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Published in:
 Listen to Lists

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
 Final author's version (accepted by publisher, after peer review)

Publication date:
 2021

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Prey, R. (2021). Playlists and the Datafication of Music Formatting. In L. Brion, D. Diederichsen, & Haus der Kulturen der Welt (Eds.), *Listen to Lists* (pp. 33-46). (The New Alphabet; Vol. 2). Spector Books.

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Playlists and the Datafication of Music Formatting

Robert Prey, University of Groningen

The Song and the Sequence

The song is the basic unit of popular music. Crafted by the songwriter, performed by the performer, curated by the DJ, and sold as a single, the song is the atom of the music universe. A hit single can break a new artist and soundtrack a summer. It can capture a moment and evoke an era. This is precisely why it sounds so counterintuitive to claim the following: The music listening experience rarely centers on the song. Instead, the listening session is typically characterized by a particular arrangement of *songs*; a succession of tracks organized in various sequences. These sequences may take the form of an album on a CD or record player, a countdown on a hit radio program, or an artist played on shuffle on an MP3 player or streaming platform.¹ Even when we seek out a particular earworm to play on its own, we often do so on repeat.

It is not only our experience with music that is defined by sequence. In his classic study *Television: Technology and Cultural Form*, Raymond Williams recognized what he called “planned flow” to be “the defining characteristic of broadcasting”.² For Williams the real programme is not the show, but the schedule - the particular sequence of TV shows and commercials designed around the purpose of capturing and retaining viewers. Williams’ point seems prescient to anyone who has ever clicked on a YouTube video, only to find themselves hours later wondering what happened to their evening.

But even when advertisers do not call the tune a similar dedication and attention to “planned flow” prevails. Since the 1960s, on both sides of the Atlantic, “serious” recording artists recorded LPs, and these “long play” albums assumed the symbolic capital of books. The Beach Boys album “Pet Sounds” – released in 1966 – has been described as the LP that “invented—and in some sense perfected—the idea that an album could be more than the sum of its parts”.³ Sequence mattered as “the order of the tracks, not just the tracks themselves, could be laden with meaning”.⁴ Just as the novelist writes a novel comprised of sequentially arranged chapters, the musician writes an album made up of tracks that proceed to tell an aural story.

Of course listeners were never beholden to listen to albums the way artists intended. As Devon Powers points out, a whole host of “changer technologies” emerged in the latter decades of the 20th century to facilitate both the randomized play of individual tracks and continuous play beyond the temporal limits of the album.⁵ The digitalization of music and the emergence in the early 2000s of Mp3 players and Apple’s iTunes store seemed to signal that the listener (in

¹ In this article I use *form* or *format* to mean “the way in which something is arranged or set out” rather than in its more technical sense, such as “the MP3 format”.

² Raymond Williams, *Television: Technology and Cultural Form*. Psychology Press, 2003, p. 86.

³ Devon Powers, “Lost in the shuffle: Technology, history, and the idea of musical randomness”, *Critical studies in media communication*, 31(3), (2014): p. 250.

⁴ Powers, “Lost in the shuffle: Technology, history, and the idea of musical randomness”, 2014, p. 250.

⁵ Powers, “Lost in the shuffle: Technology, history, and the idea of musical randomness”, 2014, p. 251.

concert with the almighty shuffle feature) had won the battle over sequence. Today, as digital downloads have declined and music consumption has moved on to streaming platforms - such as Spotify and Apple Music in the West, and Tencent Music and MelOn in the East - new modes of organizing and sequencing music have emerged. Particularly noteworthy is the rise to dominance of the streaming playlist.⁶

From Planned to Programmable Flow

While anyone can create their own playlist, streaming platforms heavily promote their own playlists over playlists compiled by users and other 3rd parties. Unlike the traditional album, which is fixed upon release, platform-curated playlists can be made and remade infinitely. Unlike radio playlists, streaming playlists are programmable through datafied user feedback. This extends the malleability and modularity of the music listening experiences; optimizing “planned flow” to increase engagement and to fit selected contexts, moods, or particular listener profiles.

Platform-curated playlists can be divided into two general categories: editorial and algorithmic. In practice, however, the popular “man-versus-machine” dichotomy breaks down. While editorial playlists like Spotify’s *RapCaviar* are “handcrafted” by curators, decisions to add, replace, or change the position of a track on a playlist are strongly supported by data and proprietary software.⁷ Spotify playlist curators employ a software tool with the acronym PUMA (Playlist Usage Monitoring and Analysis) to track “the overall performance of the playlist as a whole, with colorful charts and graphs illustrating listeners’ age range, gender, geographical region, time of day, subscription tier, and more”.⁸ PUMA also monitors the number of plays, skips, saves, etc., of individual tracks on any playlist. Tracks can then be added or replaced based on these performance metrics. Likewise, before it was folded into YouTube Music, Google Play Music curators relied on a content management system called Jamza which ranked individual tracks with a “song Score” - a multipoint metric that aggregated average play length, number of skips or thumbs-up. Jamza also helped curators by recommending songs to add to a playlist based on ones that had already been chosen.⁹

As recounted in several journalistic interviews with playlist curators, the order of the tracks - the “planned flow” of an editorial playlist - is particularly important. “Position matters, completely. We are obsessive about it,” a Spotify curator explains.¹⁰ Likewise, according to an editor at Deezer: “When creating playlists, I probably spend the most time on the order. You can have the

⁶ According to Spotify, playlist consumption accounts for approximately two-thirds of monthly content hours on the platform (United States Securities and Exchange Commission, Form F-1 Registration Statement, Spotify Technology, S.A. (2018) online <<https://www.sec.gov/Archives/edgar/data/1639920/000119312518092759/d494294df1a.htm>>, accessed July 2, 2020).

⁷ Tiziano Bonini and Alessandro Gandini. ““First week is editorial, second week is algorithmic”: Platform gatekeepers and the platformization of music curation.” *Social Media+ Society* 5, no. 4 (2019).

⁸ Liz Pelly, “Not all Spotify playlists are created equal” (posted 2017) online <<https://watt.cashmusic.org/writing/theseecretlivesofplaylists>>, accessed July 7, 2020.

⁹ Reggie Ugwu, “Inside the playlist factory” *Buzzfeed* (posted 2016) online <<https://www.buzzfeed.com/reggieugwu/the-unsung-heroes-of-the-music-streaming-boom>>, accessed July 7, 2020.

¹⁰ BuzzFeed News, “I create Spotify playlists for a living,” (posted 2017) online <https://www.youtube.com/watch?v=Ji_WfHxatoQ>, accessed July 18, 2020.

right tracks in a playlist, but if they don't sound right next to each other - if you listen to it all and something jars - you'll lose people."¹¹

This curation process is further automated with algorithmic playlists - such as Spotify's *Discover Weekly*, *Daily Mix*, and *Your Summer Rewind* - which are personalized for individual streaming listeners. While streaming platforms protect the precise makeup of their algorithms as intellectual property - and while these algorithms are constantly tweaked and updated - it is possible to make some very general observations about how they operate. Drawing from an older article published by Spotify software engineer Sophia Ciocca, it is clear that Spotify's algorithmically-curated playlists rely on at least three different sources and methods of data analysis: collaborative filtering; natural language processing (NLP); and raw audio models.¹²

Collaborative filtering is a widely-used technique across the web to compare behavioral preferences and make recommendations. It is perhaps most visible on Amazon ("Customers who bought this item also bought..."). On streaming platforms such as Spotify, collaborative filtering algorithms group similar users together. Users are deemed 'similar' if they have listened to the same songs or if they have similar usage patterns around music. Collaborative filtering is then employed to recommend a song or artist to one user that the other user has listened to.

At the same time, NLP is used to build a mathematical representation of the textual associations between artists and songs. As Ciocca explains:

Spotify crawls the web constantly looking for blog posts and other written text about music to figure out what people are saying about specific artists and songs — which adjectives and what particular language is frequently used in reference to those artists and songs, and which other artists and songs are also being discussed alongside them.¹³

This allows Spotify to map the cultural connections between songs and artists; finding similar artists and music based on what people are saying online.

However, to account for new or unpopular tracks that have little usage data – the so-called “cold start problem” – Spotify employs “machine listening” on raw audio in order to identify songs with similar acoustic patterns. This involves convolutional neural networks - which is essentially facial recognition technology adapted for the analysis of audio data instead of pixels.¹⁴ While it evaluates aspects such as the key, mode and tempo of a track, this technology also measures more unconventional features such as “valence”, “speechiness”, and “danceability”.¹⁵ This

¹¹ Stuart Dredge, “The new tastemakers: A day in the life of a music-streaming playlister,” *The Guardian* (posted 2016) online <<https://www.theguardian.com/technology/2016/may/23/music-streaming-services-playlister-sam-lee-deezer>>, accessed July 18, 2020.

¹² Sophia Ciocca, “How Does Spotify Know You So Well?” *Medium* (posted 2017) online <<https://medium.com/s/story/spotify-discover-weekly-how-machine-learning-finds-your-new-music-19a41ab76efe>>, accessed July 18, 2020.

¹³ Ciocca, “How Does Spotify Know You So Well?” (online).

¹⁴ Ciocca, “How Does Spotify Know You So Well?” (online).

¹⁵ Asher Tobin Chodos, “What Does Music Mean to Spotify? An Essay on Musical Significance in the Era of Digital Curation,” *INSAM Journal of Contemporary Music, Art and Technology*, 1(2), (2019), p. 49.

involves translating the ‘subjective’ language of music into the “objective” language of numbers. For example, in Spotify’s API documentation, “valence” is described as:

A measure from 0.0 to 1.0 describing the musical positiveness conveyed by a track. Tracks with high valence sound more positive (e.g. happy, cheerful, euphoric), while tracks with low valence sound more negative (e.g. sad, depressed, angry).¹⁶

In short, algorithmic playlists are never the result of one algorithm: They involve numerous algorithms and methods of data analysis in order to *construct* similarity. Spotify’s signature algorithmic playlist *Discover Weekly* - a personally tailored playlist of 30 new tracks that is delivered to each subscriber every Monday morning – is a good example of a this kind of hybrid recommendation system that is built upon collaborative filtering, natural language processing, and machine listening.

Most listeners care little about these details. But these details are important. Every one of the small decisions that goes into building the recommendation algorithms for a playlist like *Discover Weekly* has a real effect on what songs are heard, and in turn which artists are able to make a living from their music. For example, in building your personal weekly playlist, *Discover Weekly* gives more weight to tracks found on more popular playlists and to Spotify-curated playlists.¹⁷ Likewise, if a dance track does not meet Spotify’s definition of “danceability”, it may not be added to the *Dance Party* playlist. All this makes Spotify, and its streaming competitors, powerful gatekeepers in the music world.

It is thus crucial to interrogate the assumptions that lay beneath such methods - assumptions about the music listening subject and the (social) role of music. To start, platforms such as Spotify understand the listener-subject in ways that recall behavioral psychology’s approach to the study of the individual. Early behaviorists such as B. F. Skinner argued that the true object of psychology should be behavior rather than consciousness. Only behavior provides publicly observable data upon which to construct rigorous and scientifically-sound models of how and why people do what they do.¹⁸ In much the same way, streaming platforms are less interested in how users self-identify as music fans, or even in demographic markers that traditionally acted as a proxy for music preferences. Instead, they take an epistemologically behaviorist position to understanding music taste. For example, in order to personalize recommendations and playlists, Spotify builds a “taste profile” for each user of its service. A taste profile is a dynamic record of one’s musical identity generated primarily by implicit behavioral feedback. This feedback is collected every time we search for a song or an artist we like, listen to tracks and add songs to a playlist, or skip through tracks. Such implicit feedback is much easier to collect on a large-scale

¹⁶ Spotify for Developers, “Get Audio Features for a Track,” (posted n.d.) online <<https://developer.spotify.com/documentation/web-api/reference/tracks/get-audio-features/>>, accessed July 18, 2020.

¹⁷ Adam Pasick, “The magic that makes Spotify’s Discover Weekly playlists so damn good,” Quartz, (posted 2015) online <<http://qz.com/571007/the-magic-that-makes-spotifys-discover-weekly-playlists-so-damn-good/>>, accessed July 18, 2020.

¹⁸ Jay Moore, “The basic principles of behaviorism,” in Thyer, B. (ed) *The Philosophical Legacy of Behaviorism*, Springer, Dordrecht, 1999, p. 41-68.

basis than explicit feedback (where users actively rate content or describe their preferences), and is also considered a better indicator of the music we actually listen to (rather than the music we would like to be associated with).

Streaming platforms also appear to promote an online version of neo-behaviorism through their approach to affecting and conditioning listening behavior. A basic proposition of behavioral psychology is that behavior occurs within an environment, and that behavior can be manipulated by manipulating that environment. Driven by the goal to maximize engagement, platforms utilize playlists as cybernetic laboratories. Tracks are continuously being added, replaced and moved up and down a playlist based on performance metric. A/B testing of playlist cover images and other features are ongoing. The playlist here serves as the environment, or a “container” which “functions as a stabilizing device that prepares music for mathematical calculation and transport optimization”.¹⁹ Like the famous ‘Skinner Box’ which was used to study behavioral responses in lab animals – playlists provide a cage within which the “listener-rat” can be studied and optimal listening behavior can be induced.

This may sound somewhat hyperbolic. But as several scholars have pointed out, on streaming platforms, *listeners* are recast as *users* who “outsourc[e] the creation, maintenance, and storage of their music collections” to the platform.²⁰ In turn the organization of music is modulated to fit particular user profiles and moments in order to induce engagement.

Here we move from a theory of the streaming listener to the assumptions of music’s role that seem to underlie streaming platforms. In a fascinating experiment that monitored how Spotify Featured Playlists presented themselves to users in three different countries, Eriksson and Johansson concluded that “music was generally described as performative of motivation and energy”:

...we were repeatedly invited to view music consumption as an accompaniment to other, more significant tasks, rather than as an activity in its own right. The goal, here, was not only increased productivity but also a general improvement of one’s mental state and attitude to life, something seen in playlist descriptions like, ‘Get happy with this pick-me-up playlist full of feel good songs!’, ‘stay focused and smart with these house tracks’, and ‘Nothing hurts as heartbreak. These songs will help you have a good cry.’²¹

This signals a functionalist perspective that regards music as a background accompaniment to everyday routines, an amplifier for experiences, and an enabler of moods. This point is most clearly highlighted in Spotify’s promise to “soundtrack your life.” In an essay that explores what music “means” to Spotify, Chodos explains how “the subtle creep of the ‘soundtrack’”

¹⁹ Maria Eriksson, “The editorial playlist as container technology: On Spotify and the logistical role of digital music packages,” *Journal of Cultural Economy*. Pre-published January 10, 2020. doi: 10.1080/17530350.2019.1708780

²⁰ Jeremy Morris, *Selling Digital Music, Formatting Culture*. University of California Press. 2015, p. 168.

²¹ Maria Eriksson, M., & Anna Johansson, “‘Keep Smiling!’: Time, Functionality and Intimacy in Spotify’s Featured Playlists,” *Cultural Analysis*, 16, (2017), p. 75.

descriptor, engenders the idea that “music is generally supplemental to other activities and modes of consumption.”²²

A glance at Spotify’s top playlists reveals an abundance of contexts like “Party”, “Roadtrip” and “Workout”, and playlists with titles such as ‘summer BBQ’ or ‘songs to Sing in the Car’. Also prominent are playlists that reference particular moods, such as “Happy Hits”. While the foregrounding of context- and mood-based playlists over genre may seem like a banal design decision, the principle that underlies it can be traced all the way to the top brass at the company. “We’re not in the music space” Spotify’s CEO Daniel Ek famously told *The New Yorker* - “we’re in the moment space”.²³ Much more than simply a rhetorical flourish, to be about “moments” is to be about serving – not individual users – but rather their “context states”.²⁴

Of course, music has always been “used” by listeners to structure their lives and activities.²⁵ Streaming playlists are just the latest incarnation of the practice of turning to music to amplify and organize our everyday experiences. However, as detailed above, datafied user feedback allows the organization of music on streaming platforms to be modulated to fit particular user profiles and context moments. Since 2019 Spotify has been algorithmically personalizing some of its most popular editorial playlists, because, “songs that one person may want to sing in the shower just might not make sense for everyone else”.²⁶ This is likely just the beginning as cutting edge scientific research is exploring artificial intelligence techniques that involve real-time learning and adaptation to sequential music preferences.²⁷ This has been made possible by the proliferation of mobile devices which permit the collection of data points on location, motion, time of day, and nearby contacts. Increasingly, instead of listeners “attending” to music, music (to borrow from the etymology of “*attendere*”) is literally made to “to stretch toward” its users.

Implications for Musicians

Research has confirmed the crucial importance of Spotify-curated playlists on music artists’ careers. A study by the European Commission determined that a track placement on Spotify’s “Today’s Top Hits” playlist resulted in up to \$163,000 in additional revenue. Other popular Spotify-curated playlists resulted in an even higher payout: “Viva Latino!” was found to generate

²² Chodos, “What Does Music Mean to Spotify? An Essay on Musical Significance in the Era of Digital Curation,” 2019, p. 46.

²³ John Seabrook, “Spotify: Friend or foe?” *The New Yorker*, (posted 2014) online <<https://www.newyorker.com/magazine/2014/11/24/revenue-streams>>, accessed July 18, 2020.

²⁴ Roberto Pagano, Paolo Cremonesi, Martha Larson, Balázs Hidasi, Domonkos Tikk, Alexandros Karatzoglou, and Massimo Quadrana. “The contextual turn: From context-aware to context-driven recommender systems.” In *Proceedings of the 10th ACM conference on recommender systems*, (2016): p. 1.

²⁵ Tia DeNora, *Music in Everyday Life*. Cambridge University Press, 2000.

²⁶ Spotify for Artists, “Our Playlist Ecosystem Is Evolving: Here’s What It Means for Artists & Their Teams,” Spotify, (posted 2019) online <<https://artists.spotify.com/blog/our-playlist-ecosystem-is-evolving>>, accessed July 18, 2020.

²⁷ Elad Liebman, Maytal Saar-Tsechansky, and Peter Stone. “The Right Music at the Right Time: Adaptive Personalized Playlists Based on Sequence Modeling.” *MIS Quarterly* 43, no. 3 (2019).

between \$303,047 and \$424,265 in added revenue per track.²⁸ It is thus not surprising that musicians - and the record labels and managers that represent them - have in recent years focused all their attention on getting their tracks on the most popular playlists.

However, while the placement of a track on a popular playlist can result in a nice payday, artists are becoming increasingly concerned with the lack of engagement displayed by most playlist listeners.²⁹ Industry analyst Cherie Hu has pointed to a “growing attitude of disillusionment among up-and-coming artists and labels that playlists are not as meaningful to, or aligned with, their business as the hype had promised.”³⁰ This is because artists recognize that playlists are there to serve the platform, not the artist. The platform needs to keep users engaged and this means creating products that are – to use Silicon Valley jargon – “sticky”. Playlists fulfill that purpose but in doing so “the artist is disposable in service of the product.”³¹

Indeed, Spotify’s marquee playlists are far bigger than the artists or songs that appear on them. *Rap Caviar* - the world’s biggest and most influential hip-hop playlist – is followed by over 12 million people across the globe. Not limited to being a platform-specific or online brand, since 2017 this playlist even has its own tour – the *Rap Caviar Live* series.

Interviews and focus group research with listeners has confirmed that it is the playlist that is being listened to, not its constituent songs. In focus groups conducted with streaming users in Moscow and Stockholm it was found that playlist consumption was “leading away from knowledge about artists” as “the songs themselves were moved to the background within the fast-moving “flow” of playlist music”.³² As one participant in the study expressed:

...someone starts playing their playlist and then you get hooked on something, and you ask what it is, but you often forget about what it was, or you forget to ask because there’s another song, and another song, and then the song you wanted to ask about is, like, just number 10 on the list (...).³³

To the extent that this quote is at all representative, this is worrisome for musicians.

By choosing how artists and tracks are grouped and ordered, the playlist creator (either in the form of a person or an algorithm) redefines the meaning of the music. Furthermore, just as the unbundling and rebundling of news content by aggregators like Google News shifts power away from the newspaper editor, the disassembling of albums and their re-assembly as playlists shifts

²⁸ Luis Aguiar, and Joel Waldfogel. *Platforms, Promotion, and Product Discovery: Evidence from Spotify Playlists*. No. w24713. National Bureau of Economic Research, (2018).

²⁹ Cherie Hu, “Millions of Followers? Yes, But Some Top Spotify Playlists Fall Short on Engagement,” *Billboard*, (posted 2018) online <<https://www.billboard.com/articles/business/8463174/spotify-playlists-engagement-analysis-study>>, accessed July 18, 2020.

³⁰ Cherie Hu, “Our new “post-playlist” reality,” *Revue* (posted 2019) online <https://www.getrevue.co/profile/cheriehu2/issues/our-new-post-playlist-reality-138493?utm_campaign=Issue&utm_content=view_in_browser&utm_medium=email&utm_source=Water+%26+Music>, Issue #41, accessed June 10, 2020.

³¹ Hu, “Our new “post-playlist” reality,” online.

³² Sofia Johansson, Ann Werner, Patrik Åker, and Greg Goldenzwaig. *Streaming Music: Practices, Media, Cultures*. Routledge, (2017): p. 49.

³³ Johansson et al., *Streaming Music: Practices, Media, Cultures*, 2017, p. 49.

“curatorial power” away from the artist.³⁴ As a result, musicians have less control over the presentation of their work than they did in the album era. In place of the artist, the curator of the music experience – the platform – becomes the “creator”. Format matters, therefore, not only for what it can tell us about transformations in the consumption of music, but also because it points to the shifting locus of curatorial power, and in turn, who gets to be considered creative.

Alongside a particular theory of the listening subject, we can thus ascertain an understanding of both music and the musician that supports the playlist. While listeners are “users”, music becomes “content”³⁵ and musicians becomes “a production facility for playlists”.³⁶ In turn, the playlist threatens to subsume the artist and her song - the musical foundation upon which everything else rests.

³⁴ Robert Prey, "Locating Power in Platformization: Music Streaming Playlists and Curatorial Power." *Social Media+ Society* 6, no. 2 (2020): 2056305120933291.

³⁵ Keith Negus, "From creator to data: the post-record music industry and the digital conglomerates," *Media, Culture & Society*, 41(3), (2019): p. 367-384.

³⁶ Mark Mulligan, *Time to stop playing the velocity game*. MIDiA (posted 2020) online <https://midiaresearch.com/blog/time-to-stop-playing-the-velocity-game?utm_source=MIDiA+Research+Newsletter&utm_campaign=4299b909fa-EMAIL_CAMPAIGN_2019_01_14_12_03_COPY_01&utm_medium=email&utm_term=0_8602b921cd-4299b909fa-523290919>, accessed June 10, 2020.