is a chance that people will have a learning curve the more tasks they do. Nevertheless, considering that all of the participants will already have created playlists before, this was not expected to skew the results significantly. It can be argued that they are already familiar enough with the process anyway. For the creation task, they were given no further instructions other than that they should do it in the way they would usually do.

The playlist counted as complete when the participants themselves felt they had created a decent enough playlist with a decent enough number of songs for them to consider it as such. It was contemplated to set at least 10 songs as a minimum requirement for the creation of a playlist. The reason behind this was that in the survey all except of one respondent indicated that their playlists contain more than ten songs on average. During the user tests it became clear that this was not needed, as most participants added more tracks anyway. Three people added less than ten songs, however they gave valid reasons for stopping earlier. Namely, they mentioned that they are usually creating playlists that only contain a handful of tracks. Therefore, they were not forced to add more, as this is their way of creating playlists and thus an important factor to consider for the process. The user tests were set up to be as realistic as possible after all, hence a person who usually does not add more than ten songs to their playlists is a valid type to recognize.

During the playlist creation process, the participants were asked to use the 'think aloud' method [13], [65], which means they should comment on everything they are doing and seeing. With this approach, insights into the thought process of people are made available and work as a way to better understand decisions or behaviours done by the user. The researcher only talked to the participant during this period if they had fallen silent, had a question regarding the task, or an interesting or unusual situation arose that was important for the study and therefore needed further elaboration.

3.2.4   Post-Test Interview

After the task was finished, a short semi-structured interview followed. This was needed to get an even better understanding of the thought processes of the participants. Here, some questions from the survey were used again, including the ones about playlist characteristics, MSP feature usage, difficulty of playlist creation, song order, playlist usage and behaviours, and general playlist satisfaction. Furthermore, they were asked about the liking and satisfaction of the specific playlists that were created during the user test session. Those questions were again presented with 5-point Likert scales. They were shown to the participants on the researchers laptop in a document, which was filled out together. A template for this can be found in Appendix C. There was also room for comments about aspects that were observed or came up during the task, that could be asked about and explained in more detail here. After this, the experiment was finished.

3.2.5   Technicalities

During the user test, the screen and audio was recorded. For the audio recording the researchers smartphone (Samsung Galaxy S7) was used. For the video recording served a software called AirServer Connect[8]. This is an application that has to be installed on the device of which the screen is being mirrored and the device that watches the other screen. Hence, the participants had to install it on the personal phone or laptop they used for the user tests. Through this, the screen of their device was mirrored to the laptop of the researcher. The screen recording was done with the screen capture tool of Apple on the researcher's MacBook. For two user test sessions (both used laptops) the software TeamViewer[9] was used instead, but with the same principal. After the participants indicated that their playlists were done and thus the user test was finished, the screen recording was ended. The audio recording, however, was kept on for the following part.

The original plan was to use the first user test session as a pre-study to detect improvements and errors. However, the first session proved to have went well and no further changes had to be made. The only difference to the following sessions was that the audio recording was stopped at the same time as the

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[8]https://www.airserver.com/
[9]https://www.teamviewer.com/

screen recording right after the task was done. For the interview, only written notes were taken. After this it was decided that keeping the audio recording on until the end was more convenient and was therefore adjusted in the other sessions. This, was only a minor change and would not deviate the results from the others. Thus, the first test was included in the final sample.

3.2.6 Sampling & Participants

User Test Sample The aim of the sample size for the user tests was up to approximately ten participants. In general, a sufficient sample size for user tests is often already reached with a very low number of participants, such as five. Nonetheless, as the goal of this study is to get as much insights as possible to be able to derive meaningful user types and not solely find flaws in the usability of the system, this number seemed not to be sufficient in this case. The exact amount of participants, however, was kept open to adjustment. A satisfaction of findings might already be reached before ten user tests have been carried out. Simply put, depending on aspects found during the sessions and the needed effort to find participants, the sample size was estimated to 5-10 people.

The requirements for this were that people needed to have an active and valid Spotify account, use their own device, and had to have created at least one playlist on their own in the past. Furthermore, there was no overlap in participants for the online survey and user tests, meaning people were not able to take part in both methods. This approach was chosen due to the fact that the post-test interview contained similar questions to the survey to some extent. Another reason was that through the survey people would already be aware of the topic and aim of this research and therefore more prone to the participant (or response) bias. Hence, the two samples were kept separate.

Here again the convenience sampling approach was used. People were recruited through a personal message on WhatsApp, a post on LinkedIn and through the help of Professors of Utrecht University, who reached out to possibly interested people. To be recruited as a participant, interested persons first had to fill in a short questionnaire asking about the fulfillment of the requirements stated above. Further, they were informed about privacy concerning aspects of the study, which they had to agree to. Those notes were including information about the screen recording, the use of their own private device and the use of their own private Spotify account. This was conducted in order to let them know what they could expect in terms of participation and privacy, and thus to filter out the ones that did not want to share this information. Moreover, people also had to indicate which device they would bring to the session and how they liked to be contacted, via phone number (WhatsApp) or e-mail. The participants were offered a 10 Euro gift voucher as compensation for a completed participation in the study, which were provided by Utrecht University.

As stated above, convenience sampling does have its limits in terms of sample diversity. However, the same arguments hold here as well. Most users on streaming platforms are under the age of 35 and showed similar music listening behaviours in other studies. Therefore, the researcher was confident that the

sampling method and population were sufficient and appropriate for the scope of this research.

User Test Participants In total, 8 people participated in the user tests. One participant chose to realize two scenarios (P4), all of the others did one. This leaves a total of nine different playlists that were created during the user test sessions. Of the three scenarios, "road trip" ($S_{roadtrip}$) was the most chosen one (5 times), followed by "working/studying" ($S_{working}$), which three participants realized. Lastly, only one participant chose the "stressful time" option ($S_{stressful}$). An overview of the demographic information of each participant and their respective identifier, which will be used for the remaining of this thesis, can be found in Table 2.

Table 2. Overview of demographics of user test participants

(a). User test participants overview

ID	Age	Gender	Device used	Scenario(s)
P1	31	female	MacBook	$S_{roadtrip}$
P2	24	male	Android Smartphone	$S_{working}$
P3	26	female	iPhone	$S_{roadtrip}$
P4	28	female	Android Smartphone	$S_{stressful}$, $S_{working}$
P5	23	female	Windows Laptop	$S_{working}$
P6	24	female	Android Smartphone	$S_{roadtrip}$
P7	25	male	Fairphone running eOS	$S_{roadtrip}$
P8	27	male	Android Smartphone	$S_{roadtrip}$

(b). Summaries of gender, devices and scenarios

Genders	Devices used	Scenarios
female: 5 male: 3	Android Smartphone: 4 MacBook: 1 iPhone: 1 Windows Laptop: 1 Fairphone: 1	$S_{roadtrip}$: 5 $S_{working}$: 3 $S_{stressful}$: 1

3.3 Measures & Analysis

The main measures for this research were the concepts and themes found in the online survey and user tests about playlist creation and its process.

To analyze the quantitative data gathered from the online questionnaire mainly descriptive statistics were used. Depending on type of question and desired result different measures were considered. The responses to the multiple

choice and Likert scale questions were counted and categorized in frequencies. This was done with visualizing the numbers of each occurrence of a value by putting them into graphs. This gave clear indications on the general opinions and preferences of the sample. For further interpretation of the numbers inferential statistics were used. The processing and visualizing of the data as well as the statistical analysis was done with Python in Google Colab[10].

The responses to the open text questions in the survey were analysed similarly to the qualitative data gathered from the user tests. This will be explained in more detail below.

Qualitative Analysis   To analyze the user tests and interviews, first of all, the audio recordings were transcribed. This was done with the help of the automatic transcription web tool from Amberscript[11]. The text files received from this platform were then checked by the researcher with the help of the recordings for mistakes and missing words. The audio recordings summed up accounted for a total of 187 minutes, ranging from 13:38 (P1) to 34:16 (P6) minutes. The videos of the screen recordings were watched and analysed by the researcher. Notes of observations and the participants' actions were included in the transcripts at the appropriate place under the label 'Note (screen recording)' to consolidate everything together in one file. The video recordings were roughly 93 minutes long in total, ranging from 6:12 (P5) to 19:58 (P6) minutes. For the analysis of this qualitative data an inductive thematic analysis approach [2] was used. Here, the themes and concepts are found 'on the go', while familiarizing oneself and analyzing the data, and are determined through the data itself. This approach was chosen as the user types were not existing yet. The goal was to derive those types out of concepts found within the data, meaning no preconceptions about possible groups were made before. The (quantitative) survey results and general knowledge about the streaming platforms might have given some ideas on how users could behave, however those were kept unregarded to not lead the findings in a certain direction. This part of the analysis was done in Quirkos[12], a software designed for qualitative analysis.

Before the user tests were conducted, parts of the survey results were already analyzed. This was done to get an idea of the most important PL creation purposes. For this, the responses to Q11, Q12_1 - _4, Q13 and Q14 were reviewed. The codes included the different specific reasons, which contained specific scenarios, such as dinner, driving, summer and party, as well as different moods, such as motivation, relaxed, reflecting, and focused. Further, the overall purposes were coded, such as mood, genre, situation, favourites. Through this, it became evident what the main reasons for playlist creation are and what people use them for. These findings were used to define the three scenarios for the user tests. This analysis was also done in Quirkos.

The process of the thematic analysis [2] includes first to familiarize oneself

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[10]https://colab.research.google.com/
[11]https://www.amberscript.com/en/products/automatic-transcription/
[12]https://www.quirkos.com/

Table 3. Details on the annotation numbers

Topic	Nr. of labels	Nr. of annotations
Initial creation of playlist	4	18
Playlist aspects	5	13
Song selection criteria	18	95
Song selection process	28	189
Overall method	8	19
Playlist satisfaction & likeness	3	28
Playlist themes & customs	4	28
Playlist difficulty & intuitiveness	5	35
MSP features	3	29
Ordering & re-arranging	-	13
Spotify feature issues & problems	6	20
Total	84	487

with the data extensively. Then coding was used to describe the content and work out labels. As shown in Table 3, in total, 487 annotations were coded over 84 labels. 11 topics were coded, with almost each having several labels connected to it. They represent the aspects that the codes were annotated to, so to speak the coding scheme. After this, the themes were generated through finding patterns in the codes and grouping them together. Table 4 shows the annotation scheme in more detail, with a description of each topic and an example annotation. Those topics represent the groups or themes that the codes were organized in. Ultimately, defining the themes also led to deriving and defining the user types themselves. For this, the survey findings were also taken into consideration. Especially the responses to the open questions, which were also qualitatively analysed in the same sense as the user test transcripts in Quirkos. Each type was determined through finding patterns in the behaviour of participants, which could be clustered into a group. The main criteria was to find similarities in their playlist creation process. Those similarities were taken and further analysed to find aspects connected to them. This means that, for example if two users showed one similar behaviour, it was checked if they also share some other characteristics. Furthermore, those behaviours were also connected to questions within the survey, which were analysed accordingly. After this, the user type with all its connected and relevant behaviours and characteristics could be defined.

Table 4. Details on the annotation scheme

Topic	Description	Example of annotation
Initial creation of playlist	The first steps until the playlist was actually created, with or without songs added.	*P4: "So now I'm going to make the playlist and give it a name. So what you usually do."*
Playlist aspects	Participant mentions specific aspects/ characteristics of playlists that are important for them, e.g. duration, name, order.	*P5: "I like to make lists of approximately 3 hours of duration in total"*
Song selection criteria	Mentions of participant about important aspects of songs for them, connected to adding songs to playlists.	*P7: "I'm looking for a song of his that is a bit upbeat and a happy mood to match the road trip."*
Song selection process	The different methods participants used to find and select songs to add to their playlists, e.g. searching for artists, looking through their own playlists.	*P6: "I think I would just basically look for songs that are already in a roadtrip playlist. And then I search for songs that I know. And if I don't know them, then I specifically listen to them, if I like them then I would add them"*
Overall method	Aspects that describe the overall playlist creation process the participant used.	*P4: "I do think you can really see a pattern here that I start with creating like some sample songs and then look into the recommendations and then what you don't see now, because I'm not really listening to music right now, is that I would add songs later on, continuously."*
Playlist satisfaction & likeness	Answers to questions about how satisfied the participants are with and how much they like their playlists.	*P8: "Yes and no. So neither agree or disagree, I'd say. I am satisfied with the songs that are in it. I would like them to be in there. It's not long enough though, so I would need to spend more time."*

29

Table 4. (Continued)

Topic	Description	Example of annotation
Playlist themes & customs	Answers to questions about the themes of participants playlists, transitions of songs and uniformity of songs and genres	*P6: "Well, if fitting together also means that if they fit together when you can sing along with them, then I guess yes. So agree"*
Playlist difficulty & intuitiveness	Answers to questions about the difficulty of creating playlists and the easiness and intuitiveness of certain aspects connected to this process.	*P4: "Oh, that's not really that easy or intuitive I think. I also know how to do it, but it takes some extra steps. It's not like one button that you can click usually. So I would say neither agree nor disagree. It's not difficult, but it's not really that intuitive"*
MSP features	Answers to questions about the use of MSP features, such as personalised playlists, curated playlists and song recommendations.	*P7: "So I saw them earlier on in the main screen...I never use it. Discovery Weekly. I use the New Music Friday playlist. So I think that's also based on recommendations. So I use that to see which new songs that I might like"*
Ordering & re-arranging	All mentions regarding rearranging songs and the track order within playlists, also answers to questions about those topics.	*P8: "Sometimes I will delete songs and then re-add them just to get them in the right order. And I just have it sorted on time or date added. So I'd say they could definitely do stuff in order to improve this"*
Spotify feature issues & problems	Any problems or struggles with Spotify that were either mentioned by the participants themselves or observed by the researcher.	*Note from screen recording (P4): accidentally added song to queue instead of playlist, realized it and added song to playlist*

4 Results

In this section, the results of the quantitative and qualitative data analysis will be presented. The structure is divided into different concepts that were found within both kinds of data. This way, related findings of each can be put into context. First, general opinions and characteristics of playlists and their creation will be given. After this, the differences found in usage of streaming features, song selection and creation behaviour and processes will be stated. Lastly, the derived user types and their characteristics will be presented. For the remainder of this section, the numbers of the survey results will be mostly presented in percentages rounded to whole numbers. The absolute response number is shown in brackets.

4.1 General Results about Playlists

In the following, some general results about PLs gathered from the online survey and the user tests will be presented. Firstly, further characteristics of the survey participants will be given.

Survey Sample Characteristics By far the majority of respondents, 68% (agree 32, strongly agree 25), consider themselves as music enthusiasts, while 26% (22) stayed neutral towards this. 49% indicated that they listen to a lot of music compared to their peers (agree 27, strongly agree 13), being the majority. However, 33% (27) neither agreed nor disagreed, while 19% do not think they listen to a lot (disagree 14, strongly disagree 2)[13]. The majority (32%, 27) indicated that they listen to music for 2-4 hours daily, followed by 4-6 hours (27%, 23) and 1-2 hours (18%, 15). Figure 2 shows the users preferences in devices used to create playlist on MSPs[14]. Smartphone is by far the most preferred device (58%, 48), followed by Laptop (37%, 30), and PC (5%, 4).

General Playlist Characteristics & Habits Most participants (39%, 33) create PLs about once every half year, while 25% (21) do it once a month. The majority (66%, 55) currently have up to ten PLs (1-5 PLs 36, 6-10 PLs 19). 17% (14) have more than 20. People indicated that most of them use some of their playlists regularly (37%, 31), closely followed by people who are using only a few regularly (32%, 27). Although people might have different assumptions on what 'a few' and 'some' mean to them in terms of number. This could differ depending on the amount of PLs they have.

Surprisingly, the majority of respondents (44%, 37) usually have more than 40 songs in their self-created PLs, 40% (34) have between 21 and 40 (31-40 songs 17, 21-30 songs 17). Most respondents add songs to their PLs sometimes (38%, 32) or often (32%, 27). The majority indicated that they almost never (42%, 35) or rarely (39%, 33) delete songs from their PLs. In the user tests,

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[13]83 responses in total
[14]82 responses in total

only one participant (P7) deleted a song from the PL during the session. This shows that the process of adding songs to a PL is much more important than deleting them.

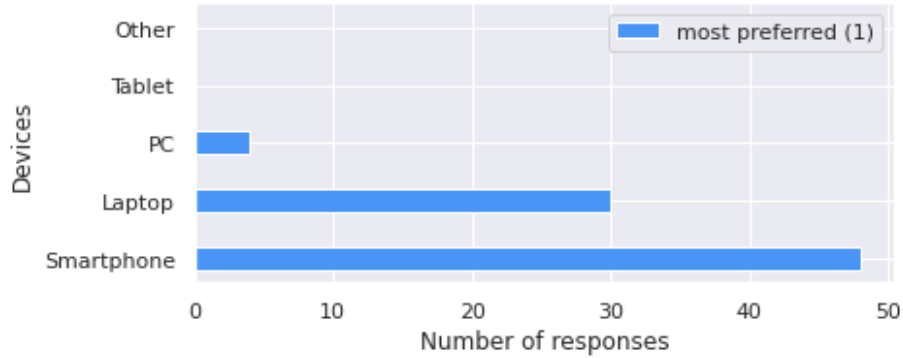More detailed numbers of those results can be found in Appendix E.

Figure 2. Most preferred devices for creating playlists on MSPs

Playlist Satisfaction   Overall it can be said that the participants' majority likes their PLs (agree 45, strongly agree 30), is satisfied with them (agree 40, strongly agree 24), and is also satisfied with the choice of songs they put in their PLs (agree 45, strongly agree 32)[15]. The reasoning for this positive result is summed up by two responses form participants in the survey when they were asked if they could explain this further. They stated "they're created and curated by me, kind of an extension of who I am" (p51), and "They represent my taste in music and who I am. And I dedicate quite some time to set up the playlists the way I want them and also keep them updated." (p84). With this it can be said that most people seem to really do carefully craft their PLs and only put in songs they genuinely like. Interestingly, five out of eight user test participants (P2, P4, P5, P7, P8) stated that they are not fully satisfied yet with the PLs they created during those sessions. This indicates that creating a playlist can be quite time-intensive and that it is often not finished or satisfactory after just one session, the initial creating.

Perceived Playlist Creation Difficulty   Figure 3 provides an overview of the results on the perceived difficulty. By far the majority (86%, 72) of the survey respondents do not find it difficult to create PLs on MSPs (disagree 37, strongly disagree 35). A similar clear result is shown in the opinions on the easiness and intuitiveness of the playlist creation process. Here, 52% (44) agreed and 40% (34) strongly agreed that it indeed is easy and intuitive. No one disagreed, which strengthens this result even further. The participants

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[15]A graph for these results can be found in Appendix F

from the user tests did not give such uniform responses. While four people do not perceive this process as difficult (P1, P5, P7, P8), two have the opposite view (P3, P6). Surprisingly, all of the participants agreed that the PL creation process is intuitive and easy to learn. This is an interesting finding, as though two participants have difficulties with the creation process, they still perceive it as intuitive and easy to learn, which one would believe to be contradicting opinions. However, the reason for this might be linked to the fact that both of them (P3, P6) mentioned that they don't create PLs that often, which is why they find it difficult. In the words of P6:

> I do not create a lot of playlists, so then I'm not used to it. And I was clicking on the wrong buttons all the time. And like I said, I guess I don't know enough about Spotify to know if I can click on multiple songs at the same time. So it's just like one song at a time. Yeah and that's a lot of work.

Furthermore, some of the other participants also mentioned that they could imagine that people who are not as familiar or even new to the platform might have issues with it (P1, P4).
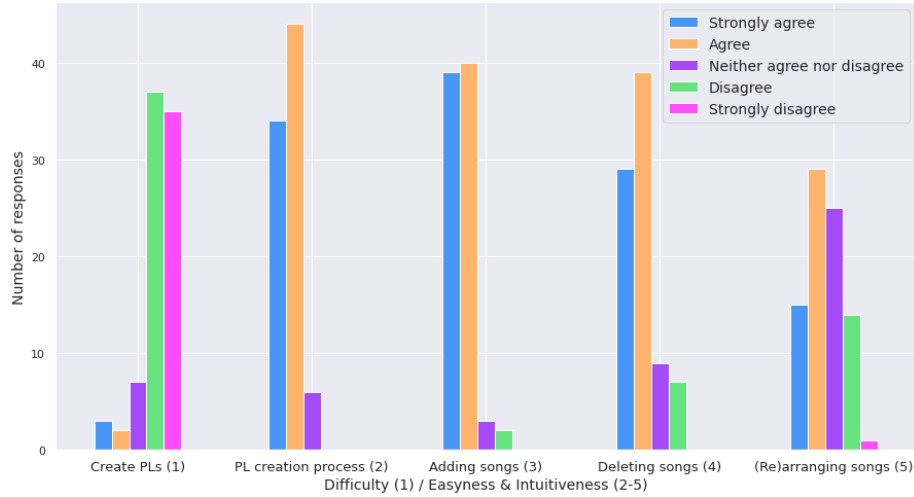

Figure 3. Perceived difficulty / easiness & intuitiveness of PL creation aspects

Nearly all survey respondents (94%, 79) find the process of adding songs to a PL easy and intuitive (agree 40, strongly agree 39). Similarly, most user test participants also think this to be true, while one person does not agree with that (P6). Another neither agreed nor disagreed (P4), as she thinks "that's not really that easy or intuitive. I also know how to do it, but it takes some extra steps. It's not like one button that you can click usually...It's not difficult, but it's not really that intuitive". For deleting songs out of a PL, most survey respondents also indicated that they find it easy and intuitive (agree 39, strongly

agree 29). The results of the user tests are similar. Five participants perceive it as easy and intuitive (P2, P4, P5, P7, P8), however two disagreed (P3, P6). An interesting observation here is that P1 suggested to include a shortcut in the UI, such as a bin icon, for deleting a song. P4 suggested the opposite. She said that such a feature "would be more intuitive but also makes it more prone to accidentally delete songs which you might want to avoid."

The respondents had very different opinions about the easiness and intuitiveness of ordering and (re)arranging songs within a PL. The majority (52%, 44) reacted positively (agree 29, strongly agree 15), however 30% (25) neither agreed nor disagreed, and 17% (14) even disagreed. When specifically asked what the participants find difficult while creating PLs, one person gave a good description of the issues people can face with wanting to arrange songs in a specific way:

> Ordering or rearranging a big playlist can be a hassle. I have a YouTube (music) playlist with friends with 100+ songs and we wanted to arrange it by "person who added the song", I had to either one by one drag the songs to the correct place in the playlist; or I had the options to "put on top/bottom of playlist" (again, in YouTube). Rearranging this long playlists could also only be done by me. I thought "never again" after this one time.

The user test participants also gave divisive responses to this question. Two (P2, P3) stayed neutral, while three each find it easy and intuitive (P1, P5, P7) or the opposite (P4, P6, P8). P8 described the struggles he has with arranging songs as follows: "Sometimes I try it, but it never works out. Sometimes I will delete songs and then re-add them just to get them in the right order." Interestingly, two out of the three participants who find this process to be difficult also indicated that the song order within their PLs matters to them.

4.2   Usage of Music Streaming Platform Features

The survey revealed interesting observations on the use of some MSP features. To be precise, the usage frequency of personalised playlists[16], curated playlists[17] and song recommendations[18] were investigated. Those features were specifically chosen, as they can be a prominent help for creating playlists for users. As can be seen in Figure 4, most people use those features, but rather irregularly.

Most survey respondents (39%, 33) use personalised PLs sometimes, or often (27%, 23). 25% (21) apparently do not use them much (rarely 10, almost never 11). The user test participants gave similar estimations on this topic. Four people use them sometimes (P1, P2, P6, P8), two each use them quite regularly (P4, P5) or almost never (P3, P7). Therefore, it can be said that people tend to use personalised PLs to some extent. However, it does not seem to be a

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[16]PLs made by MSP, tailored to a user, e.g. Discover Weekly, Release Radar, Daily Mix

[17]PLs made by companies/people for everyone to access, not personalised

[18]to be found at the bottom of a PL, example can be seen in Figure 5

prominent feature in their music streaming behaviour. P8 from the user tests put this into words, saying:

> I used to use Discover Weekly quite a lot. I would go through it weekly. I don't do it anymore...Sometimes there's a daily mix where I'm like, oh yeah, this exactly aligns with what I want to listen to right now, and then I'll use it. So overall, I would say I sometimes do.
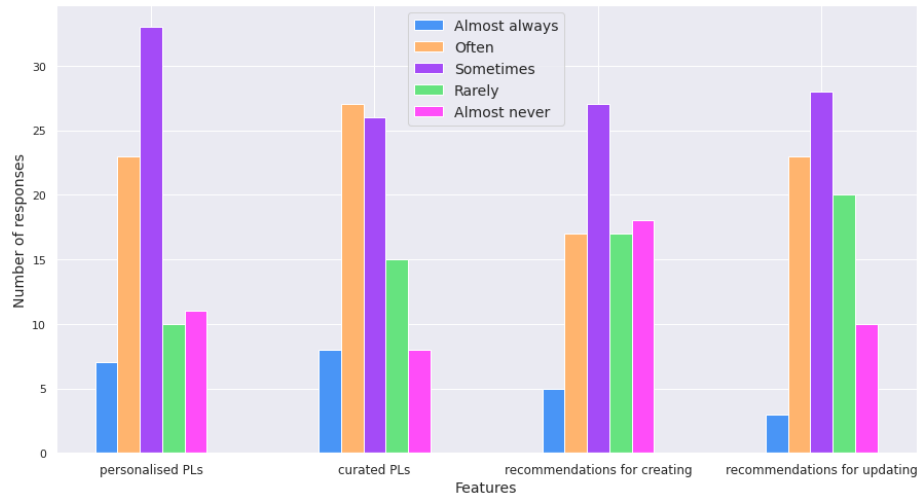

Figure 4. Frequency of use of features provided by streaming platforms

Curated PLs are used more often. Here, the majority (32%, 27) in the survey indicated to use them often, closely followed by sometimes (31%, 26). 15 people only access them rarely. A reason for this rather increasing use was further mentioned by one participant (p55) in an open question within the survey. They stated that "Currently, my playlists do kind of overlap and I make more use of the curated playlists of certain artists by Spotify". The responses from the user test participants are also leaning more towards the positive. Two people use them sometimes (P3, P5), while three (P4, P6, P7) use them quite regularly. This indicates that curated PLs can indeed be a powerful tool for users. They might use them for finding new music or getting inspired for their own PLs. Some might even use those instead of creating their own PLs for a specific setting. P7 explained his relationship with those curated lists as follows:

> ...I use them often I would say, to inspire my playlists. Or to see what's new, because my impression or my assumption is that they update these playlists quite often usually. I trust these playlists more than I trust the new music playlist.

This emphasizes the trust that users can have in those PLs. This might be due

to them being usually created by experts of the MSPs, who are expected to have a good knowledge about music.

The majority of survey respondents (32%, 27) uses the song recommendations for creating PLs sometimes, while 20% (17) each use them often or rarely. 21% (18) even almost never. Similar results can be seen for the usage of recommendations for updating PLs. This rather hesitant use of song suggestions was also hinted at by a statement of one participant (p73) in the survey, who said "It [the playlist] gives me control over choosing the tracks I really like. It is not so much influenced by algorithms". Also in the user tests the participants had a mixed opinion about them. Three indicated to use them almost always (P2, P3, P8) for creating PLs. However, two use them only rarely (P5, P6) and one almost never (P1). P6 mentioned that she "would [use them] if it came to mind. Well, I don't think I do it because I don't think about it". This indicates well that people might end up using song recommendations less, simply because they are not on their mind. P8 gave another interesting reason on why he might use them less over time, even though he stated to use them a lot for creating PLs. He said:

> The playlist that I have at this point, it's so big that they oftentimes give the same recommendations over and over. And I'm like, well, I've already decided that those won't fit. So I tend not to look at the recommendations anymore.

Interestingly, while observing the participants during their user tests, it was seen that six out of 8 participants (all except of P1 and P6) were using the song recommendations of the platform. It might indicate that users could have a rather negative view on using song recommendations. They might perceive it as not being knowledgeable enough in music when one relies on suggestions from an algorithm and thus feel self-conscious about their taste. However, this is an assumption and cannot be fully supported by the findings of this study.

More information on how and when the participants used and accessed recommendations will be given in the next part.

4.3   Song Selection

In this section, the different strategies of how people chose the songs they added to their playlists will be presented, as well as the different important aspects that made them select those tracks in the first place. Those findings were mainly gathered from the user tests.

Song Selection Processes   Despite the rather mixed responses about song recommendations presented above, they proved to be an important factor for users in the selection process during the user tests (P2, P3, P4, P5, P7, P8). Participants mainly used the song suggestions at the bottom of the new PL, for which an example can be seen in Figure 5. Most of the time they were adding tracks by other means, but then regularly checked the updated recommendations

in the new list. However, a few people also immediately looked at them right after the initial creation. Some used the recommendations to find new music. Some used them as a quick and easy method to find and add songs they like and know. Two participants (P2, P3) utilized the song suggestions within the "Add songs" space in Spotify. This is a unique feature that appears as a button right after the playlist was created, as can be seen in the screenshot in Figure 5. Here, Spotify gives four different lists of song recommendations that can be added via one click/tap. An example of them can be found in Figure 6a.

Within this space, some participants not only looked at the recommendations but also searched for artists or songs (P2, P3, P7). A unique trait here is that within the artist page or album, the songs can be added to the new playlist via one click/tap on the "+" button. This is visualized with an example in Figures 6b to 6d. However, after adding a track, the user gets automatically redirected back to the overview with recommendations, which are updated through two new lists (see Figure 6e). This led to some frustration for one person (P7), who did not intend for this to happen.

All of the participants were looking at least once at a specific artist. This was mainly done through searching for them via the main search page on Spotify, by clicking on the artist's name shown at a song, or by finding (and clicking on) an artist in the recent searches (within search page). The navigation on the artist page was dominated by participants mainly going through and adding from the popular songs at the top of the page (all except of P5). Some were also looking into specific albums of the artists (P1, P6, P7, P8). Three participants (P1, P2, P6) were examining some features on the artist page, such as artist playlists or albums they're featured in. This process was captured by a statement P8 made during the user test:

Figure 5. App screen after creating a playlist

> ...so I went to the band page and then I just scroll through and I look at what I like. And if it's a song that I like, I will add it for now. And then there's a couple of albums I know of them, of which I know that I like the album, so I'll just look through them if I see anything that I'm like, yeah, that fits the deal.

Surprisingly, only two people (P2, P6) were searching for specific songs (in the main search page).
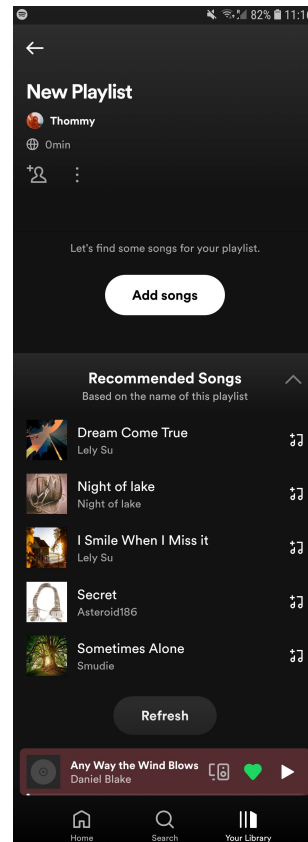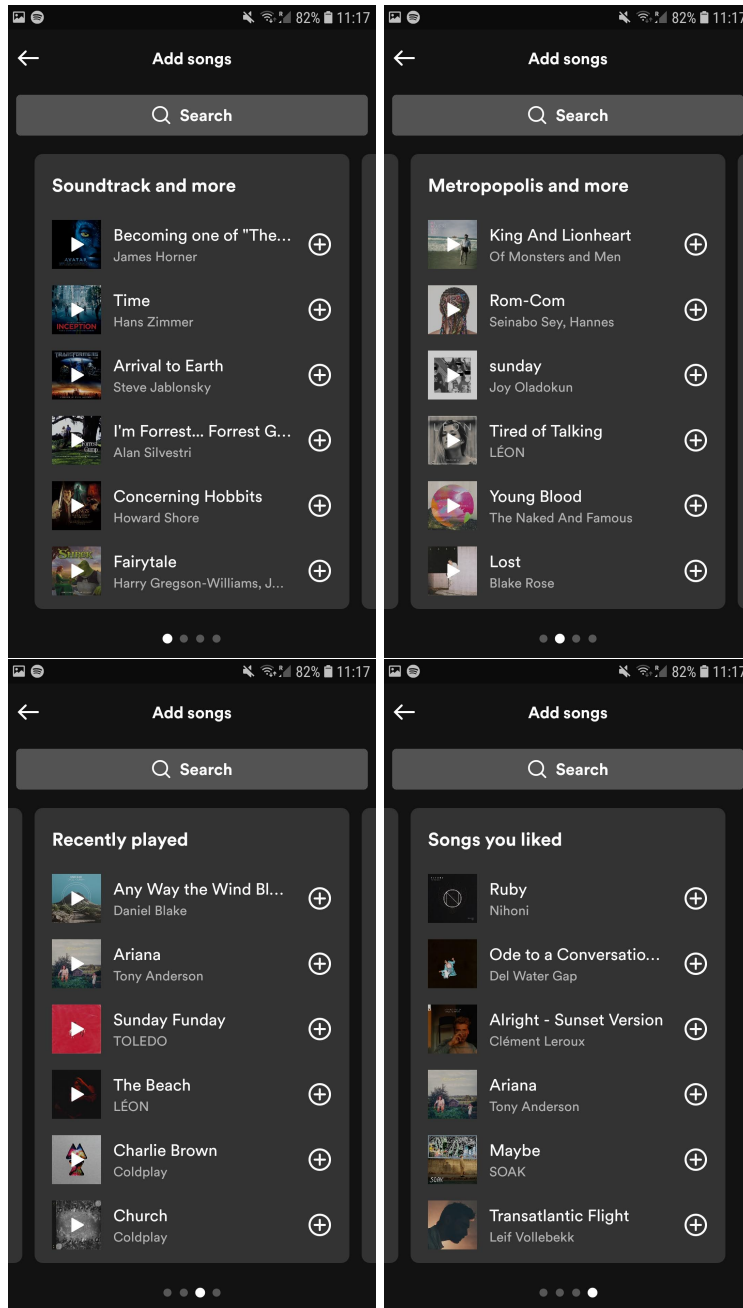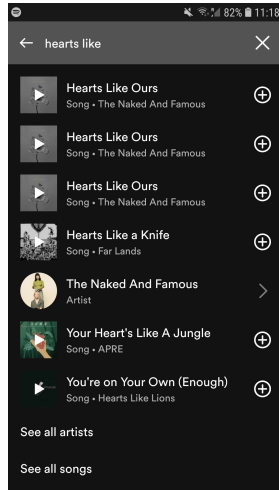
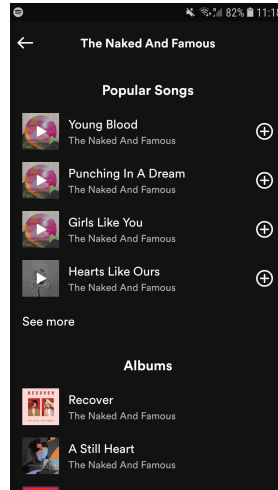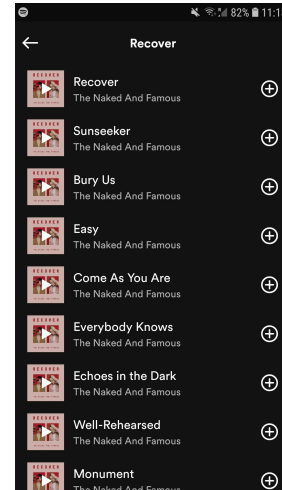*(a).* App screen after pressing "Add songs", recommendations view

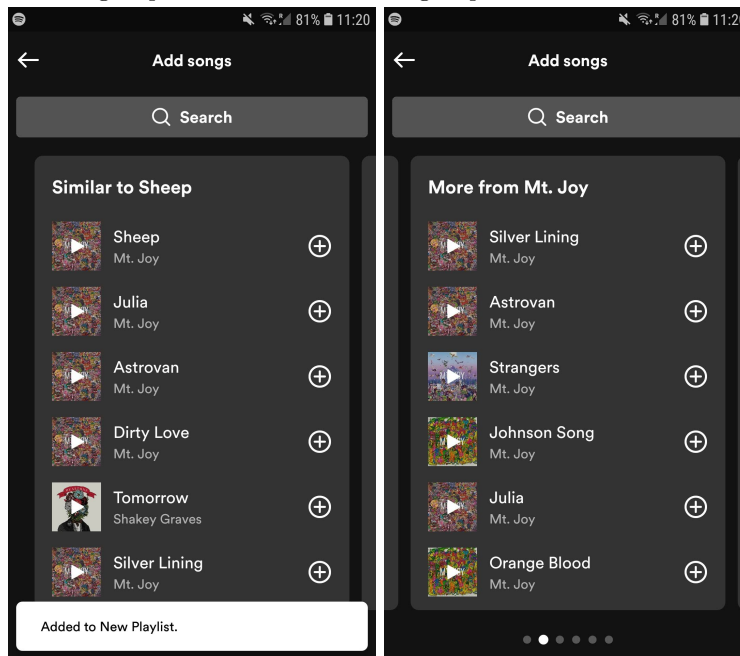*Figure 6.* Spotify app screens for "Add songs" feature space

(b). Searching for song within "Add songs" space

(c). Looking at artist within "Add songs" space

(d). Looking at album within "Add songs" space

(e). Updated recommendations after adding song; the two new lists are suggestions connected to the song & artist

Figure 6. (Continued)

The "Liked Songs" list was also a method to find fitting music for their playlist (P4, P5, P6). In fact, one participant (P5) even had an approach were she would look through one of her personalized PLs, "Discover Weekly", and like songs from there. They would then get added to the "Liked Songs" on top of the list and through this be easily findable for her to add to her new PL. Other personalized PLs that were used were the "Daily Mix" lists (P2, P6). Many participants (P1, P2, P3, P4, P7) also utilized one or several of their own already created PLs to find and add songs. While some used existing lists that were made by other people/companies or even Spotify itself (P4, P6, P7, P8). Those PLs were either found through specifically searching for them, or searching for keywords, a genre or category. The way those curated lists are used was explained by P6 in her user test session:

> I think I would just basically look for songs that are already in a roadtrip playlist...And then I search for songs that I know. And if I don't know them, then I specifically listen to them, if I like them then I would add them.

In total, four people (P2, P4, P7, P8) searched for genres in the search bar or looked through the genre/category suggestions that are shown on the search page of Spotify.

All participants except one (P5) went back into the newly created PL several times during the creation process. This was to either check the duration of the whole list, the number of songs, the updated recommendations at the bottom or the songs they already added and see which ones might be missing.

All participants expect one (P3) listened to music, or mentioned that they would, while creating their playlist. For most of the times, this was to check if the song they were currently looking at fits the style of the new PL. Here, the common method that people used was to skim through the song by using the slider on the player to go to the middle (usually the chorus). This would give them a better indication of what to expect from the style of music. Three participants (P1, P6, P7) were also looking a lot at songs that they knew by heart and therefore did not have to listen to. The reason for this was explained by P1 in her session, saying that "I don't even have to listen to them. I know how they go. So I already know if I like them for this playlist."

Another interesting observation made during the user tests was the different ways of how users get inspired or influenced by things they see or hear on Spotify. Some participants (P4, P6, P7) were looking into PLs or albums saved within their library that were on top of the library-list, which means they recently listened to them. They did not specifically search for them, but when they saw them, they decided they could contain songs they might want to add. Recent searches that one can see when you navigate to the main search bar were also a factor that influenced some participants (P3, P8) to look into certain artists or add certain songs. Search suggestions given by Spotify were also leading some users (P3, P6) to add other tracks next to the ones they were specifically looking for. Some participants' (P3, P6, P8) memory was triggered by a certain song, which lead them to search for another track or artist they just remembered.

Song Selection Criteria   The participants mentioned several criteria during their sessions they found important for their specific scenarios. Songs generally had to fit the vibe or aesthetics the participants had in mind for their PL (P4, P7, P8). By that they meant that the tracks should fit their general theme of the PL, which they came up with themselves (different to scenario). Four people (P2, P4, P7, P8) mentioned specific genres as criteria during their sessions. Three participants each stated that they were looking for sing-along (P1, P6, P7) and/or happy upbeat (P1, P7, P8) songs, which was unique for the road trip scenario ($S_{roadtrip}$). Distinctive traits of the working and studying scenario were that the music was not the main focus and that the songs should not contain lyrics (P2, P4). One participant (P5) stated that the duration of the song should not extend a certain time. Furthermore, media, such as films and TV series (P1, P2), and having a sense of connectedness to the music through heritage (P1, P7) were also influencing factors for music choice.

On the one hand, some participants (P6, P7, P8) mentioned that if they are too familiar with a song, meaning that they listened to it too many times, they would not choose it for their new PL. On the other hand, song familiarity was indeed also an important and often mentioned aspect of selecting tracks for participants (P3, P6, P7, P8). Here it seems that P7 and P8 were contradicting themselves in their statements and actions. It indeed is not a contradiction but rather reveals that there is a fine line between when a song is being too familiar and too often listened too and when not. It is, however, up to the individual to decide when this line is overstepped.

Two persons (P6, P8) that chose the road trip scenario stated several times that for them, and for this specific scenario, the music taste of others, mostly their friends and partners, were important. They further said that they were often, if not mainly, looking for songs everyone would like. In that sense other people had a huge influence on their selection.

Interestingly, one participant (P7) even changed his criteria, which the music in his new PL should have, during the creation process. Meaning, he started with a few songs and while he was adding more, he noticed that his requirements changed. This led to him removing some tracks that he added in the beginning, as they did not fit his criteria anymore.

4.4   Playlist Creation Behaviour

In this section the specific behaviours connected to creating playlists on MSPs will be presented. Those include creation purposes, PL customs, and the creation process itself.

User-Playlist Purposes   The song selection criteria stated above are closely linked to the different purposes people have for creating PLs. They work as the foundation of what overall theme the list should have and what users are looking for in songs to add. While the section before shone light on what the user test participants found important for choosing the right track, here the more general opinion of the survey respondents will be presented.

The survey participants indicated several different purposes they mainly create playlists for. Ordered by most to least frequent they are: specific situations and/or scenarios (45), such as workout (38), party (36), or studying/working (29); genres (41); moods and emotions (43; moods 25, emotions 18); time periods (15), such as months (6) or seasons (6); their (current) favourites (13); for social reasons (5), e.g. a shared PL with friends or partner; or holidays (5).

The purposes that were already shown to be quite prominent in literature in Section 2.1, and interestingly were also the most mentioned in the survey, were asked about in more detail. Those purposes are to create playlists mainly for either genres, moods, specific situations/scenarios, or a combination of all or some of those. The results can be seen in Figure 7. The responses for the first three statements are quite similar. Participants indicated that most of them create PLs with those intentions often (genres 22, moods 27, situations/scenarios 29) or sometimes (genres 27, moods 21, situations/scenarios 24). Interestingly, those results align almost one to one with the ones from the previous question, as situations/scenarios got a slightly better score than moods and genres. While for the combination of two or several of those purposes, all five of the scale options reveal very similar numbers.
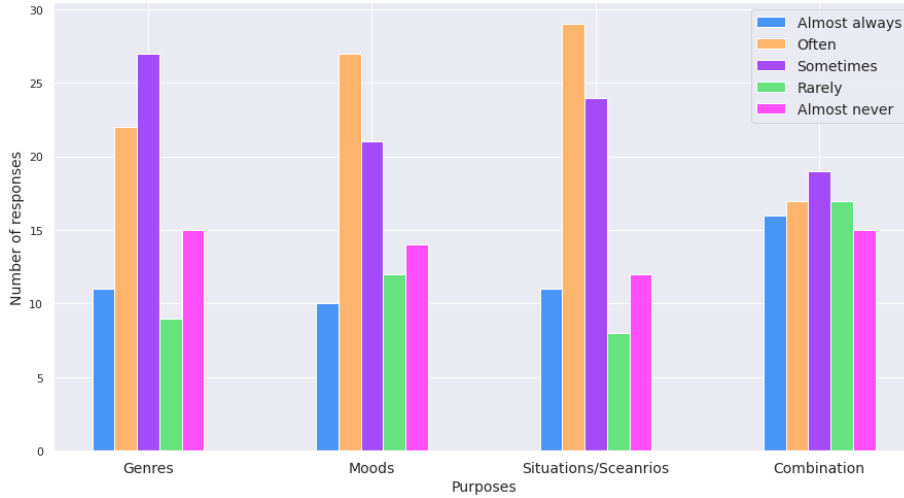
Figure 7. For what purposes do people mainly create PLs

User-Playlist Customs In the survey the participants were asked about the importance of several aspects of their playlists that are linked to their themes and the songs' uniformity. The results for them can be seen in Figure 8. It was revealed that half of the participants (42) want the songs in their self-created PLs to fit together (agree 26, strongly agree 16). 26% (22) are neutral towards this and 18% (15) do not perceive this as important[19]. In the user tests all

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[19] "Songs - fit together" in Figure 8

participants except of one (P3) also find this an important aspect. However, P2 and P7 mentioned that they have PLs that contain a very "random" collection of songs and "a lot of different genres" for which this statement does not necessarily hold. P1 gave a good explanation on how and why this is important, stating that "it's not about similar music, more about the purpose".

The survey respondents seemed mostly to not care about appropriate transitions between the songs within their PLs, as the majority (61%, 52) disagreed to this (disagree 34, strongly disagree 18). 26% (22) neither agreed nor disagreed[20]. Surprisingly, this was a rather dispersed topic in terms of importance to the participants in the user tests. Here, two people care about it (P7, P8) while four do not (P1, P3, P5, P6). Two participants were neutral towards it (P2, P4), both saying that it depends a lot on the playlist.

Interestingly, wanting the songs within a playlist to be from the same or similar genre(s) seems to be a rather divisive topic. Although 45% (38) of the survey respondents find this to be a relevant aspect (agree 30, strongly agree 8), 39% (33) do not consider this as important[21]. The responses from the user test participants were mostly in favour (P2, P4, P5, P7, P8), while P1, P2 and P6 do not mind if the songs are from similar genres or not.

Most people (52% 44) want for their playlists to have an overall theme (agree 29, strongly agree 15). 24% (20) neither agreed nor disagreed, and another 24% disagreed (disagree 14, strongly disagree 6)[22]. Although, several people did not agree to it, this topic seems to be rather important. In fact, the user test participants all had a certain theme in mind when they created their PLs. However, this might also be due to the specificity of the scenarios given to them. Nevertheless, when they were asked specifically about it, all except of two (P3, P5) find this an important aspect for their PLs.

The vast majority (77%, 65) of the survey respondents does not think that the order of songs within their PLs matters (strongly disagree 36, disagree 29). Likewise, by far most people (81%, 68) do not or only rarely (re)arrange the order of the songs in their self-created PLs (almost never 54, rarely 14). Interestingly, seven respondents indicated that they almost always do it. In the user tests, only three people indicated that this is an important aspect for them (P6, P7, P8). P6 mentioned that she is "always listening to playlists in the same order" and thus can remember songs through listening to or singing another song, just because she knows that it would come after this in her PL. Furthermore, P8 even deletes and re-adds songs to PLs just so they are in the right order, meaning the newly added tracks will be on top of the list. This behaviour is also shared by P7, who sometimes, too, puts his favourites on top of the list. Furthermore, an interesting finding here is that some people do not order their PLs, but sometimes arrange the songs in the queue when playing their lists, as was specifically mentioned by P4 and P6.

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[20] "Songs - appropriate transitions" in Figure 8
[21] "Songs - same/similar genre(s)" in Figure 8
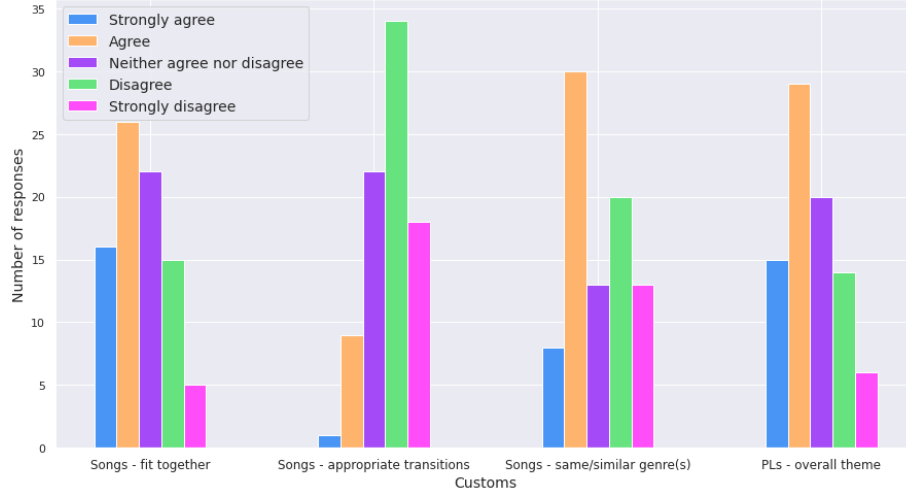[22] "PLs - overall theme" in Figure 8

*Figure 8.* Customs & importance of aspects of self-created PLs

4.5 Playlist Creation Process

The results of the qualitative analysis brought several insights to the playlist creation process of users.

Firstly, the initial creation process was the same for most of the sessions, however some people also showed different and very specific approaches. Most of the times the participants started by navigating to their library, clicking/tapping the button to create a new PL and give it a name (all except of P5). P4 (on her second scenario) first searched for a song and created the list via the option panel of the track ("Add to Playlist"→"New Playlist"). P5 had a rather specific way of creating her PL in that she shortlisted them in her "Liked Songs" list first. This will be described more in detail later.

Overall, the user tests revealed four main processes how users create their playlists, for which workflow diagrams can be found in Figure 9. First, a method people used is a combination of mainly searching for specific artists, songs, or playlists from which they add tracks to the new playlist (P1, P6). There has to be differentiated between people who mainly look through existing playlists curated by others or Spotify (P6) and users who mainly look through their own created playlists (P1). This can be seen in the workflow diagram in Figure 9a. This type of process was given the name 'foraging'. With it people look at many places to add various songs, hence they forage them for their playlists.

Another method one participant (P2) used was that he mainly searched for genres or keywords, then choosing an album or PL connected to those for finding and adding songs. He then ultimately relied on the recommendations within the new PL (at the bottom) to add more music. This process is visualized in Figure 9b and is called 'faciling', which stems from the word facile. This was chosen as the nature of this process is to have an easy way of finding and adding songs.
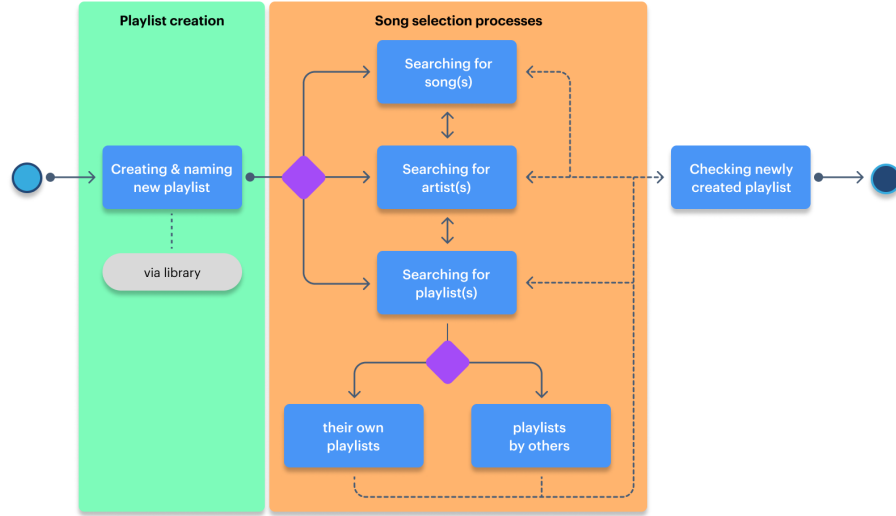
(a). Workflow diagram for process type 1 - 'foraging' (P1 & P6)
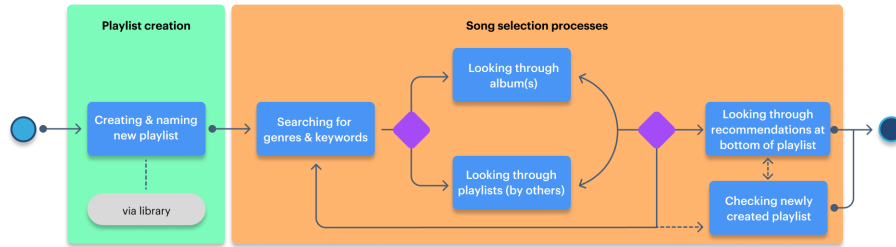
(b). Workflow diagram for process type 2 - 'faciling' (P2)
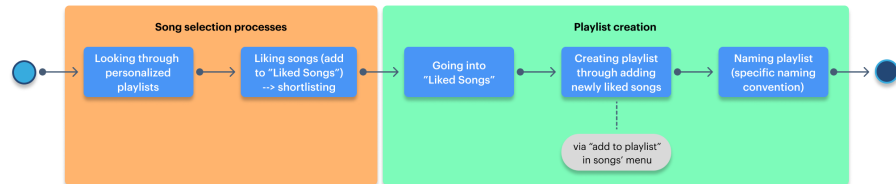
(c). Workflow diagram for process type 3 - 'shortlisting' (P5)

Figure 9. Workflow diagrams for the different playlist creation processes

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(d). Workflow diagram for process type 4 - 'improving' (P3, P4, P7 & P8)

Figure 9. (Continued)

Further, it is not looked deep into artists or playlist, rather more on the surface. Hence, the playlist creation process is simply used to serve its purpose and thus made facile.

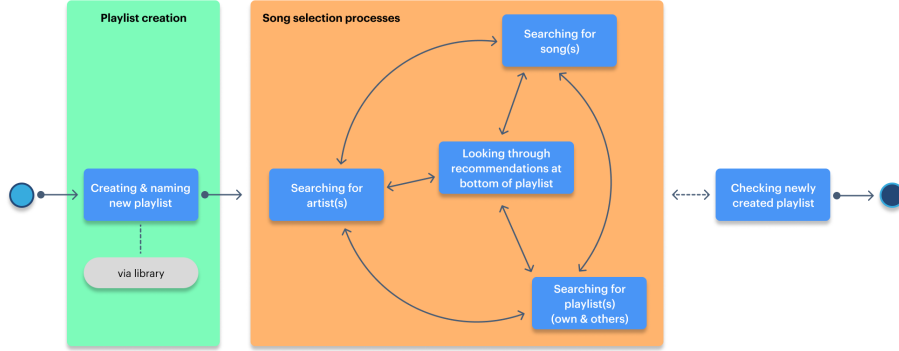Another rather specific procedure of creating a PL was used by P5. She looked through her personalized playlist ("Discover Weekly") for new songs, liked the songs via the heart button, which added them to her "Liked Songs" list. After that, she would go into this list and add those newly liked tracks to the new PL, which can be seen in Figure 9c. This process reveals a way of making songs easy to find and access for further use, basically putting them on a shortlist. Hence, this method was given the name 'shortlisting'.

The most common process used during the user tests was a combination of searching for specific artists, songs and/or PLs to find and add tracks. Moreover, those users continuously came back to the newly created list to check the (updated) recommendations at the bottom for songs to add (P3, P4, P7, P8). This process is visualized in Figure 9d. It is called 'improving', as the main common aspect for all people was that they went back to check the recommendations regularly. They added new songs from other places to update them, hence improving them for themselves and their purpose.

Two participants (P4, P7) mentioned that they would work on the PL for a longer time and continuously add songs if they discover new ones that fit. P4 even mentioned that for her "it can also take years before the playlist starts taking shape". Two other participants (P2, P3) had a very different approach to this. They stated that they usually only add a few songs to a new PL. While listening to it, they would let Spotify continue the playlist automatically with similar songs, making use of the 'Autoplay' feature.

4.6   User Types

As was shown in the findings above, there are many differences in how users create playlists. There are, however, also similarities that can be used to categorize them together into groups with different behaviours connected to PL creation. Hence, four different main user types (UTs) could be formed. They will be stated and described in the following section. Furthermore, some specific characteristics or patterns were found as well. They can be applicable for several user types, or can work as a kind of sub-type to only one. All of the types, sub-types and patterns can be found as a graphical representation in Figure 10.
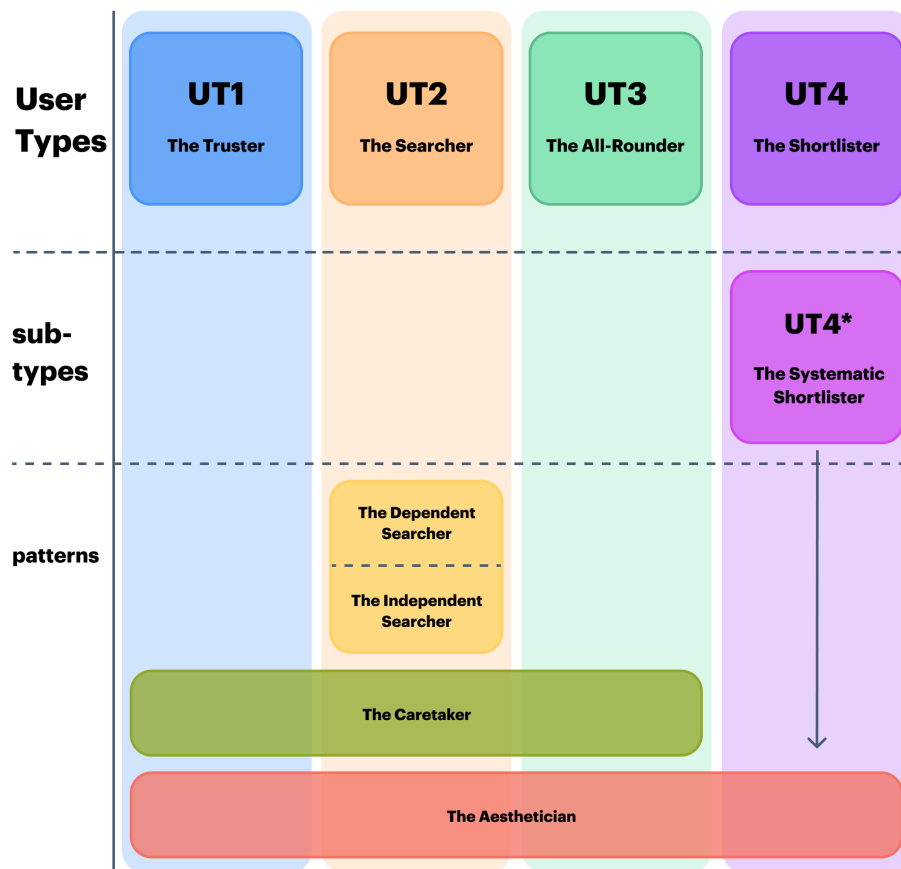

Figure 10. Graphical representation of the UTs, sub-types & patterns

UT1 - The Truster   The first UT is called 'the Truster'. The main characteristic of this type is that the users connected to it mainly use the song recommendations of MSPs for adding and filling up their PLs with tracks. They

either simply rely on the suggestions for their PLs while adding songs a lot. Or they only add a few tracks to the PL, mostly around ten or less, and after let the MSP automatically continue playing the PL with suggestions. Either way, this UT puts a lot of trust into the streaming services and their recommendation algorithms. Examples for such users are P2 and P3 from the user tests. During their sessions they were heavily using the song recommendations at the bottom of the new PL. They both also specifically mentioned themselves that they usually only add a few songs and then let the playlist automatically continue with suggestions.

UT2 - The Searcher The second UT has the name 'the Searcher'. This type describes users who mainly search for artists, playlists, albums, categories or songs while creating their PL. They usually do not use the song recommendations much, although they sometimes have a look at them. This can happen while they come back to the newly created playlist to check on the tracks that they already added, which they tend to do quite often. This type of people also generally seem to have more trust into their own music taste and thus know better what they want for their PLs than the streaming algorithms. This also leads them to mainly or preferably adding songs to their lists that are already known and familiar. The Searcher also listens to the songs to check if they fit the theme of the PL. However, they rather do it to refresh their memory of how exactly the known track sounds, and not to get an idea of completely new songs, unlike all the other UTs. Furthermore, several respondents of the online survey mentioned as well that they mainly or only put songs into their PLs which they like and know are fitting for the situation. This further strengthens this characteristic. Example users of this type are P1 and P6 from the user tests.

Two distinct behavioural patterns may occur with some users of this type. This distinction has to do with searching and looking into PLs. The Searcher usually accesses PLs created by both themselves and others for finding songs to add. Although some people within this UT will only look into either of them but not both. During the user tests it was observed that on the one hand there are users who might only search for lists that are made by others, such as Spotify or other users. This was represented by P6 and will be given the name *'the dependent Searcher'*. On the other hand, some people might mainly look for tracks and inspiration within their self-created PLs. This was done so by P1 and will be called *'the independent Searcher'*. Looking at differences in other characteristics and behaviours of P1 and P6, some interesting aspects were found. Both consider themselves as music enthusiasts, although P1 indicated to listen to a lot of music compared to her peers, while P6 does not. Moreover, P1 stated to listen to more music on a daily basis than P6. Both participants chose the road trip scenario for the task, however P1 stated to be alone, while P6 said she will have friends with her. These are interesting findings as it seems that P1 is more engaged with music than P6. Further, the more engaged P1 naturally chose to be alone on the road trip, while the less engaged P6

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chose to be with others. This in turn influenced her choice in songs immensely, which was stated by her several times throughout the user test. Therefore, the independent Searcher might be more engaged with music and have a higher trust in their taste. Whereas the dependent Searcher might be less music engaged and experience less trust in their taste, and thus be more influenced by others in their song selection.

UT3 - The All-Rounder Another UT is 'the All-Rounder'. All-Rounder users utilize various different methods while creating their PLs: searching for artists, songs, playlists and/or genres; looking into their own PLs; and looking through the song recommendations given by the MSPs. This represents the most common type of MSP users, according to the findings of this study. Examples of people that would fall within this type are P3, P4, P7 and P8 from the user tests. This type might seem quite similar to the Searcher, however, the main difference between those two is that the All-Rounder utilizes the suggestions for tracks to add by the streaming service. Users of this type usually come back to the newly created PL several times throughout the creation process to check on the songs added, and more importantly to check out the updated recommendations at the bottom of the list. They might even refresh them several times. In that sense the All-Rounder is similar to the Truster. However, the main distinction is that the Truster mostly relies on the recommendations, while the All-Rounder balances all their song finding and selection methods almost evenly.

The use of those suggestions can have different intentions for people. Some might use them to simplify the adding process. The recommendations might show songs that they planned on adding anyway and thus they do not need to look for them. They can simply add them via one click directly to the list. This was, for example, mentioned by P8 during his user test as a means of recommendations for him. Another way to leverage them is for finding new music. This also involves that the person listens to the songs presented to check if they are good and fit. Here, the streaming platform might only enable for snippets of the tracks to be played (as is the case on Spotify). This was done by all of the user test participants that fall under this UT. Lastly, a different reason for looking at song recommendations was mentioned by P7 and P8. They said that they like to look at them simply out of interest and curiosity to see what the streaming platform would suggest them to add to their PL. This was also seen as almost a sort of test for the MSP. They were curious to see how it could steer their music taste (for this specific PL) into certain directions and to test the appropriateness and quality of the recommendations given and thus the algorithm itself. P8 described his relationship with them as follows: "I just find it so interesting to see what they give us as recommendation. Because I wouldn't, if you have this list, get to Spanish music. Especially not as much as they do."

UT4 - The Shortlister   The fourth and last overarching UT is called 'the Shortlister'. It is made out of people who mainly use their favourites-list[23] or create only a few, or even one, PL that contains a vast number of songs that they like. They are usually the type of users who just simply add the songs they like to their favourites-list and then play this PL at random (shuffle). The difference to UT2 (the Searcher), who shows similar patterns in regards to song familiarity and their favourites, is that the Searcher usually has several lists for different reasons. The Shortlister, however, does not necessarily create many PLs for purposes such as genres, moods or activities. They rather want to mainly listen to their (current) favourites. They care less about a specific overall theme for their PL, but simply want to listen to music they enjoy regardless of genre, mood or situation. They tend to just skip through tracks that come up while listening and are unfitting for the specific moment.

This UT was found mainly through responses made in the online survey. Here, several people indicated to use mainly, or even solely, their favourites-list, or an equivalent self-curated PL. P2 from the user tests also mentioned that he "mainly use[s] the 'liked songs' playlist". Moreover, two other participants, P3 and P6, also said that they have this kind of PL. As P3 stated, she likes "mixing everything together in one playlist" and also "like[s] to listen to the same songs".

Observations in the user tests made apparent that the Shortlister can have a very specific creation pattern. This sub-type will be called *'the systematic Shortlister'* (UT4*). Its characteristics are that it takes the concept of short-listing quite literal, with the user liking newly discovered songs and thus adding them to the favourites-list. However, they do not stop here. They continue to take those new tracks and create a new PL out of them, containing only them. This way, they always have PLs with their current favourite music condensedly saved within them. A unique trait is that they solely create PLs this way. To note here is that on different MSPs than Spotify, the first step of saving the songs to an overall favourites-list might be skipped, as not every platform has such a feature. Instead, the user might add the songs directly to a new PL. People of this type further usually have a unique naming convention, making it easy for them to recognize the newest lists. Additionally, they might care about aspects such as the duration of the songs or the PL itself. This UT is represented by P5 of the user tests. As this PL creation behaviour was only apparent in one participant, it is not its own stand-alone UT. However, as it shows such specific characteristics and behaviours and was further hinted at by some participants of the survey, it seemed important enough to mention here and be made a sub-type to the Shortlister.

Other Patterns & Behaviours   Besides the four overarching UTs and the sub-type, other behavioural patterns were observed and mentioned by some participants. They, however, do not seem to be generalizable enough or of such

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[23]the main PL of the MSP that contains all the songs that a user liked so far. On Spotify this would be the "Liked Songs" list.

importance to be their own UT or even a sub-type. Nevertheless, they can make the playlist creation process distinctive to some extent. Therefore, they will be explained in the following.

One such behavioural pattern includes the longevity of the playlist creation process. Some study participants mentioned that they would work on a new PL for a longer period of time, adding songs and sometimes even deleting songs over a course of several days, weeks, months or even years. In that, they might discover new music that fits, stumble upon already known but forgotten tracks they want to add, or simply take a slower approach to creating the PL. Thus, people showing those patterns will be called *'the Caretaker'* in the following of this work. Several participants of the survey hinted at such behaviour in open responses. Two people of the user tests who showed characteristics of the Caretaker are P4 and P7. Both of them even mentioned themselves that they would work on their PLs for a long time. Other traits they might have, which also tie into this, are a tendency for caring stronger about having specific themes for their PLs and wanting the songs to fit those as much as possible. This makes them more selective in the process.

Another behavioural pattern connected to creating PLs are users who care about non-music related aspects of their playlists. They will be assembled under the term *'the Aesthetician'*. Those aspects can involve a thought-through naming convention, the creation of a thumbnail (or playlist-cover), a specific and personal order of the songs within the PL, or a specific duration of the PL. They might also include other non-music related characteristics that were not found in the scope of this study. The users who show such patterns do not have to fulfill all of the ones mentioned before. Mostly they only care about one of them. Examples of participants who exhibited such behaviour are P4, P5 and P7 of the user tests. P5 might be considered a special case, as she basically has her own sub-type which includes aspects of this behavioural pattern. Therefore it might be assumed that the Systematic Shortlister also tends to care about some non-music related aspects of their PLs, making them an Aesthetician as well. Thus, it can be assumed that these two are connected, at least in a one-way relationship.

Finally, users are not restricted to only belong to one UT. Some might show characteristics of two or more types, as was the case for P3. She expressed patterns of UT1 and UT3, making her eligible for both. Therefore, these UTs do not serve as a strict grouping of people. But rather as a tool that can be utilized to help interpret the behaviours and reveal the needs of users. There is the possibility that some people do not show characteristics of any of the UT and patterns discovered in this study. This, however is part of further research on this topic and those user types, which is beyond the scope of this work.

5 Discussion

The aim of this study was to gather insights into the playlist creation process of users on MSPs. The intention was to find similarities and differences of how and why users create PLs. Ultimately, it was the goal to group users into different user types, derived from those findings. Overall, it can be said that the users indeed showed differences in how they create playlists. Through this it was possible to cluster users based on their PL creation behaviour. Four distinctive overarching user types were defined, next to one sub-type and several behavioural patterns. It is further possible to explain the differences (and similarities) within and between the distinct types. This will be done within this section.

In the following, the UTs will be discussed to parts separate and to parts in combination with each other. Each section, except of Section 5.2, is structured in the following way. First, findings from the literature will be applied to the types and interpreted. Resulting from this, suggestions to improve and personalize the playlist creation process will be given, which mainly contain design implications for the interface of MSPs. Ultimately, some other UT characteristics, not resulting in improvements, will be discussed in Section 5.7.

5.1 User Types & Level of Control

UT2 and UT3 are both characterized by using many different strategies to select songs for their playlists. Literature revealed this to be an indication for a high level of control over song choice [26]. Therefore, those UTs might desire more control for their PL creation processes. Even more so for the Searcher (UT2), as they do not use the song recommendations, and thus experience an even greater control over their selection. Literature further revealed that the more control over the choice in music a person had, the more positive the listening experience was perceived [29]. Moreover, past listening experiences influence the preferences people have in song choices for specific situations [50]. This could indicate that people belonging to UT3 and especially to UT2 had more positive music listening experiences in the past, where they experienced a high control over the song selection. They might seek out more of those positive experiences with control over their playlist creation process. This supports research done by Hagen [21]. She argues that control is an important aspect of playlist creation, and users experience this through 'claiming' songs for their PLs at specific times for specific scenarios. This ultimately lets them gain control over their musical self-identity.

Different to the Shortlister (UT4), UT4* crafts their PLs with more planning, usually having a thought through naming convention and rather specific requirements. They look mainly into their personalized PLs, however they carefully select the songs they find appealing, shortlist them in their favourites, and then put them into a new PL. With this way they might also exceed higher control over their song choices. Through this strategy, they can further control overexposure to tracks. Thus, it can be assumed that the systematic Shortlister

also seeks out more control. Although not only in the choice but rather in the collection and organization of and exposure to their songs.

Design Implications for Song Adding Functionality   In the user tests, misclicks during the process of adding a song, such as adding it to the queue instead of PL, were often observed. This happened mainly to people that belong to one of the UTs that seek out more control (UT2, UT3). This might hint at a connection between this characteristic and this problem. Further, those misclicks are also partly happening due to small buttons on the mobile versions of streaming apps. Another issue connected to adding songs and stated by many people in this study is that it takes too many steps and clicks to add a song to a PL. Although, as the results suggest, the majority of people find the process of adding songs to be easy and intuitive, many still complained about it. Therefore, it should be improved upon.

One solution could be to improve and expand on features such as the "Add songs" space of Spotify (see Figures 5 and 6). The unique aspect about this is that songs can be added immediately to the PL via one click. It already provides a good solution, making the adding process much easier and convenient. However, there are a few needs to be discussed here.

First, this feature is not known enough and overlooked quite easily. In fact, only three out of eight participants from the user tests utilized it, although two of them rather shortly. The MSPs therefore need to make this feature more present and visible, so users are more keen to use it. More marketing for such features, have pop-ups explaining it, or make the button to access it more visible and noticeable could help.

Second, within this space, after a song was added, the user gets automatically redirected back to a view with recommendations (see Figure 6a). This takes away from the control of users. It was even mentioned as a frustration of P7, who belongs to the All-Rounders. Enabling it to be deactivated would let people keep their level of control over the song selection. It should not, however, be deactivated by default for everyone. Some users, who do not seek such control (such as UT1), might welcome this aspect. Providing an option within the settings or asking about it in a pop-up could solve this.

A possible easier and quicker solution for MSPs to improve the song adding functionality could be to make this action more intuitive. By that, make the buttons bigger and more visible and avoid having elements with a similar name right next to or below each other, e.g. 'Add to Playlist' and 'Add to Queue'. Moreover, having a button that enables to add a song directly to a PL could solve many of those struggles. Furthermore, this action could be given an according swipe gesture on mobile, which is already the case for 'Add to Queue'.

Design Implication for Song Arrangement Functionality   Another way of supporting more control for users could be through making the arranging of songs within a PL easier. The opinions about the intuitiveness of this process were rather divisive. Some find it easy, some not at all. Nevertheless, two user

test participants belonging to UT3 (P6, P8) did not find this task intuitive but care about song order. Moreover, several participants stated their issues with it. The main struggle here is that the MSPs do not provide many options for customizable arrangements of the songs. They can usually be sorted by date added, title, album and artist, however beyond those options it gets scarce. Spotify provides a 'Custom' sorting of PLs, however it seems as though it provides the same order as their 'Recently added' option. Furthermore, it is, to the best of the researchers knowledge, not possible to simply drag songs up or down within a PL. Therefore, MSPs should enable their users to have custom arranging options within their PLs. This could greatly enhance the control people experience during their PL creation process.

The survey revealed that most users do not care about song order and do not (re)arrange them. This, however, could partly be due to the current form of this task. An improvement might change this perception. Furthermore, it seems as though MSPs, at least Spotify, have more focus on enabling this kind of control and customization in the song queue, as here the dragging of songs is enabled. Further research on this aspect could help reveal how much support for the users' control this functionality can provide.

5.2   User Types & Personality Traits

UT2 and UT3 both leverage (existing) PLs as song selection methods for creating their own new lists. Literature showed that people with the personality traits of 'opinion leader' and 'conscientious' select more often PLs for listening to music [31]. Those personality traits show higher abilities in planning, which might be the reason behind them using this music selection method more often. PLs require a certain amount of effort and carefulness in crafting, which those personalities could thus handle well. Therefore, it might indicate that the Searcher and the All-Rounder generally tend to lean towards those two personality traits. They, however, do not hold for UT1 and UT4. They either rely heavily on recommendations or use PLs simply to save songs, which does not require a high level of planning. Both of them do not necessarily put much effort into the crafting. Nevertheless, it could be applied to the systematic Shortlister (UT4*). Users of this type tend to carefully craft their PLs, even though they might abandon them quite quickly and tend to use only one at a time.

All in all it can be assumed that the two personality traits of 'opinion leader' and 'conscientious' might be quite prevalent in users of the types UT2, UT3 and UT4*, however more research has to be done to further prove this theory.

5.3   User Types & Song Recommendations

The UTs can be categorized into two groups. The ones that use song recommendations (UT1, UT3), and the ones that do not or rarely use them (UT2, UT4). UT4, however, is a special case, as they do not look at the suggestions at the end of a PL, but they might use the personalized PLs a lot, which are

also a form of recommendations. For this part however, only the use of song suggestions at the bottom will be discussed.

The differences in the desired level of control for song selection could partly explain the distinction in the use of recommendations by the four UTs. As already stated above, people who desire more control over their choices in tracks, use the recommendations less. This might be because those song suggestions are based on algorithms and thus take away the control from the user. Some people might not get the same satisfaction out of finding a track through suggestions compared to their own search effort. For others, however, this is a welcome delight, as they simply need a quick and easy way of finding and adding songs. Thus, they see the playlist creation process rather as a chore, than a fun activity. This type of user is represented by the Truster (UT1). Literature states that less control leads to more negative listening experiences [29]. The Truster, however, wants to have less control and welcomes the algorithm features of the streaming service, to help them create PLs fast and effortless. It cannot be argued that their music listening experience is less positive than those of the other types. Hence, it has to be differentiated in users who seek out more control, and thus use less song recommendations, and those who do not, and thus use them extensively.

The above discussed personality traits could be a further reason behind this split in the use of recommendations. As discussed, users who possess those personality traits (conscientious and opinion leader) are more adverse in planning and thus might craft their PLs with more care. Further, they seem to use song suggestions much less. The UTs connected to those traits are UT2, UT4* and UT3. The latter does use the track suggestions provided by the MSP, however less so than UT1. This might indicate that users who utilize the recommendations more, such as the Truster, care less about the overall process of crafting PLs. Those people might simply create PLs for the sake of having different lists for different scenarios. They do not feel the need to put in the effort to have the perfect selection of songs. They see the algorithm as a means to do this for them, which ultimately saves them time and effort. However, UT4 was also shown to not have those personality traits, but does not characterise themselves by a frequent use of song recommendations. Therefore, this implication has to be seen with carefulness and needs further approvement through future research.

The split in use of song recommendations is quite prevalent in the four UTs. People gave legitimate reasons for not using those suggestions. Nevertheless, the algorithmic features of MSPs were shown to be able to broaden the music knowledge of users and enhance PLs with new and surprising pieces [21], [55]. Therefore, it can indeed be beneficial to use those track suggestions more, even though they might be perceived as less important. Hence, the MSPs need to improve on them.

Design Implications for Song Recommendations   MSPs should make the song recommendations more visible and attractive to leverage for users, espe-

cially those who tend not to look at them. Participants in this study revealed that they might simply overlook or not think about them. One way to increase the visibility and usability of those recommendations is again linked to the concept of the "Add songs" space of Spotify. If, as already described in Section 5.1, such a feature is made more prominent, people might be more prone to use the recommendations. They are quite heavily focused on within this space (see Figure 6a), which would help to promote their usefulness.

One way to improve on the recommended songs themselves would be to integrate context information into the algorithm. It was found that context can improve recommendations and counter their popularity bias [61]. A solution to enhance song suggestions through situational information could be by having the user indicate the context of their PL themselves. This could, for example, be realized through providing them an option within the PL to specify the purpose it serves. This information could be incorporated into the algorithm and the recommendations could be adjusted accordingly. This could even further improve the perceived level of control of users. By conveying this information themselves, people might feel as they are in charge of their streaming experience. This could in turn also make recommendations in general more attractive for those types of users, who tend to use them less. There are already existing solutions for these context-based recommendations, namely situation-aware music recommender systems (MRSs). According to Schedl et al. [53], they however lack in ways that they only incorporate one context-based data point, such as location or time of day, or only handle one specific scenario. The authors argue that a commercially used system that incorporates several context-based information and is used on a wide scale by many users is still missing. This shows that there are already attempts in realizing this improvement and prove the legitimacy of it. However, it might need one of the big players to integrate and test such an algorithm to make it available and workable on a large scale. What could be a huge barrier to overcome is the fact that context-based information is based on highly sensitive data with many privacy concerns [53].

Overall, a combination of more context-based suggestions and a more prominent "Add songs" feature could help increase the use of song recommendations greatly as well as positively change people's perception of them. This could even be taken a step further with so called psychologically inspired MRSs. According to Schedl et al. [53], they would incorporate personality and emotion of the user as input in their recommendations. Both of them were shown to influence listening behaviour, taste and the PL creation process. Thus, they could be powerful tools to give even more accurate song recommendations.

5.4   User Types & Song Familiarity

In this study as well as in literature song familiarity was shown to be an important aspect of song selection and ultimately the PL creation process. The findings and implications about this will be discussed in this section. There are two concepts to song familiarity that will be presented separately. Firstly, the relationship of some UTs and their favourites will be interpreted. Secondly,

the concept of over-exposure, which is linked to UT4*, will be examined. The structure of both parts is still congruent to the previous ones.

5.5 User Types & Favourites

It was found that there are users on MSPs who mainly add familiar songs to their lists. This was apparent in the Shortlister (UT4), but could also be applied to the Searcher (UT2) and partly to the Truster (UT1). Prior research found familiar tracks to be the most preferred choice for activities [26] and that familiarity in general influences music taste significantly [17]. Therefore, song familiarity is an important aspect to recognize for selecting songs for a PL for UT4, UT2 and UT1. The Searcher was shown to mainly select familiar songs due to the higher trust in their own taste. UT1 is not as straight forward. They were shown to have less PLs and add only a few songs. Those are often familiar tracks, however can also contain new ones, as they use the recommendations extensively. The Shortlister is characterized by using very few, up to only one, favourites-list(s). Thus, the few PLs they own contain mostly songs that they like and are quite familiar with. Instead of creating several lists for different listening intentions with fitting songs, they simply listen to their favourites at random and skip the tracks that do not fit their current context.

Design Implications for Favourites   This manual skipping might take away from the listening experience, especially when music is accompanying other activities. To prevent and improve on this, the streaming services could, similarly to the suggestion for context-based recommendations, let the users choose the context of listening within their PL. Through this, the platform could choose the most fitting songs for this scenario out of the whole favourites list and mainly play those. This could help increase the listening experience and make it more automated, which is something that UT4 would welcome. This could be even taken a step further with including song recommendations in the listening queue, that fit the context. This would further also be a beneficial feature for the Truster. They tend to use the automated playlist continuation functionality of streaming services anyway, and thus would have an even better experience through those context-based suggestions. This could lead to users of this type not having to create several different PLs for different scenarios. They could rather simply listen to their context-dependent favourites with context-based recommendations in between. An even further improvement on this would be an option to change the amount of recommendations played, making it possible to tailor this feature according to the different UT preferences.

Although automatic playlist continuation (APC) is already an existing feature in MSPs and is further a current topic in research, there is still a lack of solutions that include context-based information from users listening intentions [53]. A good starting point for this would be, as said above, to enable the person to indicate the information about the listening situation themselves. This would be a direct way of obtaining this type of data and would need less computational effort than analyzing playlist name or musical similarities.

5.6   User Types & Over-Exposure

Unlike UT4, the systematic Shortlister (UT4*) does not add mostly familiar tracks to their PLs. They are characterized by shortlisting songs in their favourites list, while further adding the new found songs into a separate PL. Although the reasoning behind this rather specific strategy might be connected to song familiarity after all, more precisely overexposure. Lamont and Webb (2010) [32] found that people tend to have daily favourites which they change regularly to tackle overexposure. Therefore, UT4* might use their strategy of shortlisting and creating many current favourites PLs to not get over-familiarized with the songs. The process of adding tracks into the favourites list, however, appears to be more of an in between step. This might be a result from the UI not supporting the systematic Shortlister in ways to do this task with less steps as of now.

Design Implications for Shortlisting   One way of making this specific process more intuitive could be to enable multi-selection for songs. This means that several tracks could be selected at the same time, e.g. through pressing on the song element in a list longer until it is highlighted (and selected). Through this, users could easily and quickly select all the tracks they want to create their new PL with and directly add them to it. This could be even taken a step further by enabling multi-selection also for playlists. By that, in the list that pops up when a user wants to add a song to a PL, the same principle could be applied. Several PLs could be selected and the songs added to them simultaneously. Functionalities like this could greatly enhance the experience of users and make this process much faster. Furthermore, such a feature could also be seen as to provide the user with more control over the song selection, and thus be much desired by other UTs as well.

5.7   Discussion of User Type Characteristics

Difference of dependent vs. independent Searcher   The Searcher (UT2) was found to have two distinct characteristics that people might show. On the one hand, some users of this type might only look into their self-created PLs (the independent Searcher). On the other hand, some might only look into those curated by others (the dependent Searcher). Prior research revealed that people who are less engaged with music were more likely to use other people's music and taste, while more engaged individuals indicated an urge to own music [17]. This might explain the difference between those two behavioural patterns. In fact, the two participants who represent those characteristics, P1 and P6 respectively, were shown to differ in their engagement with music. P1 was found to be more engaged and trusting in their own taste. P6 is less engaged and more influenced by the taste of others. Those aspects support the implication of the difference between those two characteristics based on literature. Thus, the independent Searcher is a more music engaged user who might have more trust in their taste. Hence, they mainly take songs out of their self-created PLs to add to new ones.

The dependent Searcher is a lesser with music engaged user who might have less faith in their taste. They get more influenced by others and thus mainly look into curated PLs.

User Types & Mindset for Search   Each UT showed distinct ways of how they select and search for songs. Literature revealed that the mindset of users affects the way they search for music [23]. People with a focused mindset usually search for songs in the overall streaming collection [23]. The dependent Searcher searches for songs in the overall collection, and importantly mainly looks at PLs of others. This might mean that they approach their playlist creation with a rather focused mindset. Users with an open mindset search in the personal library [23], which might be suitable for the independent Searcher. They also search in the overall collection, however mainly look into their self-created lists. Thus, they might usually have a rather open mindset while creating PLs. Those with an exploratory mindset use a less directed search and thus many different strategies [23]. The All-Rounder (UT3) uses many different song selection and search methods in different ways and thus has a less directed approach to finding tracks. Therefore, they might create their PLs in a rather explorative way. It could also be argued that UT3 approaches the process with a focused mindset, as they too search within the overall streaming collection. However, due to the less directed nature of the exploratory mindset and thus using many different strategies this seems to be the more appropriate choice for this UT.

An observation made during the user tests was the wrongful use of different search bars within the streaming app. It was done mainly by people belonging to the Searcher or the All-Rounder. Some participants accidentally wrongfully used the search bar inside their personal library view to look for new tracks, artists or playlists. This could be connected to the different mindsets people might show during their song search. Especially the exploratory and open mindsets might be affected by this, as they hint at a rather unfocused strategy. This theory could further help explain the problems people face while adding songs to PLs, as discussed in Section 5.1. However, the use of the wrong search and the misclicks while adding a song also happened to P6, who would represent the focused mindset. Therefore, it cannot be confidently assumed that there is a strong connection between those problems and the mindset of the user at this stage. Further research into this area has to investigate more precisely how different mindsets affect the playlist creation process.

6   Conclusion

The aim of this study was to get a better understanding of how users of music streaming platforms create their playlists. Quantitative and qualitative analysis was used to classify people with similar PL creation behaviours and characteristics together to form meaningful user types. This ultimately helps to make more sense of this rather personal process.

At first it was examined if the participants actually have differences in their PL creation process. This was the aim of RQ1. The results show that users of MSPs indeed show significant distinctions in the way they create their lists.

The user tests revealed four main ways in how people realize this task. Some look at many different places to add songs, but do not use recommendations. Others heavily rely on them. Some might shortlist tracks to their favourites-list. Most people were searching and looking at many different places, while continuously checking the updated recommendations for songs to add.

Based on those differences and similarities, it was possible to derive and define four distinct user types. Therefore, RQ2, which asked if these differences can be explained through classifying users into types, could be answered positively.

UT1, the Truster, mainly uses song recommendations to find and add songs to their PLs. The Searcher (UT2) leverages the search functionality the most and does not use the recommendations. Here, two distinct characteristics were found connected to the use of their own (the independent Searcher) or others (the dependent Searcher) PLs. The most common UT, the All-Rounder (UT3), uses many different methods for selecting songs. UT4, the Shortlister, adds songs to one or only a few favourites PLs. A sub-type found here is the systematic Shortlister (UT4*), who creates new PLs with shortlisted songs.

Furthermore, other behavioural patterns were discovered and reported. Although they were not important enough to be recognized as their own over-arching UT, they still contribute to the explanation of the distinctions within playlist creation. Those patterns are called the Caretaker and the Aesthetician.

The results of this study and especially the behavioural characteristics observed within the user types support some of the findings and theories prior research revealed. They further help to explain the differences in behaviours within and between the types. All in all, the different levels of control users experience during the playlist creation task is a crucial factor. Song familiarity was recognized as an important track selection and PL creation aspect. There was a split in the usage of song recommendations discovered within the four UTs. This might as well be connected to the level of control, however could further be linked to certain personality traits.

Classifying the users into distinct types for playlist creation made it possible to discover several needs connected to this process. The "Add songs" feature[24] already provides a sufficient solution for many issues that are faced during the creation of PLs. However, there are some enhancements to be made. Including

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[24]unique to Spotify, however advisable for other MSPs as well

context-based information in song recommendations could make them more accurate and enhance the playlist experience of users immensely. Furthermore, smaller improvements, such as a more customizable song arranging option, can already make the playlist creation process more intuitive.

In summary, this research revealed several different strategies users utilize to find, select and add songs to and ultimately create their playlists. Based on these differences and similarities they were classified into four overarching user types. Several other behavioural patterns were discovered and described as well. They provide a sufficient tool to understand the PL creation process and users behaviours better. Based on these findings, suggestions for design implications of UI elements and processes were given. These could cater the PL experience of each UT and ultimately enhance and simplify the process for all users. Although the implications presented in this study give an adequate impression of the playlist creation process, certain aspects that need further research were discovered. Those will be discussed in the following part, next to the limitations of this work.

6.1   Limitations & Future Research

This study faced some limitations. The scenarios might have had an influence on the way people created their PLs in the user test sessions. Research showed that situational factors are one of the main reasons influencing song selection behaviour and are especially important for explaining differences in selections within a person [18], [37], [67]. Therefore, the three scenarios presented as options in the user test might have had an influence in the way the participants created their PLs. There is a chance that some would have approached another scenario differently than the one they chose. However, all of the participants stated that they would usually create PLs the way they did during their session. Thus, it can be assumed that the overall methods and strategies they used during the experiment are representative of their general PL creation behaviour. Further, having the people select a specific scenario gives further insights on their playlist creation behaviour. Nevertheless, smaller rather specific aspects might have been apparition due to the scenarios. An interesting aspect for future research could be to look into how people create PLs when they are not given any or more pre-defined scenarios. This could give even more insights on the creation purposes.

Another limitation of this study lies in the sample for both methods. Each is made out of mainly people in their 20s. Although it was not indicated by the participants, it can be assumed that many of them came from a university background, being currently students or recent graduates. This is a very likely given, due to the background of the researcher and the use of convenience sampling. Although there are arguments in favor of the generalizability and legitimacy of this population, as stated in Section 3, a similar study should be conducted with a more diverse sample. This could give insights into aspects that stayed unanswered with this study, such as if age is a factor that influences the difference in users' playlist creation.

In this research solely the initial playlist creation process was considered, which gave valuable insights into how users create PLs. It was, however, revealed in this study that many people would craft their PLs over a longer time, spanning from several days up to several years. Therefore, future studies should look at the playlist creation process, or in this case rather the playlist curation process, over a longer time frame. The present study already hinted at differences regarding this aspect. In that some might carefully update them from time to time, while others might abandon them after they served their purpose. Conducting such research could give new important insights on the handling of playlists and further help classifying people into more user types.

The present work revealed that others influence the way people create PLs, which supports findings of prior research. Further, participants of this study mentioned collaborative playlists as something they would utilize in certain scenarios. These kinds of lists gained more importance in research in recent years through studies such as [40]–[42]. However, to the best of the researchers knowledge, the actual PL creation process of those lists was not yet investigated. This provides a significant opportunity for future studies to take the approach presented here and include social dynamics of users.

Although there was a connection between some UTs and certain personality traits shown, they can not be fully supported at this stage. However, this is an interesting topic that further research should investigate. Exploring the distinct personalities of users from each type could help explain the differences between them clearer. Moreover, as already mentioned above, information about the personality of a streaming user can be leveraged for psychologically inspired MRSs [53]. This would enable even better and more accurate song recommendations.

Overall, the suggestions for (UI) improvements of MSPs given in the present study are not designed or tested in any way. They are rather ideas and concepts that became reasonable and useful through the findings of this research. Hence, future work could realize those suggestions and test them with users. This could put the results of this study more into perspective and give a clear indication on the needs of each user type.

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Appendices

A   Online Survey Questions

Participant Validity Check

Q1   Do you have an active account on any music streaming platform? (for example: Spotify, Apple Music, Prime Music, YouTube Music, Deezer, etc.)
Answer options:

- Yes

- No

Q2   Did you create at least one playlist on your own within your music streaming platform?
Answer options:

- Yes

- No

Playlist Creation Familiarity

Q3   How often do you create playlists?
Answer options:

- Almost never

- Once a year

- Once every half year

- Once a month

- Once a week or more

Q4   How many self-created playlists do you have currently?
Answer options:

- 1-5

- 6-10

- 11-15

- 16-20

- More than 20

Q5 How many songs (on average) are usually in your self-created playlists?
Answer options:

- Less than 10

- 10-20

- 21-30

- 31-40

- More than 40

Playlist Usage & Update Behaviour

Q6 How many of your self-created playlists do you use regularly?
Answer options:

- I use almost none regularly

- I use only a few regularly

- I use some regularly

- I use most regularly

- I use almost all regularly

Q7 How often do you **add** songs to your self-created playlists?
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q8 For how many of your self-created playlists do you **regularly add** songs?
Answer options:

- I almost never regularly add songs to my playlists

- I regularly add songs to a few of my playlists

- I regularly add songs to some of my playlists

- I regularly add songs to most of my playlists

- I regularly add songs to almost all of my playlists

Q9 How often do you **delete** songs from your self-created playlists?
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q10 For how many of your self-created playlists do you **regularly delete** songs?
Answer options:

- I almost never regularly delete songs from my playlists

- I regularly delete songs from a few of my playlists

- I regularly delete songs from some of my playlists

- I regularly delete songs from most of my playlists

- I regularly delete songs from almost all of my playlists

Playlist Creation Purposes

Q11 For what purposes do you mainly create your playlists? Examples: different genres, different emotions, specific scenarios, seasons, for every month, holidays, etc.
Open question

Playlist Creation Themes & Behaviours

Q12_1 Do you create genre specific playlists?
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q12_2 Do you create playlists for different moods?
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q12_3 Do you create playlists for specific scenarios / situations?
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q12_4 Do you create playlists that are a combination of all or some of the above (genre, mood, scenario/situation)?
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q13 Can you give examples of those moods? Examples could be playlists for when being sad, frustrated, angry, relaxed, happy, mindful, grieving, etc.
Open question

Q14 Can you give examples of those scenarios / situations? Examples could be playlists for workout, houseparty, sleeping, wedding, lying in the sun, driving the car, commuting to work, working/studying, etc.
Open question

Playlist Characteristics

Q15_1 The songs in my self-created playlists generally have to fit together.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q15_2 The songs in my self-created playlists generally have to have appropriate transitions.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q15_3 The songs in my self-created playlists generally have to be from the same or similar genre(s).
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q15_4 My self-created playlists generally have to have an overall theme.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Order & Arrangement of Songs in Playlists

Q16 The order of the songs in my self-created playlists matters to me.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q17 I (re-)arrange the order of the songs in my self-created playlists.
Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q18 How do you order the songs?
Answer options (multiple selections possible):

- By title (alphabetical)

- By artist

- By date added

- By album

- Personally (+ text entry field)

- Other (+ text entry field)

Usage of MSP features

Q19_1 Do you use **personalised** playlists provided by the music streaming service?

Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q19_2 Do you use **curated** playlists provided by the music streaming service?

Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q19_3 Do you use the song recommendations provided by the music streaming service for **creating** playlists?

Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Q19_4 Do you use the song recommendations provided by the music streaming service for **updating** playlists?

Answer options:

- Almost never

- Rarely

- Sometimes

- Often

- Almost always

Playlist Sharing Behaviour

Q20 Do you share your self-created playlists with others?
Answer options:

- Never

- Only specific playlists (please elaborate) (+ text entry field)

- Only if I get asked to

- Only with friends / family / selected people

- Yes

- I don't know / I didn't know this was possible

Q21 Are your self-created playlists public?
Answer options:

- No, none

- Only specific ones (please elaborate) (+ text entry field)

- Yes, some

- Yes, all

- I don't know / I didn't know this was possible

Satisfaction & Likeness of Created Playlists

Q22_1 I generally like the playlists I create.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q22_2 I am overall satisfied with the playlists I create.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q22_3 I am overall satisfied with the choice of songs I put in my playlists.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q23 Can you elaborate on the above? (Why do you like/dislike your playlists, etc.)
   Open Question

Perceived Difficulty of Playlist Creation Process

Q24_1 Overall I find it difficult to create playlists on music streaming platforms.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q24_2   The playlist creation process is intuitive and easy to learn.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q24_3   Adding songs to my self-created playlists is easy and intuitive.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q24_4   Deleting songs from my self-created playlists is easy and intuitive.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q24_5   Ordering or rearranging songs in my self-created playlists is easy and
intuitive.
   Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q25 Can you give examples of aspects you find difficult while creating playlists on music streaming platforms?
Open question

Demographics

Q26 What is your age?
Open question

Q27 Gender: How do you identify?
Answer options:

- Male

- Female

- Non-binary / third gender

- Prefer not to say

- Prefer to self-describe (+ text entry field)

Q28 Which of the following statements apply to you?

Q28_1 I am a music enthusiast.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q28_2 Compared to my peers, I listen to a lot of music.
Answer options:

- Strongly disagree

- Disagree

- Neither agree nor disagree

- Agree

- Strongly agree

Q29 How much do you listen to music on a daily basis?
Answer options:

- Less than 1 hour

- 1-2 hours

- 2-4 hours

- 4-6 hours

- 6-8 hours

- 8-10 hours

- More than 10 hours

Q30 What is your preferred device for listening to music? Please drag the items to the right box and rank the choices in importance (top-down, most to least used). If you do not own some of the devices, you can ignore them.
Items:

- Smartphone

- Laptop

- PC

- Tablet

- MP3 Player / iPod

- Radio / CD Player

- Record Player

- Smart Speaker (Amazon Echo, Google Home, etc.)

- Other (+ text entry field)

Items had to be ranked by preference/importance of usage.

Q31 What is your preferred device for creating playlists on music streaming platforms? Please drag the items to the right box and rank the choices in importance (top-down, most to least used). If you do not own some of the devices, you can ignore them.
Items:

- Smartphone

- Laptop

- PC

- Tablet

- Other (+ text entry field)

Items had to be ranked by preference/importance of usage.

Sharing of Spotify Account

Q32 Would you be willing to share your Spotify user name, if applicable? Through that, the research team would gain access to your **public** playlists for further analysis. The data will only be used for this specific study and will be fully anonymised. If yes, please state your **username** in the text field below.

Explanation on where to find the username was given as follows:
Where can I find my Spotify username? (Be aware, your display name is NOT your username!)
In the mobile app you can find your username by clicking on the settings icon on the home screen in the upper right corner and then 'Account'. (please note that for some phones you cannot see your username in the app on the phone, but only on a laptop, tablet, or PC.)
On your laptop or PC you can find your username by clicking on your Profile name and then 'Account' in the upper right corner.
Further instructions and screenshots can be found on those two webpages:
https://support.spotify.com/us/article/username-and-display-name/
https://www.businessinsider.nl/how-to-find-spotify-username?international=true&r=US

B Pre-Test Questionnaire

Q1: What is your name?

Q2: What is your age?

Q3: How do you identify? (Gender)

    ☐ **Female**

    ☐ **Male**

    ☐ **Non-binary / third gender**

    ☐ **Rather not say**

    ☐ **Rather self-describe**

So now I will read some statements to you and then you will have to tell how much you agree or disagree to the statement.

Q4: I am a music enthusiast.

    ☐ **Strongly disagree**

    ☐ **Disagree**

    ☐ **Neither agree nor disagree**

    ☐ **Agree**

    ☐ **Strongly agree**

Q5: Compared to my peers I listen to a lot of music.

    ☐ **Strongly disagree**

    ☐ **Disagree**

    ☐ **Neither agree nor disagree**

    ☐ **Agree**

    ☐ **Strongly agree**

Q6: How much do you listen to music on a daily basis? (per average, more or less)

☐ **Less than 1 hour**

☐ **1-2 hours**

☐ **2-4 hours**

☐ **4-6 hours**

☐ **6-8 hours**

☐ **8-10 hours**

☐ **More than 10 hours**

Q7: For what purposes do you mainly create playlists?

(This could be for example for different genres, for specific moods you have, for certain activities, for different situations, for time periods such as months, for seasons, and so on)

Depending on what they answer also ask for: what specific situations/activities, what specific genres, what specific moods/emotions?

Additional questions if needed:

Q8: For what specific genres do you mainly create playlists?

Q9: For what specific moods do you mainly create playlists?

Q10: For what specific situations/activities do you mainly create playlists?

C Post-Test Interview Script

So now we will have a short interview about playlists and the creation process. This won't take too long.
I will ask you a few questions regarding the task you just did but also what applies to you in general.
A lot of the questions are just going to be statements where you have to agree or disagree to.

Ask about the scenario!
Why this specific scenario?
Did they have a specific situation in mind?
Did they create a playlist for this (exact or kind of) scenario before?
How did they approach the scenario in their thinking?

Q1: Do you like the playlist(s) that you just created?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why? Can you elaborate on that?

Q2: Are you satisfied with the playlists that you just created?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why? Can you elaborate on that?

Q3: Are you overall satisfied with the choice of songs you put in the playlist(s) you just created?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why? Can you elaborate on that?

Q4: In general, do you like the playlists you create?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why? Can you elaborate on that?

Q5: In general, are you satisfied with the playlists you create?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why? Can you elaborate on that?

Q6: In general, are you satisfied with the choice of songs you put in your playlists?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why? Can you elaborate on that?

Q7: Would you share this playlist with someone?

☐ **No**

☐ **Yes**

☐ **I don't know**

→ If yes, with who and why?
→ If no, why?

Q8: Are your self-created playlists (other than the one you just made) public?

☐ **No, none**

☐ **Only specific ones**

☐ **Yes, some**

☐ **Yes, all**

☐ **I don't know / I did not know this was possible**

→ please elaborate

Q9: Overall, do you find it difficult to create playlists (on Spotify)?

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

→ Why?
→ Was there anything in particular right now during this task that you found difficult?

Ask about a specific observation you made during the test here!
Why did they do it like that? Why not differently?
What was there exact thinking behind it?

Now I have some statements about the perceived difficulty of the playlist creation process, that I want you to agree or disagree on, the same way as before with the 5-point scale.

Q10: The playlist creation process is intuitive and easy to learn.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q11: Adding songs to self-created playlists is easy and intuitive.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q12: Deleting songs from self-created playlists is easy and intuitive.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q13: Ordering or rearranging songs in self-created playlists is easy and intuitive.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Now I have some statements about your self-created playlists in general. So please think about the ones you already made, and not necessarily about the one you just made.

Q14: The songs in my self-created playlists generally have to fit together.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q15: The songs in my self-created playlists generally have to have appropriate transitions.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q16: The songs in my self-created playlists generally have to be from the same or similar genre(s).

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q17: My self-created playlists generally have to have an overall theme.

☐ **Strongly disagree**

☐ **Disagree**

☐ **Neither agree nor disagree**

☐ **Agree**

☐ **Strongly agree**

Q18: How many of your self-created playlists do you use regularly?

☐ **I use almost none regularly**

☐ **I use only a few regularly**

☐ **I use some regularly**

☐ **I use most regularly**

☐ **I use almost all regularly**

Q19: How often do you **add** songs to your self-created playlists?

☐ **Almost never**

- [ ] **Rarely**
- [ ] **Sometimes**
- [ ] **Often**
- [ ] **Almost always**

Q20: How often do you **delete** songs from your self-created playlists?

- [ ] **Almost never**
- [ ] **Rarely**
- [ ] **Sometimes**
- [ ] **Often**
- [ ] **Almost always**

Q21: The order of the songs in my self-created playlists matters to me.

- [ ] **Strongly disagree**
- [ ] **Disagree**
- [ ] **Neither agree nor disagree**
- [ ] **Agree**
- [ ] **Strongly agree**

Q22: I (re-)arrange the order of the songs in my self-created playlists.

- [ ] **Almost never**
- [ ] **Rarely**
- [ ] **Sometimes**
- [ ] **Often**
- [ ] **Almost always**

In case I need to explain the terms:
- **personalised playlists** by the music streaming service: playlists that the streaming service created for you and only for you, such as "Discover Weekly" on Spotify.

- **curated playlists** by the music streaming service: playlists that are created and updated by the streaming service and are accessible by everyone (they are not specifically made for you), such as genre playlists by Spotify, "This is ..." playlists by Spotify.
- **song recommendations** for playlists: the songs that are suggested by the streaming service to you within your playlists; they are mostly found at the bottom of the playlist screen.

Q23: Do you use **personalised** playlists provided by the music streaming service?

☐ **Almost never**

☐ **Rarely**

☐ **Sometimes**

☐ **Often**

☐ **Almost always**

Q24: Do you use **curated** playlists provided by the music streaming service?

☐ **Almost never**

☐ **Rarely**

☐ **Sometimes**

☐ **Often**

☐ **Almost always**

Q25: Do you use the song recommendations provided by the music streaming service for **creating** playlists?

☐ **Almost never**

☐ **Rarely**

☐ **Sometimes**

☐ **Often**

☐ **Almost always**

Q26: Do you use the song recommendations provided by the music streaming service for **updating** playlists?

☐ **Almost never**

☐ **Rarely**

☐ **Sometimes**

☐ **Often**

☐ **Almost always**

Do you have any further questions or remarks you want to make or things you want to say?

D User Test Consent Form

Difference in User Types for User-Generated Playlist Creation on Music Streaming Platforms

Consent form for participation in the Study.

Please complete the form below by ticking the relevant boxes and signing on the line below. A copy of the completed form will be given to you for your own record.

☐ I confirm that the research project **"Difference in User Types for User-generated Playlist Creation on Music Streaming Platforms"** has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

☐ I consent to the material I contribute being used to generate insights for the given research project.

☐ I am aware that I will use my personal device for the study. No information other than what is seen on the screen recording will be gathered from the device.

☐ I am aware that I will use my personal Spotify account for the study. No information other than the username and what is seen on the screen recording will be gathered from it.

☐ I am aware that the researcher will take an **audio** recording of the session. I understand that I can request to stop these recordings. I understand that I can ask for the recording to be deleted.

☐ I am aware that the researcher will take a **screen** recording of the session. It will only be recorded what is seen on the screen of the device for the duration of the study. I understand that I can request to stop these recordings. I understand that I can ask for the recording to be deleted.

☐ I understand that my participation in this research is voluntary, that it is not a requirement, and that I may withdraw from the study at any time.

☐ I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

☐ I confirm that I am 18 years of age or over.

☐ I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes only.

☐ I understand that I can request any of the data collected from/by me to be deleted.

☐ I agree to take part in the above study on **"Difference in User Types for User-Generated Playlist Creation on Music Streaming Platforms"**.

Name of participant	Date	Signature

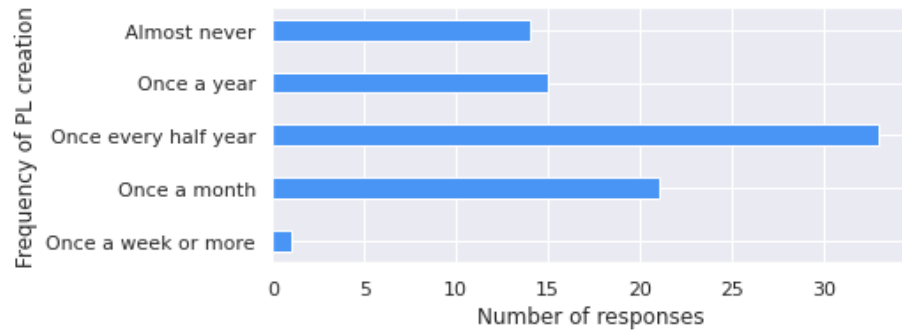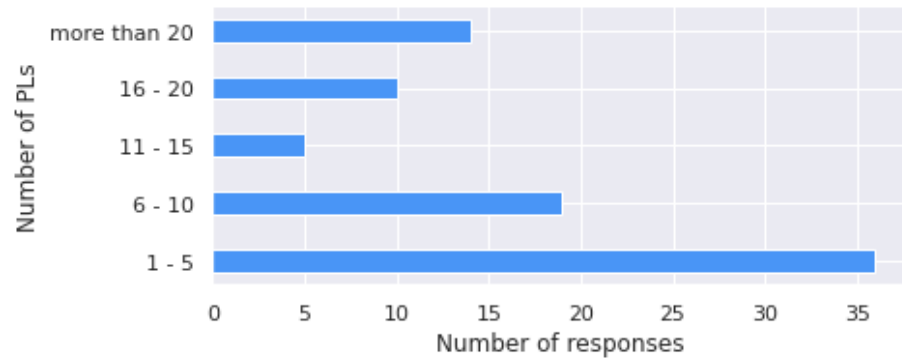|		
Name of researcher	Date	Signature

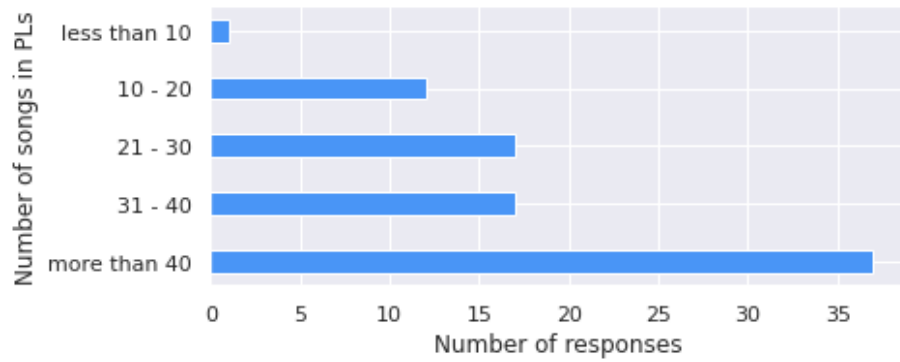# E   Survey Results for Playlist Creation Characteristics
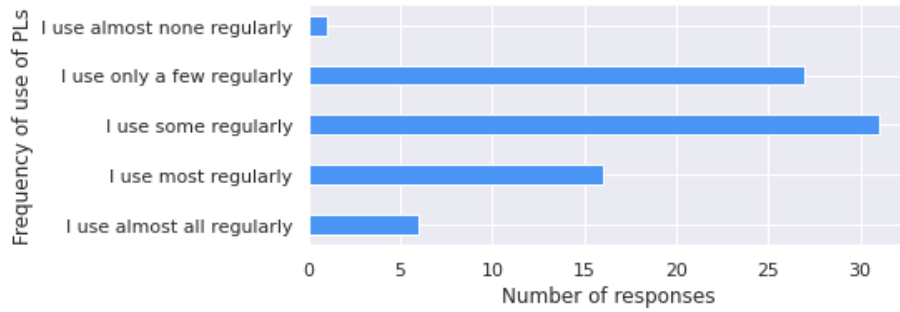

(a). Frequency of playlist creation

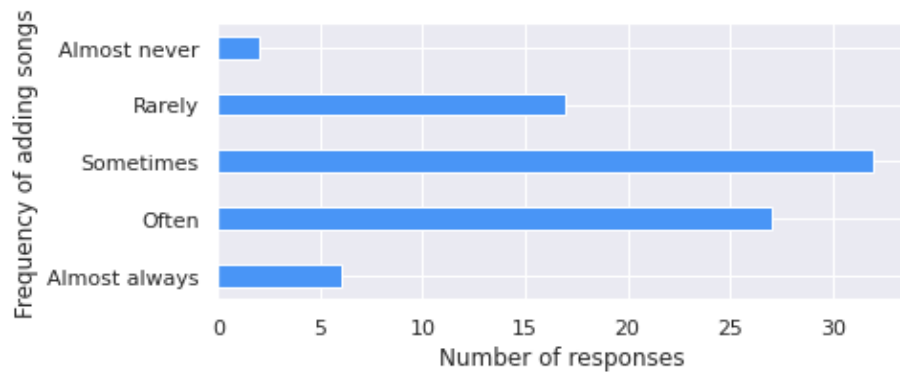*(b).* Current number of self-created playlists

Figure 11. Playlist creation characteristics questions results

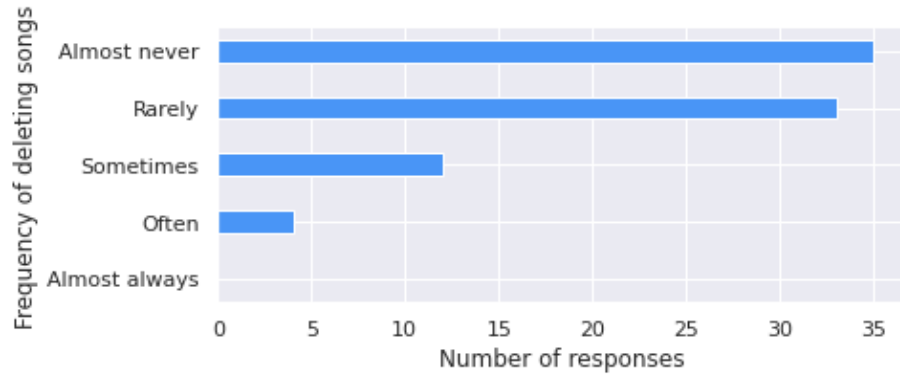*(c)*. Average number of songs in self-created playlists
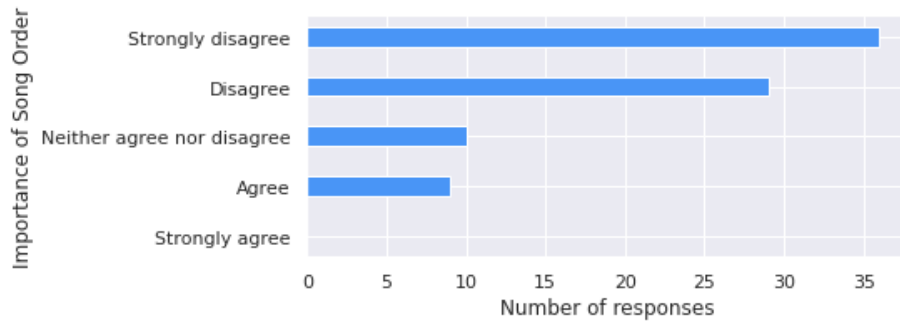

(d). Frequency of use of self-created playlists

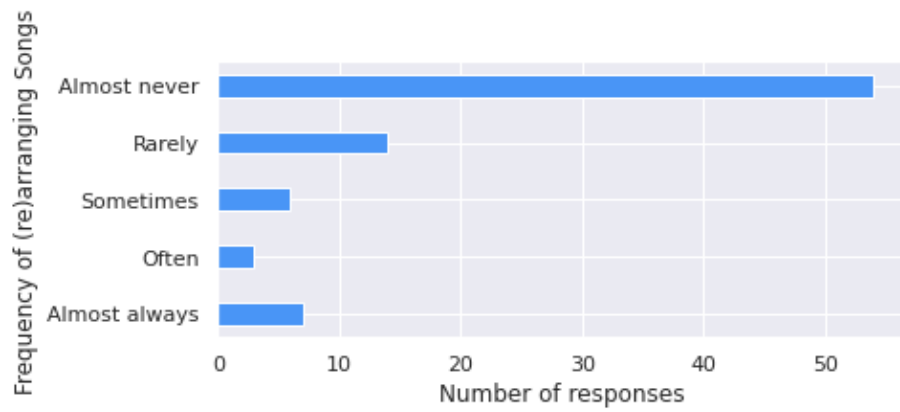*(e)*. Frequency of adding songs to self-created playlists

Figure 11. (Continued)

95

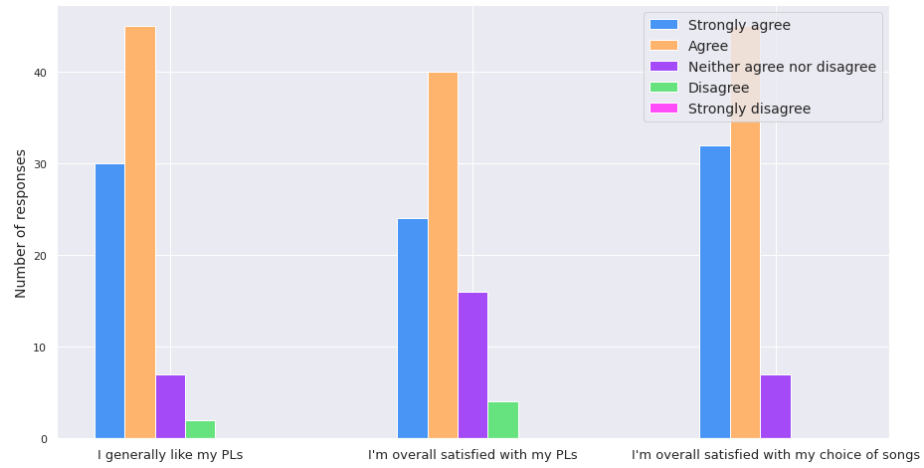*(f).* Frequency of deleting songs from self-created playlists

(g). Importance of song order within playlists

(h). Frequency of (re)arranging songs within playlists

Figure 11. (Continued)

F   Survey Results for Playlist Likeness & Satisfaction

Figure 12. Overall likeness & satisfaction of users with their self-created PLs and choice of songs