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Effects of algorithmic curation in users' music taste on Spotify

Efeitos da seleção algorítmica no gosto musical dos usuários do Spotify

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Abstract: This study addresses the potential impact of recommendation algorithms on Spotify users' musical tastes with the aim of understanding how algorithmic suggestions shape listening behaviors and preferences. A comprehensive review of the literature reveals that the presence of algorithms has contributed to reduced musical diversity and increased taste tautology among users. The results suggest that recommendation algorithms reinforce prior preferences, leading to the emergence of filter bubbles This algorithm-driven taste has obvious cultural implications and, with it, a large impact on the overall diversity of the musical experience. A qualitative methodology was used, consisting of a systematic literature review based on the PRISMA framework, identifying trends and key elements of existing studies. This study finds its limitations in the need for an additional quantitative study to delve deeper into the behavior of recommendation algorithms. Ultimately, this research underscores the need for greater awareness of the implications of music recommendation using algorithms in the digital age.

Keywords: Spotify, algorithmic curation, *platformization*, taste, calculated publics, filter bubbles

Resumo: Este estudo aborda o impacto potencial dos algoritmos de recomendação nos gostos musicais dos usuários do Spotify, com o objetivo de compreender como as sugestões algorítmicas moldam os comportamentos e preferências de escuta. Uma revisão abrangente da literatura revela que a presença de algoritmos contribuiu para a redução da diversidade musical e o aumento da tautologia de gosto entre os usuários. Os resultados sugerem que os algoritmos de recomendação reforçam preferências anteriores, levando ao surgimento de *filter bubbles*. Esse gosto impulsionado por algoritmos tem implicações culturais evidentes e, com isso, um

grande impacto na diversidade geral da experiência musical. Foi utilizada uma metodologia qualitativa, composta por uma revisão sistemática da literatura baseada no protocolo PRISMA, identificando tendências e elementos-chave dos estudos existentes. Este estudo encontra suas limitações na necessidade de um estudo quantitativo adicional para aprofundar a compreensão do comportamento dos algoritmos de recomendação. Em última análise, esta pesquisa ressalta a necessidade de maior conscientização sobre as implicações da recomendação musical por meio de algoritmos na era digital.

Palavras-chave: Spotify, curadoria algorítmica, plataformização, gosto, públicos calculados, bolhas de filtragem

1. Introduction

Our listening habits have changed and so has the music industry: during the last twenty years, there has been a shift from an ownership-based to a streaming platform-based business model. In 1999, Napster was launched, being the first digital music platform that developed a peer to peer file sharing model. (Sifferd, 2002). The arrival of websites and applications such as Napster or YouTube shifted our listening habits by providing an anytime availability of all kinds of music, as later would do Spotify. Music consumption has changed radically ever since and so has changed music curation. Traditional gatekeepers such as music journalists and radio programmers no longer controlled what the user listened to (Bonini & Gandini: 2019), and instead, listeners found the freedom of accessing an unlimited library of digital music without intermediators (Hesmondhalgh & Meier, 2018).

However, years later, the user sovereignty in the music industry was proven to be far from everlasting, but rather an illusion. The progressive acquisition of a platform economic model, the arrival of algorithms and the crescent datafication of the listener's habits make it more and more difficult to elucidate who is in command of the music we listen to. In this sense, streaming platforms and listening dynamics are under the scope of platformization and algorithmic logics of digital platforms. The model of music streaming platforms has been widely analyzed yet the effects of algorithmic curation on streaming platform users remains relatively underexplored. This study aims to analyze the possible changes in the variety of music Spotify users listen to as a consequence of an algorithmic curation of music in the platform.

2. Objectives & methodology

2.1. Objectives

The main objective of this research is to explore the possible impact of music recommendation systems on the taste of Spotify listeners. Additionally, the study aims to understand how the use of algorithms may affect the diversity of music consumption in a music streaming platform. For these purposes, a systematic analysis of the recent literature will be carried out.

2.2. Methodology

This research involves a systematic literature review to analyze existing literature on the effects of Spotify's algorithmic systems on listener's taste. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2020 protocol was used to ensure that the review process was transparent, comprehensive and exhaustive (Dialnet, n.d.). Eligible studies comprised journal articles, conference papers, books, book chapters and reports. Studies were included if

- They were published between 2009 and 2024
- They were published in English or Spanish.
- They address algorithmic curation and its impact on user behavior and music consumption or the economic and cultural effects of platformization on the music industry.

Analyzed texts have been peer-reviewed studies on Spotify's algorithms as well as studies focusing on the cultural, social, and economic impacts of algorithmic music curation. In the systematic review, out of an initial pool of over 200 articles, 80 articles passed the screening phase and a final sample of 30 studies that followed the eligibility criteria were selected for the final review, excluding those articles that did not reflect the subject matter (38), that were written in other languages (n=7), or were published in unverified sources (n=5). The recovered studies were key in providing detailed insights into how Spotify's algorithmic systems have had a meaningful impact on the curation of cultural products, and the crescent power of platformization in the music industry.

Table 1. Systematic selection using PRISMA 2020 Protocol

Records selection			**Sample**
Initial records			n=206
Studies Identification via databases	Records deleted prior to selection		n=126
	Screened studies		n=80
	Excluded studies	Reason 1 (subject)	n=38
		Reason 2 (language)	n=7
		Reason 3 (source)	n=5
Total number of studies included			n=30

The main authors that have guided this research are José Van Dijck, David Nieborg, Tarleton Gillespie and Thomas Poell, whose theories of platformization of cultural industries, datafication and algorithmical production of calculated publics were fundamental in the understanding of streaming platforms. Also noteworthy is the growing body of literature that in recent years has analyzed the influence of algorithms on music, taking into consideration the work of Robert Prey on the datification of listening and platformization of music, as well as the "algo-torial" curation of music proposed by Bonini and Gandini.

3. Results

Spotify has become a key agent in the music industry over the past decades as well as an open door to music democratization. Over the past years, Spotify has implemented a new algorithmic system to display music under the purpose of offering tailored content (Jacobson, 2016), which has permeated its users' platform experience (Björklund, 2022). The Swedish platform's intention to provide custom playlists has been pursued with commitment. As the user opens the app, the Explore page offers an array of playlists made for them. "100% you" offers a series of daily mixes based on the user's listening habits, "Daily route: a music and news mix, made for you". As we scroll down, dozens of widgets display music under the same premise: personalized radios according to the user's most listened artists, as well as mixes categorized by listened genres, moods and even aesthetics.

This digital platform devoted to music streaming has progressively changed their streaming model towards an almost entirely datafied recommendations model. And due to the logic that underlies it, it becomes essential to understand its nature as a platform and how it affects the relationship with its users.

3.1. Music streaming in platform economy

The term "platform", understood as part of the digital ecosystem, appeared not too long ago to refer mainly to digital media intermediaries. Gillespie (2010) elaborates a radiograph of the term, exploring the different areas on which it depends, stating that the platform has a computational connotation, as something to build upon and innovate from; political, a place from which to speak and be heard; figurative, in that the opportunity is an abstract promise as much as a practical one; and architectural, in that platforms are designed as open-armed, egalitarian facilitation of expression, not an elitist gatekeeper with a normative and technical restriction.

One of Gillespie's most interesting contributions is the fact that a platform is used to elevate someone from the rest. And this view is not trivial, as the concept of digital platforms has gained particular traction among user-generated content, streaming media, blogging, and social computing, given that they offer an opportunity to gain visibility, communicate, interact or sell, something which carries, according to Gillespie, a certain populist aura.

While rising above the rest, the platform offers itself as an "egalitarian space, promising to support those who stand upon it" for its users (Gillespie, 2010). Van Dijck has also provided some key contributions to the conceptualization of platforms on which the research is based, arguing that, despite presenting themselves as such, platforms “are not neutral nor are they value-free constructions”; and neither do they reflect the social. On the contrary, “they produce the social structures where we live”, by constructing a specific set of norms and values inscribed in their architectures (Van Dijck et al., 2018).

Given that most prominent content platforms are user-created (Gillespie, 2010; Van Dijck et. al. 2019), it seems that platforms cannot be completely understood without the concept of culture, and vice versa (Van Dijck, 2014). Culture’s adaptation into

the web 2.0 has been platform-based, as digital platforms have hosted and transformed cultural practices (Poell et. al, 2019), giving rise, for instance, to aspirational labor, those productive activities "that hold the promise of social and economic capital; yet the reward system for these aspirants is highly uneven" (Duffy, 2016). This promise appears to manifest itself on Spotify, where artists and bands frequently witness their songs achieving significant levels of popularity without this being necessarily matched by equivalent social or economic capital (UMAW, n.d.).

The dominance of platforms' new digital environment requires new platform-adapted dynamics. The term "platformization" was first coined by Anne Helmond in 2015, referring to the dominance of platform infrastructural and economic models on the web, as well as "the process in which third parties make their data platform-ready" (Helmond, 2015) Later on, several scholars, including Jose Van Dijck, Nieborg and Poell, have provided a deep and well-grounded depiction of this process from a multi-approach perspective, that includes business studies, critical political economy, cultural studies and software studies. (Nieborg, Poell & Van Dijck, 2019)

3.2. Cultural platformization in music streaming platforms

As regards this research, platformization will be studied from the cultural studies approach. It is in fact a process that affects to a large extent cultural production. Cultural platformization is considered by Nieborg & Poell (2018) as "the penetration of economic and infrastructural extensions of online platforms into the web, affecting the production, distribution, and circulation of cultural content." An interesting concept the authors propose in order to explain the platformization of cultural production is the term "contingent commodities", which refers to those products or services offered via digital platforms that are open to constant modification and adaptable according to "datafied feedback" of the user. This term refers therefore to platform-dependent commodities, as their own nature is contingent on platforms. (Nieborg & Poell, 2018) In the digital ecosystem, cultural production is a contingent commodity since it is increasingly reliant on an oligopoly of digital platforms, that include among them Spotify.

Culture creators are considered "platform complementors". This view on culture production eventually reflects its effects on consumers, seen as "end users". The relationship between complementor and end-user is at all times controlled by platform companies, in their role of mediator institution (Nieborg & Poell, 2018). Both platformization of cultural production and variation of user's consumption of music on Spotify are the cause and the effect of the very same phenomenon. Neither of them can be understood if not taking into account the datafication and dataveillance. The firsts in introducing the term "datafication" were Cukier and Schönberger in 2013. They described it as the -now-imposed- trend of turning every piece of information into data to create predictive analysis, signaling that data encompasses many things that weren't considered "valuable information" until nowadays.

In parallel, another shift appears, baptized as "dataveillance", and resulting from merging data and surveillance; it consists in the monitoring of users based on their online data. What separates this practique from surveillance is the fact that no specific purpose is involved, dataveillance instead consists of a permanent tracking of data whose purposes are unknown to the user (Van Dijck, 2014). Rather than the control over one particular person, it penetrates every fiber of the social fabric (Andrejevic, 2012), something that finds unavoidable consequences in the social contract between citizens and corporate platforms. The goal of dataveillance is therefore the speculation of data. There is no particular objective, but to amass data and produce patterns.

Regarding dataveillance, Raley (2013) points out that, though it may seem, it is not a novel formula. It already existed in electoral processes such as the U.S. census use of data. But there have been quantitative and qualitative shifts: not only data exchanges are growing exponentially, showing a new "appreciation" of data, but also large-scale data-aggregation companies have augmented, with more and more sophisticated technologies. These changes have completely rearranged our way of consuming and our relationship with platforms.

Datafication is carried out in most platform contexts. The activity of listening to music is also under the scope of data speculation. Prey (2016) remarked that datafication of listening was at a very initial stage of development, at that time. In the

article “Music Analytica: the Datafication of Listening, he sums up how any piece of information users generate while listening to a music streaming platform is transformed into data. The number of skips, the moment in which we stop playing a song, or the moment when we turn up the volume are just a few examples of the almost infinite datafied actions on our everyday listening routine. Listening datafication itself is in fact just another case of how users constantly generate a digital trace profitable for marketers and institutions. (Nieborg, Poell & Van Dijck, 2019)

3.3. Algorithmic production of calculated publics

In the context of platformization and dataveillance, algorithms play an important role in user interactions and consumption inside platforms. As defined by Cormen, an algorithm is a sequence of computational steps that transform inputs into outputs—similar to a recipe (Cormen, 2009). In “The Relevance of Algorithms” (2013), Gillespie reflects on his critical view of algorithms as he summarizes the main features of algorithmic logic. Some of them become especially important when analyzing the correlation between algorithms and music listened to by users. Algorithms produce “calculated publics”. The providing of algorithmic-chosen content is not fully adapted to the user, nor custom-made, but only approximate. It reshapes the public’s sense of itself, as it integrates individuals into a certain targeted public that may correspond only partially with their sense of self but may eventually end up reshaping it.

The algorithmic production of calculated publics is a key element of this research. Algorithms both participate in structuring the publics that operate within a digital environment and also create calculated publics. In the case of music streaming platforms, algorithms create calculated publics by claiming to know their users and by suggesting to them to develop an affinity with certain genres or songs. Despite Cormen’s initial definition of algorithms, we should not consider them as mere codes that produce outputs, but as a “socially constructed and institutionally managed mechanism” which is designed to assure a new knowledge logic for the public (Gillespie, 2014). Thus, as in any form of platform, social and institutional interests interfere in the normative frameworks curating the music we listen to.

3.4. Algo-torial curation in Spotify playlists

Spotify's units of organization are its playlist; they are the means by which music is presented to the user, as a result of a selection and combination of several songs. Playlists are not only the basic units in which Spotify organizes music, but they have also become a distinctive feature of the platform, which aims to arrange songs by genre, by mood, or by the current activity of the user, as a part of the platform's commercial aim to provide "musical experiences" (Morris & Powers, 2015). The selection of their songs is carried either by a person or an algorithm, as part of an "algo-torial" logic, (Bonini & Gandini, 2019) defined as a half editorial-half algorithmic creation of "listening agendas" of music listeners worldwide. As a part of the platform's quest for a differential identity based on offering experiences, the use of algorithms in Spotify's playlist curation is increasing (Freeman et al., 2021) playing a crucial role in user experience on the platform (Björklund et al., 2022) as it is used to create precise and personalized experiences for the user.

Despite this, the result of an automated curation is not equal to an editorially-curated one. Morris (2015) proposes the term "infomediaries" to address the current role of music recommendation algorithms, being "organizational entities that monitor, collect, process and repackage cultural and technical usage data into an informational infrastructure that shapes the presentation and representation of cultural goods". As such, algorithms collect users' past behaviors and combine them with extensive databases, something that highlights the clear human aspect of recommendation systems: an algorithm is nothing more than an adaptation to the tastes of a large mass of users who feed its database, and is intrinsically dependent on them (Beer, 2009; Morris & Powers, 2015).

Spotify's music recommendation systems are fundamentally generated by feedback data from listener activity and user profiles (Snickars, 2017). One of the most revealing articles on the platform's intricacies discloses that streaming devices are able to discriminate 'high-value' listeners from 'low-value' listeners (Prey, 2016), just by seeing what music is in their library and through which phone model they are accessing. Echo Nast creates a set of affinity models to segregate high-value listeners according to their interests, which will form different targets for advertisers. Prey concludes: "In short, music streaming space is not only

horizontally segmented via consumer categories, it is also vertically ordered via hierarchies of listener value and projections of future worth." In the same vein, Maasø (2022) details how the platform model incentivizes megahits and superstar economies.

3.5. The birth of an algorithmic music taste

Back in 2009, Beer exposed that the music we listened to had become "a consequence of algorithms" outlining how such influence constitutes an expression of platform power. In the same vein, a decade later, Robert Prey (2020) would point to algorithmic music curation as a representation of the shifting point of platform power. Since our way to listen to music migrates to the platform ecosystem, the presentation and the selection of music also experience changes, as they get adapted to platforms by datafication and automated curation.

Fueled by extensive databases, algorithms contribute to a uniformizing drift in the listener's taste. This is thoroughly explored by Kyle Chayka in "Filterworld" (2024), where he examines how peripheral cultures have been narrowed by the weight of the algorithmic gaze. Unlike traditional human curators, algorithms prioritize patterns of consumption, shifting the focus from an expert-driven curation to a data-driven personalization (Beer, 2009). This can reinforce existing tastes and preferences by suggesting content similar to what users have previously engaged with, potentially limiting exposure to unfamiliar cultural experiences (Gillespie, 2014). Nevertheless, algorithmic-curated music seems to meet with dissatisfaction among users. A study on the textual framing of music playlists (Ferwerda, 2023) revealed most users opt for playlists labeled as generic rather than as personalized due to the assumption that personalization implies a loop of previously listened music.

As a consequence of this automated influence on what we listen to, McCaffrey (2016) has come up with the concept of "taste tautology", to refer to the sense that users find themselves trapped in an eternal loop of automated generated content, which, in terms of Spotify, is translated to homogeneous music, same artists, same particular songs, etcetera. Indeed, algorithmically-generated recommendations were proven to significantly reduce consumption diversity, as determined by Anderson et al. (2021) in a quantitative study developed by Spotify Research Scientists. These findings align

with Eli Pariser's notion of "filter bubbles" (2011), which constitute echo chambers reinforced by algorithms that isolate us intellectually and also culturally. On the other side, musicians also experience the consequences of the recommendation systems, working with "algorithmic precariousness" that aggravates the instability of cultural work (Duffy, 2020) and being forced to constantly negotiate their relationship with platforms (Morris, 2020).

Lastly, Prey (2020) considers their music selection policy as a mechanism for uncovering Spotify's intention to incite a dependence on the platform. This increasing dependence emerges separate from the traditional music industry since it deviates from past technologies. However, what seems particularly problematic is, as Freeman (2021) noted, the fact that an algorithm reveals itself as an agent that is able to shape listeners' individual tastes.

4. Discussion and Conclusion

The results show that algorithmic curation on Spotify plays a pivotal role in shaping cultural consumption by creating calculated publics—groups of listeners segmented based on user data (Gillespie, 2014). Through Echo Nest, Spotify categorizes users into high-value and low-value listeners based on their consumption patterns, reinforcing commercial hierarchies where certain users are prioritized for monetization (Prey, 2016) and dividing taste into calculated publics.

Nowadays taste has come to be algorithm-driven and thus dependent on platform's decisions (Beer, 2009). These algorithms do not only recommend songs; but they actively influence listeners' preferences by promoting content that aligns with listeners' prior behaviors. Such systems lead to personalized but potentially homogenous musical experiences (McCaffrey, 2016; Snickers, 2017; Anderson, 2020). While playlists curated via a blend of human and algorithmic methods (Bonini & Gandini, 2019) offer a customized user experience, they also contribute to a "taste tautology" (McCaffrey, 2016), trapping listeners in loops of familiar content and reducing the diversity of their consumption. This aligns with Pariser's (2011) notion of filter bubbles, whereby algorithms limit exposure to new content, creating an isolated experience that constrains cultural exploration.

To conclude, datafied intermediation leads to an increasingly homogeneous culture -and music- consumption. The power of platforms plays a role in the monetization of listening that can be explained through the use of algorithms, having evident consequences in culture diffusion. Future lines of research can focus on the impact of algorithm-driven music streaming services on the opportunities for emerging musicians. Secondly, future efforts should focus on mitigating the narrowing effects of algorithms to promote more diverse and inclusive musical experiences.

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