**Popular music, digital technologies, and data analysis: new methods and questions**

Craig Hamilton

Birmingham City University

**Abstract**

This article explores how respondents to The Harkive Project ([www.harkive.org](http://www.harkive.org)) are enfolding streaming services and automated recommendation systems into their everyday music reception practices. Harkive is an online project running annually on a single day in July that invites people to provide detail and reflection on their experiences with music. Since the project first ran in 2013 it has gathered over 10,000 individual entries. It is conceived as an on-going experiment in research methodology that attempts to produce an online social space that encourages reflection from respondents about the detail of their music reception practice, whilst simultaneously acting as a place able to replicate commercial practices around data collection and analysis. This article will demonstrate how such a research process can produce rich descriptive data from respondents that provides a useful snapshot of contemporary music reception practice.

The article begins with an overview of how streaming services, data collection from numerous online channels, and automated recommendation systems inter-relate, and how together they raise questions around how people engage in acts of music reception. It then describes how Harkive is based on similar types of computational/algorithmic processing to those used by key players in the digital music space. The analysis that follows shows that although respondents are engaging in everyday use of streaming services and dynamic recommendations, this engagement tends to be spread across a variety of online channels used in differing combinations, and that it is often recommendations from ‘traditional’ routes, such as media outlets (newspapers, radio stations) and users’ own social groups, that feature prominently in respondent descriptions. Indeed, what Nowak (2016) calls the ‘affective’ element of recommendation appears to be rooted in existing practices that are still in the process of being transposed to the relatively recently emerged digital platforms, rather than - and sometimes in spite of - the rhetorical framing of those platforms as key sites for recommendation and discovery by the companies who operate them.

Through a discussion of those findings, and based on an update of Michael Bull’s concept of ‘auditory nostalgia’ (2009), it is then suggested that examining how listeners are enfolding the new technologies of music reception into their everyday routines and routes to meaning-making may be a useful direction for future research. The article then suggests that a mode of working where scholars attempt to reflexively harness data-derived processes may be useful in producing that work, and that experimental and practice-led approaches could enable popular music scholars and listeners alike to develop better epistemic responses to the data-related technologies that have recently helped bring about such huge changes in our everyday music reception practice.

**Introduction**

On 20th July 2015 the music streaming service Spotify launched an additional element to its platform. Billed as “your ultimate personalised playlist”[[1]](#footnote-1), Discover Weekly promised to deliver a “tailored” 30-song playlist every Monday morning to each of Spotify’s reported 75 million users[[2]](#footnote-2). The songs contained within each playlist, along with how those songs would be ordered, was to be derived from the analysis of data gathered about users’ listening habits, as the announcement explained:

For the first time ever, we’re combining your personal taste in music with what similar fans are enjoying right now. This means every song in Discover Weekly is based both on your own listening as well as what others are playlisting and listening to around the songs you love – making your playlist completely unique and full of deep cuts and new discoveries. It’s like having your best friend make you a personalised mixtape every single week. (Spotify, 2015)

With streaming now providing a major share of corporate revenue for recorded music (IFPI, 2018), the introduction of Discover Weekly highlighted many of the changes that have taken place in music consumption over the last three decades (Nowak, 2014), including issues of copyright and corporate control, the centrality of computer technology companies and data-driven business models, and the growing number of ways available to people for listening to and engaging with music.

In this article I want to explore how respondents to The Harkive Project ([www.harkive.org](http://www.harkive.org)) are enfolding streaming services and automated recommendation systems into their everyday music reception practices. I begin with an overview of how streaming services, data collection from numerous online channels, and automated recommendation systems inter-relate, and how together they raise questions around how people engage in acts of music reception. After providing an overview of The Harkive Project and the rationale behind the data collection and analytical methods employed within that, I then demonstrate some of the ways respondents to the project describe engaging with streaming services and recommendation systems. I show that although respondents engage in everyday use of streaming services and dynamic recommendations, this engagement tends to be spread across a variety of online channels used in combination, and that it is often recommendations from ‘traditional’ routes - such as media outlets (newspapers, radio stations) and users’ own social groups - that feature prominently in respondent descriptions. Indeed, what Nowak (2016) calls the affective element of discovery appears to be rooted in existing practices that are in the process of being transposed to recently emerged digital platforms, rather than - and sometimes in spite of - the rhetorical framing of those platforms as key sites for recommendation and discovery by the companies who operate them.

Through a discussion of those findings, and based on an update of Michael Bull’s concept of ‘auditory nostalgia’ (2009), I suggest that examining how listeners are enfolding the new technologies of music reception into their everyday routines and routes to meaning-making may be a useful direction for future research. Based on a reflection on the methodological processes that facilitated my analysis, I suggest that a mode of working where scholars attempt to reflexively harness data-derived processes may be useful in producing that work. Ultimately I suggest that experimental and practice-led approaches could enable popular music scholars and listeners alike to develop better epistemic responses to the data-related technologies that have recently helped bring about such huge changes in the field.

**Streaming services, data collection, and automated recommendation**

By capturing, analysing and reflecting back individual and collective listener activity in the form of recommendations, Spotify are engaged in a practice that is not entirely new in terms of commerce (see: Cohen, 2004), the media industries (see: Lears, 1995) or indeed the music industries specifically (see: McCourt and Rothenbuhler, 2004). However, as Prey observes, “what truly distinguishes these services from previous forms of music consumption…is the data feedback loop they generate in real time” (2016:32). As Vanderbilt (2016) and Amatrinain (2013) demonstrate, in the construction and iterative rationalisation of recommender systems it is often implicit feedback – which in the case of Spotify is data about which songs are played, skipped, shared, or added to playlists by users - that is viewed as a more useful ‘raw material’ than the explicit feedback volunteered by users in the form of star ratings, purchases, or reviews. Implicit feedback also takes the form of data related to the times and locations of activity, and the devices used when doing so. As Brian Whitman, CTO of Echonest - the self-defined ‘music intelligence service’ Spotify acquired in 2013 - observed (quoted in White, 2014), they aim to “get whatever contextual clues we can possibly get from you, there are all sorts of things you give away without even noticing, even the fact that you are using an iPhone instead of an Android.”

Yet the data gathering and analysis facilitating automated recommendation goes beyond that. Because, as Housley et al point out, “digital societies are self-referential, in the sense that they generate data as an accountable trace and functional pre-requisite for network and system integration” (2014:3), a wider-reaching information grab is enabled, meaning that different and disparate data from possibly unrelated sources can be reciprocally contextualised. This, coupled with inferences derived from implicit feedback, facilitates the production of a form of knowledge deployed via services’ interfaces. In the case of popular music, alongside the digital monitoring of listening activity taking place within streaming interfaces, other activities related to what Negus (1997:9) calls music reception – e.g. the online purchase of concert tickets and physical products, or social media discussions around music – now also often take place within interfaces that enable large-scale data collection and analysis.

With Spotify, the web-crawling and natural language processing capabilities of Echonest enables the collection and analysis of conversations occurring outside the Spotify interface, on blogs, online music media channels, and social media in particular (Pasnick, 2015). This activity augments implicit feedback by compiling lists of words used in descriptions of artists and songs occurring elsewhere online. According to Prey (ibid), this facilitates analysis on a more ‘cultural level’ and the construction of models based not only on the ‘ground truth’ of implicit feedback, but also on what can be implied from machine-processed information - and specifically text - gathered elsewhere online. Thus, a clear link emerges between streaming services, automated recommendation, and our use of other online services, and particularly social media.

The specifics of how Spotify collects and processes data in order to create Discover Weekly is unique to its own operational methods (Pasnick, ibid), but these methods are indicative of what Hartmann et al (2014) call data-driven business models (DDBMs) – i.e. models relying on data as a key resource. Indeed, the collection and processing of what is often framed by businesses as ‘freely’ available data (Puschmann and Burgess, 2014), are key components in the leveraging of a competitive advantage for Spotify (Dredge, 2016). The mechanisms behind such processes are technically complex, subject to rapid change, and are hidden behind legal and commercial firewalls (Ananny, 2015). Within such systems algorithms, fuelled by consumer activity data and cultural content metadata, are deployed as subjective decision makers (Zhu and Chen, 2008). Tufekci defines algorithms as “computational processes that are used to make decisions of such complexity that inputs and outputs are neither transparent nor obvious to the casual human observer” (2015:205), arguing that such operational opacity introduces “new obstacles in the quest for accountability and transparency in consequential gatekeeping [that] reverses or significantly modifies…traditional gatekeeping with regard to visibility, information asymmetry, and the ability of the public to perceive the results of editorial work” (2015:209).

Given, then, the growing importance of streaming services operating such systems, understanding the contemporary conditions of music reception presents the problem of exploring the consequences of systems we presently lack sufficient access to, or else the technical knowledge and skills required to sufficiently understand (see: Boyd and Crawford, 2012; Savage and Burrows, 2007). Recent work by Hagen (2016, 2015), Nowak (2014), Prey (2016, 2015) and Webster et al (2016) has made progress in this regard, with each to varying degrees demonstrating that recommender systems “take part in shaping our individual experiences and acquire meaning through their embedding in everyday life” (Hagen and Lüders, 2017: 228). Each also attempts to peer under the hood of contemporary conditions to help develop our understanding of how, as previous studies of everyday listening (DeNora, 2000; Hesmondhalgh, 2002) and personal digital listening devices (see: Bull, 2006, 2005, 2000) demonstrate, music listening and technology play a role in the management of self and environment. A question that subsequently emerges is how further inquiries may be usefully undertaken given the specifics of the new conditions outlined above. My suggestion is that through engaging practically with the mechanisms of data collection and automated analysis that facilitate such activity we may begin to better understand the role and function of the new technologies of music reception.

In the case of music recommendation services, we can observe a cyclical process in which data is gathered on listener activity, from which abstracted inferences of taste are derived, leading to recommendations that positively or negatively influence choice. This in turn creates further data/knowledge about listeners. Barile and Sugiyama (2015:409-11) describe this as ‘a sort of automated cognitive environment’, or a ‘techno-emotional circuit’, where – and because musical taste is a ‘complex and environmental process’ that already contains traces of automaton since it is in part guided by collectively developed tastes at a given moment - there emerges ‘a straight integration between virtual and real, human and artificial, and rational and emotional’, and through this natural qualities come to be bestowed on machines while simultaneously social action is reified. We can see also that, while listeners can choose whether or not to follow recommendations, they often cannot chose whether or not their activities are recorded and subsequently used in the creation of recommendations. The conditions under which users engage with Spotify are thus not entirely known, but are inescapable as long as Spotify use continues, and ultimately helps to produce consequences in the form of recommendations and dynamic changes to interfaces.

A productive step in further framing an enquiry into such systems is offered by Prey’s (2015) analysis of music streaming services. Building on Lefebvre’s trialectics of space model (Lefebvre, 1991), Prey argues that the production of music streaming services as experiential interfaces are an ongoing dialogue between ideas of form, concept and practice. For Prey, how we perceive music streaming spaces, in terms of their interfaces and the experiences we have, is influenced not only by how they are conceived of by designers, engineers, and the business needs of the services concerned, but also by the actions (or non-actions) of users informing the on-going, iterative (re)conception of interfaces. In other words, it is important to remember that this process, however technologically complex and rationalized it is perceived to be or may become, and however uneven relationships between service providers and their users are, it nevertheless remains – both conceptually and in reality – a negotiation. As such, exploring how users reflect on their engagement with such processes may provide us with an understanding of their benefits, consequences and implications, particularly since how users describe music in online environments forms parts of the complex operational procedures that underpin automated recommendation.

To undertake such an exploration I am proposing an approach similar to that taken by Hagen and Lüders (2017), who combined listener data gathered from Last.FM with diary entries from respondents as a way of ‘embracing and grappling with [the] complexity’ involved with attempts to better understand how ‘all variables in flux’ (2017:231) form part of the contemporary listener experience. My focus, however, differs in that it relates to the collection and processing of third party data (from social media, and elsewhere online) that - as shown above - forms part of the mechanism for automated recommendation and the foregrounding of content to users. Through an analysis of responses gathered by The Harkive Project – which in part relies on similar types of data collection and machine-derived analysis to those used by companies operating DDBMs - I want to begin exploring the negotiation highlighted by Prey, and through that the conditions such a negotiation takes place within.

**The Harkive Project**

Harkive ([www.harkive.org](http://www.harkive.org)) is an online project running annually on a single day in July that invites people to provide detail and reflection on their experiences with music. Since the project first ran in 2013 it has gathered over 10,000 individual entries. The reflections and detail contained within the Harkive dataset in the main come from posts made to social media platforms, from participants who have emailed the project directly, or else have completed an online form. During the 2016 instance of the project a survey was made available to participants to gather additional quantitative and demographic data. The project does not impose word limits and simply asks potential participants to describe how, where and why they listen to music across the day.

It should be noted before proceeding that Harkive is conceived as an on-going experiment in research methodology that attempts to produce an online social space that encourages reflection from respondents about the detail of their music reception practice, whilst simultaneously acting as a place able to replicate commercial practices around data collection and analysis. Given the experimental nature of the project, there are a number of issues around research design that should be acknowledged at the outset. Most notable are issues around respondent recruitment and whether respondents generate a representative sample of broader music reception activity. The project is promoted each year via a number of online channels and through media outlets but is entirely reliant on respondents describing the detail of their activity. As noted by Hagen and Lüders, who engaged in a similar method, respondents are thus more likely to be those who ‘invest more time and effort than most people….in terms of developing innovative, distinct and skilled streaming practices’ (2017:232). Indeed, it is reasonable to extend this observation further and suggest that Harkive respondents are likely to be more heavily engaged than most in terms of their broader music reception activities. I therefore make no claims about whether the observations derived from this analysis could be generalised to music reception activity as a whole. That being said – and not withstanding the overall aim of the project to create an experimental space/place – this article will demonstrate how the research design employed here can produce rich descriptive data from respondents to provide a useful snapshot of contemporary music reception practice.

Relatedly, a key consideration for the purposes of this article is that all information gathered is in a digital format, and is thus reducible to data points that can be computationally processed at scale. Stripping away the individual detail within each response, the ‘raw material’ generated by Harkive can be understood as data. Using a number of automated collection methods[[3]](#footnote-3), data has been gathered into a single database organised according to the principles of Tidy Data (Wickham, 2014), making it ready for computational analysis at the point it is collected. The dataset contains respondents’ texts and quantitative survey responses, along with metadata gathered during the collection processes (e.g. time/date stamps; the platforms each entry was collected from), and additional variables generated through a series of unsupervised machine learning algorithms including topic modeling (Blei, 2012)and sentiment analysis (Jockers, 2015). As such, the reflections of individuals (the texts) can be considered alongside not only the numeric abstractions produced through those computational analyses, but also in terms of the processes generating those abstractions. They can also, of course, be considered in their original format of texts that contain detail about music reception activity.

The findings that follow are based on a hybrid approach that combined both distant (computational) and close (manual) readings of the data in order to discover what the Harkive texts could reveal about respondents’ engagement with streaming services. Clusters of respondents likely to reveal insights specific to streaming use were isolated for close analysis based on a process that segmented the dataset gathered between 2013 and 2016 into a focussed sample in the following manner:

* 122 (6.34%) of the 1922 respondents to the text-gathering element of the project also completed the survey. Between them they provided 1750 (23.1%) of the total 7,576 responses[[4]](#footnote-4).
* Of the 122 respondents who completed the survey, 58 (47.54%) identified as regular users of streaming services, indicating that they used streaming services *Often*, *Very Often*, or *Daily*. Between these 58[[5]](#footnote-5) respondents, 1268 text entries were provided, equating to 16.72% of the total corpus.
* This segment was then reduced further by automatically searching for mentions of words foregrounded by topic modelling analysis interpreted as being associated with streaming activity[[6]](#footnote-6). In so doing the 1268 texts from 122 respondents was reduced to 203 (2.69% of total corpus), from a total of 47 respondents (2.44% of total).

This segment is on the one hand a significant reduction of the entire Harkive dataset, but can be understood to contain data specific to the aims of this article. These are Harkive respondents who are regular users of streaming services, and who have provided responses containing the use of specific words or phrases commonly associated with streaming technologies. This enables the examination of respondents’ use of automated discovery and recommendation systems contained in the next section.

**Streaming, discovery, and recommendation**

Nowak (2016) has argued that although the act of discovering new music is widely acknowledged be an essential component of popular music culture, questions of how people discover and what a discovery is remain poorly theorised. He offers a useful route towards a better understanding of discovery by challenging the often “taken-for-granted association[s] either with the social positioning of consumers or with the increasing array of material agencies at their disposal” (2016:137), which together can also be understood to comprise central tenets of automated recommendation – i.e. when the results of data collection about abstractions of ‘taste’ are deployed as curatorial mechanisms through service interfaces. In other words, Nowak argues that it is either a case of structure or agency, or – in a manner that recalls Prey above -- the ongoing dialogue between the two, that tends to define our thinking about music discovery, and that this is often replicated in the commercial models of streaming services. Relatedly, Morris & Powers suggest that a key task for streaming companies is to “interweave the newness [of streaming]..with norms, demographics and predilections that predate streaming” (2015:9). An example of this can be seen clearly in the language used by Spotify in their unveiling of Discover Weekly, which they described as being akin to a best friend’s mixtape. We might expect then, if we combine these observations with Hagan’s (2016) suggestion that producers’ metaphors are often repeated by users, to find examples within the Harkive corpus of either socially derived recommendation, discovery through agency afforded by technology, or combinations of the two. This is indeed the case.

The following examples show how respondents engage with streaming services interfaces to find useful recommendations and routes to discovery. Within the descriptions below we can see evidence that such practices display elements of the habitual and are becoming incorporated and embedded into everyday practice. Spotify’s Discovery Weekly function has a ‘good hit rate’ and is ‘on fire’ in two examples, and ‘awaits’ in another.

Pretty good hit rate this week from Discover – Inner City Blues by Sly Dunbar is a nice slice of dubby poppy reggae. (#6825)[[7]](#footnote-7)

Settling in to the work day. Spotify Discover playlist awaits. Kicking off with 'Door of the Cosmos' by Sun Ra (#6828)

Discover Weekly on fire this week. World Gone Deaf by Bill Baird. Catchy, Beck-y indie. (#6818)

However, we see rather more examples where different digital interfaces are used in combination, rather than isolation, and where the affordances of one can be seen to feed directly into the use of another. To consider this in terms of Nowak and Prey’s work discussed above, here we see respondents engage in negotiation between structure(s) and agency. In the examples below, the use of streaming services is characterised primarily by the dexterous and repeated moves from one online ‘place’ to another. It is through this that users, following in the footsteps of De Certeau’s (1984) walkers, act tactically to carve out spaces of their own through the use of a range of digital interfaces, engaging in acts of Prey’s negotiation that cast a seemingly wider net. Streaming services in these examples facilitate rather than guide discovery, and indeed the tactical moments of discovery below – in other words the space being carved out – emerge from digital interfaces not closely associated with streaming, but rather the online versions of media outlets or else other forms of online cultural intermediation, such as DJ mixes and podcasts.

So many discoveries to be found via JDTwitch RinseFM mixes. This, from Graham Philip D'Ancey, is ace: [LINK] (#146)

The list is heavily influenced by what I’ve heard on BBC 6 Music recently, particularly on Mary Anne Hobbs and Gideon Coe’s shows. I use the BBC Playlister a lot. If I hear a good track I can save it to a playlist on the BBC site and then export it to Spotify. I have about 70 songs from this year so far. If I then really like a track I will download from amazon mp3 or iTunes. This playlist is on my iPod so is the stuff that bore enough repeated plays on Spotify for me to buy the tracks, or the relevant albums (#5147)

Now listening to Liverpool band Strange Collective and their new EP Super Touchy. As recommended by theriderpodcast (#6823)

The 'New stuff’ list is usually populated from within Spotify these days, via Spotify’s New Releases page and a couple of apps – any Decent Music and Pitchfork. (#1062)

There are also numerous examples of technological affordances meeting social milieus as routes towards discovery, and particularly through Twitter. Often these relate to media organisations using Twitter as a means of communicating with audiences, but predominantly examples relate to specific recommendations that come from others within a respondents’ personal network. As Markham (2003) has suggested, digital environments are places that people enter and make themselves available to others, and which can be seen here providing ways of engaging with music that have almost become expected as part of everyday practice. In other words, it is through the constant moves from one interface to another that respondents act tactically, engage in negotiation, and create their own or collective spaces. In the examples below, this activity is not linked solely to the use of music streaming services, but rather includes social media, email and online conversations, which facilitate music listening that ultimately occurs within a streaming service.

I find a lot of music via Twitter these days. Websites tweet links to articles, friends post recommendations, all on one site (#1251)

#harkive first up: cover of David Bowie's Young Americans by The Cure via YouTube, recommended by [Twitter name] and [Twitter name] (#4216)

I discover a lot of new music on Twitter, simply by following people who are enthusiastic and knowledgeable about music. One such is the writer [name], who has just tweeted a link to Swamp Dogg’s ‘My Hang-Ups Ain’t Hung Up No More’, an extraordinary 1974 southern soul track about going to a shrink! I immediately head for Discogs and added it to my wants list… I click on another tweet, this time one of Domino records inviting me to watch the new video by Matthew E White for his song ‘Vision’. Oh, it’s gorgeous. I must get his album. I loved his first. (#3823)

Sometimes recommendations creep in and, when they do, it’s via Twitter. For example, [name] mentioned that Jungle’s debut is available so I added that to the list. That went to the 'Good stuff 2014’ list too. I also listened to Royksopp & Robyns 'Do It Again’ and Owen Pallett 'In Conflict’. Work was interrupted by lunch (watched a saved video on Vimeo – no music) and a bus down to the Southbank Centre – talky podcasts while walking, Mr Fine Wine’s Downtown Soulville while reading articles. Meeting done and back to Owen Pallett and then some S. Carey before a tweet from [name] mentioned Gotan Project, which made me think of St Germain (possibly also influenced by an email asking me to proofread a short French translation). I queued up a few tracks from Tourist, which was played everywhere when I lived there many years ago. (#1062)

..finally got the headphones on playing some music via PC while working: mix of YouTube and SoundCloud tunes recommended via Twitter (#4214)

The examples above support Nowak’s observation that discourses of discovery are often rooted in ideas of technological affordance and social milieus, but it is questionable whether the responses of Harkive respondents here are perpetuating conceptual metaphors of discovery posited by companies operating in the streaming space. Indeed – and as shown below - there are also examples of outright rejections of the language and efficacy of streaming service recommendation. These variously suggest that songs recommended are either not aligned with listener tastes or preferred modes of listening, are variable in their efficacy, or else are rooted in what Razlogova (2013) calls a cybernetic serendipity rather than any listener-perceived technical prowess of automated recommendation. The Harkive survey responses provides useful additional context here[[8]](#footnote-11). Only 13.79% (n=8) of respondents state that online/automatic recommendations are often better than those they receive from friends, and only 29.31% (n=17) are surprised by how accurately online music service recommendations reflect their tastes.[[9]](#footnote-12)

Discover Weekly is now playing “I Believe in Miracles” for the second time this week. It pops up most weeks. It’s discovered. (#6817)

On to wider Discover tab in Spotify ‘Charlene’ by Psychic Mirrors. Not for me. 80s style plodding R&B with annoying vocals. (#6824)

Enjoying Spotify's Discover, though I'm not a playlist kinda gal. Does feel like I will discover new bands (#1248)

Zammuto session for KEXP…Courtesy of YouTube mailer which is usually 90% pish but recommends one good video (#4671)

A YouTube recommendation I agree with! Earlier Gershwin has led to Bronski Beat's Ain't Necessarily So #serendipity (#468)

Rejecting the dominant notions of technological and social conceptions of discovery, Nowak (2016) argues that it is the affective responses to music – whether discovered through social connections or technological agency – that are important and “entangles much more than the question of the origins of such discoveries” (2016:142). A discovery has to be memorable, then, he argues, or it would not be reported as such, and theorises that it is *epiphanies* and *rediscoveries* that allow us to differentiate from music that we simply have access to via our social milieus or via technological affordance (or combinations of the two). It is not so much the point at which discovery occurs that is important, then, but “the interaction that leaves an affective mark on individuals” (2016:143) that is the site of and indeed what makes up the ‘actual’ discovery. This is an interesting idea to pursue, and indeed there are examples from regular streaming service users below of exactly these epiphanies and rediscoveries. Additionally, 50% (n = 29) of survey respondents indicate that music is important to them when they wish to reminisce about something, or someone, and 79.31% (n=46) report often recalling or remembering a song and seeking it out to play it[[10]](#footnote-13). In the examples below it is respondents’ memories and previous discoveries that inform music listening via streaming services.

"Pale Blue Eyes"– The Velvet Underground. I vividly remember on the night I heard that Lou Reed had died, I laid in my room with no light but a candle and played this album aloud. I discovered the Velvets soon after I moved to New York for the first time, when I was eighteen, and their music has been a constant ever since. Sure, some of it is nasty and dark and dirty, but there's an undercurrent of gentleness there, perhaps all the more rewarding because it runs so contrary to his provocative image (#4554)

This morning, as I was finishing my breakfast, I got the urge to listen to Alex Chilton by The Replacements. I’ve only recently begun listening to them in a serious way, and I don’t possess much of their work, so it was off to YouTube. In the sidebar, I of course found Can’t Hardly Wait, which so far is my favourite song of theirs. The building of anticipation that happens during the line ”I’ll be home when I’m sleeping” is such a wonderfully pure romantic moment. After that, I wanted to hear Teenage Fanclub’s ‘Songs From Northern Britain’, so I opened up iTunes and listened to the entire thing. I discovered that album last September, and it’s shepherded me through a lot over the past few months. I’ve even occasionally thought that, if I ever manage to hoodwink some poor innocent man into becoming my husband, I’d play ‘Planets’ at our wedding reception, for us to dance to. (What can I say; I’m at an age where people I know are starting to get married.) (#4541)

When I got home I remembered I'd seen on Twitter earlier in the day one of my favourite DJs, Kutmah, share a link to a mix he's recorded to promote the Low End Theory Festival in LA this weekend. Low End Theory is a clubnight held every Wednesday in Los Angeles and has played a pivotal role in the development of the 'beats' scene, where people like Flying Lotus and Daedelus emerged. I first came across Kutmah, a Brit who moved to LA aged 12, a few years ago when he was arrested and threatened with deportation from the States, so there was a campaign on social media to support him and through that I found his mixes. So I didn't want to sleep on this mix, which he'd recorded for Wire magazine, and promptly put it on my iPad through my monitor speakers while I cooked my post-gym dinner and tried not to sweat to death on the hottest day of the year (#7255)

The respondent narratives explored in this section demonstrate the many and complex ways that streaming services, music reception activities, and ideas of recommendation and discovery are becoming enfolded with everyday practice. In the following section I will attempt to unpack some of the issues and questions this activity raises, before offering some suggestions as to how scholars may approach the role of digital platforms and data-derived activity in subsequent studies of contemporary, everyday music reception.

**Discussion**

For Felski the everyday is “the essential, taken-for-granted continuum of mundane activities that frames our forays into more esoteric or exotic worlds” (1999:1). The reception of music – which Negus (1997:8) defines as “how people receive, interpret and use music as a cultural form while engaging in specific social activities” – is the activity that plays out alongside both the taken-for-granted and the forays into the esoteric and exotic. Much of everyday music reception described by Harkive respondents above is ordinary at a macro level, but is also extraordinary and unique at the micro level of the individual. To borrow a natural metaphor associated with the recent technological developments around data technologies (see: Puschmann and Burgess, 2014), those who seek to understand audiences for music via digital monitoring and data analysis, are faced with the tantalising promise and the intriguing problem of abundance at a *granular* level. We can see from the above that is often the choices and uses of technology that mark out this granularity, this uniqueness of cultural practice, as it is any of the other potentially measureable characteristics of individuals’ activities - their age, gender, or their choices of particular types of music. What is interesting in terms of next steps is that the technological elements of respondent narratives highlight unique facets of their choices that simultaneously replicate - in the metaphorical sense described by Hagen (2016) - and challenge the progressive narratives that have emerged around digital technologies of listening.

We can thus see not only that the activity of engaging with music through the use of streaming interfaces is something that is both “synonymous with the habitual, the ordinary and the mundane” and “strangely elusive, that which resists our understanding and escapes our grasp” (Felski, 1999:2), but also that respondents are engaged in the type of negotiation highlighted by Prey. They are De Certeau’s walkers, carving out their own space through the tactical uses of listening technologies. Although patterns of technology use are possibly even more difficult to gain a handle on than other means of differentiation associated with automated recommendation (songs listened to, or listener demographics), they may – paradoxically – be of potentially more use in terms of generating ways of understanding contemporary conditions. The question becomes, then, whether an exploration of the ways in which new cultural practices emerge alongside online technologies can arrive help us arrive at a different kind of understanding.

Bijsterveld and van Dijck (2009:16) define cultural practices related to listening as “the ways in which people are used to doing things and commonly attribute meanings to these routines”. This is a useful next step, because considering the relationship between routine and meaning is an important way we may approach issues around understanding how music reception now occurs. The subtle changes to routine (understood at both macro and micro levels) that accompany emerging practices associated with streaming technologies – for instance, where the choice of music at a given moment is handed over to a recommendation algorithm – suggest that not only are ideas of routine being altered, but so also is the manner in which meaning is attributed to those routines. As such, by examining the routine cultural practices that are emerging alongside these new technologies, we may edge closer to a better understanding of contemporary methods of meaning-making. Before we run the risk, however, of over-privileging new technologies, we should consider that Bijsterveld and van Dijck make the point also that now, as in the past, new technologies “inspire” new cultural practices[[11]](#footnote-14) and that (echoing Morris and Powers) the promotional rhetoric of manufacturers “usually advertise[s] new use options which they aim to embed in both well-established and newly imagined cultural practices” (2009:16).

In the Harkive narratives surveyed above we observed a similar process occurring, but in ways that are linked to intriguing configurations of online technologies used in combination that were specific to individuals’ negotiations between routine, use and affordance: we can thus see that contemporary routes to meaning through routine are informed as much by older practices as they are newly emerging ones, and can make the observation also that this is a process with a much longer lineage that would have likely played out also with the arrival of the record, or radio technologies, or the CD. We may ask, then, what is it about the contemporary conditions of music reception that is new? As was discussed above, because data collection (and subsequent analysis) is, as Housley et al show, a “functional prerequisite of network integration” (2014:2) these newer technologies have, according to both proponents and critics, the potential to close the gap highlighted by Felski between the ordinary and the elusive. To its proponents, datafication (Mayer-Schönberger and Cukier, 2013) suggests that many (and progressively more) elusive elements of the mundane can now be captured, monitored, and perhaps even predicted. This is one of the key consequences of our use of devices now closely associated with listening. But this in turn begs the question of the extent to which these technologies can account for that which is evidenced above, i.e. the on-going, abundant detail contained within the negotiation between individual cultural practices and technologies of reception that occur in mundane, everyday situations. As Prey (2015) observes, the qualitative can never be fully absorbed by the quantitative, and as such they remain in tension. However, the gap that exists between the two is where cultural practices of listening and data technologies collide, and as such it is a useful and interesting potential location for further enquiry.

Thinking through and updating Bull’s (2009) idea of auditory nostalgia allows us to start to make sense of this negotiation and tension, and also enables us to consider the conditions and issues that are new and unique to the contemporary landscape. Auditory nostalgia is an idea Bull developed through his examination of iPod culture and how communication technologies were used in the management of daily experiences. Bull describes listeners as “living in an interiorised and pleasurable world of their own making, away from the historical contingency of the world, and into the certainty of their own past” (2009:84). Since Bull wrote, however, the novelty and role of the iPod – and thus the new cultural practices it helped inspire – has been overtaken by connected devices and digital interfaces performing similar tasks. The important addition is of functions providing and forging connections between internal and external worlds. There is thus an emerging, new ground created by this recent change in how people engage in the reception of music. It is a shift that sees the personalised, internalised narrative experiences suggested by Bull’s work cross over into more collective, connected experiences of the present which, as shown above, whether desired or otherwise is inescapable as long as streaming service use continues. A streaming service is thus both a personal music library *and* a technology that links “internalised and pleasurable” worlds to the connected world. The intriguing issue raised by this is how, where, when, and with whom, these new collective, connected experiences manifest themselves, and whether the nature of our reception experience (our routines, and thus our routes to meaning) alter and inspire new cultural practices as a consequence.

Contemporary listeners, then, head not only towards the “certainty of their own past” (Bull, ibid), but also somewhere else; listeners guide activity as yet only imagined, because their activity will appear in the form of recommendations at a future point. Through listening in this manner they are not only drawing upon, or creating memories, but also facilitating the possibility of their creation at some future point. Subsequent research may wish to consider the extent to which listeners are comfortable with the act of communicating with manifestations of their digital self – i.e. their music preferences rendered and reflected back in abstracted form via interfaces. We may wish also to examine also how, through the tactical use of available strategic technologies, music listeners reflexively attempt to turn the processes of datafication to their own ends and becoming part of what Webster et al (2016) describe as the assemblage of automated music recommendation, and through that attempt to exert a degree of agency and control over automated recommendation.

**Conclusion**

In this chapter I have shown the various ways respondents to the Harkive project engage with a variety of music streaming services as they negotiate the changing landscape of music reception, and how existing practices of music reception are being transposed to streaming platforms. In terms of automated recommendation, I have demonstrated that it is often recommendations from media outlets, users’ own social groups, and individuals’ memories that feature more prominently in respondent descriptions, and that the affective element of discovery and recommendation appears to be rooted in those existing practices, rather than - and sometimes in spite of - the rhetorical framing of those platforms by companies who operate them.

I have shown that studying the role, benefits and potential consequences of the data-derived technologies of popular music reception is extremely difficult, and particularly for humanities researchers who may not necessarily possess the technical skills, access or related resources that such an enquiry would require (see: Sandvig and Hargittai, 2015; Savage and Burrows, 2007). The work of Prey points towards an on-going negotiation and dialogue between strategic aims of governance (e.g. record labels, streaming services, interfaces, etc.) and the tactical activities of listeners engaged in the reception of music and other cultural content. I have suggested that by engaging with the sites of such negotiation we may find fruitful routes to enquiry. The new technologies of music reception also invite us to consider how listeners’ routines and routes to meaning are altering now that listening and discovery are linked in new ways through automated recommendation. I have suggested that future research may wish to examine how the everyday cultural practices of music listeners now include a consideration of the consequences and affordances of data driven technologies that now link internal and external worlds, and present and future activity.

As a means of examining this I have demonstrated how Harkive has been conceived as an experimental place/space where respondents are simultaneously “the informed, the informant, and the information” (Michael and Lupton, 2015), and which is intended to replicate and explore many of the (technical) conditions under which contemporary modes of music reception can and do occur within. Where many digital interfaces and platforms are defined by the integrated “capture, analysis and output” of data (Rieder, 2016), Harkive attempts to reflexively examine each of these processes in turn. I have acknowledged that Harkive – as an experimental and evolving method – at this point contains a number of research design issues, but is nevertheless able to produce rich descriptions of contemporary music reception practice and a technological means of isolating data at scale that is specific to particular issues of debate.

The relationships between the marketplace, technologies and cultural practices of music, how these are changing, and the issues that are raised by the on-going dialogue between them, is the wider focus of my longer term intellectual project and will inform much of activity I hope to undertake in my future work. Within the limited scope of this article, however, the aim has been to explore the means by which I can build and improve upon our understanding of those relationships and changes through the Harkive project in its present form. This article demonstrates, then, how such an approach could make a contribution to contemporary debates by developing a new and innovate means through which cultural data can be collected and analysed. In doing so I have sought to make a contribution towards ameliorating the disconnection between the present skills sets of many cultural studies and popular music studies researchers (myself included) and the technologies and systems that may now become an important (if not central) focus of our collective work.

**BIBLIOGRAPHY**

Amatriain, X. (2013) Mining large streams of user data for personalized recommendations. *ACM SIGKDD Explorations Newsletter*, 14(2), pp.37-48.

Ananny, M. (2016) Toward an ethics of algorithms: Convening, observation, probability, and timeliness. *Science, Technology, & Human Values*, 41(1), pp.93-117.

Barile, N. and Sugiyama, S., (2015). The automation of taste: A theoretical exploration of mobile ICTs and social robots in the context of music consumption. *International Journal of Social Robotics*, *7*(3), pp.407-416.

Bijsterveld, K. and van Dijck, J. eds. (2009) *Sound souvenirs: audio technologies, memory and cultural practices (Vol. 2).* Amsterdam University Press.

Blei, D.M. (2012) Topic modeling and digital humanities. *Journal of Digital Humanities.* 2, 8–11.

Boyd, D. and Crawford, K. (2012) Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. *Information, communication & society,* 15(5), pp.662-679.

Bull, M. (2000) *Sounding out the city: Personal stereos and the management of everyday life*. Berg.

Bull, M. (2006) Investigating the culture of mobile listening: From Walkman to iPod. *Consuming music together* (pp. 131-149). Springer, Dordrecht.

Bull, M. (2009) The auditory nostalgia of iPod culture. *Sound Souvenirs: Audio Technologies. Memory and Cultural Practices*, pp.83-93. Amsterdam University Press

Cohen, L. (2004) *A Consumers’ Republic.* New York: Alfred a Knopf Inc.

De Certeau, M. (1984) The practice of everyday life. Berkeley.

DeNora, T. (2000) *Music in everyday life*. Cambridge University Press.

Dredge, S. (2016) *Matt Ogle talks Discover Weekly and Spotify evolution.* [ONLINE] Available at: http://musically.com/2016/03/21/matt-ogle-discover-weekly-spotify/. [Accessed 10 December 2018].

Felski, R. (1999) The invention of everyday life. *New formations*, (39), pp.13-31.

Hagen, A.N. (2015) The playlist experience: Personal playlists in music streaming services. *Popular Music and Society*, 38(5), pp.625-645.

Hagen, A.N. (2016)The metaphors we stream by: Making sense of music streaming. *First Monday*.

Hagen, A.N. and Lüders, M., 2017. Social streaming? Navigating music as personal and social. *Convergence*, *23*(6), pp.643-659.

Hartmann, P.M., Zaki, M., Feldmann, N. and Neely, A. (2014) Big data for big business? A taxonomy of data-driven business models used by start-up firms. *A Taxonomy of Data-Driven Business Models Used by Start-Up Firms* (March 27, 2014).

Hesmondhalgh, D. (2002) Popular music audiences and everyday life. In David Hesmondhalgh and Keith Negus (eds) *Popular Music Studies,* London: Arnold, 117–130.

Housley, W., Procter, R., Edwards, A., Burnap, P., Williams, M., Sloan, L., Rana, O., Morgan, J., Voss, A. and Greenhill, A. (2014) Big and broad social data and the sociological imagination: A collaborative response. *Big Data & Society*, 1(2), p.2053951714545135.

IFPI, (2018). IFPI Global Music Report 2018. IFPI [ONLINE] Available at http://www.ifpi.org/news/IFPI-GLOBAL-MUSIC-REPORT-2018. [Accessed 01 August 2018]

Jockers, M. (2015). Revealing sentiment and plot arcs with the syuzhet package. [ONLINE] Available at: http://www.matthewjockers.net/2015/02/02/syuzhet/ [Accessed 01 August 2018]

Lears, J. (1995) *Fables of abundance: A cultural history of advertising in America.* Basic Books.

Lefebvre, H. (1991) *The production of space*. Oxford Blackwell.

Markham, A.N. (2003) Metaphors reflecting and shaping the reality of the Internet: Tool, place, way of being. *Association of Internet Researchers Conference, Toronto*, Canada (pp. 16-19).

Mayer-Schönberger, V., Cukier, K. (2013) Big data: A revolution that will transform how we live, work, and think. Houghton Mifflin Harcourt.

McCourt, T. and Rothenbuhler, E.W. (2004) Burnishing the brand: Todd Storz and the total station sound. *Radio Journal: International Studies in Broadcast & Audio Media*, 2(1), pp.3-14.

Michael, M. and Lupton, D. (2016) Toward a manifesto for the ‘public understanding of big data’. *Public Understanding of Science*, 25(1), pp.104-116.

Morris, J.W. and Powers, D. (2015) Control, curation and musical experience in streaming music services. *Creative Industries Journal*, 8(2), pp.106-122.

Negus, K. (1997) *Popular music in theory: An introduction*. Wesleyan University Press.

Nowak, R. (2014) Investigating the interactions between individuals and music technologies within contemporary modes of music consumption. *First Monday*, 19(10).

Nowak, R. (2016) When is a discovery? The affective dimensions of discovery in music consumption. *Popular Communication*, 14(3), pp.137-145.

Pasnick, A. (2015) *The magic that makes Spotify’s Discover Weekly playlists so damn good.* [ONLINE] Available at: https://qz.com/571007/

 the-magic-that-makes-spotifys-discover-weekly-playlists-so-damn-good/. [Accessed 1 August 2018].

Prey, R., (2016). Musica analytica: the datafication of listening. In *Networked Music Cultures* (pp. 31-48). Palgrave Macmillan, London.

Prey, R. (2015) Henri Lefebvre and the Production of Music Streaming Spaces. *Sociologica*, 9(3)

Puschmann, C. and Burgess, J. (2014) Big data, big questions| Metaphors of big data. *International Journal of Communication*, 8, p.20.

Razlogova, E., (2013). The past and future of music listening: between freeform DJs and recommendation algorithms. *Radio’s new wave: Global sound in the digital era*, pp.62-76.

Rieder, B. (2016) Big Data and the Paradox of Diversity. *Digital Culture & Society*, 2(2), pp.39-54.

Sandvig, C. and Hargittai, E. (2015) How to Think about Digital Research. *Digital research confidential: The secrets of studying behavior online.* MIT Press.

Savage, M. and Burrows, R. (2007) The coming crisis of empirical sociology. *Sociology*, 41(5), pp.885-899.

Tufekci, Z. (2015) Algorithmic harms beyond Facebook and Google: Emergent challenges of computational agency. *Colorado Technology Law Journal* 13 (2015b).

Vanderbilt, T. (2016) *You May Also Like: Taste in an Age of Endless Choice*. Simon and Schuster.

Webster, J., Gibbins, N., Halford, S. and Hracs, B.J. (2016) Towards a theoretical approach for analysing music recommender systems as sociotechnical cultural intermediaries. *In Proceedings of the 8th ACM Conference on Web Science* (pp. 137-145). ACM.

White, E. (2014) The Echo Nest CTO Brian Whitman on Spotify Deal, man vs machine, why Pandora 'Freaks' him out (Q&A). Available at: http://www.billboard.com/biz/articles/news/digital-andmobile/

5944950/the-echo-nest-cto-brian-whitman-on-spotify-deal-man-vs. Accessed 10 December 2018

Wickham, H. (2014) Tidy data. *Journal of Statistical Software*, 59(10), pp.1-23.

Zhu, B. and Chen, H., (2008). Information visualization for decision support. In *Handbook on Decision Support Systems 2*(pp. 699-722). Springer, Berlin, Heidelberg.

1. The original press release for the announcement of Discover Weekly is now longer available on the Spotify website but was summarised and quoted in numerous press articles, for example: http://time.com/3965078/spotify-playlists/ [↑](#footnote-ref-1)
2. As of May 2019 Spotify’s user base had grown to 170m, according to company figures: https://investors.spotify.com/financials/press-release-details/2018/Spotify-Technology-SA-Announces-Financial-Results-for-First-Quarter-2018/default.aspx [↑](#footnote-ref-2)
3. For a detailed breakdown of this process, see the instructional overview provided on the Harkive project website: http://harkive.org/datcolzap/ [↑](#footnote-ref-3)
4. 23% of the total story dataset originating from just 6% of respondents can be explained by the fact that those using platforms such as Twitter are able to post more than one entry across the course of the day. By using the survey data to subset the corpus based on respondents identifying as regular streaming user, I am able to extract all of their entries, and not just those that mention words associated with streaming. [↑](#footnote-ref-4)
5. Of the **58** respondents, **22** (37.93%) identified as female, **35** (60.34%) as male, and **1** (1.72%) indicated they would rather not say. In terms of age, **46** respondents (79.31%) were aged between 31 and 50, 12% (n=**7**) were under 30, and the remaining 8.62% (n=**5**) over 50. A total of **46** (79.31%) respondents came from the UK, **3** (5.17%) from the USA, **2** (3.44%) from Ireland, and the remaining 7 respondents (12.06%) were made up of one person from each of the following countries: Bulgaria; Canada, China; India; New Zealand, Poland; Spain. [↑](#footnote-ref-5)
6. List of words used for search were derived from topic modelling and other text processing, with words related to privacy, automated and curation added for the purpose of this analysis. NLP algorithms often stems words to their roots to avoid repetition in counts. The words are presented here in the stemmed form with their ‘true’ value in brackets: **spotif** (Spotify); **deezer** (Deezer); pandora (Pandora); **applemu** (AppleMusic); **soundcloud** (Soundcloud); **data** (Data); **algor** (Algorithm); **privacy** (Private, Privacy, etc); **automat** (Automatic, Automated, etc); **curat** (Curated, Curation, etc); **recomm** (Recommendation, Recommended, etc); **discov** (Discovery, Discover, etc); **playlist** (Playling, Playlisted, etc); **stream** (Stream, Streaming, etc) [↑](#footnote-ref-6)
7. All quotes and extracts from Harkive stories presented in this article will be identified only by their unique entry number allocated by the collection process described in footnote 3. [↑](#footnote-ref-7)
8. Subsequent mentions of analysis based on survey data will include further footnotes detailing the specific question(s) from the survey the responses relate to. See footnote 11 for an example. [↑](#footnote-ref-11)
9. Q81: The online/automatic recommendations are often better than those I receive from friends & Q85 I am surprised by how accurately online music service recommendations reflect my taste [↑](#footnote-ref-12)
10. |  |
| --- |
|  Q48: Importance of music when I reminisce (remember someone/somewhere) & Q33: I listen when I remember a song and seek it out to play it |

 [↑](#footnote-ref-13)
11. They are referring here specifically to the relationship between cultural practices, audio technologies and memory, but the efficacy of new technologies to ‘inspire’ (rather than, say, ‘lead’) does, I think, hold for listening practices more generally conceived. [↑](#footnote-ref-14)