

# Nothing personal: algorithmic individuation on music streaming platforms

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## Abstract

Raymond Williams once wrote, ‘... there are in fact no masses, but only ways of seeing people as masses’. In an age of personalized media, the word ‘masses’ seems like an anachronism. Nevertheless, if Williams were to study contemporary online platforms, he would no doubt conclude that there are in fact no individuals, but only ways of seeing people as individuals. This article explores this idea by taking a closer look at online music streaming services. It first conducts a comparison of how two leading streaming platforms conceive of the individual music listener. Then, drawing from Gilbert Simondon’s theory of individuation, it demonstrates how ways of seeing the individual work to enact the individual on these platforms. In particular, ways of seeing are heavily influenced by the consumer categories that are defined and demanded by advertisers. This article concludes with an examination of how commercial imperatives shape ‘ways of seeing’ and ‘algorithmic individuation’ on music streaming platforms.

## Keywords

algorithm, algorithmic individuation, Gilbert Simondon, music streaming, Pandora Internet Radio, personalization, Raymond Williams, Spotify

In his classic essay ‘Culture is ordinary’, Raymond Williams addressed the role industrialization and early broadcast media played in the transmutation of ordinary people into masses. With characteristic sensitivity to the relationship between the human subject and the larger socio-technical systems we are embedded within, Williams (2011 [1958]) wrote, ‘... there are in fact no masses, but only ways of seeing people as masses’ (p. 57).

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Almost 60 years later, media ‘audiences’ inhabit a very different world from the one Williams was describing. Today, personalized media appear to dissolve the mass, bringing into view the long concealed individual media consumer. In an age of personalization – when our every entertainment or consumer desire is catered to – it appears as if we are being seen for who we really are: as individuals with distinct tastes and predilections.

Nevertheless, if Raymond Williams were alive today, he would no doubt take issue with this simple narrative. He would carefully examine how readers, viewers, or listeners are conceived of as individuals on personalized platforms like Amazon, Netflix, or Spotify. He would likely conclude that on these platforms there are in fact no individuals, but only ways of seeing people as individuals.

To explore this insight further, our point of entry will be contemporary music streaming services. Music taste provides a particularly fertile means through which to ‘see’ the individual. Music is intimately connected to our everyday lives, our memories, our aspirations, and the social groups that we identify with. One’s taste in music has thus long been seen as a window into one’s sense of self, and place in society (Frith, 1998). ‘[N]othing more infallibly classifies, than tastes in music,’ wrote Pierre Bourdieu (1984: 18) in *Distinction*, his famous study of French cultural practices.

In recent years, economic rather than theoretical motives are driving a newly charged fascination with determining what someone’s music taste says about them. In an increasingly competitive and crowded sector, music streaming services such as Spotify and Pandora Internet Radio attempt to distinguish themselves from their competitors and reduce high churn rates by offering up better recommendations. What is more, since they also generate revenue from advertising, they need to precisely target ads at listeners to increase ad rates. In doing so, they develop competing techniques to ‘see’ the individual listener. In what follows, I will compare how two leading streaming platforms – Pandora Internet Radio and Spotify – conceive of the individual music listener after first briefly reviewing the relevant literature.

## Constructing media consumers

There is a long history of academic scholarship that examines how media organizations and practitioners imagine and construct their own audiences (Ang, 1991; Cantor, 1971; De Sola Pool and Shulman, 1959; Ettema and Whitney, 1994). However, what Turov and Draper (2014) call ‘the industrial construction of audiences’ is sometimes assumed to be a relic of the mass media era. Internet audiences are more commonly characterized as ‘users’ or even ‘producers’ (Bruns, 2008). As they interact with online media, these users provide media industries with finely detailed consumer data which allow for more precise targeting and personalization of media content. Negroponte’s (1995) early celebration of the ‘Daily Me’ – media content customized for each individual’s tastes – epitomizes the idea that the audience-as-abstraction is a relic of the past. The development of more precise measurement tools and techniques is seen to provide media practitioners and the advertising industry with real insight into who they are actually communicating with (Blakley, 2012, 2016). Even those who are critical of the collection and analysis of personal data implicitly accept the one-to-one relationship between the representation and the represented. As Evelyn Ruppert (2011) writes, ‘[t]here is an assumption,

especially in debates about privacy, that a true or authentic self is revealed or ‘made public’ by identification practices’ (p. 219).

As a number of scholars have argued however, the individual is not so much revealed as constructed by his or her data. Various terms – such as ‘data shadow’ (Andrejevic, 2013) or ‘data double’ (Haggerty and Ericson, 2000) – have been employed to refer to these representations. Ruppert (2011) uses the concept of ‘data subject’ to highlight the sociotechnical practices through which we become data. As is often pointed out, there always exists a gap between the subject and the ‘data subject’. As media consumers, we experience this on a regular basis. Your citizenship as stated in your passport may be different from the one you have been assigned by Quantcast. The results of this gap range from the relatively innocuous mis-targeting of ads to potentially landing you on an NSA database (Cheney-Lippold, 2016).

Along with being subjected to identification practices, individuals are also subjectified by them (Ruppert, 2011). Our online practices act as inputs according to which profiles are constructed – sorted into ‘measurable types’ (Cheney-Lippold, 2017) such as ‘young African American’ or ‘female college educated foreigner’. These profiles attempt to define us, filtering our encounters with media content and others (Pariser, 2011) and influencing how we see ourselves (Cheney-Lippold, 2011, 2017).

As Cheney-Lippold (2011, 2017) demonstrates, one’s ‘algorithmic identity’ is in a constant state of modulation. Online, traditional categories of identity such as ‘gender’, ‘race’, or ‘age’ are not determined at the outset, but rather performed into being through the user’s actions. Algorithmic identity is also never conclusive. A visitor to a website might be identified as a ‘Caucasian’ man with a confidence measure of 79% (Cheney-Lippold, 2017: 34). This measure may rise or fall based on a subsequent purchase on the site. From this perspective, the ‘data subject’ is essentially a process *in* development, not a state *of* development.

These processes occur differently on different platforms because they emerge out of particular ways of ‘seeing’ the individual. In this article, I will describe how these processes occur on two music streaming services – Pandora Internet Radio and Spotify. Precisely how each service personalizes content for its listeners derives from how they conceive of the individual music listener. I will compare and contrast the ‘data subject’ that is enacted<sup>1</sup> in order to personalize music and ads on these services. In turn, I will argue that instead of focusing on the relative accuracy or inaccuracy of one’s ‘data shadow’, we need to study the processes of data subject formation and its implications for subject formation. Here, the work of the French philosopher Gilbert Simondon is helpful. I suggest that we can understand algorithmic subject formation in terms of Simondon’s concept of individuation: a process I refer to as ‘algorithmic individuation’. I will begin by examining the personalization of music on Pandora Internet Radio.

## **Pandora Internet Radio and the Music Genome Project**

Pandora Internet Radio is one of the most popular music streaming services in the United States and a pioneer in both streaming and personalization. Pandora’s content-based recommender system is powered by a massive music database called the ‘Music Genome Project’. Instead of grouping songs by genre (as record shops and radio stations do), by

collaborative filtering ('listeners who like this also like ...'), or by ratings, Pandora organizes music by musical traits, or 'genes'. Genes could include, for example, the gender of the lead vocalist, the tempo of the chorus, the level of distortion on the electric guitar, the type of background vocals, and many more. There is no single, one-size-fits-all list of attributes that fits all types of music. According to the patent application for the Music Genome Project, the number of genes differs widely between musical genres. Rock and pop songs have 150 genes, rap songs have 350, jazz songs have approximately 400, while world and classical music have between 300 and 500 genes (Glaser et al., 2006). For example, since rap music is lyrically driven, it requires a greater list of subsets of genes within the category of lyrics (rhyme schemes, degree of profanity, etc.).

The construction of a music genome is incredibly labor intensive, as it requires intricate analysis by a Pandora employee in a process that takes 20–30 minutes per 4-minute song. Each attribute, or gene, for every song in Pandora's database is manually assigned a number between 0 and 5, in half-integer increments. Once all the attributes for a particular song have been entered, the song is placed topographically within a set of other similar songs using a distance function.<sup>2</sup> When a listener chooses a song to start a station, behind the scenes Pandora quickly locates the Genome analysis for that song. An algorithm then compares the song to the genetic makeup of every song in Pandora's database in order to identify songs that contain similar traits. As stated in the Music Genome Project's patent application, '[t]he matching engine effectively calculates the distance between a source song and the other songs in the database and then sorts the results to yield an adjustable number of closest matches' (Glaser et al., 2006). Those songs deemed 'closest' make up the new 'station'.

Once the algorithmically chosen song begins to play, the listener is able to give the song a thumbs up if they like it, or a thumbs down if they do not. This feedback instantly changes the station's playlist. Thumbs up and the listener will hear that song and other songs like it more frequently; thumbs down and that song will not play on that particular station again. Behind the scenes, this feedback affects the particular weight given to some genes over others. 'By raising the weights of genes that are important to the individual and reducing the weights of those that are not, the matching process can be made to improve with each use' (Glaser et al., 2006). In other words, through continuous feedback, Pandora learns more and more about each listener's tastes, resulting in a progressively more personalized station.<sup>3</sup>

While the technique is interesting on its own, I would like to focus on what it tells us about how Pandora 'sees' the individual music listener. For Pandora, individual music listeners possess particular *essential* tastes. These tastes are intrinsic and knowable but they are often confused and distorted by cultural information. As a *New York Times* article put it,

Pandora's approach more or less ignores the crowd ... the taste of your cool friends, your peers, the traditional music critics, big-label talent scouts and the latest influential music blog are all equally irrelevant. That's all cultural information, not musical information. (Walker, 2009)

Pandora claims to personalize radio by freeing music from both the straitjacket of broad and 'artificial' genre categories and from the distorting influence of cultural taste

hierarchies. If you like songs with emotive female vocals and string arrangements, then you might actually like a Celine Dion ballad. In short, Pandora aims to separate taste from cultural influence.

Pandora instead promises to serve you music that is individually – *genetically* – fitted to you. ‘Now Playing. You’ was Pandora’s slogan for one ad campaign. This reveals both how Pandora conceives of the individual music listener and how Pandora sees music listeners as individuals. For Pandora, there is an individual in all of us just waiting to get out. And, for Pandora, the individual stands in opposition to the group.

Pandora thus draws on the modern usage of the term ‘individual’, which since about the 17th century gradually came to signify the separation of the part from the whole (Stallybrass, 1992: 594). Today, the Oxford English Dictionary (n.d.) defines the noun ‘individual’ as ‘a single human being as distinct from a group’. Interestingly however, the etymology of the term ‘individual’ reveals a very different understanding. In *Keywords*, Raymond Williams (1976: 133–136) explains how the term originally meant indivisible. This represents quite the paradox Williams notes, as “‘individual’ stresses a distinction from others; ‘indivisible’ a necessary connection’.

At Pandora, every listener is an individual who deserves liberation from the homogenizing influence of the masses. Pandora both sees and promises to play ‘you’ in splendid isolation. As we will see in our examination of Spotify below, however, a more relational understanding of the individual forms the basis for an entirely different music recommendation system.

## Spotify and ‘Discover Weekly’

With over 150 million active users, Spotify is the global leader in music streaming. Subscribers to Spotify will likely be familiar with ‘Discover Weekly’, a personally tailored playlist of 30 new tracks that is delivered to each subscriber every Monday morning. Since it was introduced in July 2015, Discover Weekly has been one of Spotify’s most successful products. Over 40 million listeners have turned to Discover Weekly for personalized playlists, streaming 5 billion tracks in the process (Spotify Press, 2016). To understand how Discover Weekly personalizes music, we need to first understand how Spotify ‘maps’ the vast world of online music, and from this, creates a ‘taste profile’ for each individual listener.

Spotify improved its music data analytics capabilities significantly when it purchased The Echo Nest, a Boston-based data analytics start-up, in 2014. Unlike Pandora’s manual, labor-intensive method of aural classification, The Echo Nest utilizes acoustic analysis software to process and classify music according to multiple aural factors – from its pitch to its tempo to its danceability. ‘The system ingests and analyzes the mp3, working to understand every single event in the song, such as a note in a guitar solo or the way in which two notes are connected’, explained Brian Whitman, co-founder and CTO of The Echo Nest. ‘The average song has about 2000 of these “events” for the system to analyze. It then makes connections between that song and other song with similar progressions or structures’ (as cited in Darer, 2012).

At the same time, The Echo Nest conducts semantic analysis of online conversations about music that take place every day, all over the world – millions of blog posts, music

reviews, tweets and social media discussions. Essentially, The Echo Nest attempts to turn both conversations about music, and music itself, into quantifiable data. They do this by compiling keywords found in descriptions of the music and its creators and then linking them to other artists and songs that have been described with similar keywords and phrases. These data are used to determine song similarities on a more cultural level. For example, while a Christian rock band might sound similar to an indie rock band, fans of the two inhabit different discursive spheres.

Once the world of music has been mapped, the task then becomes to figure out where each individual listener fits on this map, and their individual movements through music space. To this end, The Echo Nest developed a preference analytics and visualization tool called the ‘Taste Profile’. Every interaction a listener has with a musical item – including the listener’s music tastes (selected artists and songs) and music behavior (favorites, ratings, skips, and bans) – is captured and recorded in real-time. The Taste Profile is thus a dynamic record of one’s musical identity and ‘the foundation of personalization at Spotify’ according to Ajay Kalia, who oversees the project at the company (Heath, 2015).

Spotify’s premier recommendation service ‘Discover Weekly’ is built atop the Taste Profile, but it is a hybrid recommender system. It combines content-based filtering of the Taste Profile with its own take on collaborative filtering. Discover Weekly first combs through its massive collection of playlists to find lists that include the songs and artists you love. While Discover Weekly incorporates both professionally curated playlists and the roughly 2 billion user-generated playlists in its algorithm, it gives more weight to playlists with more followers and to Spotify-generated playlists (Pasick, 2015). Next, it identifies the songs on those playlists that you have not heard. Finally, it filters those songs through your own Taste Profile, in order to only select the undiscovered songs that match the particular type of music fan that you are.

Like Pandora, Spotify’s Discover Weekly necessarily builds its algorithm atop a particular conceptualization of the individual music listener. The conceived listener of Discover Weekly, however, differs significantly from that of Pandora. For Spotify, the individual is not only understood in relation to the musical object, but in relation to his or her prior listening behaviors *and* to other individuals deemed most similar. While Pandora’s Music Genome Project treats the cultural mapping of music as distortion, Spotify’s Discover Weekly treats it as further insight. If a song is deemed sonically similar to another song, yet they never appear together on the same playlist, then the two shall remain estranged. While Spotify builds a unique music identity profile for each listener, unlike with Pandora’s recommendation system, Discover Weekly assembles this profile partially from other people’s tastes. In a press release announcing the service, Spotify explains, ‘Discover Weekly combines both your personal taste in music with what others are playlisting and listening to around the songs that you listen to’ (Spotify Press, 2015).

## **The listener as multiplicity**

As detailed above, there are interesting differences in how Spotify and Pandora conceive of the individual music listener. However, there are also ways of seeing the individual

that are common to both platforms. These shared conceptions provide us with a glimpse into how the 'data subject' is being enacted on platforms beyond these two case studies.

First, like many personalized media services, both Spotify and Pandora downplay the role of demographics in recommending content. A good recommendation system, according to those who design and study them, should not rely on demographics because demographics discriminate.<sup>4</sup> Recommenders should only be interested in what consumers are interested in (Blakley, 2016). On music streaming platforms, traditional categories of musical identity such as 'jazz fan' are not deduced after first determining a listener's age, gender, or income, but are instead performed into being through listening behavior. This is what John Cheney-Lippold (2011) describes as a 'cybernetic relationship to identification' whereby essentialist notions of identity are replaced by 'pliable behavioral models' (p. 168).

Second, what is common to both platforms is a rejection of fixed markers of identity. Increasingly, the individual music listener is understood as having many music identities, rather than one stable identity. '[A] person's preference will vary by the type of music, by their current activity, by the time of day, and so on', says Spotify's Ajay Kalia. 'Our goal then is to come up with a nuanced understanding of each portion of your taste' (as cited in Heath, 2015).

This way of seeing the individual media consumer has fueled what has been called 'the contextual turn' (Pagano et al., 2016: 1) in recommender systems. Significant research is being devoted to developing context-sensitive algorithms (Pichl and Zangerle, 2015). In order to recommend music that matches a listener's context, streaming platforms need to collect and aggregate data points on everything from a listener's location, to the content they are consuming, to their current emotional state. This is made possible by the proliferation of mobile devices such as the smartphone, which permits the collection of data points like location, motion, time of day, and nearby contacts. Increasingly, wearable 'smart' devices will provide continuous contextual signals that recommendation systems can draw on.

The contextual turn can be described as a move away from the 'Immutable Preference Paradigm' (ImP). ImP assumed that the user was a fixed individual, whose 'goals, needs, and tastes do not develop' and in turn, 'that the set of items to be recommended remains relatively static' (Pagano et al., 2016: 1). At its extreme, context-based recommendation systems take the position that one *equals* one's context: 'people have more in common with other people in the same situation, or with the same goals, than they do with past versions of themselves' (Pagano et al., 2016: 1). From this perspective, a music listener who is about to go for an early morning jog has more in common with another jogger than the person they were 30 minutes earlier, when they were just waking up.

As Pagano et al. (2016) write, a focus on context 'overthrows the assumption that personalization in recommender systems involves recommendation for specific individuals' (p. 1). With the growing importance of context-aware personalization, it would appear that individuals are seen as multiplicities, or in Deleuzian terms, endlessly subdividable 'dividuals' (Deleuze, 1992). Indeed, 'we believe that it's important to recognize that a single music listener is usually many listeners', says Spotify's Ajay Kalia (as cited in Heath, 2015).

This focus on context has important implications for serving listeners with personalized advertisements as well – a discussion to which we now turn.

## Advertising and ‘personalization’

The vast majority of streaming music listeners access these platforms through their free ad-supported versions.<sup>5</sup> Even on ad-free subscription services, brands are now able to sponsor playlists. For example, a car company might sponsor a popular driving playlist on Spotify. Streaming services are therefore becoming increasingly important spaces for marketers and brands. This in turn impacts how the individual listener is seen on these services.

Determining one’s ‘musical identity’ is not just useful for predicting what song to play next but also for determining what ad to serve a listener. ‘Musical Identity can also predict age, gender and lifestyle interests’ boasts The Echo Nest (2014) in a company whitepaper. As with music recommendations, the rhetoric implies personalization. Pandora’s former chief scientist Eric Bieschke told *The New York Times*, ‘It’s becoming quite apparent to us that the world of playing the perfect music to people and the world of playing perfect advertising to them are strikingly similar’ (Singer, 2014). On its ‘Pandora For Brands’ (2017) site, the streaming service makes a pitch for why advertisers should choose Pandora:

... the insights we offer go way beyond the general demographic information provided by most publishers. We can actually infer deep insights about the emotional and mental state of our listeners from what their favorite genres are, what songs they thumb-up most, and when and where they like to listen. This takes ‘Big Data’ and adds a layer of humanity to help our advertisers craft more contextually relevant messages.

However, advertisers see the world in terms of target segments – not individuals – and thus Pandora must organize its listening base into the segments preferred by its advertising clients. Through its ‘Audience Explorer’ tool, Pandora provides its advertising clients with data on over 2300 targetable audience segments. Pandora boasts to potential advertisers: ‘Whether you want to reach fitness-driven moms in Atlanta or mobile Gen Z in Sioux Falls, Pandora’s targeting platform allows us to zero in on your audience’ (Pandora for Brands, 2016).

While profiling potential consumers is a longstanding advertising industry practice, what is new is the level of detail and the degree of fragmentation. The target segments are proliferating and the categories are fluid. For example, in late 2013, Pandora began promoting to ad agencies their first two audience segments – Hispanic listeners and a sub-segment for Spanish-speaking listeners. In order to create these two categories, Pandora referred to US census data to locate zip codes with a high percentage of Hispanic or Spanish-speaking residents. It then cross-referenced this information with its user registration data to figure out which listeners fit into this ethnic category. For example, Pandora may have a pool of 2 million listeners that it knows are Hispanic. By then looking closely at the music listened to by this sample, it could use the music listening behavior of this segment to locate other Hispanic listeners across its user base of 250 million plus listeners (see Joe, 2014).



This exemplifies the ‘cybernetic relationship to identification’ (Cheney-Lippold, 2011: 168) discussed earlier. Here, ‘Hispanic-ness’ is performed into being through music listening behavior. If a listener’s listening behavior begins to change, so will her Hispanic-ness. The listener may eventually be assigned another ethnic identity.

As with music recommendations, context is also increasingly important in matching brands with listeners. This type of contextual insight is particularly essential for advertising-dependent services such as Pandora. For example, an ad that asks the listener to call a certain number is wasted on someone listening to Pandora driving down the freeway. Pandora not only wants to know when that driver is in her car but also wants to know when she arrives home, and switches on the TV to continue listening to Pandora in her living room. In this scenario, if her husband thumbs down one of her favorite songs, Pandora understands at that moment that it needs to deliver ads more appropriate for a couple listening at home.

Spotify, as mentioned above, also allows brands to sponsor playlists. Announcing to its brand partners that it was tripling the number of categories in its Playlist Targeting suite in March 2016, Spotify promised brands that they could now ‘reach target audiences in unique, real-time contexts such as working out, partying or commuting’. Brands can directly engage with Spotify listeners ‘during life activities, major life moments, real-time mood states, and seasonal events’ (Spotify for Brands, 2016a). In October 2016, Spotify took context-targeting one step further with the introduction of ‘Branded Moments’. Announcing the beta launch of Branded Moments, Spotify promised to leverage ‘our unique data and insights’ in order to ‘identify – in real-time – what a listener is doing, and give brands an opportunity to *own that moment*’ (emphasis added). Initially, these branded moments were organized around six contexts: ‘chill time’, ‘workout’, ‘party’, ‘dinner’, ‘focus’, and ‘sleep’. Interestingly, Spotify states that these contexts were chosen, ‘so brands have the opportunity to reach listeners in *all* aspects of their day’ (Spotify for Brands, 2016b, emphasis added).

Bacardi, Gatorade, and Bose were among the big brands making up the ‘select launch partners’ for ‘Branded Moments’: Bacardi on ‘Party’, Gatorade on ‘Workout’, and Bose on ‘Chill’. Reporting on the launch, *Advertising Age* explains how the drink-maker Bacardi is ‘sponsoring party moments’ to introduce its ‘We Are the Night’ campaign. The company will be ‘trying to hit consumers when they’re either “pre-gaming” or in the Uber on the way to a night out’. Trumpeting Spotify’s ‘robust data’, Bacardi has identified ‘nine different party-type people’, which the company has placed into categories with names like ‘brave shirts’, ‘glow gals’, and ‘last train sprinters’. Different Spotify video ads have been produced for each type of partier (Sloane, 2016).

As can be gleaned from the above discussion, ways of seeing the individual listener on streaming platforms are heavily influenced by categories that are defined and demanded by advertisers and brands. However, just like one’s music identity, the consumer segment one belongs to can be modulated according to contextual cues. This indicates a move from blunt categories like the ‘soccer mom’ to more finely grained segments that adapt to the time of day and the listener’s perceived mood, or ‘emotional and mental state’ (Pandora For Brands, 2017). What is more, instead of being derived from demographic information, music itself becomes a tracking device whereby the service categorizes users on the basis of their preferences and advertisers dictate how these preferences will be reflected back to users in the form of ads. We now turn to the theoretical and practical implications of this.

## From the individual to individuation

In popular discussion and debate over the topic of music streaming services and the recommendations they deliver, the issue of ‘accuracy’ dominates.irate listeners post online diatribes against particular services for recommending the ‘wrong’ songs while enthusiasts pen glowing accounts of how well their streaming service ‘knows’ them (i.e. Hickey, 2014). Personalized advertising elicits much the same debate: disgust when ads are poorly matched and discomfort when they are too accurate.

According to music technology insiders and analysts, streaming services will progressively improve their ability to ‘know’ the individual listener (Lamere, 2014). Not surprisingly, this often makes music fans somewhat uncomfortable. As fans, we invest so much of ourselves in music (Frith, 1998). ‘We figure music to be a personal expression of our individuality, to be inherently pleasurable and therefore beyond rational measurement’, as sociologist Nick Prior (2013: 181) explains.

From this perspective, in attempting to ‘know’ the individual media consumer, recommendation services are committing the cardinal sin of reification: reifying both the subject and the object of media consumption. Pandora’s Music Genome Project exemplifies this parallel process of reification. Broken down, categorized, quantified, and reassembled vis-à-vis its constitutive ‘genes’, the Music Genome Project reifies music. At the same time, the individual Pandora listener undergoes reification – reduced to the behavioral feedback cues she has generated on the platform.

However, to conclude critique at the point of reification would be to misrepresent how Spotify and Pandora ‘see’ the individual streaming music listener. As this article has demonstrated, Spotify and Pandora do not conceive of individual music listeners as immutable subjects to be modeled. There is no territory to be mapped. There is no ‘real’ to be represented. I am an urban travel enthusiast with a penchant for the Delta blues ... until I am not. You are a suburban lover of smooth jazz ... until you are not. In short, streaming platforms promise the potential of processual identity: of the perpetually ‘becoming-individual’.

This recognition necessitates a shift from studying *the individual* to studying processes of *individuation*. Here, the work of the French philosopher Gilbert Simondon is foundational. Simondon (1992, 2009) critiqued theories which assume a priori the existence of fully constituted individuals. For Simondon, we are not individuals: the individual subject is an effect of individuation rather than a cause. The ‘individual’ is never given in advance and is never final. The individual must be produced in an ongoing process that is always open to ‘additional possibilities for metamorphosis (and) further individuations’ (Shaviro, 2006). Simondon thus shifts the focus from *ontology* to *ontogenesis* – from individuals as a given to individuation as a process of becoming.

Through myriad acts of everyday consumption – from the songs we listen to, to the products we buy – we produce our identity and modulate ourselves as individuals. The recommendation systems that power personalized media across the web are merely one enabler of individuation, albeit an increasingly central one. I will refer to processes of individuation that takes place through personalized platforms such as Spotify and Pandora as instances of ‘algorithmic individuation’ (Zuillhof, 2014). Algorithmic individuation should be understood as a dynamic socio-technical process engaged in enacting the individual.

One's musical identity on Spotify or Pandora is in a constant process in development. On streaming platforms it is not just the music that is being streamed, but the listener as well. For example, instead of recommending content for specific individuals, context-based recommendation systems personalize to users' context states. In doing so, they unknowingly follow Simondon's (1992) advice to 'understand the individual from the perspective of the process of individuation rather than the process of individuation by means of the individual' (p. 300).

However, to properly understand the process of individuation on streaming platforms, we also need to acknowledge the political economy of these platforms. In doing so, we take a step toward, as Simondon (2009) put it, 'placing the individual into the system of reality in which the individuation occurs' (p. 4). On streaming platforms, the data subject that is built atop each individual music listener is, in part, constructed through categories of interest to brands and marketers. Listening behavior on ad-supported streaming is used as a proxy for consumer categories in order to enable targeted advertising. On Spotify and Pandora, the promise of ontogenesis – of the perpetually 'becoming-individual' – is thus submerged by a persistent form of reification that harkens back to the mass media–advertising nexus but one that has been updated to fit the more modulatory, data-driven reality of personalized media. While an individual may flow in and back out of a category such as 'fitness-driven moms in Atlanta', it is not possible to escape categorization entirely.

We can again look at the contextual turn as an example. Everyday life can be sliced and diced into an innumerable number of different contexts. However, what constitutes 'context' on these platforms? While it is not surprising that 'party', 'workout', and 'chill time' are popular contexts in which to listen to music, they also happen to be effective marketing segments for products sold by Bacardi, Gatorade, and Bose. As Nick Seaver (2015) points out, '[a]s corporations turn their data mining attention to context, they have the power to impose and normalize certain modes of contextualization at the expense of others' (p. 1106). They will also seek to define and reify these contexts.

Which contexts will playlists be built around, and for what purposes? Which contexts will be attractive to which brands, which one's will be unattractive, and how will this influence how listeners are understood and enacted? As Evelyn Ruppert (2011: 219) points out, individuals are not only subjected to identification practices, they are also subjectified by them. Personalized media do not only 'see' the individual, they enact the individual into being, and often through the categories deemed most economically meaningful.

This is a matter of significant importance because, as Cheney-Lippold (2011) argues, the categories that emerge online to envelope and define each one of us 'exercise a profound impact on how we as subjects encounter our world' (p. 174). Are you a 'glow gal' or a 'last train sprinter'? As Cooley (1902) famously put it, 'we derive our sense of self from the image of our self that others reflect back to us in interaction'. Today, these interactions are just as likely to occur online as face-to-face, and the 'others' we interact with are increasingly algorithms reflecting back categorized images of our self (Couldry et al., 2016: 121). The concept of algorithmic individuation thus highlights the increasing importance of algorithms in subject formation.

What is new about *algorithmic* individuation is not so much its modulatory nature, but rather that it remains hidden from view from the subject. 'What an algorithmic

gender signifies is something largely illegible to us ...' (Cheney-Lippold, 2017: 8). Likewise, most listeners are unaware of precisely *why* they were recommended a particular song through Discover Weekly. Among other things, they are unaware that the algorithm gives more weight to songs from playlists with more followers and from Spotify-generated playlists (Pasick, 2015). 'When identity is formed without our conscious interaction with others' writes Cheney-Lippold (2017: 8), 'we are never free to develop – nor do we know how to develop'.

## Conclusion

For Raymond Williams, the 'mass' was a construction produced, in part, through mass broadcasting. '[T]here are in fact no masses', Williams famously wrote, 'but only ways of seeing people as masses'. In this article, I have argued that contemporary media systems can likewise be investigated for their ways of seeing. But in an age of personalization, serving the 'individual' is their *raison d'être*.

Precisely how this individual is conceived of and enacted was the task of this article. In this article, I describe how these processes occur on two leading music streaming services: Pandora Internet Radio and Spotify. Music offers a particularly interesting means through which to investigate personalization because of the intimately personal and undeniably social uses to which music is put.

The work of the French philosopher Gilbert Simondon, it was argued, helps us understand the intersubjective processes involved in enacting the individual. Instead of focusing on 'individuals', Simondon asks us to consider processes of 'individuation'. I suggested that we can understand algorithmic subject formation on streaming platforms in terms of Simondon's concept of individuation.

The concept of algorithmic individuation shifts the locus of our critical engagement with personalized media content. The question of how well personalization approximates the person is misplaced. The question is not whether – or to what extent – such services have gotten us 'right'. Instead, we should ask how personalized media 'see' the individual; how this in turn leads them to enact the 'data subject'; and what this might imply for the relationship between the data subject and the subject it refers to. The bands we find through Discover Weekly, and the brands that find us through Branded Moments, may match our tastes more or less. However, regardless of the relative influence they exert, they are part of the broader processes of individuation that enact the individual music listener.

On contemporary music streaming services what our listening data say about us is fused with what it can infer 'about who we might be – on our very proclivities and potentialities' (Amoore, 2011: 28). Instead of enacting subjectivity through normative discourses that delineate how we 'ought' to act, algorithmic individuation configures subjectivity by tailoring the 'conditions of possibility' (Cheney-Lippold, 2011: 169). It does so by 'tethering the potential for alternative futures to our previous actions as users based on consumption and research for consumption' (Cheney-Lippold, 2011: 169).

How do 'Discover Weekly' recommendations influence how Spotify listeners understand themselves as music fans? How do targeted ads on Pandora, or Branded Playlists on Spotify, impact an individual's self-image as a consumer? These are

empirical question beyond the scope of this article. They nevertheless remind us to always position the subject in relation to larger socio-technical systems. This was always the approach taken by Raymond Williams. In a contemporary twist on Williams' insight on 'masses', an analysis of personalized music streaming platforms reveals that there are in fact no individuals, there are only ways of seeing individuals. There is only algorithmic individuation.

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## Notes

1. In choosing the term 'enacted' instead of the more common 'constructed', I am following scholars like John Law and Evelyn Ruppert. As Law (2008) argues, the term 'constructed' 'tends to conjure up an image of something like a building site', with its emphasis on fixity and permanence (p. 635). As Law continues, 'this does not work so well if the focus is on process – and more importantly, continuing process'.
2. In mathematics, a distance function is a function that defines a distance between elements of a set.
3. It is a simplification to speak of *the* algorithm that powers Pandora. In reality, as Pandora's former chief scientist Eric Bieschke told *Fast Company*, Pandora utilizes '54 different individual recommenders that take entirely separate statistical approaches to how to recommend music to specific people' with a 'master algorithm' handling the coordinating tasks (as cited in Titlow, 2013).
4. My appreciation to the anthropologist Nick Seaver for sharing this observation, based on his ethnographic research on developers of music recommender systems.
5. This is particularly the case for Pandora Internet Radio. Advertising typically accounts for around 80% of Pandora's yearly revenues, as only around 5% of Pandora listeners subscribe to the service's ad-free version (Pandora Internet Radio, 2017). In a bid to increase subscriber numbers and revenue, Pandora announced the launch of its 'Pandora Plus' subscription service in September, 2016.

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