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Ubiquitous tunes, virtuous archiving and catering for algorithms: the tethered affairs of people and music streaming services

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ABSTRACT

Music streaming services all provide affordable and easy access to massive databases of music and instead attempt to increase customer loyalty by optimizing personalized recommendations and offering opportunities for listeners to build their 'own' music libraries. In this paper, these features are operationalized as the convenience, price, archive and algorithmic value of streaming services. Existing studies detail the multitude of ways of making sense of these services, but do not allow for specifying what features matter more. Drawing on an online survey and interviews, this study indicates that price, convenience and archive value predict continued intention to use music streaming services. Survey results negate the importance of algorithmic value, but the interviews suggest that for some, algorithmic individuation is too evasive to be noticed. Those who 'see' and value recommendations 'cater for algorithms' and consider their own listening and archiving practices as input for optimizing output. Combined, the different features set the stage for both overt and covert tethering of people and streaming services.

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Introduction

When music streaming services were launched, they came with an immediate and irresistible appeal: legal, affordable, and convenient access to massive databases of music. A decade later, music streaming services attempt to increase customer-loyalty by offering optimized recommendations and features for sorting and managing music (Eriksson et al., 2019; Morris & Powers, 2015; Prey, 2018). Studies on the importance of these features for music listeners detail the multitude of ways of making sense of music streaming services, but do not allow for specifying the relative importance of what factors matter more for listeners (see e.g., Hagen, 2015; Lüders, 2019; Nowak, 2016).

This paper therefore investigates the importance of different characteristics of music streaming services, operationalized as convenient and affordable access to music, opportunities to sort and organize music, and personalized recommendations. People likely

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differ in how they use music streaming services (Hagen, 2015; Lüders, 2019), and the overall research question is consequently: *How do patterns of using music streaming services shape the experienced value of these services?* If personalized recommendations and features for sorting and managing music increase loyalty, we would expect listeners who experience these features as useful to be more likely to express an interest in continuing to use these services. My intrinsic objective is to situate an inquiry of multifaceted service-experiences within a cultural context. Insights into how people see, use and value music streaming services complement existing efforts to conceptualize how these services 'see' and categorize users. A common argument is that music streaming services need to find ways to differentiate their services given that the catalogue differences are minimal (Goldschmitt & Seaver, 2019; Morris & Powers, 2015; Prey, 2019). I do not, however, examine whether music streaming services are successful in their attempts to differentiate their brand from their competitors, but treat music streaming services generically, with the proposition that experienced value and loyalty are likely connected.

Theoretically, this paper combines approaches from technology acceptance studies, collecting/sensemaking in music streaming services and algorithmic culture/individuation. This theoretical framework is chosen as each approach points to constructs that capture part of the appeal of these services, yet that have not been examined in combination. Empirically, this paper combines research interviews and a representative survey on the use of music streaming services in Norway. While the results from the survey identify what factors matter more for continued intention to use these services, the interviews elucidate how experiences covary with practices.

The paper proceeds with outlining the theoretical framework. Next, methods and measurements are accounted for, before presenting the results from the survey and findings from the interviews. Finally, results and findings are discussed. I suggest that the convenience of accessing 'any music anywhere and anytime' remains decisive, and detail how the most avid music listeners cater for and control their own service-experience, but not without empowering their service provider.

Theoretical framework and hypotheses

The prolonged efforts to understand acceptance and use of information technology within information systems research have resulted in models distilling factors related to behavioural intention. Initial models of technology acceptance were developed to predict acceptance of workplace technologies (Davis, 1989). The unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) and later extensions (Venkatesh et al., 2012) have expanded its applicability from organizational contexts to consumer-technologies, including streaming services (Chandra et al., 2018; Hampton-Sosa, 2017). Others have used elements of the model to predict intention to use music streaming services (Bolduc & Kinnally, 2018), or to predict usage rates of streaming apps (Oyedele & Simpson, 2018). This study likewise adapts elements from the UTAUT, and adds components from collecting/sensemaking and algorithm studies. The theoretical framework is used to delineate what service-specific features are expected to influence continued intention to use music streaming services. Service-specific features are here understood both as characteristics of music streaming services, and how the materiality of the service instil certain

action-potentials. The latter is important, as the experienced value of some features depends on these actually being used (Lüders, 2019).

Technology acceptance and use: convenience value, effort expectancy, price value

Performance expectancy in the UTAUT-model is defined as 'the degree to which using a technology will provide benefits to consumers in performing certain activities' (Venkatesh et al., 2012, p. 159), and is measured with items on the extent to which consumers perceive said technology as productive, useful and helping them accomplish things more quickly. This is conceptually similar to convenience value in studies of self-service and mobile technologies, denoting the flexibility, efficacy and speed of achieving a task (see e.g., Pihlström & Brush, 2008). This study applies Oyedele and Simpson's (2018, p. 298) operationalization of convenience value as adapted to streaming services and defined as the value 'of easily accessing content anywhere and anytime'. Convenience value captures service-characteristics of music streaming services, and fits with how music streaming services were originally marketed (Drott, 2018). Hence, *H1: Convenience value will have a positive effect on continued behavioural intention.*

Effort expectancy is defined as 'the degree of ease associated with consumer's use of technology' (Venkatesh et al., 2012, p. 159). In the context of hedonic systems, such as music streaming services, the degree to which these systems are perceived as easy to use can be considered particularly central. Unlike work-related systems where the interaction with the system is subordinate to completing a task, intention to use hedonic systems more strongly depend of interaction being free of effort (van der Heijden, 2004). Hence, *H2: Effort expectancy will have a positive effect on continued behavioural intention.*

Price value is the final construct included from technology acceptance and use studies. Venkatesh et al. (2012, p. 161) define price value as 'consumers' cognitive tradeoff between the perceived benefits of the applications and the monetary cost for using them'. If benefits of use are experienced as greater than the monetary cost, price value is positive and expected to predict behavioural intention. Hence, *H3: Price value will have a positive effect on continued behavioural intention.*

The contextual-oriented UTAUT-constructs social influence, facilitating conditions, hedonic motivation, and habit (Venkatesh et al., 2012) have been omitted in this study as these do not concern service-specific features, or how these are used. Excluding hedonic motivation, defined as whether using a technology is fun, enjoyable and pleasurable, needs some explaining, as it relates to the experience of using a technology. However, hedonic motivation concerns subjective experiences that are hard to pin down to material aspects of a technology or the action-potentials enabled. It should be noted that people's use of technologies also depends on external and contextual factors, and the excluded UTAUT-constructs could influence continued use of music streaming services. Future research may therefore benefit from situating adoption and continued use of media technologies into a larger social context. The narrower focus in this study is a limitation that follows from the aim of investigating the relative importance of different characteristics of music streaming services.

The strengths of the UTAUT include how the model with its validated constructs has been applied to numerous and very different forms of technologies. This implies that the theory does not include aspects that do not cut across technologies, but such specific aspects are of key interest in this paper. Music streaming services offer more than affordable, effortless and convenient access to large libraries of music: they provide features for organizing music and attempt to offer accurate recommendations. The importance of these features has not been examined in UTAUT or related types of studies (Bolduc & Kinnally, 2018; Chandra et al., 2018; Hampton-Sosa, 2017; Oyedele & Simpson, 2018). The theoretical reasoning behind the potential importance of these features will be addressed next.

Collecting and sense of ownership: archive value

Research into the personal meaning of music suggests that people still regard it important to collect and sort music in order to create a sense of ownership to music. Hence, while streaming services offer vast catalogues of music, people remain attached to their musical preferences and history. The immaterial access-based way of listening to music does not negate the seemingly inherent human desire to collect (Marshall, 2014). The massive and already-ordered database of music provided by music streaming services is not sufficient if considered from the listeners' point of view. These databases are produced by someone else, and hence 'the most important element of ordering – the discrimination involved in determining what is and is not included in a collection – is nullified: everything is included' (Marshall, 2014, p. 68).

Whereas Marshall questions whether the streaming model can replicate an intimate sense of ownership, others have examined such questions empirically and largely qualitatively. Hagen (2015) finds that playlisting practices relate to a sense of ownership: by creating playlists, listeners create experiences of exclusivity and subjectivity 'that bring about, in turn, a felt ownership, or even notions of self-identity through the playlist' (p. 641). Not only do listeners create and curate their own music archives, and hence restore the connection between subjectivity and the archive, such practices might also replicate an intimate sense of ownership. The time and effort listeners put into creating playlists work as an antecedent to psychological ownership (Sinclair & Tinson, 2017). Given the importance of music and music collections as tied to personal meanings and life narratives (DeNora, 2000; Giles et al., 2007; Kibby, 2009; Nag, 2018), we may hence expect listeners to still regard it important to organize and archive 'their' music, yet few if any studies have tested the importance of such practices. In this study, 'archive value' is introduced as a construct, conceptualized as the personalizing value accrued from making use of features for collecting and saving music. Hence, *H4: Archive value will have a positive effect on continued behavioural intention.*

Algorithms and discovery: algorithmic value

Offering recommendations that 'fit' the current categorization of a music listener is a way of guiding listeners through vast music libraries to tunes that are predicted to match their (ever-evolving) taste-profiles (Drott, 2018). Consequently, algorithms as cultural intermediaries are argued to interfere with people's taste formation by deciding the type of content

we encounter online (Beer, 2013, p. 96). Mathematical algorithms as such work with behavioural data and 'infer categories of identity on otherwise anonymous beings' (Cheney-Lippold, 2011, p. 165). Critical perspectives on algorithmic culture are often more interested in discussing how algorithms 'see' and sort audiences (Fisher & Mehozay, 2019), than investigating encounters between human and algorithmic culture empirically with regard to how people 'see' and experience algorithms. Bucher (2018) represents an exception: her study of how people react to algorithms, primarily on Facebook and Netflix, depicts how people create mental models about algorithms, which further shape how they play along and/or resist how they believe algorithms operate. However, Bucher's sampling procedure, recruiting research participants among those who have tweeted about algorithmic experiences, implies she could only reach those who have already reacted to algorithmic individuation.

The value of personalization for listeners is integral to the challenges represented by commercial data mining (Goldschmitt & Seaver, 2019; Prey, 2019). People tacitly accept unprecedented tracking of online behaviour (Goldschmitt & Seaver, 2019, p. 67), and while tracking user data is used to optimize recommendations to listeners, these data insights also represent assets for streaming platforms (Drott, 2018; Prey, 2019). Recommendations mitigate the inherent difficulties of musical plenitude, and while matching music and users is part of the marketing rhetoric, the purpose is to secure financial viability of streaming platforms (Drott, 2018). For analytical purposes, personalized recommendations are here understood as mechanisms that help listeners discover music, but streaming platforms likely also benefit from the data insights listeners grant them. Research investigating recommendations from the perspective of music listeners suggests listeners pay attention to recommendations for guidance and discovery of music (Nowak, 2016), and perceive recommendation-systems as intimate companions that help them transform their music taste (Karakayali et al., 2018). The present study hence examines how listeners perceive personalized recommendations, and proposes that algorithmic value, conceptualized as the relevance and accuracy of recommendations, makes a difference. Hence, *H5: Algorithmic value will have a positive effect on continued behavioural intention*.

Methods

This study is based on interviews with 18 users of streaming services (2017/2018) and a cross-sectional online survey (2018). The mixed methods approach alleviates the limitations of the deterministic model represented by user acceptance studies (Bagozzi, 2007). Whereas the research model to be tested with the survey data is subject to the shortcoming that human agency is more complex than a parsimonious model can capture, the interview analysis accounts for non-deterministic patterns that elucidate why and how different constructs matter. Results from the survey will therefore be presented before the analysis of the interviews.

Interviews

Interviewees include nine men and nine females between 21 and 72 years, with a mean age of 38. Participants were recruited using printed fliers, sharing of a Facebook-post, and

snowballing from personal and professional networks (avoiding interviews with persons in own networks). The requirement for participation was prior experience with streaming services, and participants were recruited to represent different age-groups and socio-economic positions. Two phone-interviews were conducted with participants living too far away for a face-to-face interview. The remaining interviews were conducted face-to-face at a location of the participants' preference. Interviews lasted between one and one and a half hour and were transcribed verbatim. Transcribed interviews were coded with NVivo12. The coding-process was data-driven with codes being identified by reading through the transcripts. In the next step, relevant codes were linked with the theoretical notions of use-value. Efforts were made to interpret the data comprehensively, avoiding identifying only evidence that would support a simple account of expected relations between themes of analysis.

Survey

The questionnaire was developed by the author. The data collection was conducted by the research agency Kantar TNS. A stratified probability sample of 1511 respondents were recruited from Kantar's web panel of 46,000 participants. Post-stratification weights (minimum = .415; maximum = 2.536) allow the sample to match the composition of the Norwegian population on age, sex and education. The sample includes respondents who use premium music streaming services (52.5% of respondents), freemium music streaming services (30.5%) as well as respondents who do not use such services (17%). Non-users of music streaming services were not asked questions about algorithmic value. Additionally, only 142 of the freemium respondents confirmed to ever explore music recommended by music streaming services (a filter question for whether respondents were enquired further about algorithmic value). The hypotheses are hence tested only with respondents with premium subscriptions (either single-user or multi-user

Table 1. Demographics full sample and sub-samples (weighted).

	Full sample	Premium-user	Freemium/non-user
Gender			
Male	51%	52%	49%
Female	49%	48%	51%
Age			
Mean age/SD	47/17.5	39/14.4	56/16.1
Below 30 years	21%	32%	8%
30–49	26%	32%	19%
45–59	26%	26%	25%
60 years or older	28%	9%	48%
Education			
Primary school	9%	7%	11%
Upper secondary school	58%	57%	60%
Higher education ≤ 4 years	19%	21%	17%
Higher education 4 years >	14%	15%	12%
Income before tax			
Less than 299,999	23%	24%	23%
300,000–499,999	35%	31%	40%
500,000–699,999	21%	24%	17%
700,000–999,999	7%	8%	5%
1 million or more	2%	3%	2%
Don't want to answer	12%	10%	13%

Note: Some variables do not add to 100% due to rounding. Income in NOK (1 NOK ≈ 0.12 USD).

subscription accounts). On average premium-users are younger (M = 39.17, SE = .511) than freemium-users and non-users (M = 56.36, SE = .60). This difference, 17.19, 95% CI [15.64, 18.73] was significant, t(14556.19) = 21.81, $p < .0005$. Other demographic variables remain relatively stable between the sub-samples (see Table 1).

Measurements and factor analysis

Items for convenience value, effort expectancy, price value and continued behavioural intention were adapted from prior research. Items for archive value reflect how the literature and the interviews point to the importance of playlisting practices for creating a sense of ownership, for linking music to a certain time or place, and for having the right tunes available for different moods and situations (Hagen, 2015; Sinclair & Tinson, 2017). Items for algorithmic value reflect how personalized recommendations enable users to discover new music, and help them expand their taste in music (Karakayali et al., 2018; Nowak, 2016). The interviews additionally indicate that recommendations and archiving are interrelated, which is reflected with an item on saving personalized recommendations. Items for all constructs are included in Table 2.

Respondents indicated whether they agreed with statements on a 5-point Likert-scale ranging from 1 (completely disagree) to 5 (completely agree). The items were subjected to a principal component analysis with oblimin rotation. Factors that loaded with an

Table 2. Factor loadings ($N = 793$).

	CV	AV	ArV	PV	CBI
CV: Convenience value (from Oyedele & Simpson, 2018)					
I like that I can listen to whatever I want wherever I want	**.92**				
I like that I can listen to whatever I want whenever I want	**.87**				
With [MSS] the music I like is always available	**.78**				
[MSS] are easy to use	**.61**				
It's easy to find the music I want to listen to	**.61**				
It's easy for me to learn to use [MSS]	.59				
[MSS] includes all the music I want to listen to	.50				
AV: Algorithmic value. Personalized recommendations often					
help me discover music I'm not already familiar with		**.82**			
include music I like		**.80**			
include music I end up saving (for example in a playlist)		**.77**			
help me expand my taste in music		**.74**			
ArV: Archive value. It's important for me to save music to					
link music to a certain time or place			**.84**		
make it easy to find music (…) to play in different situations			**.71**		
create a sense of ownership to music that matters to me			**.64**		
avoid losing track of music that matters to me			.51		
PV: Price value. (from Venkatesh et al., 2012)					
offer a good and economically favourable product for the price				**.90**	
The subscription costs (from 99 NOK/month) is acceptable				**.89**	
[MSS] provide good value for the money				**.87**	
CBI: Cont. behav. intention (from Venkatesh et al., 2012)					
I intend to use [MSS] often in the future					**-.80**
I want to use [MSS] more in the future					**-.72**
I will continue to use [MSS] in the future					**-.64**
Variance explained	35.29	11.19	8.25	7.17	4.77
Cronbach's alpha	.87	.80	.75	.92	.86
M	4.3	3.5	3.5	3.9	4.0
SD	.57	.71	.78	.84	.77

Note: Coefficients below .2 suppressed. Factor loadings over .60 appear in bold. Wording of items condensed compared to survey. Music streaming services shortened to MSS in the table, but not in the questionnaire.

eigenvalue of 1 or greater and had at least three loadings using a 60–40 rule were retained. Items that loaded on each factor were summed and averaged. The resultant factors explained 66.7% of the total variance after rotation. Cronbach's alpha was above the recommended value of .7 for all factors (see Table 2).

The factor analysis shows that that effort expectancy loads on the same factor as convenience value. Assessing the items, effort expectancy items can be considered to be about the convenience of such services. In the subsequent analysis these are consequently included in the convenience value construct, implying that H2 cannot be tested separately.

Results

Correlation coefficients between predictor variables were below the recommended threshold of .7 (Table 3), and variance inflation factor values were all below 10 (Field, 2018), suggesting multicollinearity is not an issue.

Hierarchical regression analyses were used to test the hypotheses (Table 4), with the UTAUT-related constructs entered in model 1, archive value entered in model 2, and algorithmic value entered in model 3.

In model 1, convenience value and price value account for 38% of the variation in continued behavioural intention ($R^2 = .379$). In model 2, R^2 increases by 5%, making R^2 .427 with a significant F-statistic of 50.87 ($p < .001$). In model 3, R^2 increases with 0.2% making R^2 .429 with an insignificant F-statistics of 1.97 ($p = .161$).

The results support all hypotheses except H5: algorithmic value does not predict behavioural intention. Price value is the strongest predictor ($\beta = .33$) followed by convenience value ($\beta = .26$), and archive value ($\beta = .22$). While the results suggest that algorithmic value has no direct influence on continued behavioural intention, the correlation coefficients (Table 3) indicate that algorithmic value is not without importance, and the results encourage studies where more complex research models are tested.

These results will next be explicated with the help of findings from the qualitative interviews. The objective of this analysis is to enquire why and how participants value music streaming services. The analysis addresses convenience value, archiving practices, and how algorithmic recommendations matter.

Findings from interviews

As a background for the analysis, Table 5 introduces the interview-participants with pseudonyms, age and what types of music streaming-services they use.

The sample includes three participants who only use freemium-services or YouTube for streaming music. Most participants occasionally use YouTube for streaming music, which

Table 3. Correlation coefficients.

	CV	PV	ArV	AV
Convenience value (CV)	1			
Price value (PV)	.52[a]	1		
Archive value (ArV)	.32[a]	.26[a]	1	
Algorithmic value (AV)	.37[a]	.31[a]	.41[a]	1
Continued behavioural intention (CBI)	.55[a]	.52[a]	.43[a]	.33[a]

[a]Correlation is significant at the .01 level (two-tailed).

Table 4. Results from the hierarchical regression analysis.

	Dependent variable: continued behavioural intention			
	b	*SE B*	*β*	*p*
Model 1				
Constant	.959	.18		<.001
Convenience value	.43	.05	.34	<.001
Price value	.31	.03	.37	<.001
Model 2				
Constant	.60	.18		<.001
Convenience value	.35	.05	.27	<.001
Price value	.29	.03	.34	<.001
Archive value	.23	.03	.23	<.001
Model 3				
Constant	.52	.18		<.001
Convenience value	.33	.05	.26	<.001
Price value	.29	.03	.33	<.001
Archive value	.22	.03	.22	<.001
Algorithmic value	.05	.04	.05	.161

Note: $R^2 = .38$ for step 1 ($p < .001$); $\Delta R^2 = .05$ for step 2 ($p < .001$); $\Delta R^2 = .002$ for step 3 ($p = .161$).

also in the free version allows people to create playlists. Table 5 also shows discontinued use of premium services: Erik and Heidi stayed with Spotify and ended subscriptions to Tidal and Apple Music after free trials; Kristian switched to Tidal for Hi-Fi lossless quality; and Camilla switched to Apple Music, which she perceived as more user-friendly.

Convenience: 'what if I could listen to whatever I want?'

> Nina (52): Streaming-services gave you freedom of choice. That is what has been most important: I can choose what type of music I want to listen to. Choice and abundance. And it's not too expensive. And easily available. I remember when I got Spotify: it was like having a record store at home.
>
> Lars (49): To all of a sudden get access to a very large offer of music. This change kind of started before streaming, but streaming-services amplified it to the extreme. It used to be a fantasy I had when I was young. What if I could listen to whatever I want? Now I can.

Table 5. Interview participants (pseudonyms).

Participant	Age	Premium services	Freemium services
Kevin (m)	21	Spotify	Soundcloud, YouTube
Bård (m)	24	Spotify	YouTube
Richard (m)	25	Spotify	YouTube
Sara (f)	26		Spotify, YouTube
Ruth (f)	26	Spotify	YouTube
Annette (f)	27	Tidal	Spotify*
Erik (m)	27	Spotify, Tidal*	YouTube
Vilde (f)	31	Spotify	YouTube
Camilla (f)	31	Apple music, Spotify*, Tidal*	YouTube
Markus (m)	36	Spotify*	YouTube
Kristian (m)	36	Tidal, Spotify*	YouTube
Thomas (m)	43	Spotify	Soundcloud, YouTube
Morten (m)	46	Spotify	
Lars (m)	49	Spotify, Apple music	Soundcloud, YouTube
Nina (f)	52	Spotify	YouTube
Heidi (f)	56	Spotify, Apple music*	
Anne (f)	57		YouTube, Spotify*
Ingrid (f)	72	Apple music	YouTube, Spotify*

Note: Services marked with * refer to discontinued subscriptions or use.

It is hardly a coincidence that two of the middle-aged participants, with ample experience of the pre-digital time, refer to similar experiences of the change represented by music streaming services. Yet for all informants, convenient and affordable access to an abundant database of music is the default motivation for using and continuing to use these services. This convenient access to music instigates secondary modes of listening while doing chores, travelling to school or work, and during sports activities; but also dedicated listening, which might very well take place exactly during those moments.

Whereas anytime and anywhere represent dimensions that all participants emphasize as crucial, abundance of choice is portrayed in more nuanced ways: for some abundance represents freedom, and for others, a slight curse of choice. The former group of participants describes the abundance and availability of music as 'freedom'. Nina does so in the quote above, and Lars does so implicitly by referring to his younger self's fantasy turned reality in his adult years. It is not, however, a freedom employed to constantly explore the boundaries of the musical universe. The plenitude of accessible music portrays a higher-order musical universe from which personal collections are accrued. For example, Vilde (31) and Bård (24) explicitly refer to freedom of access and availability, but add that their own collections represent their main gateways to music.

Participants who feel the strain of choice appear more concerned with the near-infinite boundaries of the database beyond their current hunches for what to listen to. Annette (27) states the truism that the more there is too choose from, the more difficult it becomes. Kristian (36) blames his own lack of knowledge: 'I don't know too much about music, and I'm notoriously bad at finding new music, so I'm suffering slightly from "too much". There is just too much to choose from'. The realization of the fantasy of young Lars paves the way for a follow-up question: 'What would I listen to?' The answer points in two interrelated directions: features for archiving and features for making music find listeners.

Archiving: searchers, randomizers and organizers

The items used for measuring archive value in the survey capture why organizing and saving music still matters, yet the extent to which participants organize music differs. Three archetypical modes of archiving emerge, here labelled searchers, randomizers and organizers.

Searchers

Sara, Anne, Heidi and Ingrid do not create personal collections of music. Instead they search and browse music and rely on the ready-made playlists of their streaming provider. Sara (26) streams music daily, yet does not sort her music into categories or playlists. Heidi (56) is happy with the ready-made playlists provided by Spotify, or primarily searches for the music she wants to listen to. Ingrid (72) has no playlists and most of the time, she simply searches for the artist she wants to listen to. However, she talked about playlists as something she should create, and how playlists would make 'it easier to find my way: to just put on a playlist that I know includes the music I like. I just haven't taken the time to do so'.

Randomizers

For Kevin, Ruth, Vilde and Erik creating playlists is important, but they share the same pattern of primarily relying on their favourites-playlist: their go-to list for music they know they like at this moment in time. For Erik (27), this go-to list includes the songs he has hearted in Spotify: 'I add songs by hearting them. I kind of use that instead of playlists. And I remove songs when I grow tired of them. Remove and add'. Vilde (31), who relies on her folders for tackling abundance, in fact relies mainly on her newest list: when she gets tired of the old list, 'I start a new one. And start collecting songs'. These types of lists end up as fragmented assemblages of genres and styles, amassed to account for disordered and omnivorous taste-preferences; musical one-pot bowl of all sorts.

> Kevin (21): Well, I only have one playlist that I use a lot: my list of favourites. I don't bother with setting up lists for different genres. I should, but I can't bother. I just throw in everything from Whitney Houston to Da Rude and to DJs from the 1990s. I'm basically everywhere, and that playlist doesn't make much sense. (…) But I have all of my playlists here. I never delete them. Shazam songs, Billie Holiday. LS, that's a really old one. HS, hard freaking style. No, so there's only one that I actually use.

These types of lists instil a shuffle-and-skip mode of listening; the perfect song could always be one click away. Hence, whereas all songs are favourites, the favourite-flavour of the moment depends negatively on tear (skip) and positively on 'just right' (play):

> Ruth (26): I'm like, 'open playlist, shuffle, play, skip'. I have a playlist with the songs I like the most. (…) Here it is. 360 songs. This other list was my previous triple A list. I got tired of 90% of the songs, so I made a new triple A. I made it because there were so many songs to skip. Well it's not new anymore, it's probably three years old. And I just add songs when I find them. (…) I create playlists to have easy access to the music I actually listen to.

While these participants primarily listen to their latest go-to list, old archives of music are rarely deleted. Old lists are retained as reminders of music that once mattered, and which may come to matter again at a later point in time.

Organizers

The remaining participants have more neatly organized collections of music, created for keeping track of music and ensuring appropriate soundtracks are always available. Some are happy with a handful of lists, curated to fit different situations of listening, whereas others invest considerable efforts in maintaining meticulously organized libraries of playlists.

> Bård (24): I've created quite a few playlists, and spent many hours searching for new music, or old music I like, and often created genre-based lists. (…) I have these periods where I need new music and create new playlists. But I usually listen to music I already know, probably 80–85%. (…) I have at least 10 lists that I listen to a lot.

Most participants state that their personal archives account for a considerable, if not the largest, share of time spent streaming music. Archiving and exploring are interrelated practices (see also, Lüders, 2019), but participants differ in how often they explore the full musical universe for the sake of discovering new music. Thomas (43) has close to 40 playlists and explains how he edits them all the time, and how new tunes 'belong in the different playlists I've created'. Yet whereas he is always in a potential editing mode,

he primarily listens to his own music. At the other end of the spectrum is Richard (25) who frequently explores new music to be added to his library:

> Richard (25): I have several playlists, let's see. So, my summer-playlist, chilldill, old breaking songs. The runner. (…) And miscellaneous, divdill, oldisgoldis. Like, different stuff depending on what I want to listen to. Divdill is more popular songs that I included because I didn't want to forget about them. I immediately add songs I like to one of my playlists. So, they constantly evolve. And I rarely delete music from a list. I search for new music several times a week, and see what's new, and like 'well, I need to add this one'.

For organizers and randomizers, features for archiving music are important: participants who organize and curate personal music libraries create added value to their service-experience, and ultimately retention-incentives. These archives are their safe havens, places they know they can rely on for *their* music, partly answering the question of what to listen to when 'everything' is available.

Algorithms: allowing and enabling algorithms to know you

According to Fisher and Mehozay (2019), personalization bears the promise of effortlessly catering for the individual based on her wants and needs, representing a move from search to discovery: 'search implying a human subject who knows what she is looking for, discovery implying serendipitously running into content offered or hosted by the media platform based on how it sees her and interprets her views' (p. 8–9). Yet, at least with regard to music streaming services, 'serendipitously running into content' does not quite capture the experiences of the participants. The extent to which they experience algorithmic recommendations as relevant varies with their willingness to allow and enable streaming services to know them. Kevin (21) makes efforts to be served the most relevant recommendations: 'with Spotify radio or Discover Weekly. If you make sure to listen to a bit of everything you like, you get pretty decent results. I don't do it too often, but it's how I discover new music'. Camilla (31) relies on a combination of her own Apple Music library and Apple's lists. She rates songs, and regularly uses Apple's smart playlists to automatically play her favourites. While curating and rating music is a way for Camilla to keep track of her music, she also explains it as a way to enable Apple to provide her with accurate recommendations. She listens to Apple's personalized mixes and makes sure to 'heart songs I like', both for these recommendations to be added to her smart playlists, and, as she explains:

> When it comes to these things, I want Apple to know as much as possible about me. Everything concerning my taste, like music and TV-series, I like that they know me. Music is where recommendations are most accurate, at least for me.

Participants who regularly rely on personalized recommendations share this sense of catering for algorithms and point to how the recommendations they get are a result of their archives and the music they play. They share an understanding of how the quality of the data they offer their streaming provider will next reflect the quality of recommendations. Catering for algorithms is as such also a way of discovering new music. Lars (49), one of the most avid music listeners among the participants, maintains and listens to numerous of his own systematically organized playlists, and habitually also checks out Spotify's Discover Weekly and Daily Mix:

> Lars (49): If you know what you want to listen to, Daily Mix is a good option. Discover Weekly is more conscious. I listen to it while I work out and save a tune if there is something special. I have my own list for Discover Weekly and add the songs I like. Needs to be done by Monday [when a new Discover Weekly list will replace the previous].

When Lars shows his own Discover Weekly playlist, it turns out it includes 548 tunes. Given that each edition of the playlist includes about 30 songs, Lars has considered quite a few of those recommendations accurate enough to be included in his own library.

About half of the participants use these types of recommendations often or regularly. The relevance of recommendations is not uncritically embraced as perfect matches, yet to some extent participants blame themselves. Sara (26) reasons Spotify does not have 'enough data to work with', as she does not make much effort to find and organize the music she loves. She considers her random listening practices to be a poor benchmark for optimizing recommendations. Some participants also experience recommendations as inadequately capable of distinguishing between fine-tuned likes and dislikes. When Ruth (26), who regularly checks out her personalized mixes, opens the latest edition of Discover Weekly and finds Pewdiepie listed, she sighs, 'That's because I listen to the music of other YouTubers [in Spotify]. But I don't like Pewdiepie, he's nasty'.

Recommendations and personalization extend beyond features such as Discover Weekly, and most participants explore music by checking out 'related artists' and sometimes play ready-made playlists curated by genre, mood or situations. While these ready-made lists in the case of Spotify are 'supposedly human-curated' (Eriksson et al., 2019, p. 128), the decision of what lists to feature for what listeners is an outcome of algorithmic calculations. Consequently, the answer to the abundance-deduced question 'What would I listen to?' can very well be 'music based on how algorithms see me', regardless of whether participants see or recognize these as algorithmically calculated.

Concluding discussion

This study examined how patterns of using music streaming services shape the experienced value of these services, with the proposition that experienced value and loyalty are likely connected. The survey results support the expected influence of price, convenience and archive value on continued intention to use music streaming services. The interviews suggest that the benefits of convenience are perceived as substantial enough to warrant the monetary cost, and additionally portray how practices and experiences are intertwined. Results and findings will next be discussed in three steps focusing on how convenience, archiving and algorithms are entangled.

First, accessing music anytime and anywhere is the default motivation for using and continuing to use streaming services. Convenience value has the highest mean score of all constructs in the survey (4.3 out of 5, see Table 2), and the interviews corroborate the importance of easy access to an abundant catalogue of music as the primary appeal of these services. In short, listeners appear to experience streaming services as what Morris and Powers (2015, p. 118) depict as the deceptive promise of a global celestial jukebox. Music streaming services are no longer a novelty, and the once remarkable first experiences of 'listening to whatever I want' depict memories younger generations cannot relate to. The Norwegian context for the study implies immediate access to and surplus of music

replaced scarcity years ago, and it is noteworthy that the initial appeal of streaming remains so core for listeners regardless of age. This brings up the question of convenient compared to what? Whereas music is abundantly available also in other formats, streaming services offer the most 'frictionless' access to a seemingly bottomless universe of music.

Second, this study suggests that people differ in their interest to organize their own archives of music, but also how selectively composed archives and playlists seem associated with a sense of virtue. The already-ordered databases where everything is included (Marshall, 2014) pose challenges that require actions to separate own archives from the confounding totality of available music. Personal archives, whether in the form of the current lists of favourites or meticulously curated collections of music, come across as safe musical retreats. Previous research likewise emphasizes the continued importance of personal collections (Hagen, 2015; Lüders, 2019; Marshall, 2014), but this study additionally indicates that archive value influences continued behavioural intention. People who invest efforts in organizing music create added value to their own service-experience, and these efforts produce affective strings-attached relations between listeners and service providers.

Third, the survey did not find algorithmic value to predict continued intention to use music streaming services, but the interviews elucidate how the extent to which personalized recommendations are perceived to matter relates to actions of catering for algorithms. The study hence accentuates how listeners' personalizing endeavours (archive value) are interpreted to affect personalized recommendations. Whereas the purpose of this study has been to investigate the relative importance of different characteristics of music streaming services, the findings encourage future studies examining the extent to which algorithmic value is conditioned by archive value. What I have termed catering for algorithms resembles Bucher's (2018) discussion of how mental models of algorithms shape how people play along and/or resist how they believe algorithms work, yet with much less emphasis on resistance. Conversely, casual listeners pay little attention to recommendations, or perhaps more accurately, do not recognize and see these as recommendations.

Communication research abounds with critical discussions of algorithmic culture (Beer, 2017; Kitchin, 2017; Prey, 2018; Willson, 2017), typically framed to discuss how recommendation systems are never neutral, but always imbued with vested interests of those with the strengths to influence what we encounter online. The literature on how behavioural data are used in a continuous process of flexible categorization (Cheney-Lippold, 2011), and the commercial logic shaping the perpetual process of 'becoming-individual' (Prey, 2018, p. 1095) rarely addresses these issues empirically from those being algorithmically categorized. My attempt to unpack how people use, value and make sense of music streaming delineates how the streaming-experience is co-created by music listeners. The personalization value accrued from collecting and saving music represents an individualized agency to shape the streaming-experience. From the perspective of the listener, this is important to demarcate the personal musical space from the totality of the service, but also to instruct algorithms. Ultimately, listeners consider themselves as part of those actors with vested interests to influence the recommendations they receive: ensuring the system gets optimized input by way of listening practices and operating the material features for sorting and archiving music. Invested listeners thus cater for and control their own service-experience, but not without simultaneously catering for the provider. By taking control, listeners also create tethered liaisons to service providers, who in turn depend on data traces in the commercial process of categorizing taste-profiles (Drott, 2018; Prey, 2019).

The mixed methods approach and the heterogenous sample of participants interviewed allow this study to identify what features matter more for listeners, and to portray how and why these features matter. While previous studies stress the branding inadequacies of the (deceptive) promise of 'anything, anytime, anywhere' dimension of streaming services (Morris & Powers, 2015; Prey, 2019), the results and findings of this study confirm the continued importance of convenience, and for casual listeners, this appears sufficient. For more devoted listeners, archiving and recommendations represent potential value, realized through listeners' own efforts. Different service providers might very well struggle to differentiate themselves from their competitors, but the ultimate differentiator is a result of listener-labour.

Given that such listener-labour varies considerably, two final aspects are emphasized. First, how people 'see' music streaming services incorporate elements of actions perceived as virtuous, that is, organizing archives of music appears as an imperative of these services regardless of whether participants do so. Second, for some, algorithms and recommendations are evasive to the extent that the act of algorithmic individuation escapes people's awareness. It does not matter for the service provider if most people do not grasp that they are being categorized. However, for critical scholarship, the elusive yet action-steering potentials of streaming services as infrastructure warrant continued efforts to understand just how these services work. Some features are visible and depend on human action: people can hardly build personal libraries of music without realizing they do so. Algorithmic recommendations, conversely, act in veiled ways for many listeners. Combined they set the stage for both overt and covert tethering of people and streaming services.

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