

Sounds of Accompaniment: Transcript from an SCMS 2022 Panel on Music, Technology, and Labor

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The Society for Cinema and Media Studies held—virtually, for a second year in a row, due to the ongoing pandemic—its 63rd annual conference in the spring of this year. Reprinted here and lightly edited for clarity, is one panel from the conference, “Sounds of Accompaniment: Music, Technology, and Labor amidst Capitalist Aesthetics,” a fascinating collection of talks from four thinkers of music, sound, and media discussing historical and recent phenomena that are relevant to our current-day social and technological environments. This panel was chaired by Andy Stuhl of McGill University and sponsored by two SCMS Scholarly Interest Groups (SIGs): the Radio, Audio Media, and Podcasting Studies SIG and the Sound and Music Studies SIG.

Laboring Sound: Industrial Music Systems, Worker Morale, and Pan-aural Listening by Alexandra Hui

Today I'm going to talk about two of the main industrial programs of the 1940s: Muzak's piped-in service and RCA Victor's subscription program. And I'm going to try and show how they relied on a new understanding of music as functional—music could affect workers' bodies and minds and emotions and their morale towards greater efficiency. So, this was an understanding of music as functional and therefore laboring. Surveys of worker music preferences, especially, both collected data on the effects of music, and they also reinforced this functional understanding of music. And this was both for the workers and for management.

Further, industrial music that was based on worker preference surveys gave workers a sense of individuality that boosted their morale. And I think by reading this discourse against the most emphasized (to management) features of the RCA system, ability to contact any worker immediately through their public address system, created an interesting loop. So, according to RCA, the music played over the loudspeakers conveyed to the workers that management was listening to them and that management could then assume that the workers were also attentively listening to them through the public address system. And so, in this way, the *sounds* of the industrial music system facilitated a factory-wide culture of what I want to call pan-aural listening. I'm floating that concept out there for all of you to pick apart.

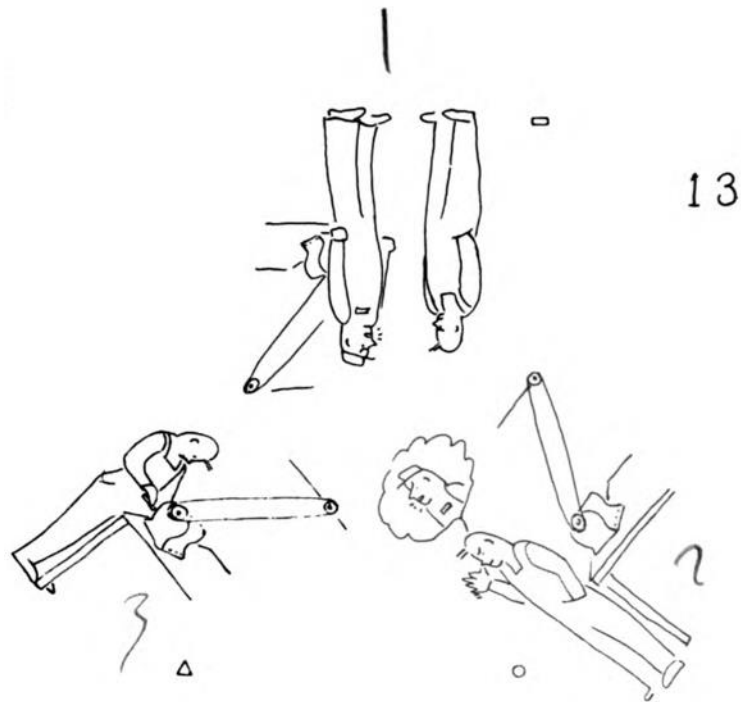


Figure 1. Plate 13 of Picture Arrangement Test. Silvan Tomkins and John Miner, *The Tomkins-Horn Picture Arrangement Test* (New York: Springer Publishing Company, Inc., 1957), p. 370.

I also want to try a conceit here: figure 1 is an image — or rather, a series of three images — from the Picture Arrangement Test that had been developed by Silvan Tomkins and Daniel Horn in 1942, further refined in 1952.¹ The Picture Arrangement Test, the PAT, was an adaptation of the thematic apperception test, the TAT, which functioned like the Rorschach Test. Essentially, the test subject was asked to order the images here into a "story that made sense." And then the subject's answers were analyzed for reasoning abilities to give information about the subject's intelligence, personality, and possible psychopathologies. This was developed in the 1940s to assist with the selection and the training of personnel for industrial settings. So, a lot of the images are placed in industrial setting. Each plate consisted of three images, arranged in 120-degree rotations from each other in order to randomize the test subject's engagement with them. In Figure 1, which was Plate 13, the three images are a man (Tomkins's text terms this person the "hero") standing at a machine, touching it with his hands, the man turned away from his machine with a thought bubble of a second man talking hovering overhead, and both men facing each other, the second man talking.

There were originally 25 of these plates. They were used, again, for training and placement in industrial settings. And later Tomkins actually started incorporating visual representations of his affect theory that he was developing at this time. Affect theory was, briefly, the theory that there are universal physical expressions of the building blocks of emotion, essentially, and that these are

¹ Silvan Tomkins, "The Tomkins-Horn picture arrangement Test," *Transactions of the New York Academy of Sciences* 15, 2 (1952):46-50; Silvan Tomkins and John Miner, *The Tomkins-Horn Picture Arrangement Test* (New York: Springer Publishing Company, Inc., 1957).

universal and standardized and that there are also standard reactions to them. Affect theory took off in a slightly different direction after Tomkins. So, what I want to do is to use plate 13 here to help frame my talk today. So how might we arrange these various images?

First, let's start with the hero working. We know that he's working because his hands are on some machine here and he's looking at his hands. So, we're seeing this as a representation of working. The next scene he is being talked to, maybe yelled at, by his boss. We know this person is his boss because he has a hat and a name tag, and because he is a little bit taller. We might note that everybody's frowning a little bit. And then the third scene is the hero-worker resentfully remembering his boss either in general or that specific encounter of the previous frame. So, I'm calling this the management-versus-labor interpretation of this. The grumpy laborer version. And this is to underscore that industrial laboring spaces at the beginning of World War II were this sort of top-down structure. There were pressures for efficiency and possible grumbling from organized labor that couldn't be fully articulated due to the national cause of war. I want to talk today about the use of sound in these laboring spaces during the 1940s to potentially redefine labor and how this inflected management-labor relations, worker morale and established a system for pan-aural listening.

I don't think I actually need to chart the complete arc of music as an accompaniment to labor for this group. But I want to note that by the early 1920s, phonographs had been introduced to factories for use during breaks. Additionally, in this period, there were studies and marketing efforts by the Edison Phonograph Company, as well as others that established that music could consistently affect mood, mind, and even the body.

Following a British report on the role of music and increased efficiency among workers in 1937, there were similar efforts to employ music in factories in the United States. There were two main models that came out of this, both dependent on new loudspeaker technology. There was a Muzak model of piped-in music programs via electric wires from a central source, and they would go out to the individual factories' public address systems. And there was the RCA Plant Broadcasting System that instead required a local phonograph to be connected to the public address system. And then also, because of that, required an onsite music director that was responsible for switching out the recordings as well as a subscription to the RCA record library.

Both of the industrial music models depended on employee surveys to measure efficacy as well as to refine the playlists, play time, and to develop these new morale-building strategies. These systems again were connected to the factory amplification systems to play music for workers *as* they worked. So, this was no longer music during breaks, this was music during work. Music itself was being put to work.

So again, Muzak was founded in the early 1930s; it recorded its own music and then piped it in to these curated music programs via electrical wires to subscribers. It described itself not as entertainment. It was instead, "music specially designed to help workers without distracting them from their tasks."² Again, because it was a subscription service, you didn't need to have your own equipment. They would come and get everything set up for you. Muzak claimed to have specially - designed channels for different types of labor: there's industrial work versus white-collar office work versus public lobby spaces like hotels and restaurants. They claimed to have specially engineered

² "Muzak: Music at Work" pamphlet (New York: Muzak Corporation, 1950?). Hagley Museum and Library Collections.

sound quality that could “slice” through the sounds of the machinery on the factory floor. They described themselves as management-, labor science- and government-approved.

The science part—which, I’m a historian of science, so this is the part I get extra excited about—is, they had a number of psychologists working on measuring worker efficiency. Muzak measured efficiency by counting things. They counted objects; they counted units of things produced by the workers. They also counted absenteeism and they counted injury and would try and chart these incidents against the intervention of music (see figure 2). Also, though it’s not totally obvious in figure 2, but they often just played music for like 30 minutes at a time as an injection into the system. They recognized that playing music continuously could lead to boredom and reduced effects.

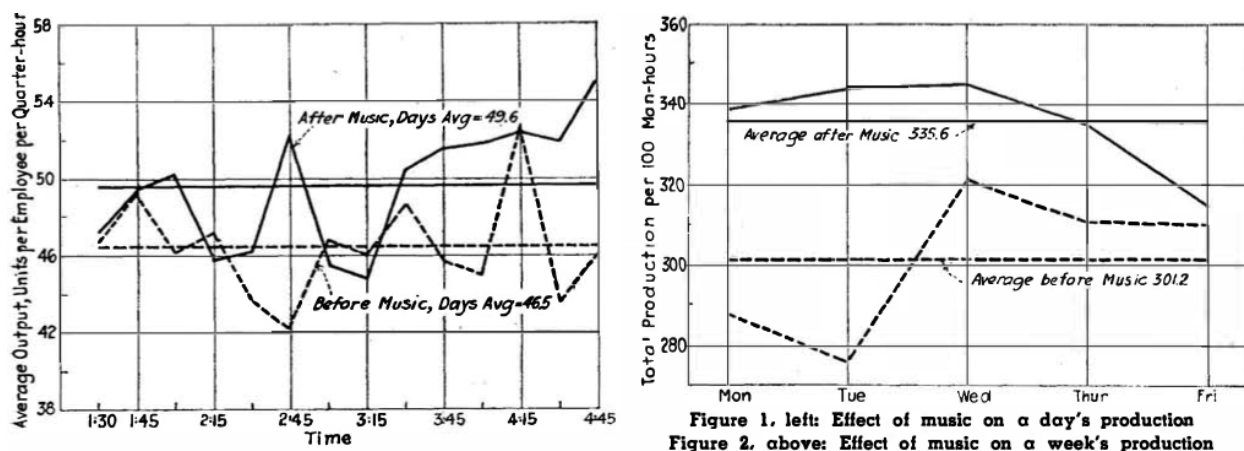


Figure 2. Effects of music on a day and week's production. Harold Burriss-Meyer, "Music in Industry," *Scientific American* (September, 1943): 262-4, 262.

Muzak also refined their programming through worker surveys. So, this collected data towards that. It also, I think in the case of Muzak, much more so than RCA, worked as a branding exercise. Workers were asked for demographic information and to indicate whether they liked or disliked various musical genres. Then they were directed to agree or disagree with a series of sentences that I find delightful; "Muzak gives me a lift," "Muzak helps relieve my fatigue," "I wish the music would be stopped immediately."³ And so, in all of this it allows for them again to refine their programming. It also offers the appearance of caring about worker opinions and in internal memos and discussions, they talk about asking for worker feedback in order to keep the unions happy and make them think that we care about what they want. It also standardized the ears of the workers and underscored the functional applications of music. It created affect.

In brochures aimed at management, Muzak described their product as a lubricant that eased tensions with workers.⁴ It allowed management to look like it cared about the humanity of its employees; music was a gesture of courtesy. And then they go on to say that it's a practical gesture because "it's

³ Ernest Werner, "Survey of Musical Preference of Factory and Office Employees in the Metropolitan Area of New York" (New York: Muzak Corporation, 1945). Music Division, Library of Congress.

⁴ Muzak: Music at Work" pamphlet (New York: Muzak Corporation, 1950?). Hagley Museum and Library Collections; "An answer... to Worker Tension" pamphlet (New York: Muzak Corporation, 1956). Hagley Museum and Library Collections.

real.” Although again, this feels a bit like this is about keeping up appearances of caring about workers.

Now we're back at plate 13 of the Picture Arrangement test and I've rearranged the scenes. So, here we have what I am calling the Affect-Realized Interpretation. First is the worker-hero thinking about his boss talking/yelling. But maybe the worker is not remembering the boss yell. Instead the worker is anticipating his interaction with his boss. Next is the image of him working. Then third is the imagined interaction coming to pass, the boss yells at our worker-hero. And so we can think about the realization of this affect and that in Muzak's case they are actively training workers to realize, maybe not conflict as in this picture, but a harmonious relationship via the piped-in Muzak.

RCA Victor's Plant Broadcasting System, in contrast to Muzak, offered a subscription service. The plants would regularly receive new records as well as guidance for the plant's music director. And part of this guidance was the monthly *Industrial Music Newsletter*, a wonderful archival resource for thinking through the listening experience of workers.

Music was absolutely a part of this listening experience, but there were also a number of other worker morale-oriented programs that RCA Victor, via the *Industrial Music Newsletter*, recommended. RCA endeavored to collapse morale and production together. Because morale was presumed to have direct consequences for production, it could be optimized to increase production. Many of the underlying features of the RCA industrial music system—the practice of highlighting the accomplishments or shortcomings of individual workers in plant-wide broadcasts, quiz competitions and awards, and surveying worker opinions about music—were promoted by RCA as a way to foster individuality or personhood, and they use this language very clearly, in turn, to increase morale. The system could also, through this very cultivation of individuality, control the factories' workers. And so I would argue that this counterintuitive system of control was only possible through sound and a very specific understanding of the technology of industrial sound systems at this time. RCA promoted an idealized plant of attentively listening workers that in turn, because of management's use of the industrial sound system, believed that management was also listening to *them*.

The *Industrial Music Newsletter* offered support and guidance for managers, usually opening with a suggestion for a playlist. It would be holiday-themed when relevant, there was also always a report from Victor Vim (more on him shortly), new releases, relevant scientific studies and testimonials about improved morale that were due to the music in the workplace. It also showcased other factories that had used their RCA industrial music system well. The Hollingshead factory, for example, did a weekly trivia quiz over their public address system. Again, it wasn't just about music.

RCA also polled worker opinions, and the *Industrial Music Newsletter* included several images of workers filling out blank request cards and dropping them in request boxes. They also asked workers to fill out surveys through these forms, compared to Muzak's, were much more open-ended inquiries about employees' music attitudes. There was an assumption that the workers were listening to the RCA Victor Plant Broadcast System.

A bit more about Victor Vim. A one-eyed, walking phonograph record, pep-squad captain, he was introduced to *Industrial Music News* in June of 1944. He was actually a crossover from a 1943

promotional pamphlet, “Manpower, Music and Morale.”⁵ And this jaunty fellow brought music and morale together. He explained that this was his job: to help music aid the workers. The World War II context cannot be ignored. It added production pressure and provided language of morale and patriotism. Here, the newsletter offered suggestions for what type of music directors should consider for when the D-Day invasion news arrived at their plant and this underscores the RCA version of morale as military-adjacent.

One last bit on the way in which the RCA Plant Broadcasting System presented itself: apparently there was perennial problem of losing individuals in the factory. This was solved by the use of the paging feature of the RCA industrial music system. Paging required, of course, that everyone was listening for their name to be called and would then respond. So, it presumed that the listening was part of this loop. A close reading of the admittedly brief publication, the *Industrial Music Newsletter*, reveals a constant refrain: that showcasing individual workers, highlighting their individuality and personhood via the industrial sound system was the best way to demonstrate the humanity of the executive. So, not just the workers, but the manager. He, the manager (and it was always a he), showed that he cared via sound. Sound was a tool of demonstrating his humanity. So again, the central feature of the RCA Plant Broadcasting System helped management to improve morale by embracing workers as individuals through sound. This was only possible via sound.

This is my last attempt to rearrange plate 13 of the Picture Arrangement Test. Let’s begin with the image of the boss talking at the worker. Then the worker, remembering *or* anticipating. Here I want to suggest the possibility of auditory memory and also auditory anticipation at work. And finally, the worker efficiently working. I give you the Efficiency of Pan-aurality Interpretation.

To sum up, hopefully I’ve conveyed that the historical record suggests several scenarios playing out parallel or, likely intertwined. The images of plate 13 can be arranged many ways. Management practices were informed by the pressures of organized labor, the war, and profit margins. They were also facilitated by psychological theory, applied psychoacoustics and sound-making technologies. And in these industrial setting sound also labored. What were the sounds of labor? Music, machinery, the voice of the manager, the aggregated voice of the worker (mostly via survey), the manifestations of psycho-acousticians and sound engineers, and the affective auditory memory and anticipation. I’ll stop there. Thank you.

Musical Programming: Automation and Aural Anxiety from 1950s Radio to Spotify by Andy Stuhl

Thanks so much, Alix. My talk is called Musical Programming: Automation and Aural Anxiety from 1950s Radio to Spotify. And in this talk, I’m going to oscillate between two vantage points, one in the present, and one toward the end of the 1950s. The reason I will do this oscillating is because I want to bring a media historical approach to bear on a recent tendency among researchers and critics to use the figure of Muzak to critique present day streaming services. These writers give different explanations for why Muzakification, as I’ll call it, is the right way to understand streaming’s effect on music—and for why this is something people should worry about.

⁵ “Manpower, Music, and Morale” (Camden, NJ: Radio Corporation of America, ~1943). Hagley Museum and Library Collections.

But even in the critiques that take an active interest in the historical relationship between Muzak and streaming, there seems to always be the same gap in the narrative. Namely, how did this musical system that managers imposed on factory workers and retail customers in the 1940s make its way into twenty-first century entertainment media that people choose to and even pay to hear in their leisure time? In other words, how did this industrial feature of factories that Alix showed us cross over into entertainment media? I want to propose that an important, while certainly not the only, part of that crossover occurred through a venture called Programatic [sic] Broadcasting Service at the end of the '50s and into the 6'0s. Programatic was a subsidiary of the Muzak corporation that for a few years became a major player in the then-emerging field of radio automation. It established a business model and a musical aesthetics, which it touted as “adult music,” that would both become enduring structures in American commercial radio.

By exploring how Programatic sold its services to station owners, my aim is to untangle the industrial side of a link between automation and Muzakification in popular sound media. Today these trends are the targets of interlocking anxieties that constrain people's music listening as part of a larger complex that I will call musical programming. But before I get too far into that, I first want to return to the present (or recent past) and take a closer look at this type of writing where we see the Muzak metaphor deployed.

When I first planned this project, I imagined I'd alternate between material on Programatic and a lit review of writing that uses this metaphor, but luckily for me, David Hesmondhalgh already did the latter part last year. He was interested in drawing out specific anxieties from literature that addresses “streaming's effects on music culture”—that is, the effects that streaming seems to exert on “musical texts” and “musical experience” separately from its economic effects on musicians themselves.⁶ And I should note that Hesmondhalgh explored the latter part in an earlier article, in case it seems like I'm suggesting he dismissed it. Hesmondhalgh's taxonomy of these critiques includes five themes in total, three of which are near and dear to Muzakification. One is an increase in functional music; two, a trend toward blandness in music; and three, a receding of music into background status. All these categories make frequent use of the Muzak metaphor, as in the 2017 essay by Liz Pelly on Spotify and mood playlists “The Problem with Muzak: Spotify's Bid to Remodel an Industry,”⁷ which Hesmondhalgh cites prominently.

Hesmondhalgh casts some, I think, needed skepticism on these expressions, pointing out that “the recent concerns about the use of music to accompany other activities can seem rather odd when seen in a larger historical context.”⁸ I would further his caution by making sure we don't take the claims of music distributors at face value in our eagerness to critique them. Pelly's essay, for instance, does seem to take for granted that Spotify's algorithm is able to manipulate something called mood or affect, much like Muzak and RCA claimed to be able to do. Paul Anderson provided a more extreme formulation in his 2015 article “Neo-Muzak and the Business of Mood” by equating mood playlists and antidepressants under an aggressively cynical frame concerning commercial mood management.⁹ For the purposes of this paper, I'm less interested in sussing out exactly what

⁶ David Hesmondhalgh, “Streaming's Effects on Music Culture: Old Anxieties and New Simplifications,” *Cultural Sociology*, June 16, 2021, 4, <https://doi.org/10.1177/17499755211019974>.

⁷ Liz Pelly, “The Problem with Muzak,” *The Baffler*, December 4, 2017, <https://thebaffler.com/salvos/the-problem-with-muzak-pelly>.

⁸ Hesmondhalgh, “Streaming's Effects on Music Culture,” 8.

⁹ Paul Allen Anderson, “Neo-Muzak and the Business of Mood,” *Critical Inquiry* 41, no. 4 (2015): 811–40.

various companies and critics have meant by mood and more interested in the fact that both parties believe that in general, these platforms are able to use sound to manipulate their listeners. Whatever mood is, it is also the most commonly attributed vector for this manipulation, the occurrence of which is the basis for the larger anxiety I want to examine here.

And an important part of that anxiety is one that Hesmondhalgh doesn't cover: the automation of music. Automation actually surfaces in Pelly's essay when she describes how musicians lack an easy way to exempt their work from these automated advertiser-branded playlists. But a larger thrust of this claim sees an imminent or perhaps already happening automation of music itself. The automation claim saw a flurry of expression in connection to Spotify, also in 2017, when a “fake artist” scandal came to light. In this case, listeners noticed that recordings of mysterious origin had earned top placement in high-traffic mood playlists on the platform. Multiple responses to this information, including one by Andrew Flanagan for NPR, raised the issue of AI-generated songs—even while acknowledging that the evidence pointed towards Spotify having commissioned these tracks from very human producers.¹⁰ These insinuations tied into an ongoing genre of coverage from both techno-optimist and techno-pessimist angles that seizes on AI music press releases to predict that automated music will soon be a major source of competition for human musicians. It's important to note that the real fact of musicians competing within Spotify against other musicians who had accepted a different labor arrangement is at least a part of what seemed to have invoked artificial intelligence for Flanagan. And we'll return to that association in a bit.

But I first just want to point out that it seems to me at least, there was no necessary correspondence to begin with between automation and the other qualities, like blandness, that tend to go along with functional or background music. The connection is maybe best conjured by the ambiguity in the term “programmed music” that usually seems closely synonymous to “functional music.” This is how Ronald Radano explained what “Muzak” means today, writing in 1989 that its genericized meaning referred to “all forms of programmed musics.”¹¹ The notion of programmed-ness heightens an ominous specter of social control that recovers Muzak's industrial purpose. This is the double entendre I like in the phrase “musical programming.” Is the music being programmed or is it helping someone program us? Another recent critical study of mood music, by Nedim Karakayali and Baris Alpertan, draws on parts of the Muzak corporation's history and on a Foucauldian biopower frame in comparing Muzak to the Panopticon as “two ‘classical’ instruments of social control.”¹² These authors make a convincing case that we should be very concerned about the success with which these techniques seem to have migrated into new and newly widespread digital media. But in claiming that “Muzak is the closest ancestor of online functional music,”¹³ Karakayali and Alpertan throw a particularly sharp spotlight on that gap that I mentioned earlier: how exactly did industrial Muzak gain a presence in entertainment media?

¹⁰ Andrew Flanagan, “Spotify Is Accused Of Creating Fake Artists — But What Is A Fake Artist?,” *NPR*, July 12, 2017, <https://www.npr.org/sections/therecord/2017/07/12/536670493/spotify-is-accused-of-creating-fake-artists-but-what-is-a-fake-artist>.

¹¹ Ronald M. Radano, “Interpreting Muzak: Speculations on Musical Experience in Everyday Life,” *American Music*, 1989, 459.

¹² Nedim Karakayali and Baris Alpertan, “Mood Playlists, Biopower, and the ‘Functional Turn’ in Online Media: What Happens When a Pre-Digital Social Control Technology Is Transferred to the Internet?,” *The Information Society* 37, no. 1 (January 1, 2021): 30, <https://doi.org/10.1080/01972243.2020.1826616>.

¹³ *Ibid.*, 23

Here is where I think Programatic Broadcasting Service can shed light on this present-day puzzle. With Programatic, the Muzak corporation not only entered an entertainment media market, but also pinned that entry on a specific form of sonic automation. *Broadcasting Magazine* explained that the service, which was called Muzak Radiomation Programming System prior to its formal launch, promised to provide "daily tape-recorded music programming plus basic equipment for unattended, completely controlled broadcast."¹⁴ (The magazine was quoting from a Muzak press release¹⁵ that I was actually able to see thanks to Alix's archival work.) "A station of average size that goes on should be able to cut overhead two to four employees through the use of the service,"¹⁶ the company predicted.

Radio automation was a few years old at this point. Its basic technical conceit was that special tape players could recognize sub-audible cue tones, usually 25 hertz, which would trigger them to stop and start other tape machines. This allowed station managers to arrange a long set of elements ahead of time, with station announcements and commercials cutting into the prerecorded music sequence at the appropriate times. But though the technology wasn't quite new, Programatic was the first automation venture to my knowledge that marketed the equipment and the prerecorded, cue-tone-embedded music tape reels as one package. This business model would become the industry standard as radio automation flourished in the '60s and '70s. And the musical aesthetics that Muzak selected for this service would ride along with that model.

The same 1958 *Broadcasting* article described this aesthetics through a mostly negative definition. It would be "melodic, 'entertainment music,' almost wholly instrumental—the complete antithesis of the average disc jockey program," according to spokesmen. It also would contrast with the background music that Muzak supplies to stores, offices and restaurants. Rock and roll and jazz will be omitted." I think this is where we can see the most explicit point of departure away from the industrial background music context, in which we saw (in Alix's presentation) Muzak insisting that it was not entertainment, and into an entertainment context.

But Muzak's marketers were just as emphatic in assuring station managers that Programatic would offer a sharp contrast from disc jockey shows—and from the rock and jazz music that DJs were perhaps significantly more interested in playing than were their station owners or the advertisers who funded them. In their vendor listing for the National Association of Broadcasters conference the following year, Programatic used the term for this music style that would appear in most of their ads going forward: "adult music." Also typically, the term was coupled to the equipment, emphasizing the package of hardware and programming that the stations could lease or buy as a single unit.

"Adult music," as best I can understand it, is also functioning negatively here. This was above all else, not youth music. To understand why this would be Muzak's angle, a quick sketch of the 1950s commercial radio context in America is useful. TV had been rapidly drawing big-name show hosts and audiences, especially youth audiences, away from radio. FM transmitting had meanwhile become an enticing new resource for broadcasters since the '40s, but the FCC was gradually shutting down hopes that established stations could continue either simulcasting the same program on AM and FM

¹⁴ "Muzak to Show System for Full Automation," *Broadcasting Magazine*, April 21, 1958, 74.

¹⁵ "Muzak Radiomation Programming System" [press release] (Muzak Corporation, April 21, 1958), Box 228, Folder 4, William Benton Papers.

¹⁶ "Muzak to Show System for Full Automation," 74.

or multiplexing their FM signals to provide “narrowcasting” services, including background music for stores. (Muzak itself had in fact been involved in some of those earlier efforts.)

This left a crowded field of established radio stations looking for new ways to find a market niche, and competing for a dwindling youth audience with live rock and jazz programming didn't seem to be a viable path; or, perhaps, conservative station owners simply hoped that it wasn't. When industry press announced the arrival of automation in the middle of the decade, they often pointed out that previously unprofitable overnight hours, when not enough ads could be sold to justify hiring a DJ and keeping the transmitter on, could become profitable with an automated and unattended setup. The gentle, nostalgic sounds of “adult music” were in some cases described as a good fit for the late night market that Programatic invited struggling stations to pursue.

But there's another piece of this context where Muzak was able to leverage an existing advantage, and that's labor dynamics. Not only did automation reduce employment and increase station owners' powers over DJs and engineers; it also appears to have given Muzak a chance to dodge the usual need for union involvement as it crossed into broadcast radio. In a correspondence from the American Federation of TV and Radio Artists archives at NYU, an inquiry from AFTRA's executive secretary Kenneth Groot ends in a hostile response from Muzak VP John Andrus, who insists that Programatic's performers don't fall under AFTRA representation.¹⁷

Whether Groot pursued this issue further and whether he was aware of Programatic's automation aspect are unclear. But the automation-syndication model may have given Muzak and Programatic a useful buffer from scrutiny as labor leaders and regulators caught up to this development. In any case, Muzak was able to use its existing resources to generate consistently styled recordings and to syndicate shows using non-union labor. This presumably held major appeal for anxious station owners, for whom the American Federation of Musicians strikes of the 1940s were still a recent memory.

And it's here that I want to return to that theme that we saw in the Spotify fake artist coverage, where the practice of undercutting artists' labor power raises the specter of automation all on its own, even when the sound production itself isn't being automated. We've now seen a moment where Muzakification and automation took a firm hold in popular sound media by way of Muzak automating broadcast radio. But how does this connect to our present moment and to the cultural anxieties that attend these projects? I've mentioned that Programatic's automation-syndication business model became the standard for other automation companies that cropped up later in the 1960s. One of them was IGM, which stood for International Good Music. Drake-Chenault was another big name in the field going into the '70s. A colorful full-page magazine ad from IGM in 1968 bore the simple banner, “Musical programming;” below the text, an illustration showed musicians and instruments evoking many genres collapsing together toward a single tape reel.

These vendors would often supply several different formats—different packages of tape reels embedded with cue tones—that could be sent to the subscribing station. And a major category that almost all of these automation services offered from the start came to be called beautiful music. There are multiple competing origin stories for the beautiful music format in radio, and I don't really want to open that can of worms by claiming another one around Programatic. But many of the

¹⁷ John R. Andrus, “Reply to Kenneth Groot,” October 19, 1961, Box 17, Folder 23, American Federation of Radio and Television Artists (AFTRA) National Office Records.

qualities that defined adult music also applied to beautiful music: appeals to nostalgia, for one, and a capacity both to provide foreground entertainment and to recede into the background when that was desired.

A National Association of Broadcasters-sponsored programming study in the '80s showed that beautiful music continued to be a prominent format. Devising labels like “anti-talk escapist” and “background music fans,”¹⁸ the study’s beautiful music breakout showed the same appeals in play that Programatic offered in the ‘50s. These logics, which were developed around adult music, seemed to have an almost natural affinity for the technological side of automation. They were light on talk as a feature; the format’s listeners typically didn’t express a desire to hear any more from a DJ than the kind of intermittent station announcements that the automation system could easily intersperse.

To start zooming out again, my explanation has so far focused on the industrial side of this interlocking between Muzakification and automation. But the problem I initially started talking about is more of an articulation of cultural anxieties. And I want to try to close with taking my best shot at an explanation for why that articulation between automation and Muzakification as ongoing concerns has come to be so entrenched for critics of sound media.

So here it goes. Early efforts to automate musical distribution depended on treating recorded sound as a control medium. The transition from programming to automatic programming in radio—subsequently just called radio automation—occurred when producers could embed cue tones into music sequences and have these tones trigger actions in tape machines that had been designed to recognize the tones. Sound, in other words, became a means of controlling its own playback. When this logic was put to widespread use in radio automation, it helped accelerate other senses in which recorded music acted as a control medium, namely the use of music for what Tia DeNora has called “self-programming.”¹⁹

The result has been an attitude, shared between distributors and listeners, that music is the default content that fills an auditory channel or auditory signal-time; and that the under-utilization of that channel is a missed opportunity for profit or for productivity. So, playing on Programatic, and also, on the computational sense of “program,” I refer to this complex as musical programming. And I argue that it has actually made it very difficult to think or talk about music outside of its status as content or outside of its potential effects on listeners.

The last piece of context I want to add from these intervening years between the '50s automation and today’s anxieties around the platform economy is a complex of fears around programming and programmability, especially pertaining to ideology. The literary historian Scott Selisker has a great book on this called *Human Programming*, focusing largely on the Cold War context.²⁰ In a computation context, the logic of programming looks for those underutilized spaces, times, and channels and underutilized resources and seeks economic ways to fill the former with the latter. This logic is what Programatic and other early radio automation vendors deployed when they pointed to

¹⁸ “A Look at Beautiful/Easy Music,” Radio W.A.R.S. (National Association of Broadcasters, August 1983), Box 1, Folder 26, National Association of Broadcasters (NAB) records.

¹⁹ Tia DeNora, *Music in Everyday Life* (Cambridge: Cambridge University Press, 2000), 48.

²⁰ Scott Selisker, *Human Programming: Brainwashing, Automats, and American Unfreedom* (Minneapolis, MN: University of Minnesota Press, 2016).

overnight operations as a reason for automating. And these studies by Karakayali and Alpertan and others have shown a sense in which precaritized workers in neoliberal economies now apply a similar logic to their own listening. The auditory channel, if not filled with something that might increase their productivity, is a kind of wasted resource.

But I think we can't get a full picture of how we've ended up here and why people feel these anxieties about their listening solely by pathologizing individual listening modalities. To return to and revalidate Liz Pelly's essay, I think we do need to approach this problem from a labor standpoint. We can't understand what has happened to music without understanding what managerial systems, including automation in these specific contexts, have attempted to do to musical labor. That's where I will close; thanks so much for your time and attention.

Detangling Tape: Divergent Sonic Textures and Labor Orientations of Magnetic Audio-Tape in 1960s Top 40 and MOR Formats by Alexander Russo

It's really quite remarkable when a panel like this comes together and the cross-fertilization that's a part of that. I think you'll hear some parallel and similar things in my presentation here. Histories of audio tape, notwithstanding this panel, tend to focus on the recording studio, not the broadcast one. And it's certainly true that new possibilities for multiple takes and multi-track recording radically transformed the production practices across musical genre as a wider variety of music scholars have traced. But what are the roles and orientations of magnetic recording in a radio station booth containing multiple instances and devices of recorded sonic performance, where they both play back content and control all our devices? In these situations, magnetic tape technologies work as representational media, logistical media, and then circle back again.

Initially, magnetic recording was used to edit and playback network-era programs, and station automation focused on activities like transmitter monitoring and remote adjustment of levels. But as the technologies of audio tape recording developed, broadcasters realized that they could not just play back existing content, but also, by placing cue tones, using punch outs or other kind of electrical connections on the tape, they could control playback in a variety of devices. When this occurred, audio tape takes on the dual modality. It contained both the content apprehensible to the human ear, but also, they functioned as logistical media, ones that perform a certain task. Logistical media, as John Durham Peters notes, have the job of organizing and orienting humans and property. "They coordinate and subordinate, arranging relationships between people and things."²¹ As both representational and logistical media, magnetic tape technologies constituted, and were constituted by, the creative and labor practices of the 1950s and '60s. Significantly, as they developed, the material form of each technology was linked to either the elimination and erasure of human labor or the performative foregrounding of it.

Moreover, as they did so, these technologies were mapped onto the sonic qualities of, on one hand, quietude, calmness, and sparseness, and on the other, loudness, freneticism and density. When the former was desired, such as in MOR formats, reel-to-reel machines were used for cost efficiency.

²¹ John Durham Peters, *The Marvelous Clouds: Towards a Philosophy of Elemental Media* (University of Chicago Press, 2015), 37.

But when the latter was required, cart machines allowed for automatic cueing, and quick changes made the up-tempo sonically dense sound of 1960s top 40 possible.

This is part of a larger chapter where I examine the influence of cybernetic concepts in the radio world of the 1950s and early 1960s. But here, I'm going to be looking at the work of a number of these radio engineers, particularly Paul Schafer, who developed the tools for remote control of transmitters starting in 1953. From this work, he was asked by the owner of a Bakersfield, California, radio station to create a system for overnight programming which, as Andy points out, was not considered profitable enough to have a full-time DJ.²²

The Schafer system initially contained several linked reel-to-reel machines and a jukebox-based record playing system that allowed DJs to prerecord their segues and link them to the songs, advertisements, and other spots in between. It used those electrical signals and tape preparations to stop and start each machine in order to play each element according to a pre-programmed sequence. Schafer systems and its rapidly developed competitors, of which Programmatic Music was one, were the talk of late 1950s National Association of Broadcasters' conventions resulting in a torrent of orders. In five years, Schafer had installed systems in over 200 stations and was grossing over a million dollars in annual equipment sales, while also running three automated stations on his own.²³

Other established radio equipment companies like Gates and Collins introduced their own automation equipment to respond to the crush of the demand. In the wake of their debut, the broadcasting trade press was full of enthusiastic accounts of cost savings and increased efficiency from tape-based automation. In a February 1960 article in *Broadcasting* entitled "Answer to Costs, Automation," Frank Crane, the manager of the Imperial Broadcast System of California testified that he had been able to cut \$5,000 a month using Schafer systems to program his stations, a savings that represented 15% of his gross billings.²⁴ Such anecdotes led *Sponsor Magazine* to editorialize in March of that year that "there's a tape jockey in your future. Don't be surprised if radio stations someday are completely run by automation. The latest thingamabob in that direction, a machine that offers jingles for every minute of the day, singing time signals, station identification vocals and weather jingles, all preset on tape or via the push of a button in the engineer."²⁵

Later that year, *Broadcasting* joined them, opining that automation and the radio was "inevitable."²⁶ And such predictions even influenced job listings, such as in April 1960, when a Juneau, Alaska, station advertised for "Engineer, small station, automated, very little announcing required."²⁷ Yet, not all was so rosy. In an article interview with *Sponsor*, Schafer, "Cheerfully admits that full programming automation is possible only because on most stations, programming is a repetitive

²² James O'Neal, "Paul Shafer, Father of Radio Automation, Dead at 90," *Radio World*, April 14, 2016. <https://www.radioworld.com/news-and-business/paul-schafer-father-of-radio-automation-dead-at-90>

²³ For example, at the 1959 NAB convention, Collins sold \$100k of equipment to 45 stations. "Automatic Spots for Radio," *Broadcasting Magazine*, March 23, 1959, 72

²⁴ "Answer to Costs: Automation," *Broadcasting Magazine*, February 15, 1960, 130.

²⁵ "Sponsor Hears," *Sponsor*, March 5, 1960, 66.

²⁶ "Automation in radio termed 'inevitable,'" *Broadcasting Magazine*, October 17, 1960, 62.

²⁷ "Classified Advertisements," *Broadcasting Magazine*, April 18, 1960, 110.

business."²⁸ Such comments reveal cracks in the veneer of the promises accompanying tape-based automation equipment.

Indeed, at the same moment that there were ads for engineers experienced with automation, there were also ads for secondhand machines and systems.²⁹ The question is why not all the stations were happy with their purchases. Several answers come from an extensive research survey on radio automation conducted in 1962 by U.S. Radio Magazine.³⁰ They found that 45% of their respondents had installed automation systems—so we can see their ubiquity—while the other 55% could envision doing so. The authors noted that "economy, the primary reason being problems of coping with 'prima donna announcers,' was their main reason for automation."³¹ Still, their ultimate conclusions were far more tempered than the buoyant predictions of just a few years prior. Out of the four main takeaways, three reflected some ambivalence about an automated operation. The biggest objection to using automation was couched in terms of immediacy, dehumanization, and a desire to "stay personal with local audiences."

The study found that 23% of non-automation using stations feared the "loss of personal contact with the audience," or "a canned sound." Even 31% of the stations that used automation technology agreed that "the personal touch and vibrant sound may be disappearing as a result of their electronic servant." This ambivalence can be seen in the comments of Tommy Brenn, a station manager in Wichita Falls, Texas, who described the problematic efficiency of what he called the automation "monster." He noted, "A six-hour show can be recorded in less than an hour with no planning and nothing more than recording intros and blah, blah, blah. This is fine, except it sounds like nothing on the air." Thus, the pitfalls for him were not mechanical. They were human. Brenn felt his DJs could not convey a feeling of impromptu performance when pre-recording their shifts. While he was somewhat of an outlier seeing no technical problems with automation, the survey also reported massive issues with the basic operations of these systems. The survey found that a quarter of automation users had major mechanical trouble, something especially disastrous if the station was absent of any on-air personnel. As one anonymous respondent noted, "It's complete discombobulation when a machine breaks down or a tape snaps. Good maintenance keeps this to a minimum, but when it happens, wow."

What this respondent described is the distance from broadcast performance and the legacy of liveness that created a rigidity to the daily operations that rendered automated stations less capable of responding to technical snafus. Because of such concerns, full-time automation gained a bad reputation [and] is something to be employed only by the most skinflint operators. As Bob Vaughn, program director for WSUN in St. Petersburg, Florida, said, "Automation is for cheap operators who cannot afford to program and staff a station properly. They lose the spontaneity available only with a pro performing live, and short-staffed stations cannot possibly perform in the public interests."

²⁸ "How Good is Automated Radio?" *Sponsor/U.S. Radio*, March 26, 1962, 74. Note: *U.S. Radio* ceased independent publication in early 1962, which led to the survey being published in *Sponsor* under a joint title.

²⁹ "Classified Advertisements," *Broadcasting Magazine*, May 23, 1960, 109.

³⁰ "How Good is Automated Radio?" *Sponsor/U.S. Radio*, March 26, 1962, 65–70+.

³¹ "Is Radio Ready to Automate?" *Sponsor*, February 12, 1962, 35. Note: this article provided a brief summary of the survey. A month later, a longer piece covered it more extensively.

Still, there were several areas in which automated programming continued to find success. Middle-of-the-road stations, late night, overnights and FM duplicators. In the interest of time, I will only address the first of these, but all, I will argue in the longer version, reflect the downplaying or the absence of a DJ presence. By definition, the middle-of-the-road format excluded loud raucous sounds, especially those associated with rock and roll or R&B. It was also not as affected by fast-changing chart positions and the changing musical tastes of that era's Top 40. In the desire for a somnolent soundscape, the absence of a disc jockey presence was not deemed a liability. Indeed, of the various equipment manufacturers, you have Programmatic Music and International Good Music as the ones that are providing both equipment and programming. I find IGM particularly interesting in this because it was also at the forefront of labor conflict regarding radio automation. While much of the late 1950s coverage was laudatory of automation, there were also frequent references to fears and resistance by workers, something that was paralleled in a wide variety of industries in the era. Although they found that both non-union and union stations used automation (there was only a 3% difference), IGM had a collective bargaining agreement where they allocated 5% of their profits to a retraining fund controlled by the International Brotherhood of Electrical Workers, which was predicted to reach about half a million dollars as of 1964.³² And likewise in 1962, the IBEW contended that over 1,500 transmitters had been automated in the previous decade, which has displaced 5,000 workers, hence the need for their retraining fund.

That same year, the National Association of Broadcast Employees and Technicians estimated that it had lost 300 positions in the last four years, and many trade publications predicted that future years would see increased tension and bargaining agreements because of automation. And there were a few, both high- and low-profile strikes by broadcast engineers and DJs. Ultimately, broadcasters came to see that program automation was not a blanket panacea as exemplified by the title of a 1962 article by Bill McKibbin, president of the Balaban Stations: "There's no push-button path to bigger profits."³³

We can see how the other kinds of stations and other kinds of formats began to judiciously employ tape technology, integrating it within live DJ performances. Chief in this category was that era's top 40 format and its use of the tape cartridge. As is often the case in iterative invention, competing versions of the endless loop-based type tape machines emerged in the late 1950s as variations and elaborations on an existing magnetic recording technologies. In 1955, Gates, a longstanding radio equipment company, introduced the Spot Tape SP-101, which could hold 101 separate 90-second tracks. That same year, the MacKenzie Corporation developed an open tape cartridge and had a multi-access machine that it marketed, called the MacKenzie Repeater. Automatic Tape Control and Collins soon introduced a more durable, close tape cartridge that became known as the NAB or the "Fidelipac" pack standard.

And by the early 1960s, the majority of radio stations had some sort of looped tape automation based on this standard because it served the interest of stations, advertisers, and DJs. Advertisers liked carts because they gave them more control over which recorded spots were played and when. Before tape, recorded commercials were distributed via a transcription disc. And even though each disc had multiple versions of each spot, the conventional wisdom in the industry was that DJs

³² "How Good is Automated Radio?" *Sponsor/U.S. Radio*, March 26, 1962, 86.

³³ Bill McKibbin, "There's No Pushbutton-Path to Bigger Profits," *Sponsor/U.S. Radio*, March 26, 1962 71.

tended to overlay the outside-most commercial because it was the easiest one for them to cue in the studio.³⁴

Carts were also used to dupe nationally produced jingle packages, sound effects, libraries, and even the hit records themselves so that the original recordings wouldn't wear out and the station could maintain a high-quality sound. Some stations, like WABC in New York, replaced 45 rpm singles with dubbed carts to prevent high rotation songs from getting worn out. Finally, while they resembled later eight-tracks, the NAB tape cartridge machines had two key characteristics that turned them from logistical media into a creative and an aesthetic one at the same time. While they were faster in terms of their tape speed, allowing relatively quick pickup when starting, which then allowed for a rapid succession of sonic effects.

Second, they did not need to be actively cued like the reel to reels, they used either a subsonic tone or a piece of foil to tell the machine to advance the tape to the next cue or [go] back to the start. This reduced the need for time to cue up different sonic elements and allowed DJs and engineers to create a more sonically dense palette for the broadcast. In short order, these personnel embraced the creative possibilities of integrating recorded sounds with live performance.

In the descriptions of the sonic elements by carts and weaver boxes attest to these creative practices. Bumpers act as transitions between program elements, drops referred to short clips from popular culture (often film or television), stingers emphasize what the DJ just said, music beds provide a continuous sound background, sweepers are used in between songs and commercials, and jingles were songs that promoted station identification and liners were other kinds of specific phrases that conveyed concise imaging, which was the sonic signature of a station in relationship to other stations in the markets. Collectively these elements were an essential part of the oral branding that reflected the then state of the art, thinking about station identification and radio formatting.

For radio stations at the start of the 1960s, practices around magnetic audio tape develop both as logistical and infrastructural technology, as well as a creative and representational one.

As the former, it rationalized and obscured or eliminated the presence of the disc jockey by prerecording and time shifting the entirety of the broadcast flow. And as the latter, it facilitated a hybrid live and recorded performance, but performances by the practices of the DJs. In the middle-of-the-road format, the DJ presence was repressed or eliminated entirely, concurrent with the relaxing and easygoing sound and conversely with carts and other kinds of sound effects technologies, a live DJ performance was combined with prerecorded bumpers, station IDs, jingles, and other effects that proved to establish a distinctive and consistent station identity, which was a hallmark of the era's Top 40 sound.

And both of these examples demonstrate how the material contours of recording technologies developed in conjunction with sonic aesthetics of tonal “energy,” (excitement versus calm), density (full versus spare), as well as the formatics that identify these aesthetics with particular radio formats and musical genres. In this way, we can see this is a practice by which various technologies and practices came to be understood as appropriate technologies and how they intersect with other kinds of discursive formations.

³⁴ “Tape Cartridges: Systems for Stations Sell Well in Chicago,” *Broadcasting Magazine*, April 11, 1960, 99.

In this sense, it provides a map of how the residual investment in the performative presence of liveness provided a crucial intervention against the competing discourses of efficiency, as well as business models that sought to reduce or keep labor costs here to a minimum. And so we have here in this story, a clash of two distinct habitus, in Pierre Bourdieu's model of the internalized structures and senses of the rules of the radio game.³⁵ One was based on a feeling of parasocial connection, and the other based on hardnosed business sense. Ultimately, it's not clear whether audiences could tell the difference between live and taped DJs, but they could tell the difference in terms of the musical selections and the overall aesthetic that they preferred. And they used that to make their choices and the stations they chose to tune to and acted accordingly.

Gimmick Music: Negotiating Auto-Tune's "Cher Effect" by Amy Skjerseth

It's such a joy to be joining my fellow panelists today. I've learned so much from your absolutely fascinating work.

Auto-Tune is a software plug-in for pitch correction that since 1997 has cast doubt on pop stars' authenticity. Singers no longer need the skill to sing in tune and can even use Auto-Tune live, often to such subtle degrees that only producers' ears can detect it. But Auto-Tune also draws suspicion when used ostentatiously in what's known as "the Auto-Tune effect." When the software's retuning speed is set to zero milliseconds for instant pitch correction, it produces machinic, garbled tones. While covert uses of Auto-Tune offer a behind-the-scenes Photoshop for the voice, overt Auto-Tune makes singers sound unnatural, even inhuman.

For many years, "the Auto-Tune effect" was known as the "Cher effect" after her song "Believe," which transformed Cher's image and revitalized a fading career. In 1998, on the cusp of Y2K, artists were looking for a new sound of the future. Whereas singers up to the '90s had used the vocoder, Sonovox, and Talk Box to sound futuristic, Cher suggested a new type of voice distortion. She asked producers Mark Taylor and Brian Rawling to duplicate a telephone-like sound she heard in an Andrew Roachford record. The duo distorted select syllables with Auto-Tune. But when Cher's Warner UK label worried that the producers had gone too far, Cher quipped, "You can change that part of it, over my dead body!"³⁶ After all, the lyric, "Do you believe in life after love?" urges listeners not to dwell in the past but to pursue something new.

On "Believe," Auto-Tune simultaneously sounds old and new, a collision of temporalities that accords with Sianne Ngai's Theory of the Gimmick. In Ngai's words, "A gimmick seems to be over or underperforming [...] because the social timing of its appearance is off."³⁷ Cher's overt use of Auto-Tune sparked accusations of gimmickry because it was at once too futuristic, with Cher sounding like "she's standing behind an electric fan," as one critic said.³⁸ But critics also said she was too dated, with a "metallic chipmunk sound"³⁹ that connects to the vocoder. During World War II, Eisenhower feared the vocoder would make him sound like a chipmunk in its use as a speech

³⁵ Pierre Bourdieu, *Outline of a Theory of Practice* (Cambridge University Press, 1977).

³⁶ Cher quoted in Neil Strauss, "Cher Resurrected, Again, by a Hit: The Long, Hard but Serendipitous Road to 'Believe,'" *New York Times*, March 11, 1999.

³⁷ Sianne Ngai, *Theory of the Gimmick: Aesthetic Judgment and Capitalist Form* (Cambridge: Harvard University Press, 2020), 3.

³⁸ Josh Tyrangiel, "Singer's Little Helper," *Time International (South Pacific Edition)* 173, no. 6 (February 16, 2009): 41–43.

³⁹ David Hajdu, "David Hajdu on Music: Imperfect Pitch," *The New Republic*, July 12, 2012, 29.

scrambler and decoder system in Allied communications.⁴⁰ And in 1958 with “The Chipmunk Song” sung by Alvin and the Chipmunks, pitch shifting, or increasing a tape recording’s speed to raise its pitch, became known as the “‘Donald Duck’ or ‘chipmunk’ effect,” as Jonathan Sterne and Mara Mills have shown.⁴¹ A tension between alien and animal sounds dominates the genealogy of voice modulation, from Eisenhower’s fears of emasculation to T-Pain’s Auto-Tuned “gerbil voice.”

The popular and scholarly discourse around Auto-Tune frames it as a gimmick that both dehumanizes and cheapens labor. In what follows, I’ll analyze Auto-Tune’s status as gimmick music in three parts.

First, I’ll track how Auto-Tune developed and how it was labeled as a trick. Second, I’ll show how Auto-Tune intervenes in Cher’s musical career. And third, I’ll examine the music video for “Believe” as a testing ground for imagery that defies Auto-Tune’s status as a technology that cheapens labor. Until now, Auto-Tune has been analyzed predominantly as a sonic device. But a fuller picture can be gained by studying Auto-Tune’s accompanying imagery—the waveforms visualized in the software plug-in, company ads, and album covers and music videos. Visual depictions of Auto-Tune reveal essentialized beliefs about whether an artist’s voice is in tune with expected performances of their gender, race, age, and more. But video images can also cut through industry standards of commercial pop stars to demonstrate new ways of being human.

I. The Gimmick

Auto-Tune originated from a woman’s idea to create a pitch correction device—an idea that was instantly shamed. At the 1995 National Association of Music Merchants trade show, Auto-Tune’s inventor, Andy Hildebrand, met his distributor and his wife for lunch. Hildebrand had just released looping software and was wondering what to invent next. The distributor’s wife chimed in, “Well, Andy, why don’t you make me a box that would have me sing in tune?” In Hildebrand’s words, “Everyone just stared at their lunch plates, they didn’t say a word.”⁴² Auto-Tune thus originated out of this shame to not be perfect, which has continued throughout its history. In particular, women, queer artists, and artists of color who have used the device have been panned for lacking the skills of true singers or for profiting off of a surface effect, such as T-Pain.

Auto-Tune’s discourse as a gimmick has long been linked to tense relationships with feminized and racialized labor. Ngai describes the gimmick as an aesthetic category that reveals the devaluation of minoritarian subjects and labor under capitalism. As she explains, labeling something as a gimmick “names an experience of dissatisfaction—mixed, for all this, with fascination—linked to our perception of an object making untrustworthy claims about the saving of time, the reduction of labor, and the expansion of value.”⁴³ A gimmick at once attracts and repulses us, since it promises to save time and labor but then appears to both work too much and too little to do so.

⁴⁰ Dave Tompkins, “The Vocoder: From Speech-Scrambling to Robot Rock,” *NPR*, May 13, 2010, <https://www.npr.org/templates/story/story.php?storyId=126781688>.

⁴¹ Jonathan Sterne and Mara Mills, “Second Rate: Tempo Regulation, Helium Speech, and ‘Information Overload,’” *Triple Canopy* #26 (2020): <https://www.canopycanopycanopy.com/issues/26/contents/second-rate>.

⁴² Andy Hildebrand, quoted in Greg Eckard, “How an Oil Engineer Created Auto-Tune and Changed Music Forever,” February 25, 2016, <https://www.vice.com/en/article/bmaj4d/how-an-oil-engineer-created-auto-tune-and-changed-music-forever-interview-creator>.

⁴³ Ngai, *Theory of the Gimmick*, 3.

When Auto-Tune arrived on the cusp of Y2K, consumers and artists feared that it might replace human labor and the so-called “natural” voice. But the schism that critics draw between the “natural” voice and the “unnatural” manipulation of it by a machine was not new with Auto-Tune. Recording engineers have been manipulating pop voices for decades, and, moreover, technology always mediates recorded or amplified voices. What put Auto-Tune's manipulation under scrutiny was the robotic sound of instant retuning. Like the “operational aesthetic” of P.T. Barnum's hoaxes,⁴⁴ overt uses of Auto-Tune seem to advertise a blatant bid for capital when compared to what producers would like us to think is a natural voice. For example, Hildebrand's company, Antares Audio Technologies, advertises the Throat plug-in by showing how it models but also exceeds human anatomy because you can manipulate it with the touch of a button. Such a sleight of hand holds tightly to the idea that recorded voices and pop stars could ever be natural in the first place. For Ngai, the structure of the gimmick is deeply worked out throughout capitalist art production. As she writes, "On the one hand, the gimmick seems to make certain capitalist operations transparent, in a not entirely pleasurable way. On the other hand, something about it seems to make these operations obscure."⁴⁵ This inherent contradiction matters not only for Auto-Tune's visual illustrations, but also for the creation of its software.

Before working in music technology, Hildebrand was a signal processing engineer for Exxon. He used the mathematical tool of autocorrelation to beam pitches undersea and then listen to how the pitches differed when they bounced off sediment on the ocean floor. These frequencies allowed engineers to plot data points about rocks' locations, densities, and deposits onto a visualization that identified which rocks would be rich with oil before drilling. There is a myth that Hildebrand used the same algorithm for Auto-Tune, but it was autocorrelation that he used to correct pitch in real time. While there are crucial differences between oil drilling and pitch shifting, they nonetheless share the conceptual idea of an audiovisual map of frequencies, which makes their previously invisible commodities visible and tangible.

Auto-Tune plots vocal pitches as visual sound waves on Digital Audio Workstations. This audiovisual interface allows users to quickly move sounds to more tuneful places, which is a valuable currency in popular music. But when Auto-Tune's retune speed is set anywhere below 15 milliseconds, which means that out-of-tune pitches are very quickly snapped to the correct ones, it produces robotic or mechanical sounds. Hildebrand intended for Auto-Tune to imperceptibly correct pitch, but he also made it possible to dial the re-tune speed to zero for the most extreme effects. So when people bring up T-Pain to him, he says, "I just built a car, I didn't drive it down the wrong side of the freeway."⁴⁶ But while he's scorned the “misuse” of his device, it nevertheless helped him to mine the tuning of human voices for significant profit in both covert and overt uses.

Auto-Tune's visual interface stoked critics' fear that the ease and speed of pitch correction would replace producers' labor, or even turn non-singers into pop stars. Yet as Catherine Provenzano notes, Auto-Tuning involves highly skilled labor from producers and computational power.⁴⁷ Ostentatious uses of Auto-Tune aren't created with zero retune speed alone. Engineers make the

⁴⁴ On “operational aesthetics,” see Neil Harris, *Humbug: The Art of P. T. Barnum* (Chicago: University of Chicago Press, 1981 [1973]).

⁴⁵ Ngai, *Theory of the Gimmick*, 72.

⁴⁶ Hildebrand quoted in Zachary Crockett, “The Mathematical Genius of Auto-Tune.”

⁴⁷ Catherine Provenzano, “Emotional Signals: Digital Tuning Software and the Meanings of Pop Voices,” (Ph.D. diss., New York University, 2018), 148.

voice more machinic through other effects. Meanwhile, over the last two decades, covert uses of Auto-Tune have become so ubiquitous that it's shaped pop voices into noticeably more mechanical and airbrushed sounds with dead-center pitches. In this way, Auto-Tune is not unlike CGI, which initially was shown off in movies like *The Matrix* (Lana and Lilly Wachowski, 1999) but now makes up the background of much media. When Auto-Tune is set to zero milliseconds for the Cher effect, however, it makes the sudden snap to a correct pitch sound out not sameness but radical difference.

II. Music

Cher was the ideal person to debut Auto-Tune as an overt effect, since she was a visual icon long before. She donned increasingly extravagant costumes on various 1970s Sonny and Cher CBS shows and during tours, so that by the time of “Believe,” music critics tended to focus on Cher's image over her voice. For Barry Walters of the *Village Voice*, the song's Europop genre allowed Cher to dress up and appeal to disparate audiences of adolescent girls, women, and gay men.⁴⁸

Cher's many looks were also mirrored by the myriad emotions of her androgynous contralto voice. Its synthetic sound in “Believe” drew critics' comparisons of Auto-Tune to her numerous plastic surgeries, which flaunt how different both the body is from its so-called “natural” state—so, too, does the overt Auto-Tuning of her voice. Yet below this label of the gimmick is the deep structure of women who are socialized, for example, to use cosmetics for “natural” beauty, or pop stars who try to look and sound younger. Instead of using Auto-Tune as sonic airbrushing for pitch correction, Cher celebrates over-the-top artifice and self-making. Cher uses Auto-Tune to joyfully refuse pop industry norms that discard stars who are too old or seem too androgynous. And for some critics, her voice was right on time in 1998: Ann Powers, for example, called it the latest fashion in vocal accessories.⁴⁹ To my mind, Cher uses Auto-Tune as a self-disclosing gimmick—not as a party trick, but as her own enduring effect.

III. Video

But given the alien sounds of Auto-Tune in “Believe,” Cher's music video imagery helped to contextualize her new self-fashioning for audiences. Cher and her producers used Auto-Tune to create audiovisual personas for her that simultaneously revive her career and disrupt pop industry norms. Here, I'm drawing on Kai Arne Hansen's framing of “pop personae” as a transmedia phenomenon co-constructed by stars, production teams, fans, and critics across recordings, music, videos, live shows, interviews, reviews, social media, and more.⁵⁰ The video's depiction of the single reveals that critics' anxiety over Auto-Tune isn't necessarily that it corrects pitch, for when it's done inaudibly, no one complains. Rather, it is that artists who misuse Auto-Tune thwart standard voices and images of pop music icons. In the video for “Believe,” Cher's larger-than-life personas invite audiences to revel in her notice-me constructedness.

⁴⁸ Barry Walters, “The Beats Go On,” *Village Voice*, February 2, 1999, 127.

⁴⁹ Ann Powers, “If There's One Star to ‘Believe’ in, It's Cher,” *Morning Star* (July 9, 1999): 1D.

⁵⁰ Kai Arne Hansen, “(Re)Reading Pop Personae: A Transmedial Approach to Studying the Multiple Construction of Artist Identities,” *Twentieth-Century Music* 16, no. 3 (2019): 501–29. For more on pop personae, see Simon Frith, *Performing Rites: Evaluating Popular Music* (Oxford: Oxford University Press, 1996) and Philip Auslander, “Musical Persona: The Physical Performance of Popular Music,” in *The Ashgate Research Companion to Popular Musicology*, ed. Derek B. Scott (Aldershot: Ashgate, 2009), 303–15.

Nigel Dick's video for "Believe" features three different personas for Cher. We see her as the robot, the pop star, and the heartbroken girl in the club, which is a foil for Cher as she recovers her agency after her divorce from Sonny. At the beginning of the music video, Cher is beamed into a cage, stock still as lights bounce off her crown of fiber-optic cables. Her eyes open to showcase a distinctly robotic glow amid a sonic wash of phasers that sound like jets taking off and landing. Lens flares lancing around her also reinforce the idea of robotics. In verse one, when Auto-Tune contorts select syllables, Cher's image transforms accordingly. As Auto-Tune is applied on the ends of the third, fifth, and sixth lines of verse one, she pixelates and teleports across the screen.

In verse one alone, Cher's use of Auto-Tune simultaneously reflects a chase for an aging voice to keep up with pop conventions—when, for example, her voice opens up in the chorus to sound more like a typical pop star. But her Auto-Tune use also demonstrates, sonically and visually, a line of flight away from those expectations when she moves in ways that are impossible for humans, such as sideways across the screen. This unnatural movement in the first verse foreshadows a larger one: at the end of the second verse, Cher teleports to the stage to sing the chorus in the guise of a pop star persona for her adoring fans.

As Cher evades norms of human behavior, through both unnatural movement and unnatural singing, she develops new sonic and visual ways of being in pop and music videos. She and her producers transform Auto-Tune from a sonic gimmick to a cultural theme that invites stars to acknowledge the artificial constructiveness of pop personas. Auto-Tune is often critiqued as distorting the human qualities of pop voices. But Cher purposely uses it as a tool of disidentification, to invoke José Muñoz's concept⁵¹: she defies the pop industry's ideals of pre-approved voices and identities. With Auto-Tune, she becomes another type of human, shifting from a robot to a triumphant star. In my larger work on Auto-Tune, I suggest that its overt uses create a "persona effect" that allows artists to shift not just pitch but to new and unexpected versions of themselves.⁵² Cher's ostentatious personas in her music video disturb and reconstruct the associations audiences make between her voice and body.

When stars use Auto-Tune to untether themselves from having one perfect star image and voice, they reveal anxieties of capitalist pop culture. Cher's plastic surgeries, for one, cohere with the commodified image of a female pop star. For Kay Dickinson, Auto-Tune plays a similar role, as her producers become "surgeon[s] molding Cher into something which cannot help but represent masculine dominance and the male resuscitation of a waning female singing career."⁵³ Yet when we recall that Cher suggested the vocal effect to her male producers, she herself grabbed hold of the forces that shaped her public persona. This is not to say that she forecloses how others interpret her, however. Cher's robot trappings in "Believe" have led Sasha Geffen and others to call her an icon for cyberfeminism,⁵⁴ and, conversely, Dickinson hears her Auto-Tuned voice as a vintage sound that calls back to the vocoder and early voice manipulation technologies. As I hear it, Cher's voice has both a cyberfeminist edge and a nostalgic warmth to communicate visceral human emotions of love and loss. She subverts the chilling effect that critics attribute to excessive uses of Auto-Tune, which

⁵¹ José Esteban Muñoz, *Disidentifications: Queers of Color and the Performance of Politics* (Minneapolis: University of Minnesota Press, 1999).

⁵² Amy Skjerseth, "Music's Visual Waves: Popular Music Technology and Audiovisual Aesthetics," (Ph.D. diss., University of Chicago, 2022), ch. 4.

⁵³ Kay Dickinson, "'Believe'? Vocoders, Digitalised Female Identity, and Camp," *Popular Music* 20 (October 2001): 342.

⁵⁴ Sasha Geffen, *Glitter up the Dark: How Pop Music Broke the Binary* (Austin, TX: University of Texas Press, 2020), 200.

today often polishes women's voices for easy consumption. When Cher deploys Auto-Tune as a self-disclosing gimmick, it becomes a gambit for queer and feminist circles to show new ways of being apart from heteropatriarchal culture. Through Auto-Tune and the imagery it inspires, Cher critiques an ageist and gendered industry that prevents a 52-year-old woman from singing pop.

Cher's video depicts Auto-Tune as not merely robotic but escaping from that state, from the cage of fetishization that women have been consigned to in popular music. The video likewise uses science fiction tropes of teleportation, distortion, and body-swapping to depict industrial control and then rupture it. Cher's experience is profoundly human in "Believe," as it emphasizes her comeback as a pop star and portrays her as a woman seizing agency in the midst of heartbreak. The video's narrative of body-swapping seems to suggest that Auto-Tune isn't just a surface effect, a sonic airbrushing, but has emotional effects that go skin deep. We see this when Cher remakes herself by entwining her experiences with those of the heartbroken woman. Cher adopts a younger skin throughout the video in her embrace of a new demographic in the Europop genre, but she does so quite literally and visually in the final scene on the roof. Like *The Matrix* is so fond of CGI and apocalyptic roof scenes, this scene takes digital distortion to an apex as Cher teleports into the clubbing woman's body. Cher does so in her most overt use of Auto-Tune yet in the chorus, so that as she swaps bodies we both see and hear her distance herself from the pop industry's ideals of stars on pedestals with so-called "correct" voices.

In all, the Cher effect and its realization in the "Believe" video invite viewers to consider the labor of being human and of artistry. Cher and her producers sound the labor of Auto-Tune, an emotive armor she puts on like she dons the persona of the heartbroken woman. Critics of Auto-Tune have feared that it will erase human labor since its debut. But with a textured, emotional voice in a landscape of other digital effects, Cher sonically exposes just how much music production has always been entangled with machines. Simultaneously, her performance as a caged robot who breaks free reveals how pop stars can become machines in the cog of a powerful labor-plundering industry. But then she uses Auto-Tune to strategically disidentify from pop's polished and "correct" female voices. In these ways, overt uses of Auto-Tune are not merely a tool of capital but a self-disclosing gimmick that expresses artistic personas as well as the labor it takes to create them. As Cher punches through the glossy veneer of pop production, she shows that Auto-Tune is not merely trifling but is necessary for survival in a fast-moving industry. By baring the seams of the gimmick and acknowledging it as a technologically mediated artistic practice, Cher paves the way for other women pop artists to remake their voices and images.