

#trendingistrending: when algorithms become culture

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To make sense of the increasingly complex information systems that now undergird so many social enterprises, some social scientists have turned their attention to the "algorithms" that animate them. This "critical sociology of algorithms" (see Gillespie and Seaver 2015 for an evolving catalog of this work) has revived longstanding concerns about the automation and rationalization of human sociality, the potential for discrimination inside of bureaucratic and formulaic procedures, and the implications of sociotechnical systems for the practices that depend on them. Algorithms offer a powerful focal point for this line of inquiry: a hidden core inside these complex systems that appears to hold the secret, embedded values within. They are instructions, after all, the mechanic ghost in the machine? Tempting. (Gillespie, forthcoming; Ziewitz 2015) But, in our enthusiasm to install the algorithm as our new object of study, we (myself included) may have fallen into the most obvious of intellectual traps: the tendency to reify the very phenomenon we hope to explain. Much of this work positions "the algorithm" as the thing to be explained, as the force acting on the world. This is hardly a new misstep; rather, it is one that has plagued the sociology of technology. (Bimber 1994; Gillespie, Boczkowski, and Foot 2014; Smith and Marx 1994; Sterne 2014; Wyatt 2008)

Invited to consider "algorithmic cultures," as we are in this volume, we might be tempted into the same trap: how has the introduction of algorithms changed the dynamics of culture? There are some interesting avenues to explore there, but they all run the same risk: of rehearsing a cause-and-effect story that treats "the algorithm" as a single, bounded entity, presumes a stable and unsullied "culture" that precedes this perturbation, and then looks to pinpoint the effects of these algorithms on cultural practices and meanings — usually troubling ones.

But we will certainly come up short if we tell simple cautionary tales about the mechanisms of production and distribution and their effects, or reassuring fables about how they merely answer to the genuine wants of audiences. These are the intellectual missteps that plague the study of culture. Culture is the product of both of these corresponding, but not isomorphic, forces (Bourdieu 1993, 230). Cultural objects are designed in anticipation of the value people may find in them and the means by which they may circulate; once circulated, we encounter cultural objects amidst a corpus of others, and attend to their place amidst them (Mukerji and Schudson 1991) Moreover, culture is aware of this correspondence, self-aware and reflexive about its own construction. As we consume cultural objects, we sometimes wonder what it says about us that

we consume them; and some cultural works are interested in culture itself, reading the popular as a clue to the society it is produced for and that finds meaning in it. Culture thinks about itself.

The mechanisms by which culture is produced and circulated are sometimes drawn up into those debates, and the signals of valuation (Helgesson and Muniesa 2013) they generate - of what is significant, or popular, or newsworthy, or interesting - themselves become points of cultural interest, telling us something about the “us” to which it is served. We not only debate the news item that made the front page, we sometimes debate the fact that it made the front page, the claim of importance made by the newspaper in putting it there, the logic by which newspapers choose and prioritize news stories, the institutional forces that drive modern news production. Evidence that we want a particular cultural artifact, or claims that we should, provoke us to ask why: why is this particular cultural object popular, how did it become so, are the artists and industries that helped generate it feeding us well, should culture be popular or should it be enlightening, are other kinds of culture being displaced in the process?

Today, these questions have algorithms in their sights, particularly those algorithms that help select and deliver the cultural works we encounter. Algorithms, particularly those involved in the movement of culture, are both mechanisms of distribution and valuation, part of the process by which knowledge institutions circulate and evaluate information, the process by which new media industries provide and sort culture. In particular, assertions of cultural value, always based on prediction, recipes, and measurements about what makes something culturally valuable, are incorporating algorithmic techniques for doing so. Algorithms, then, are not invisible. While they may be black boxes in terms of their code, at the same time they are often objects of public scrutiny and debate.

Not only should we ask, then, what it means for modern culture industries to adopt algorithmic techniques for producing, organizing, and selecting culture, and for knowing and tracking and parsing audiences in order to make those choices (Beer and Burrows). We should also examine the way these algorithmic techniques themselves become cultural objects, get taken up in our thinking about culture and the public to which it is addressed, and get contested both for what they do and what they reveal (Striphas 2015). We should ask not just how algorithms shape culture, but how they become culture.

trending algorithms and how they work

Given their scale, all social media platforms must provide mechanisms ways to “surface” new and relevant content, both to offer the user points of entry into and avenues through the archive, and thereby to keep users on the site longer, exposing them to more ads and collecting more valuable data about them. Most navigation mechanisms are either *search* or *recommendation*: search, where the user's query is matched with the available content; and recommendation, where the user is matched with other users and offered content they preferred. (Many navigation mechanisms are now a combination of the two; I'm separating them here only for analytical purposes.)

If not as pervasive and structurally central as search and recommendation, *trending* has emerged as an increasingly common feature of such interfaces and seems to be growing in cultural importance. It represents a fundamentally different logic for how to algorithmically navigate social media: besides identifying and highlighting what might be relevant to “you” specifically, trending algorithms identify what is popular with “us” more broadly. The simplest version of trending is as old as social media: using some simple measure of recent activity across a site to populate the front page with popular content. More sophisticated techniques, what I will broadly call *trending algorithms*, use a combination of metrics to identify particular content or topics generating the most activity, at a particular moment, and among a particular group of users.

One of the earliest and most widely known of these is Twitter Trends, introduced in September 2008 (though Google introduced its Trends Lab back in 2006, before Twitter launched). Twitter Trends is a brief list of the hashtags and other terms that are appearing more than usual at that moment, specific to the user’s city (within in the U.S.) or country. The terms are ranked and, if clicked, conduct a search on that term, presenting the user with the most recent uses of it.



Figure 1: Twitter.com

By indicating that "Arsenal" is trending, the algorithm indicates that lots of people seem to be using the phrase in their tweets, more so than usual, enough to stand out above all other topics. It implies that a group of people (a public if you will, though a momentary one) has gathered around a common interest. Some trending topics are referential to phenomena beyond Twitter, like a beloved sports team or politically relevant event, while others may index discussions that emerge on Twitter exclusively, like "#PerfectMusicVideo". What puts them on the list is an algorithmic calculation, the details of which are largely opaque to the user.

Twitter Trends may seem like a minor feature. The list occupies a relatively small box in the lower lefthand corner of a Twitter user’s homepage; for those accessing Twitter on their mobile phone, Trends were only recently added, displayed only when the user first initiates a search but before beginning to type. For users who access Twitter through a third-party app, Trends may be harder to locate or even be unavailable. It is also easy to discount, often full of gimmicky hashtags, pop culture fads, and seemingly meaningless terms. Nevertheless, it is a means by which users find their way to new topics, one of what Bucher (2012) calls the "technicities of attention" that social media interfaces provide. To the extent that it surfaces content, it elevates its visibility and directs users toward it, at least potentially.

Trending algorithms calculate the current activity around every post, image, or hashtag, by combining some measure of each item's popularity, novelty, and timeliness.¹ Within these measures are a number of assumptions. In particular, trending algorithms tend to be concerned with a very broad *who*, and a very narrow *when* (and a little *what*):

Who: Trending algorithms start with a measure of popularity, for instance how many users are favoriting a particular image or using a particular hashtag. But this entails deciding first who counts. Is it all users on the platform, or a subset? They are often bounded regionally (only counting U.S. users, for example); this may be presented as a feature of the results (as with Twitter), or it may remain obscure within the calculation, leaving it to the user to imagine who the "us" is. Platforms sometimes also factor in information about the users whose activity they're assessing, such as weighing the activity of popular users more heavily, or factoring in whether the popularity of an item is bounded within or spans across clusters of users already linked as friends or followers.

When: trending algorithms emphasize novelty and timeliness, both in terms of identifying unprecedented surges of activity, and in aspiring to match those to real events happening now. The parameters of what "now" means are often oblique: are these items popular over the last minute? hour? day? In addition, to identify a surge of activity requires a baseline measure what's typical for this item. This usually means selecting a past period as a comparison point: how much more discussion of this topic is there now, compared to the same hour one week ago? This can require tricky mathematical adjustments, to compensate for topics that have very little activity (if a topic had one mention last week and two mentions this week, is that an enormous jump in activity or a meager one?) or for topics that have no precedent with which to compare (the first discussion of a new movie title, or a viral hashtag in its first appearance).

(*What*: Trending algorithms are almost entirely agnostic about what content they are identifying. They must exclude words that are too common to trend: something like "today" probably shouldn't be there, although if its use surged over its typical usage, perhaps something different is happening? They must also discern when the same word has different meanings: is it "today" as in the current say, or as in the NBC morning news show? And they must recognize when different terms should be counted together: perhaps "Today Show" and "Today" and #todayshow and #today should be considered a single instance. All of this depends on a great deal of machine learning and rough guesswork. And platforms adjust their trending algorithms to better approximate the kind of results they want.² It is also worth noting that Twitter Trends tries to exclude profanity, terms identifiable as hate speech, and other obscenities - regardless of its popularity.³ Many other social media do the same.)

¹ The most lucid explanation of the calculations that go into a trending algorithm is from Instagram; it is a very useful primer, as I will not go into much technical detail in this essay: <http://instagram-engineering.tumblr.com/post/122961624217/trending-at-instagram>.

² Ben Parr, "Twitter Improves Trending Topic Algorithm: Bye Bye, Bieber!" *Mashable*, May 14, 2010. <http://mashable.com/2010/05/14/twitter-improves-trending-topic-algorithm-bye-bye-bieber/>

³ Jeff Raines, "Twitter Trends Should Face the Threat of Censorship" *Arts.Mic* August 22, 2011.

<http://mic.com/articles/1420/twitter-trends-should-face-the-threat-of-censorship#.cJD4342pZ>; Jolie O'Dell, "Twitter

This means, of course, there are different ways to make these calculations. Factoring the who, the when and the what in different ways, or including other factors, generates different results. Reddit, for example, offers several trending algorithms for identifying what's popular, including "new," "rising," "controversial," and "top."

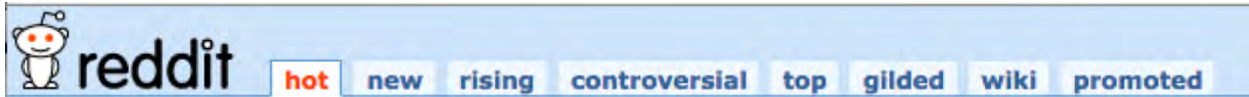


Figure 2: Reddit.com

beyond Twitter

Twitter Trends has enjoyed the most visibility. But we should not be misled by the relative prominence of Twitter's version, or the current zeitgeist of the term "trending" itself. I want to broaden the category of trending algorithms to include the myriad ways in which platforms offer quick, calculated glimpses of what "we" are looking at and talking about.

Most social media platforms now offer some measure of recent and popular activity. Similar Trends lists now appear on Facebook, Instagram, YouTube, Tumblr, Pinterest, and Vine. Reddit's front page is organized as a list of recent posts ranked according to how users have

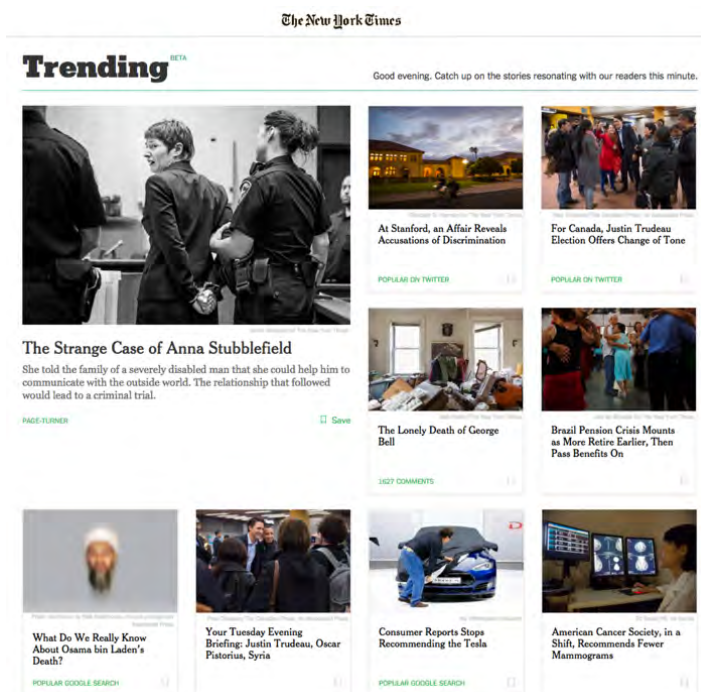


Figure 3: New York Times: <http://www.nytimes.com/trending/>

upvoted and downvoted them, with decay over time factored in - a similar aggregation of the popular and the current. Google and Bing search engines offer Google Trends and Bing "Popular Now" that digest the most popular search queries of the moment. Apple's App Store lists "trending searches" before the search bar is filled in; Etsy will email you the latest trends among their offerings. Many news and entertainment sites offer similar mechanisms: The New York Times, just as one example, highlights articles most frequently viewed or emailed by readers and those most shared on Facebook, based on a measure of the previous 24 hours of activity on the site. Hulu includes "what's trending now" as one of its navigation menus.

Censoring Trending Topics? Isn't It About Time?" *ReadWrite*, June 18, 2009.
http://www.readwriteweb.com/archives/twitter_censoring_trending_topics.php

Some social media platforms issue "trend reports," not in real time but at particular moments. These include "this year in trends," such as those produced by Google and Bing, that use the most popular search queries to craft a visual reminiscence of the cultural highlights of the past year. Other sites publish glimpses of their data, as blog posts or infographics, revealing something about popular activity and taste on their site (while also showing off their capacity for data analytics). OK Cupid, Foursquare, Spotify music streaming, and adult video platform Pornhub have been notable in serving up these glimpses of what is most popular on their site, producing analyses and infographics that then circulate on sites like BuzzFeed: what men or women rate highly in their partners, the most popular porn search terms by state, surges in site activity after a major national event, or what songs are most distinctly popular in a particular city this month. OK Cupid's founder even turned his site's data analytics into the book *Dataclysm*, with the provocative subtitle *Who We Are (When We Think No One's Looking)* (Rudder, 2014).

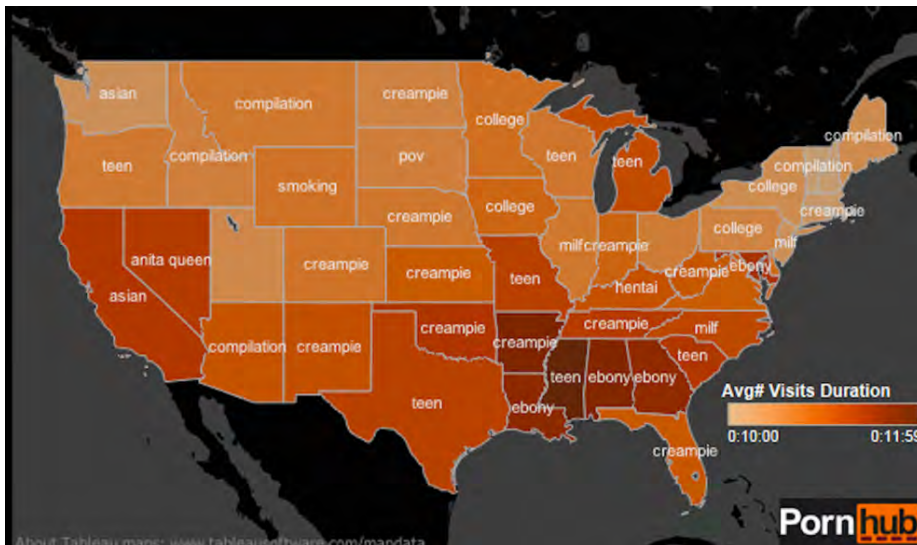


Figure 4: Pornhub, 2013

While these are more retroactive synopses than real-time snapshots, like other trending algorithms they aggregate some subset of activity on their platform over some specific time parameter, and constitute that data into representations of popular activity and preference.

E-commerce sites such as Amazon list the sales ranks of their products. On first blush, these may not seem to belong in the same category as trends, as they claim to measure a much more straightforward data point, number of purchases of a given product among all products. But it is a very similar mechanism: a measure of popular activity, bounded in oblique ways by timeframe, category, and other parameters determined by the platform, and fed back not just as information but as an invitation to value that product because of its popularity.

Sales ranking also does not include everything: Amazon's is carefully moderated for inappropriate content, just as most trending algorithms are. This was made apparent by the "Amazonfail" incident, when thousands of gay and lesbian fiction titles temporarily lost their sales rank because they had been incorrectly classified as "adult."⁴ This is a small but important reminder that, like other trending algorithms, sales rank is a public-facing representation of popularity, not just a pure tabulation of transactions.

⁴ Avi Rappoport, "Amazonfail: How Metadata and Sex Broke the Amazon Book Search" *Information Today, Inc.* April 20, 2009. <http://newsbreaks.infotoday.com/NewsBreaks/Amazonfail-How-Metadata-and-Sex-Broke-the-Amazon-Book-Search-53507.asp>

Let's also include navigation tools that may feel somewhat more incidental, but nevertheless are legible as glimpses of popular activity. Consider Google's autocomplete function, where the site anticipates the search query you're typing based on the first few letters or words, by comparing it to the corpus of past search queries. While the primary purpose of autocomplete is merely to relieve the user of typing the remainder of their query, the suggestions it makes are a kind of measure of popular activity and taste (at least as represented through searching on Google).

It appears we are awash in these algorithmic glimpses of the popular, tiny barometers of public interest and preference produced for us on the basis of platform-specific activity, inviting us to both attend to and join these trends. Moreover, the word "trending" has escaped Twitter and its competitors, showing up across cultural, advertising, and journalistic discourse. It is an increasingly common trope in ad copy, fashion spreads, news reports, even academic publishing.

This is not to suggest that advertisers and news programs have never before wanted to get our attention by telling us what's popular. But the fact that the term "trending" is enjoying a zeitgeist moment is indicative of the way that this particular formation of popularity has captured our attention and imagination.

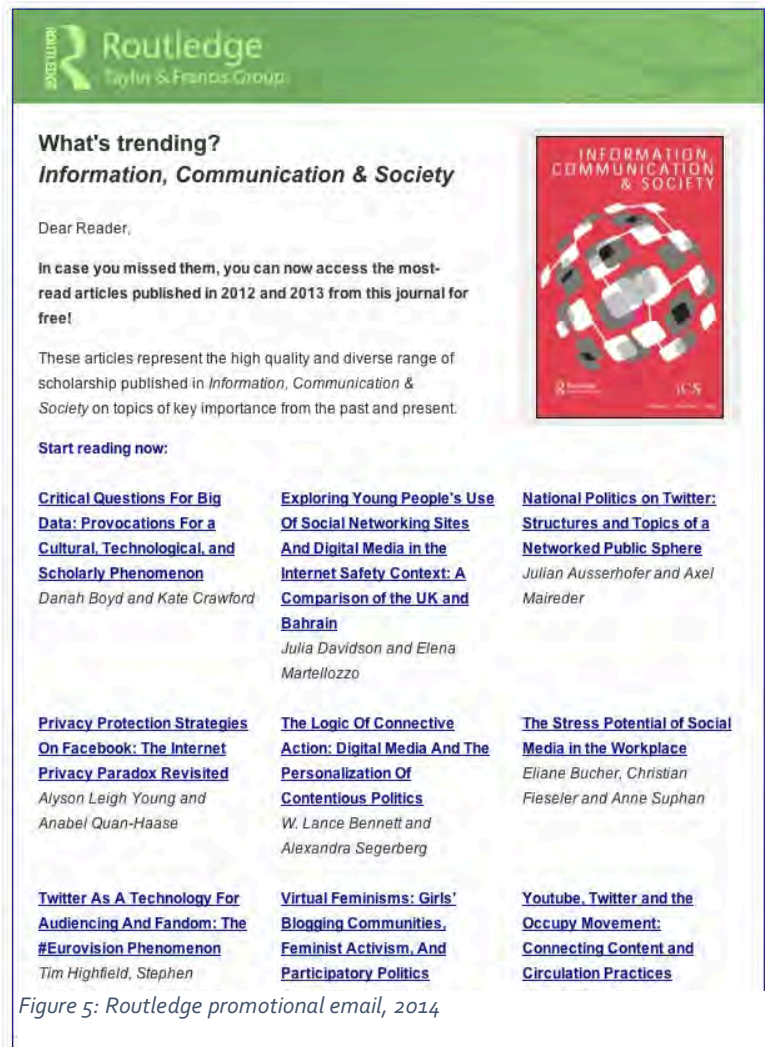


Figure 5: Routledge promotional email, 2014

the effects of trending?

Search was the first point of concern for sociologists interested in algorithmic media. Whether or not they used the term "algorithm," investigations into the possible biases of search (Granka 2010; Halavais 2008; Introna and Nissenbaum 2000) and the personalization of news (Pariser 2012) were concerns about algorithms and their impact on culture. What animated that work was the disappearance of common experience and the fracture of publics, and with the

growing privacy abuses and information exploitation as platforms sought more ways to know the preferences of each individual user (Stalder and Mayer 2009; Zimmer 2008).

Unlike search, trending algorithms promise a glimpse into what may be popular or of interest to others, a barometer of “what’s going on.” They offer the kind of serendipity that the personalized news environment threatened to do away with. They call together publics rather than fracturing them (while privileging some publics over others).

On the other hand, they are not so much glimpses as they are hieroglyphs. “Trending” is an oblique category these measures rarely unpack. Trends are not an independent phenomenon: unlike something like the number of subscribers or the number of likes, it doesn’t even claim to represent a verifiable fact. “Trends” could mean a hundred things, and may mean almost nothing. Trending algorithms don’t even have to be right, in the strictest sense; they merely have to be not wrong. But they do aspire to say something about public attention, beyond the user-selected community of friends or followers; they say something — perhaps implicitly, perhaps incorrectly — about cultural relevance, or at least we are invited to read them that way. They crystallize popular activity into something legible, then feed it back to us, often at the very moment of further activity.

Scholars interested in social media platforms and particularly the algorithms that animate them have begun to think about the importance of metrics like Twitter Trends, and more broadly about the “metrification” of social activity online. (Beer 2015; Beer and Burrows 2013; Gerlitz and Lury 2014; Grosser 2014; Hallinan and Striplas 2014; Hanrahan 2013; Marwick 2015; Lotan 2015) First, there are important questions to ask about how these measures are made and how they shape digital culture. Similar questions have been raised about the measurement of public opinion (Beniger 1992; Bourdieu 1972; Herbst 2001) How are claims of what is “trending” reached, who do they measure, and how might these claims be biased? The computational and statistical procedures used to assess popular taste may be biased in particular ways. (Baym 2013) Trends may measure some kinds of audience activity better than others, not only overlooking other popular activity but further rendering it seemingly irrelevant. And, as only a few institutions can generate these metrics at scale, and many of them are the producers and distributors (and platforms) themselves, there is a risk of self-serving biases, forming the kinds of collectivities they hope to produce and cater to with their platform.

Second, what are the effect of these metrics when delivered back to audiences? There is evidence that metrics not only describe popularity, they also amplify it, a Matthew Effect with real economic consequences for the winner and losers. Some social media platforms are structured to reward popularity with visibility, listing the highest ranking search results or content voted up by a user community near the top of the page. If visibility matters for further exposure, then the metrics of popularity that determine visibility matter as well (Sorenson 2007; Stoddard 2015). Further, some consumers use metrics as a proxy for quality: buying from the best seller list or downloading the most downloaded song is a better strategy than random for getting something good. This means early winners can see that popularity compounded (Salganik and Watts 2008).

The dynamics of these feedback loops are likely to be more pronounced and intertwined for trending algorithms. Because the calculation is in near real-time (Weltevrede, Helmond, and Gerlitz, 2014), and is fed back to users at exactly the point at which they can interact with that highlighted content, the amplification of the popular is likely heightened. As David Beer (2015) has noted, we are seeing "an emergent 'politics of circulation' in which data have come to recursively fold-back into and reconfigure culture." In some cases, these are central to the platform's interface. For instance, click on an artist in Spotify, and the first and most prominent offer is that artist's top five songs, according to Spotify's measure of play count, though adjusted for how recent the music is - in other words, a trending algorithm. These five songs are not only more likely to be played, they are presented as a way to encounter and evaluate that artist. Furthermore, Trends are self-affirming: click a trending topic on Twitter and you immediately enter a discussion already underway, visceral proof that the topic is popular (regardless of what other topics may in fact exceed it, or what kind of populations are or are not helping that topic trend).

Moreover, because trending algorithms attend to such a broad *who* and such a narrow *when*, their shape could affect the temporal qualities of cultural discourse. It is not new to suggest that popular culture, especially in the West, has become ever more concerned with speed. News cycles, the rapidity with which hit movies or popular songs come and go, and the virality of digital culture, all suggest that contemporary culture is more interested in timeliness and novelty. The effort to get a topic to trend means playing the game, of bread and speed, get a discussion to surge in exactly the right way for a trending algorithm to recognize it. We may see something similar to the emergence of the "soundbite" (Hallin), a similar shaping of cultural practices oriented towards capturing the attention of a news institutions obsessed with brevity. Powers (2015) makes a similar point in her discussion of "firsts" - when online commenters try to post first in a thread, regardless of whether they have anything to contribute. This particular "metaculture" (Urban 2001, quoted in Powers), or the cultural shape of culture, is a complex combination of being first in time, first on a list, and first as best - a combination that unites other structures like "top 10" or "breaking news" or "soundbite" It is a combination that "trending" shares as well.

As Beer and Burrows (2013) observe, "This is a much accelerated and in some ways entirely new set of organizations and relations in popular culture about which we so far have little understanding. Nor, we could add, do we have a clear sense of the socio-technological infrastructures and archives that organize and underpin it, the way the data is played with or algorithmically sorted, and how this shapes culture." (19)

knowing the popular, from tastemakers to audience metrics to infomediaries

But trending algorithms, while they may be new in the technical sense, are not new in the cultural sense. They build on a century long exercise by media industries to identify (and often quantify) what's popular, and they innovate the ways in which these measures themselves feed back into cultural circulation. We have long encountered culture through both subjective assertions and manufactured metrics about what's popular, what's about to be, and what should be. This means that trending algorithms and their role in social media platforms must be understood in light of their 20th century analogues.

Here I am linking the study of algorithms to the broader interrogation of the material, institutional, and economic structures of media, and the implications those structures have for the circulation of culture (Williams). This includes attention to the political economy of cultural production and distribution (Garnham 1979; Mansell 2004), and specifically the commercial industries that dominate those undertakings (McChesney 2015; Jenkins 2006; Havens, Lotz, and Tinic 2009), and how social media platforms increasingly play that role (Gillespie 2010; van Dijck 2013; Burgess and Green 2013, Vaidhyanathan; Sandvig 2015, Napoli 2015); the dynamics of cultural production that shape content (Peterson and Anand 2004; Holt and Perren 2009; Braun 2015a, 2015b) and the work of "cultural intermediaries" that facilitate and legitimate the making of symbolic goods and meaning (Bourdieu 1993, Hesmondhalgh 2006, Neff 2012, Downey 2014) The link is made most explicitly by Morris (2015) in his discussion of "infomediaries," where he considers the work of algorithmic curators (his example is music recommendation systems) as analogous in important ways to the (human) cultural intermediaries that concerned Bourdieu.

Like information media, the 19th and 20th century media industries, from book and magazine publishing to broadcasting to the distribution of music and film were dependent on the economics of "public goods" where initial costs are high and distribution costs are relatively low, and on the anticipation of the fickle tastes of audiences. As they grew in scale and ambition, they sought ways to make popular taste legible and to deliver those preferences back to audiences.

Producers and distributors eager to anticipate and shape popular tastes turned first to subjective and impressionistic tastemakers: disc jockeys, book reviewers and film critics, and cultural commentators. These evaluators of the popular depended on a combination of personal or subjective acumen, expertise, and some purported or demonstrable capacity for taking the public's pulse. The fact that Twitter and other social media platforms called their mechanisms "trends" harkens back to this tradition of cultural tastemaking: magazines devoted to identifying trends in fashion, DJs with an ear for emerging music genres, industry execs with an intuitive sense for "the next big thing." Today, bloggers, podcasters, the makers of playlists - and maybe all of us (Maguire and Matthews, 2012) - also play this role of cultural intermediary into the 21st century.

But for the media industries, reading the public and anticipating its wants in this way appeared increasingly insufficient and risky. But they did have another way to evaluate what was popular, at least around their own products: "Simultaneously with the development of mass communication by the turn of the century came what might be called mass feedback technologies" (Beniger 1989, 376) These companies sought increasingly sophisticated versions of sales data, including circulation numbers for newspapers and magazines, box office receipts, and audience ratings mechanisms for radio and television (Napoli). Some of this was part of the industrialization of the distribution process itself, entries on a ledger for how newspapers or LPs moved from warehouse to shop counter. Advertisers in particular wanted more information about the audiences they were buying, more objectively acquired, and at greater granularity. (Ang 1991)

But this was no small undertaking, requiring decades of innovation for how to track sales and circulation data on a national and even global scale, and how to make sense of that data according to demographics, region, and genre. The first measures were clumsy — as both Ang and

Napoli note, early radio stations would weigh fan mail as a rough assessment of popularity. These early and blunt feedback mechanisms were increasingly replaced by more rationalized, analytical approaches to understanding public behavior and taste, the emergence of new professionals and disciplines (like psychology) for audience measurement, and eventually the rise of third-party services like Nielsen for tracking audience data and selling it back to the industries who wanted it. (Napoli 2003) These claims, while more grounded in data of actual consumption, do not entirely shed the more impressionistic quality of tastemakers, in their hope to identify and generate surges of popularity as or before they crest.

This turn to audience metrics represented a transformation of the media industries and the cultural work they helped to circulate, as both audiences and even products came to be understood in terms of these metrics of popularity. (Napoli 2003) But the rise of audience data was concomitant with a broader embrace of an fascination with surveys and other measurable social data in the world at large (Igo 2008). In large-scale projects like the Lynd's Middletown study, political polling by Gallup and others, and the studies of human sexuality by Kinsey, large-scale and quantifiable social science research techniques were used to satisfy an emerging interest in both the typical and the aggregate. Alongside these projects, market research and media industry audience research took up these same tools to ask similar questions. The current public interest not only in "trends" but in infographics, heat maps and forecasts of online activity and cultural preference, is part of a century-long fascination with social data and what it promises to reveal about the public at large.

With the shift to digital production and distribution, a radical new scale of data about audience activity and preference can be collected, whether by content producers, distribution platforms, or search engines. The digestion and exploitation of this data is a fundamental process for information intermediaries. Trending algorithms have become a structural element of social media platforms in part because they are a relatively easy and incidental bit of data for platforms to serve back to users. We might think of trends as a user-facing tip of an immense back-end iceberg, the enormous amount of user analytics run by platforms for their own benefit and for the benefit of advertisers and partners, the results of which users rarely see.

Morris suggests that we think more about "infomediaries": "an emerging layer of organizations... that monitor, mine and mediate the use of digital cultural products (e.g. e-Books, music files, video streams, etc.) as well as audience responses to those products via social and new media technologies." (Morris 2015: 447) These infomediaries have taken up the role of both taste making and "audience manufacture" (Bermejo 2009). Further, we are beginning to see the automatic production of information, generated on demand in response to the measure of public interests (Anderson 2011).

Situating trending algorithms as part of a historical lineage of efforts to know the popular highlights some interesting features about trending algorithms and how they mediate our engagement with culture. They are part of a much longer debate about how culture is produced and measured; how those metrics are always both mathematical and subjective, always shaped by how they are measured by and bent through the prism of commerce; and how those measures are made meaningful by the industries and platforms that generate them.

metrics become cultural objects themselves

Still, if we think about trending algorithms only in terms of their possible impact, I would argue, we miss an important additional dimension: the way they quickly become cultural objects themselves. They matter not only because they represent culture in particular ways, and are acted upon with particular consequences. They matter also because they come to be culturally meaningful: points of interest, “data” to be debated or tracked, legible signifiers of shifting public taste or a culture gone mad, depending on the observer. When CNN discusses “what’s trending” on Twitter it is using Trends as a index of the popular, and treating that index as culturally relevant. Measures of what’s popular tell stories about the public, and are made to tell stories by those who generate and attend to them.

Once again, audience metrics are a useful point of comparison. In the second half of the 20th century, audience metrics were not only consumed by industry professionals, but by the broader public as well. They were incorporated into advertising - “Number 1 at the box office!” - and circulated more broadly as part of an entertainment press reporting on popular entertainment. Newspaper sections devoted to books or movies now report the best seller lists and the weekend box office returns, and cover the week’s big winners much like they cover elections. Trade magazines that cover specific industries, like *Billboard* and *Variety*, have expanded to increasingly address non-industry audiences; popular magazines like *TV Guide*, *Entertainment Weekly*, and *Rolling Stone* report ratings and sales data along side their articles and reviews. Increasingly, part of being a media fan is knowing how much money a movie made in its opening weekend, which show won its time slot, or what album had the biggest debut.

Perhaps the most striking example is the long-running radio program *American Top 40*, hosted by Casey Kasem. Building on the emergence of “Top 40” radio stations devoted to playing only the most popular hits, the program’s conceit was to play the 40 most popular songs in the U.S that week, based on data from *Billboard’s* “Hot 100” singles chart. The show was quickly embraced — beginning on July 4, 1970 on seven stations in the U.S., at its most popular it was syndicated on more than a thousand stations in over fifty countries. For the next few decades it had an outsized influence on American music culture. Before MTV, digital downloads, or streaming music services, it was one of the few places to hear the most popular music in the country. And it offered a weekly opportunity to find out which songs were rising and falling in popularity, and which would be crowned number one for that week (Weisbard).

This was not the first time that music sales were turned back to the audience as a contribution to culture. Local radio stations had begun to broadcast countdowns, though their measure was limited to the station’s regional audience. *American Top 40’s* most direct predecessor, *Your Hit Parade*, ran from 1935-1953 as a radio program and through the 1950s as a television show, broadcast studio musicians and vocalists performing the most popular songs nationwide. *Your Hit Parade* was more circumspect about exactly how this popularity was determined — based on a “authentic tabulation” of surveys of U.S. listeners, jukebox providers and sheet music sellers, conducted by American Tobacco, the show’s sponsor.

Billboard magazine itself had been in print since 1894, originally tracking outdoor advertising and amusements before expanding to film, vaudeville, and live entertainment. Charts for sheet music sales appeared in the 1910s, “hit parades” that tracked the most popular songs on U.S. jukeboxes were added in the 1930s, followed by charts for broadcast music in the 1950s. Though *Billboard* was available to individual subscribers, it was intended as a trade magazine for advertising and music professionals; it was *American Top 40* that turned its metrics out for popular consumption.

Besides broadcasting the results of *Billboard's* measurements, *American Top 40* became a cultural icon in and of itself. It offered a ritual for music fans in the 70s, 80s, and 90s, a shared media text. Kasem became a well-known celebrity, and many of the details of the show became widely recognized cultural touchstones: the sonic flourishes used to bring the show back from commercial, the “long distance dedications,” and Kasem’s sign-off phrase. *American Top 40* was culturally meaningful, not only for the artists (whose popularity and income was deeply affected by “charting” or reaching number 1) but for fans who listened, some of whom studiously kept track of the shifting fortunes of favorite artists, argued why this or that artist should or should not have made the list, aspired to get their own comments on the air. Providing an accurate report on the taste choices of the American public was only part of its popularity. It was American music's version of Trends, with *Billboard* as its trending algorithm.

metrics can become an object of cultural concern

As long as *American Top 40* was on the air, and long after, people debated the show and the vision of music and the American public that it offered. Even Kasem’s death in 2014 revived debates about the populism and artifactuality of his show and its effect on U.S. music culture.⁵ Was it a center point, uniting audiences around the most shared and beloved music of the moment? Or was it the product of an already narrow radio formatting too focused on hits? Was it meritocratic, introducing new performers and challenging musical forms despite the conservatism of radio programming? Or did it further marginalize genres like hip hop, metal, and country, categories often associated with working class and black audiences? Did it make commerce the predominant metric for measuring the value of music? Or did it listen to fans, better than the market could? Did it represent a “shared culture,” around the likes of 1980s superstars like Michael Jackson and Madonna, or was this “shared culture” merely an artificial construct of the *Billboard* charts and the show itself, that crumbled in the face of the fragmentation of music in the 1990s?

⁵ Jon Pareles, “Host in a Big-Tent Era of Pop Music” *New York Times*, June 15, 2014.

<http://www.nytimes.com/2014/06/16/arts/music/remembering-casey-kasem-dj-for-a-more-eclectic-pop-radio.html>;
Scott Timberg, “Casey Kasem, Ronald Reagan and music’s 1 percent: Artificial ‘popularity’ is not democracy” *Salon*, June 22, 2014.

http://www.salon.com/2014/06/22/casey_kasem_ronald_reagan_and_musics_percent_artificial_popularity_is_not_democracy/

Debates about the nature and value of the “popular” in culture both predate and extend past *American Top 40*. What does “popular” mean in the vocabulary of each of these metrics, and what should it mean? Does the amplification of the popular do harm or good to the culture? Such concerns implicate *American Top 40*, the Billboard charts, the historic formats of American radio, and the structure of the music industry itself. What does it mean that commercial mechanisms measure and make claims about the popular? When information intermediaries offer us the popular, is that a reflection of our wants or the manufacture of them?

We can hear similar debates today, about social media platforms and what they’re for, about how social media amplify the popular back to us and with what effect. As long as social media have existed, we have debated whether they convey information of sufficient importance. The well-worn critique of Twitter, “I don’t care what my friend had for breakfast,” echoes early critics of radio. Similar laments about the effect of social media on journalism suggest that the important and the civic-minded will be drowned out by narcissism and frivolity. Criticizing Facebook’s algorithm, Tufekci (2015) wondered what it meant that, while her Twitter feed was full of news and comment about the protests in Ferguson, her Facebook feed had very little, dominated instead by the popular “ice bucket challenge.” What if what we want is precisely our downfall?

Sometimes trending algorithms play a part in those contestations, and are sometimes even redesigned in the wake of such debates. Twitter Trends offers an opportunity to debate what appears there - or, more importantly, what does not. Some say it celebrates pop culture trash and silly hashtag games; others have called it out for overlooking important topics. I have written elsewhere (Gillespie 2012) about the concerns raised by political activists, both around the Occupy Wall Street protests and the classified documents published by Wikileaks, when a seemingly popular term fails to Trend. Charges of “censorship” overshadow more complex questions about the workings of trending algorithms, how they measure popularity, and what assumptions users make about what does and does not appear there. But they resonate because Trends is a powerful and consequential measure of the popular, and is often taken to be so in the wider culture. Occupy critics may have been wrong about why their hashtag didn’t Trend, but if CNN and the wider culture assumes that trends = importance, they were not wrong for worrying.

metrics can provide a venue to think about ourselves as a public

Measures of the popular claim to represent the public and its tastes, though it might be more accurate to say that they momentarily bring a “public” into being around this claim of shared preferences. As Raymond Williams noted, “there are in fact no masses, but only ways of seeing people as masses” (Williams 1958, 11; cited in Baym). But whether we think of these metrics as reflections of a public or as constituting one, they certainly are often taken as revealing something about that public, by both industry insiders and listeners. A public is brought into focus, made legible; a listener of *American Top 40* feels like they know something about their fellow listeners, and about the culture of which they themselves are a part.

Social media algorithms generate “calculated publics” (Gillespie 2014): they imply a body of people who have been measured or assessed, as an explanation for why particular information has been presented as relevant to them. This is true for search and recommendation, and it is true for trending as well: when search results are returned to our query, there is some undefined population of users who have found these sites relevant, and have left their assessment in traces like incoming links and past clicks. When a movie is recommended based on “people like you,” users enjoy a passing glance of a public to which they apparently belong, though one they can only know through the algorithmic results delivered on that basis. Trending algorithms make the claim of this calculated public more explicit: this is what “we” are reading, this is what my city or country is tweeting about, this is what America is listening to today.

Who and when this public is, exactly, is less clear. While *American Top 40* explicitly stated that it based its rankings on the Billboard charts, any specific knowledge about how Billboard produced those charts was not conveyed, nor was it important to the experience of the program. You need not know how Billboard measures music sales to enjoy the countdown.

But while who was being measured was left unclear, the program told us who it was about and for, again and again, as part of its performance. Even from the program’s name and logos, it was clear that this public was an American one.



Figure 6: American Top 40 logo, 1970-1982



Figure 7: American Top 40 logo, 1982-1988

The program performed "America" as its spatial imaginary throughout the show, from the recurring tagline “The hits from coast to coast!”, to Kasem welcoming new affiliate radio stations by their city and state (and regularly highlighting that show proudly appeared on American Armed Forces Radio), to his interstitial flourishes like “from the rocky coasts of Maine to the sandy shores of Hawaii.” The program was not just listing popular songs of the moment, it was performing America itself. Any mismatch between “America” and who was actually tabulated in Billboard’s charts was completely elided.

Twitter Trends indicates what region is being measured; I might choose "Boston Trends" or "United States Trends" or any region that Twitter offers, whether I live there or not. The specifics of how Twitter bounds these places, or these sets of geo-located users, are left unspecified. But for many trending algorithms, American-ness is assumed, or offered as the default. *American Top 40*'s emphasis on American may be more like the trends infographics that gather search data from

Pornhub or check-ins from Foursquare, which always seem to cast it back on the familiar outline of the fifty states - an intuitive and conventional way to make sense of shared preferences, whether state lines have anything to do with the commonalities of cultural meaning or the flow of online discussion being represented.

But the fact that the "us" being measured is left vague also means it can be contested. Trends results can become a terrain for discussion about who gets to be in the public square, how their visibility matters, and what happens when competing publics collide in a single space. The United Nations used this to great effect in a 2014 ad campaign intended to raise awareness about violence against women, by showing the reprehensible Google autocomplete results to sentence fragments like "women shouldn't...". In tiny print each poster asserted "Actual Google search on 08/03/2013." The message is a sobering one; its power depends on the presumption that the autocomplete algorithm reveals what "people" really think, or at least really search for - "who we are, when we think no one's looking".

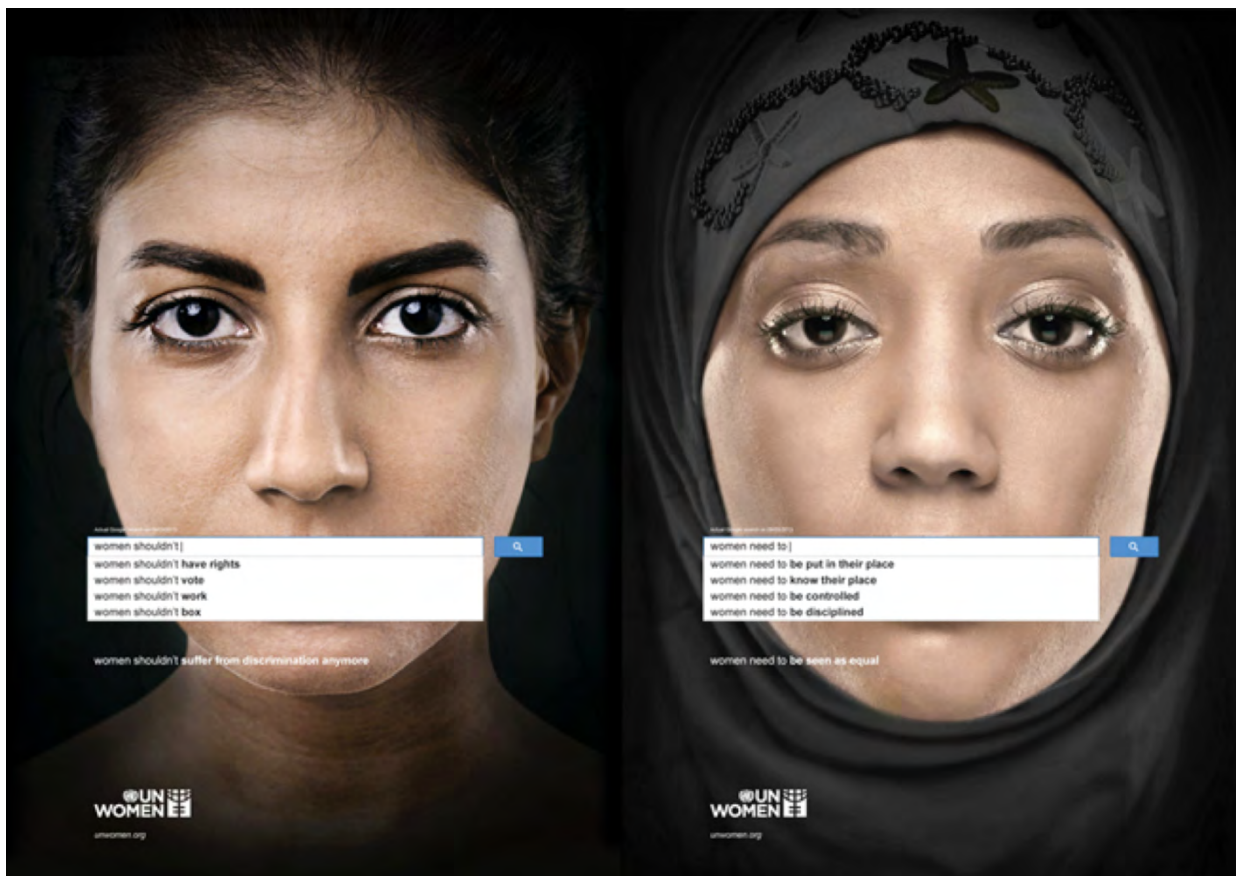


Figure 8: UN Women public campaign, 2013

Particularly tricky discussions have erupted around the visibility of race, and a subpopulation of Twitter users commonly referred to as "Black Twitter." The topics important to this community will only sometimes reach the thresholds sufficient to be recognized by Twitter's

algorithm; when they do, they have elicited xenophobic reactions.⁶ The "what are these topics doing here" outcry rests on presumptions of who the "here" belongs to, and what happens when the measures suggest otherwise. There are echoes here of the panics around *American Top 40* when hip hop began to chart alongside white artists. The very offer of a common space in which popularity amidst an entire public will be represented, even when the contours of that "entirety" are opaque and contested, can make terrain for debates about who is in that public, competing subcommunities with a single public, and who and what deserves representation there.

conclusion: when algorithms become culture

Trending algorithms measure, and they also announce. This makes them data-based and calculating, and in doing so, they offer up a rich hieroglyph about some "us," some public, that can itself be discussed, marveled over, or rejected, just like finding out that some crappy pop group just took the #1 spot from your beloved indie band. They can be cultural objects of meaning, not just for those producing information and looking to them for amplification, but for those who see in them a reflection of the public in which they take part. And they sometimes then become a point of content in and of themselves: what do they measure, what public do they represent, and how should they?

Maybe the question about how algorithms shape culture is the wrong one, or wrong if left by itself. Instead, or at least also, it is about what happens when algorithms get taken up as culture, when their particular kinds of claims become legible, meaningful, and contested. We can continue to ask questions about how algorithms shape what is seen or privileged or categorized, about how they may discriminate or make mistakes or treat us like data or automate human judgment. But when algorithms are attending to social and cultural activity, we must remember two things: human activity is public, and algorithmic interventions are too. As Giddens (1984) noted, our scientific attention to human activity is different than to natural phenomena, because people know they are being observed, and act accordingly and often strategically. Algorithmic interventions into human activity face the same challenge. And when algorithmic interventions are also public, in their outputs if not their workings, then they too are observed, taken into account, and strategically contested. This means that the work of algorithms is cultural, and algorithms are not free of culture themselves.

It may be that, because algorithms were so invisible to common practice for so long, it has taken them time to become objects of culture. As Google became prominent, cultural meaning about what it meant to use Google, what it meant to love Google, whether Google was objective or not, and so forth began to emerge and cultural discourse (Roberge and Melancon 2015). It became a point of reference in casual conversations, the butt of jokes, a verb. But that was a focus on the site, or the service, or maybe the company, but not the algorithms specifically. Similarly,

⁶ Farhad Manjoo, "How Black People Use Twitter" *Slate*, August 10, 2010. http://primary.slate.com/articles/technology/technology/2010/08/how_black_people_use_twitter.html; Lynne D. Johnson, "Reading Responses to How Black People Use Twitter" August 14, 2010. http://www.lynnedjohnson.com/diary/reading_responses_to_how_black_people_use_twitter/index.html#comment-68768426

Facebook became a cultural reference point as it became more prominent and more widely used, the kind of go-to reference that can be thrown in conversation about anything from life online, to what college kids are like, to an easy dismissal of hyperactive teenagers. In some ways we always domesticate (Silverstone) technologies by pulling them into culture as well as into practice, adding meanings that have, at best, a partial connection to their workings or their purposes. We tame them and make them our own through talk and shared meanings.

So it's as algorithms became more visible, both as the core functionality of social media and as points of contention in recent controversies, that they too, specifically, could become culturally meaningful. Not only do we begin to discuss what results Google returns or what updates Facebook seems to privilege, but the Google algorithm and Facebook newsfeed algorithm themselves become meaningful, or their algorithm-ness becomes meaningful. When CNN tells us what's trending on Twitter, that's making the algorithm culturally meaningful. When people joke about what the Facebook algorithm must think of them, that's making the algorithm culturally meaningful. When a group of Twitter users try to make their hashtag trend, or celebrate the fact that it is trending, or denounce the fact that it failed to trend, that's making the algorithm culturally meaningful. But, this should extend to algorithms that may not be visible to everyone: stockbrokers find meaning in the algorithms they use, or feel used by; real estate agents have opinions and ideas about the complex systems that now organize their knowledge of the field; police officers tell tales of the predictive analytics that now change the way they work. There is always culture amid the artifice: not just in its design, but in its embrace.

This leaves us with a promising epilogue. Many have expressed concern that users are ignorant of algorithms and their implications, too often treating social media or complex technical systems as either hopelessly inscrutable or unproblematically transparent. Calls for data literacy and concerns about abuses perpetrated by information systems all harbor a fear that users are not concerned enough about the algorithmic systems around them. I think this may underestimate the kind of inarticulate hesitations many users in fact do feel, as well as the outrage around specific cases. But, in the lesson of *American Top 40* and Trends, I think there is a hopeful response to this fear. Users will be concerned about the politics of algorithms, not in the abstract, but when they see themselves and their knowledge, culture, and community reflected back to them in particular ways, and those representations themselves become points of contention. *American Top 40* and the *Billboard* charts did obscure specific biases and underlying ideological assumptions. But they were not embraced unquestioningly. While they reported preferences, they sometimes became objects of contention about those preferences. While they claimed impartiality, they were sometimes challenged for their assumptions and oversights. When they began to seem mismatched with shifting interests in music culture, they were called to task for failing to identify something vital. Their articulation of the hits, or Twitter's identification of Trends, opened up discussions about other trends, other publics, and other possibilities.

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