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Listening to music videos on YouTube. Digital consumption practices and the environmental impact of streaming

Jean-Samuel Beuscart (Telecom Paris, IPP, i3), Samuel Coavoux (Crest, ENSAE, IPP), and Jean-Baptiste Garroq (Sciences Po, Medialab)

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Abstract:

YouTube is currently the most widely used platform for music streaming. Users listen to music videos rather than watch them. This is environmentally suboptimal since video data requires more energy than audio data to be hosted and transmitted. Why are consumers using a video platform to stream music? In this paper, we sketch a framework for analyzing digital practices as consumption practices and their transformation in the context of the ecological transition. We interviewed 29 online music consumers from varied backgrounds. Drawing on practice theory, we conceptualize online music use as a combination of sociotechnical configurations articulating listening devices, types of attention to music and the social contexts of daily life. We analyze how different platforms, especially YouTube, are embedded in specific configurations. We first establish that configurations in which videos are actually watched are rare. Though users are aware of the carbon footprint of streaming, this representation does not inform their listening configurations. We describe three types of online music practices according to the role YouTube plays in, that correlate with music passion: YouTube can be framed as a free and open listening platform (especially to casual listeners), as an efficient soundtracking device in many contexts, as a useful complementary listening and music sharing device. The paper extends the literature on green consumption to digital consumption, analyzing relations to infrastructures in a regime of abundance, and contributes to the sociology of online music consumption, showing how platform choices are linked with music passion and embedded in social contexts.

Keywords: cultural consumption, music, environment, practices, YouTube

In the early 1980s, “Video killed the radio star” became the symbol of the threat MTV posed to the music industry. Forty years later, the competition between video and audio flows goes on, albeit on renewed terms. Online streaming is now one of the primary modes of access to music. Several companies have built dedicated music streaming platforms, such as Spotify, Apple Music, Deezer, and Amazon Music. However, YouTube, a general-purpose video streaming platform, is the most used one. Why do Internet users look for music on a video platform more often than they do on dedicated ones? The obvious explanation for using YouTube, namely that users would rather watch videos than just listen to music, is not sufficient to explain this behavior: this research shows that most users, most of the time, actually let the video play in the background, using the website for its audio content only.

Understanding music video consumption is especially relevant in a context of rising concerns about the environmental footprint of digital technologies. In recent years, several public and civil society actors have drawn attention to the consumption of energy and resources associated with digital uses. They suggest that, in addition to optimizing the design of products and services, controlling the carbon footprint of the digital world requires moderating uses. In this regard, streaming music video data in order to access audio tracks is a paradigmatic example of energy overconsumption. The same quality of service can be delivered more efficiently through audio streaming¹. In order to reduce the environmental footprint of digital activities, there is a need for a better understanding of digital infrastructures and their uses. Music video streaming is a good candidate because it is widespread and because, as it is often suboptimal, its environmental footprint can be lowered without a reduction of the volume of consumption.

Why do users listen to music on a video platform although there are audio alternatives, and despite video platforms being more resource-intensive? We adopt a practice theory framework to look at patterns of uses of music platform. Relying on a corpus of 29 interviews with YouTube users, we propose to describe these practices as a combination of plural sociotechnical configurations that we define as combinations of contexts, technical setups, and modes of attention. Platforms are integrated into these configurations depending on their affordances, and tend to stay for as long as the configuration is relevant. We show that environmental considerations are currently irrelevant to users in this domain, even though they are mostly aware of the impact of digital consumption on climate change. The evolution in representations has not given way to a change in competencies and material configurations. This has implications for environmental sociology: in the digital world, invisible infrastructures built in a world of abundance make change towards greener practices difficult. This article also sheds light on a major way to access music that is often overlooked by studies of music

¹ We compared the amount of data needed for a half-hour music playlist as animated music videos on YouTube (about 120 MB), as static-image music videos on YouTube (about 60 MB), and audio-only on Deezer (about 30 MB), giving a 1 to 4 ratio in favor of audio-only platforms.

consumption, and extends previous studies of “technological eclecticism” (Nowak and Bennett, 2020) to platform choice.

1 Background

1.1 Environmental concerns about video streaming.

A growing body of research attempts to measure the ecological footprint of the Internet. Using various methods, these works provide estimations about the energy intensity of data centers (Koomey, 2008; Masanet et al., 2020), the core network (Coroama et al., 2015), fixed Internet data transmission (Aslan et al., 2018) and mobile network transmission (Pihkola et al., 2018). Due to the great complexity of networks and the heterogeneity of the data, most researchers acknowledge that the estimations vary greatly. Nevertheless, they agree that the environmental footprint of digital infrastructures (data centers, networks, consumer devices) is significant and rising, representing between 4% and 15% of global energy consumption.

The ecological footprint of video streaming has recently come under the scrutiny of environmental organizations and public actors. Video is responsible for 82% of total Internet traffic in 2020 (Cisco, 2020). As it is heavier than other formats, it requires larger data centers and more bandwidth to be delivered to its consumers. Drawing on research about the carbon footprint of Internet consumption (Andrae and Edler, 2015), The Shift Project (2019) estimated that online video consumption has a carbon footprint of 300Mt CO₂, equivalent to the annual emissions of Spain. This estimation has been contested as overly pessimistic, as it underestimates efficiency gains in data centers and overestimates the energetic cost of data transfer (Kamiya, 2020b). The controversy is still ongoing, resulting in more precisely sourced and documented estimations, ranging from 0.077 to 0.78 GW per hour (Kamiya, 2020a; The Shift Project, 2020). Moreover, the link between data consumption and energy cost is not direct and not linear. The energy cost of networks is mostly due to infrastructures, which are stable in the short term: cutting data consumption does not proportionally reduce energy consumption immediately. However, in the long run, networks are sized based on uses, so that today’s trends in data consumption determine tomorrow’s trends in infrastructure capacities, and thus, along with efficiency gains, in overall energy consumption. These trends are incompatible with the IPCC recommendations, which state that all economic sectors should reduce their carbon footprint by at least 50%. Beyond strong differences in estimations, analysts agree on the fact that the energy footprint of important digital activities should be actively monitored and that efficiency gains should be combined with digital sobriety in order to be sustainable.

To what extent are these concerns shared by consumers? The environmental footprint of digital consumption, and of online video in particular, has only been put on the agenda recently, circa 2018. Works in the sociology of consumption discuss the emergence of an “eco-habitus” (Carfagna et al., 2014; Ginsburger, 2020) and describe consumption practices centered on “restraint” (Khamis, 2019) or frugality, but they rarely address the issue of digital consumption. Moreover, research shows that, regarding the greening of practices, adherence to eco-conscious discourses does not automatically lead to a transformation of practices, which are strongly constrained by conflicting norms, internalized dispositions, infrastructures, and the rhythms of social life (Gram-Hanssen, 2011; Strengers, 2011). Audiovisual and digital practices, such as choosing a television screen, are subject to tensions between aspirations to sustainability and the norms and dispositions that guide perceptions of domestic and family audiovisual uses (Aro, 2020). Building on these works, our study provides some elements about the perception of the footprint of online video by users and their possible translation into practices.

1.2 Music listening online

Music streaming platforms such as Spotify and Deezer appeared in the mid-2000s and have become a major means of access to recorded music. However, a general video platform, YouTube, is the most often used for streaming music (Liikkanen and Salovaara, 2015). Recent industry data show that in Western Europe and North America, 47% of music streaming is from video platforms, i.e. YouTube, 37% from paid audio platforms, and 15% from free audio platforms. Moreover, 75% of online music consumers have “used YouTube for music in the past month” (IFPI, 2020: 9). YouTube is thus both used by a majority of online music consumers, and used more on average than audio platforms. Conversely, music appears to be one of the most popular content on YouTube (Liikkanen and Salovaara, 2015).

A growing body of literature deals with the digital turn and its effects on music listening. Three main results are relevant to our research. First, digital technologies are supplementing rather than replacing previous technologies. Indeed, in France, about half of the population uses digital means to listen to music, while 70% uses the radio, and 40% uses CDs². Moreover, digital listening can be done through a variety of devices (computer, phone, mp3 player) and services (audio streaming, video streaming, offline files). Since “digital technologies are adopted as a complement to pre-existing practices” (Nowak and Bennett, 2020: 4), music consumers tend to mix devices from different technical

² Data from the *Pratiques culturelles 2018* survey, Ministry of Culture, doi:10.13144/lil-1511. Nationally representative data of the population aged 15 and more, n=9234.

generations according to their needs, the contexts of use, their materiality (Magaudda, 2011), and representations (Webster, 2020).

Second, digital technologies changed how consumers discover and organize cultural goods, producing a regime of abundance. Streaming platforms' discourse first focused on providing large catalogs, and then switched to orientation through personalized recommendations (Seaver, 2019). They now put forward their ability to predict consumers' tastes and to provide them with the right items at the right time. A lot of academic attention has thus been devoted to algorithmic recommendations (Beuscart et al., 2019; Seaver, 2019; Siles González et al., 2019). Yet music is a good that is often consumed repeatedly, and its value increases with familiarity (Ward et al., 2014). There is thus a tension between discovery and archiving (Lüders, 2019), and consumers devise strategies to categorize and organize their collections, online and offline (Gilliotte, 2022).

Finally, researchers noticed that the digitalization of music consumption has changed how music fits in everyday life. They highlight the decline of music listening as a standalone activity (Hagberg and Kjellberg, 2017) and the rise of "soundtracking", i.e. "choosing and listening to music to accompany other everyday practices" (Fuentes et al., 2019). Digital technologies allow for ubiquitous music, which makes music present in more situations than before, but most often as a secondary activity. Music platforms encourage this through contextual playlists ("Work out", "Chill Sunday"...). These features are built to let "attention to drift" (Hagen, 2016).

This literature shows three main limitations. First, it often focuses on specific consumers, namely music fans and/or young adults, such as "heavy users" of Spotify (Siles González et al., 2019) or festival goers (Lüders, 2019). Yet, music is central neither to the daily life, nor to the identity of most consumers. In this paper, we included people with varied relation to music and we show that the degree of passion is a crucial factor for platform choice.

Second, despite works on device choice, and especially on the choice between offline and online ways of listening to music (Magaudda, 2011; Nowak and Bennett, 2020; Webster, 2020), few works deal with platform choice in online practices. One reason may be that participants are often sampled from a single platform in studies of online practices. Furthermore, studies focus on audio platforms. Paradoxically, although YouTube is the most important platform for online music consumption, it has almost never been studied as such, as a thorough literature review, which we completed using the same strategies, established (Liikkanen and Salovaara, 2015). The only research of music consumption that includes YouTube (Liikkanen and Aman, 2016) points to a complementarity between audio and video streaming. It shows that YouTube fares better than Spotify on shareability and accessibility, and Spotify fares better than YouTube on faithfulness and sound quality. Overall, YouTube appears as a go-to platform for quickly playing music in every circumstance, and for sending it to someone else.

Finally, to the best of our knowledge, there has not been any study of the role, or lack thereof, of the environmental impact of music streaming in determining listening practices.

1.3 Practice theory and sociotechnical configurations

A strong stream of sociological research has shown that the adoption of a product over another may better be conceived in terms of habits, routines, and constraints rather than choice. Following what is often referred to as the “practice turn” in sociological theory of consumption (Schatzki, 2002; Shove et al., 2012; Warde, 2014), we aim to describe the actual dynamics and the constraints of the use and non-use of audio and video music platforms. First, following this literature, the relevant level of analysis should not be the product or the service bought, but the social practice (Warde, 2016), i.e. music listening. Second, most of consumption choices do not elicit a conscious deliberation; in daily social life, the explicit weighing of existing options is the exception rather than the rule (Warde, 2005). Third, practices take shape at the articulation of several dimensions that model and constrain them (Hand et al., 2005; Schatzki, 2002; Shove et al., 2012; Warde, 2016), such as the existing social representations of the practice, normative discourses eliciting the right ways of doing things (“meaning”); the dispositions, feelings, moods associated with the practice (“competence”); the sociotechnical infrastructure that enables the practice (“material”); and the integration of the practice into the rhythms of everyday life and routines (“temporal”).

One of the challenges of the study of ordinary practices is to account for both the constraints that shape a practice and the diversity of its enactments. To cope with this difficulty, scholars have described practices as enacted through several “configurations” (Hand and Shove, 2007) or “arrangements” (Shove et al., 2012). A configuration is a specific combination of (material, temporal, dispositional, imaginary) elements that define a stable and shared way of performing a practice. At some point of its history, a practice can be centered on a single configuration (Hand et al., 2005) or realized through different arrangements (Hand and Shove, 2007); conversely, practitioners may be embedded in only one configuration or combine several ones (Hand and Shove, 2007; Warde, 2016).

In this respect, one specificity of the practice of music listening is that it can be scattered into many different configurations because, as we noted in the previous section, music has become ubiquitous, is used for soundtracking, and played from varied devices. To account for this diversity, we conceptualize music listening practices as a combination of several sociotechnical configurations which we define as common, stable associations of technical setups, social contexts, and specific states of mind. The music listening practice of a consumer can be described as a set of one or more stable listening configurations. Conversely, configurations are typically shared by many consumers, the practice of music listening being ultimately described as the addition of the large but not infinite number of sociotechnical configurations.

2 Data and method

This study took place in France. We conducted 29 semi-structured interviews with people who use YouTube to stream music at least occasionally. The first four participants were recruited through the authors' personal network, in order to test and tune the interview guide. We then used a database of participants to a previous survey on digital cultural consumption who had agreed to follow-up interviews to recruit the remaining 25 participants. The literature on digital music consumption favors homogeneous samples of young music fans. However, we hypothesized that age and music passion were crucial to understanding platform choice. The sample is thus diverse with regard to age (mean 37 years old, standard deviation 9.4), gender (nine women, 20 men), occupation (six working class, 10 middle class, 13 upper-middle class), and passion for music (nine casual, 11 regular, nine fans).

We classified participants in three categories of music passion taking into account how often they listen to music, how interested they were about the music they listened to, and how central music was to their identity. In this paper, we use this variable as the main analytical lens. It is linked with respondents' occupation and education level, since cultural participation tends to increase with education. We did not find significant differences related to gender.

We conducted the interviews remotely during the spring 2020 COVID-19 lockdown. Participation was compensated with a 20-euro voucher. We used a guide providing a general structure and acting as a checklist of important topics: music equipment, temporal, spatial and social environments of music listening, uses of YouTube and of audio-only platforms, use of personalized recommendations, and environmental concerns about digital technologies. Environmental concerns were kept for the end of the interview for two reasons: in order to see whether participants spontaneously mentioned it about their platform choices, and to avoid it affecting participants' description of their consumption, as we were wary of the symbolic imposition of this issue.

All interviews were fully transcribed. For their analysis, we used three different strategies. First, we coded the transcripts in QDAMiner along the themes established in the interview guide. This allowed us to take a global look at the data. Second, we elaborated on the coded material to define the sociotechnical configurations used by the interviewees and classified them according to several dimensions such as the use of YouTube and attention paid to video. Third, we read and analyzed every interview separately and wrote a one-paragraph portrait of each participant, describing the set of sociotechnical configurations they were navigating.

In a grounded theory approach (Glaser and Strauss, 2000), the sociotechnical configurations were defined in a back-and-forth movement between our fieldwork and practice theory concepts: temporal and material framing, competence, representations (Shove et al., 2012; Warde, 2014). We ended up defining music listening configurations through six dimensions:

- A context or a main activity (work, sport, housekeeping, commuting, etc.), usually included in a regular schedule;
- A location (workplace, living room, bathroom, cars, etc.);
- A listening device (phone and headphones, connected TV, personal computers, etc.);
- A way to access music (radio, CDs, streaming platform, etc.);
- A mode of selection (personal playlist, search and click, let the algorithm run, etc.)
- A type of attention (energizing to music, background music, focus on the music, watching the video, etc.), expressed through normative statements about the type of pleasure or energy music should provide in this context.

During the interviews, when accounting for their streaming habits, participants very often spontaneously associate several of these elements, especially activity, location, device, and platform (“I listen to YouTube on my computer at work”, “I play Spotify on my phone in the bathroom during my morning shower”); when prompted to by the interviewers, they easily articulate it with one or several listening modes and describe the type of attention they dedicate to the music in these configurations.

Every music streaming user can be characterized by at least one sociotechnical configuration. Their number depends on the variety of social contexts where music is present. Music fans usually combine several. For instance, Charlotte’s (I20) music listening practice is made up of four main configurations: at work, she listens to YouTube on her professional computer, as background music, letting the algorithm run or launching long playlists. When commuting (walking or taking the train), she listens to editorial playlists on Deezer on her phone. At home, in her room, she listens to her collection of CDs and vinyl records; in the living room, she favors web radios. On the contrary, casual music users tend to be characterized by only one configuration. For instance, Caroline (I22) only listens to YouTube on her phone every evening in her bed, before falling asleep, what she describes as “her moment”; she plays a song from her listening history and lets the algorithm choose the following one. Otherwise, she has no time to listen to her own music, although she is exposed to that of her children.

3 Results

3.1 Are music videos watched?

Do YouTube users actually watch music videos? Video streaming could be justified by the specific value it brings compared to audio platforms. This study provides qualitative evidence that music video uses of YouTube are scarce: the dominant use is to solely listen to the music, without watching, and sometimes without even displaying, the video.

We identify four configurations in which users pay either full or “oblique” (Hoggart, 1958: 197) attention to videos. First, some users (I2, I3, I4, I9, I17, I26, I27) mention using YouTube during dedicated “exploration” moments, browsing music videos, or following links sent by friends. During these moments, music is the main activity; users pay attention to the music videos as well as to the music itself, enjoy its aesthetics, and “explore the artists’ universes.” Second, some (I4, I9, I12, I13, I25, I28) rely on YouTube to watch music videos or concerts as they would watch a movie, during dedicated moments. Here the focus of the activity is on the appreciation of a cultural product (concerts, performances, good-quality music videos) in a nice setting (a connected TV or a large computer screen rather than a phone). Video is obviously an essential component of the experience. One participant mentioned that she would rather watch concerts because they are “more lively, fabulous, magical” (I13). Participants value artists’ “onstage presence” (I17), and they consider concerts and clips as more authentic.

Eleven out of 29 participants include one of these two configurations in their practice. This shows focused attention to video is not dominant. Moreover, these are configurations where music listening is the main activity. As such, even though they exist, they are far less frequent in participants’ practice than background uses. For instance, no participant watches music videos with focused attention daily, but almost all have daily soundtracking practices.

A third configuration (I11, I27) is the display of YouTube music videos on a connected TV, in the living room, providing a visual and musical background. Neither listening nor watching is the main activity, but the video is an important element of the atmosphere provided by the music. Finally, several users (I6, I10, I27) keep the video visible on their computer while soundtracking. They do not focus on it but regularly “take a look,” “get a glimpse,” “keep a small window open on a screen”; when their work does not need full focus, they appreciate music videos as an occasional distraction. These two configurations are the only ones where videos are at least partially watched in the background. Only four participants include them in their practice. This means that soundtracking practices are dominated by audio-only uses.

Indeed, in most configurations, the visual dimension of YouTube is completely discarded. A third of participants (10/29) listen to YouTube on their computer, at the office or at home, while working or “doing stuff on the computer” (i.e., personal emails, e-commerce, administrative procedures). YouTube is played in a non-visible window or tab of the browser that users never check out unless they feel the need to change the music.

In many other configurations, YouTube is used to broadcast music from a smartphone to a speaker or to headphones, at home, or in a car, while performing domestic activities such as showering, cooking, housekeeping, driving, etc. During these activities, users do not (and most often cannot) pay attention to videos. However, due to restrictions on the YouTube application, the phone screen has to stay on in order to continue the streaming process.

“I listen to YouTube at least 15 minutes a day, [when I take my shower]; and two hours every two days, when I do the housework. [...] It’s mostly a form of support, to turn an unpleasant activity into something pleasant.” (I7)

3.2 The ecological impacts of streaming

Streaming videos requires larger storage in data centers and a higher use of bandwidth than streaming audio; using a phone requires to let the screen on, consuming more energy than needed; and streaming it on a mobile rather than a broadband network further increases energy use. Yet, the second main result of the study is that environmental factors are never considered in platform choice, despite widespread awareness of the environmental cost of video.

Only one participant (I3) mentioned the environment as a factor in music platform choice, but he was recruited during the exploratory phase of the fieldwork, in the authors’ personal network, and asked to participate precisely because he was known to be strongly committed to environmental issues. Most said they had heard about “the environmental concerns raised around streaming”, especially mentioning Netflix because of its media salience; participants working in information technologies mentioned they knew about the consumption of data centers; but only one said he was willingly limiting his use of Netflix for this reason (I11). Finally, no participant mentioned the environment as a factor determining their use of mobile or broadband data. Cost was the most important factor here: consumers wary of mobile data cost make sure to only listen to music on broadband, while consumers with unlimited data plans did not care what network they were using. **Although previous research has shown that the desirability of green consumption rises with social status, education and income (Elliott, 2013), we find a homogeneous ignorance of environmental factors in streaming platform choices.**

Yet, all participants stated concerns about climate change and gave examples of everyday actions they were taking, like recycling, and reducing car use, air travel, and meat consumption. Moreover, those using IT for professional purposes, i.e., non-manual workers, mentioned digital pollution, but the most widespread (and often the only) everyday action in that regard was sorting and deleting old emails. After asking about the environment, some participants did express guilt.

Before you told me about it, I have to admit that this, I mean data consumption, did not... It's not that I did not know, but I think I never really had a conversation about it. I've had conversations about garbage and recycling, pollution, and the like, but not... [mobile data]. Asking a question is putting someone in front of their responsibilities, and here, you are putting me in that place. (I11)

A participant compared the lack of information about streaming with fashion shopping: “a typical example, I guess, is shoes. It's rather easy to find out about manufacturing policies, the origin of materials, etc., I mean, you know Nike isn't great, you know Veja [a fair-trade shoe manufacturer] pays their workers better than the country's average and uses some criteria for sourcing...” (I1). Indeed, information for the fashion industry is more readily available, thanks to long-term advocacy campaigns, while not much is known about the streaming industry. However, as various studies have pointed out, information does not necessarily translate into action; the evolution of representations is not, or maybe not yet, associated with a change in competences and in new affordances in digital infrastructures that would stabilize in new configurations (Shove et al., 2012; Strengers, 2011).

3.3 YouTube as the default platform

If the environment is overlooked, the way platforms fit in sociotechnical configurations is the main factor determining platform choice. We distinguished three types of arrangement, where YouTube plays a different role: default platform, soundtracking platform, and complementary platform. They are very correlated with music passion, describing respectively casual listeners, regular listeners, and music fans, although this association is not rigid.

For casual music consumers, YouTube appears as the default, free platform, and the alternatives are ignored. First, YouTube is “already there,” i.e. consumers already use the platform for various other contents. Casual music consumers are often not aware of alternatives. “I only know this site [YouTube], so I can't really look for music elsewhere” (I13). Conversely, they seek little information about these alternatives. “To be fair, I've known YouTube since it started, I've been using it since, on all kinds of terminals, so I never really looked its competitors up, neither what they offer, nor their prices, so I mechanically go on using it.” (I21). For them, YouTube fits its goal well enough. “Maybe there are better platforms, but it suits my needs; my uses are not very developed or varied.” (I20).

Among our participants, 8 out of 29 use only YouTube to stream music, whatever the device and context, even though they might also resort to non-digital devices such as radio or CDs. Melanie (I7) listens to YouTube in four different contexts: while doing the housework, taking her shower, being with friends in the living room, and driving her car. While at home, she connects her phone to a portable speaker, leaving the screen on so that the music stream does not get interrupted. Six of those participants are casual listeners (two thirds of respondents in this category) and the last two are regular listeners (I20, I21), but none are music fans.

Second, YouTube is free. Some consumers, especially among casual listeners, have a low willingness to pay for music. “I don’t feel the need to pay to listen to music, whatever it is. I think I have never paid [...]. I never bought that many CDs because I always found what I wanted on the radio [...] soon after the Internet arrived and I could find anything for free” (I17). More importantly, YouTube appears free. Audio platforms like Spotify and Deezer also have free plans supported through advertisements. However, these users are not aware of such plans.

Q: What about streaming websites, for instance Deezer, Spotify, or Apple Music? Have you ever tried that?

R: I’ve never tried. When I saw Deezer was premium, I said “bye-bye.”

Q: Even free accounts? They offer free accounts supported by advertisements.

R: No, I never really... Why look for something else if YouTube is good? (I7)

This may have to do with the fact that audio platforms tend to advertise their revenue generating subscription plans. The fact that audio platforms do not have a free homepage accessible without logging in might also explain this image.

3.4 YouTube as a soundtracking platform

However, YouTube is not a default choice only for casual music listeners who exclusively use this platform. It is also regularly used in soundtracking configurations (Fuentes et al., 2019) by casual and regular listeners who also use audio platforms and other devices.

YouTube’s recommendation algorithm is central to these configurations. A list of suggested videos appears on each page, based on similarity to the selected video and on user history. The top video starts playing a few seconds after the current one ends. This means that each video is the seed for a personalized playlist. The main use is to pick a seed video in order to choose the mood of the playlist, and then let the algorithm run it. “Either I let it go, that’s what is nice with YouTube, it goes on, you don’t need to tune it; or I use the search bar on the side, I select an artist that was suggested and that I

don't know, or another piece of music from the artist I am playing" (I2). The ability to delegate the choice of music to the platform make YouTube fit well in soundtracking configurations. "Sometimes at work, a colleague fires up a playlist and we let it run, we let the phone play music between us; sometimes we look at it and we let the playlist go." (I9) The homogeneity of recommendations help sustain the attention given to the main activity. "I really use music to concentrate. If it goes from one style to another, I can't" (I20).

Participants appreciate that YouTube "knows" them and their taste. "I do not delete my YouTube history, so it gathers up in playlists and I just have to pick a playlist with the same kinds of songs [...] I have trouble picking something else. Maybe I am too lazy to look for other things; I start this playlist, and I know I am going to like it" (I22). One participant, who uses YouTube Music, admits that "I just ask Google to start the music, and it starts. I don't really know how it works. I feel like it's based on what I played earlier. For instance, when I am at the gym, it starts workout playlists." (I5)

Soundtracking on YouTube may be associated with the use of audio platforms in other configurations. Participants who combine the two usually favor YouTube on a computer and Spotify or Deezer on a phone, and thus use YouTube while working or doing administrative tasks, and audio platform during commute, walks, and exercise. For instance, Benedicte (I24) listens to Spotify premium on her phone, with earphones, when commuting and either connects the phone to a speaker or listens to her collection of vinyl records when she's at home. Yet, when at work, she listens to music all day long via YouTube because she does not want to use her personal phone or install the Spotify app on her professional computer. Ted (I21), an independent IT consultant, says he only uses YouTube because he often works on his customers' computers and doesn't want to install apps. Akin to casual listeners who do not know about free versions of audio platforms, several regular listeners and fans do not know about audio platforms' web applications that could serve the same purpose.

Another reason for the choice of YouTube in soundtracking practices is that it is open. No login is required so access is immediate and guaranteed. As a result, many links point to YouTube, all the more on Google since the same company owns both sites. "Generally, I go on Google, think 'I'd like to listen to this' and find it [on YouTube] via Google" (I17). Consequently, YouTube is often the platform used for sharing music even by those who use it rarely (Liikkanen and Aman, 2016). "If it's someone who doesn't use Spotify, I send a YouTube link" (I1). A school teacher says she shares YouTube links to her students for the music they study in class (I23).

Participants who associate YouTube soundtracking configurations with audio platform configurations usually resort to the latter for organizing their music collection. They built personal playlists, add favorite artists, tracks and albums, and bookmark editorial playlists. Even discoveries made on YouTube are repatriated to an account on an audio platform. Audio platforms are then used to play

familiar music, and especially a playlist of favorite music, either in soundtracking configurations or in some contexts with full attention, like Benedicte (I24) does during her commute.

3.5 YouTube as a complementary platform

Music fans tend to prefer audio platforms and offline devices to listen to music, but may still use YouTube in certain situations. The first reason they put forward is the size of YouTube catalog. Although audio platforms' catalog is very important, it is limited by licensing agreements and may not include music that the copyright holders do not want to license, or whose copyright holders are unknown. On YouTube, on the contrary, any user can upload videos, and copyright infringement is dealt with ex-post. For the most passionate, the appeal of YouTube lies in its niche products, "for things that have very few listens" (I4). This is especially the case when participants are looking for emerging artists or for specific, often live-performance-based genres. In this case, YouTube is an archival repository.

I still look for stuff on contemporary electronic music, drone, ambient, where people are not very professional and face difficulties, I'll look for them on YouTube. And for a specific kind of hip-hop from the 80s and 90s that did not make it into the mainstream. (I1)

More generally, participants mention emerging artists who, without the support of a label, use social media as a launch pad and upload their music. "For instance, after a concert, if I like the artist, I'll find their video on YouTube. Smaller, alternative acts can be found on YouTube and not anywhere else." (I20) Finally, contemporary marketing strategies have artists and labels use YouTube to release new music. "Sometimes, an artist I like announces a new album and uploads a single before its release, and it's the only way to listen to the track" (I16).

Beyond the catalog itself, the quality of the YouTube search engine and its ability to dig out the precise music is lauded. This is especially the case when, instead of an artist's name or an album title, one is looking for a genre, a mood, a keyword.

"A few months ago, I was looking for old Italian songs, I mean from the 60s–70s, I was struggling to find them on Deezer, it kept leading me back to Eros Ramazotti and likes [mainstream Italian pop music from the 1990s], but I was looking for stuff from the 60s–70s. I found it on YouTube [...] and thanks to the search results, I actually made a playlist on Deezer, because the tracks were on Deezer, but hard to... I couldn't just type 'Italian songs 60–70' and find what I wanted on Deezer; they were scattered all around." (I26)

Similarly, many media websites use YouTube embedded videos to share music tracks. Kevin (I11) spends on average 15 minutes a day listening to music on YouTube: the writers of his favorite webzine embed YouTube videos to showcase the artists they are talking about. Kevin describes this ritual moment as dedicated to exploration. He then bookmarks the artists he discovered on Deezer account, which is the main device he uses in other configurations.

Finally, YouTube is used for discovering new music. It plays a role similar to that of radio, i.e., to hear about new releases and to remember old favorites. YouTube favors discovery through associated videos on the side panels. “On YouTube, whenever you’re on a singer’s page, it links to other singers in the same style on the side. So, sometimes I click and I listen to some new voices.” (I13) Participants who use many recommendation sources (specialized media, the press or websites, concerts, friends) tend to prefer looking for recommendations on Spotify, which has the reputation of giving “better” recommendations, i.e. more varied, more surprising, and more niche.

4 Discussion

This paper sketches a framework to conceptualize digital consumption practices as a sum of stable and heterogeneous sociotechnical configurations that are more or less energy-efficient. Our research first establishes that although video features sometimes are the primary reason for using YouTube, music videos are more often used as a soundtrack for other activities, and are barely watched. This is a revealing case for studying the persistence of environmentally suboptimal consumption practices. Why do these happen? Environmental considerations are absent from this choice even though participants are mindful in other consumption settings (food, transportation, etc.) and even though they heard about controversies over the impact of video use. We show that the use of YouTube is linked with the degree of passion for music. Casual listeners tend to choose this platform because it is free and easy to access, and exclusively use YouTube for online music consumption. Regular listeners often also use audio platforms, but they will favor YouTube in some soundtracking situations, especially when they are using a computer for work or administrative purposes. Finally, music fans tend to prefer audio platforms, but will use YouTube for discovery, exploration, and sharing.

This is a study of French consumers. We have no reasons to believe that there would be significant differences in other Western countries. The market for music streaming is similar in Western Europe and North America: despite Deezer being more prominent than Spotify in France, their services are almost identical. Moreover, as lifestyles are globally similar in these countries, so should music listening configurations be. There are national differences in the public saliency of the environmental impact of streaming. A French think tank, the Shift Project (2019) largely contributed to setting the agenda on this issue, which attracted national media coverage. However, since it has not been

translated into change in practices, as we have shown, we do not expect the environmental impact of streaming to be a more important factor in other countries.

Our research first contributes to the sociology of online music consumption. Despite widespread knowledge of the magnitude of video music streaming, it had almost never been studied before (Liikkanen and Aman, 2016; Liikkanen and Salovaara, 2015). We shed light on a paradoxical situation: the appeal of YouTube lies not so much in videos than in other affordances (open access, search capabilities, and homogeneous, personalized recommendations), previous familiarity with the platform, as well as in its dominant market position.

Music plays an increasingly important role in everyday life (DeNora, 2011). Digitization reinforced previous technological trends favoring ubiquitous music consumption; yet, as music spreads through numerous contexts, its centrality decreases. Drawing on previous research of everyday online music (Fuentes et al., 2019), we show that soundtracking configurations exist in the practice of participants from all levels of music passion. Indeed, the activity we describe, playing music on YouTube without looking at, or even displaying, the video, stems from this background role of music. However, soundtracking configurations vary a lot according to the choice of devices. Moreover, YouTube is favored for casual consumption of music, but music fans tend to prefer specific media, such as web radios and personal playlist on audio platforms.

We extend the literature on the materiality of music consumption in two ways. Previous works on device diversity (Magaudda, 2011; Nowak and Bennett, 2020) tend to consider streaming as a homogeneous category, and to focus on aesthetic explanations (Nowak and Bennett, 2020). First, we open the black box of “music streaming” and show that platforms actually have different affordances so that to platform choice is as important as device choice. Second, we insist on the contexts where music is used and propose to name sociotechnical configurations the assemblage of material, temporal, dispositional and imaginary elements to understand why, regardless of music tastes, some platforms appear as a better fit than others. Music passion appears as a central factor determining platform choice.

This paper also contributes to the environmental sociology of consumption. In line with works on the greening of food (Evans, 2012) or energy (Strengers, 2011) practices, digital practices are strongly embedded in the spatial and temporal constraints of individuals' daily lives as well as driven by infrastructures. Yet, they are rarely studied. In music listening configurations, platforms are strongly associated with users competences, perceived affordances and their ability to fulfill different musical uses such as soundtracking or discovery. Paradoxically, in digital consumption, platform adoption is both very easy and very stable; though the cost of adoption of a new platform is low, satisfying configurations are very scarcely questioned. In the case of YouTube, many technical features of the digital infrastructure (openness, association with Google accounts, default search results, etc.) drive

and lock platform choices. Moreover, in the digital world, the assumption of immateriality makes infrastructures even more remote from consumers (Shove, 2003). Inertia in practices is all the more widespread when infrastructures are hidden, making choices implicit.

Rebecca Elliott proposed to focus the sociology of climate change on “losses” (2018). Digital music is a paradigmatic case of consumption in a regime of abundance. We now expect to find any music for free, or for a small monthly subscription. This abundance is taken for granted in other sectors: people in OCDE countries expect running water and electricity to just go on flowing. But this abundance will not last, either because policies are implemented to preserve resources and limit global warming, or because these resources will run out. Our study outlines various “losses,” with various costs, that users could face in a world where streaming has to be reduced: giving up using YouTube when not watching videos, or doing it in an oblique way, limiting usage in the most energy-consuming configurations (connection to the mobile network, display on the television), limiting the amount of streaming used by promoting offline uses, or even limiting soundtracking altogether.

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