Technological and Methodological Assemblages: Analyzing the Production of Culture in Istanbul's Recording Studios

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Recording studios are acoustical environments and social spaces designed to do four things: they house massive amounts of 'stuff' (e.g. technologies, acoustic materials, furniture), organize objects and people within the space, position themselves in relation to the outside world, and structure how specific occupations are able to contribute to production workflows (Bates 2020). But what should recording studio *ethnographies* consist of? At a minimum, in some meaningful way they have to grapple with the human experience of architecture and technology. But beyond something pertaining to technology and architecture, an ethnographer can't know in advance what will matter most in a particular studio milieu, and shouldn't assume that specific discourses outside of the studio necessarily factor meaningfully on practices within. *Within* a production milieu, even those engaged with traditional music, not all recording acts are best described as productions of symbolic representations, and not all recordings are governed by anxieties around authenticity.

Most routine recording studio operations, whether recording a new part or mixing a song, cut across domains (i.e. sensory, material, social, digital, discursive, musical) that in academic accounts are *purified* (Latour 1993)—presented *as* discrete and analyzed in isolation. Two challenges for studio ethnographers, then, concern how to *resist* the excessive purification of domains, and how to develop a suitable locally specific approach for dealing with heterogeneity as a core defining aspect. The analysis of heterogeneity *as* heterogeneous, however, requires heterogeneous research methods, what John Law terms *method assemblage* (Law 2004: 143). 'Deep hanging out' (Geertz 1998) is a start, but insufficient by itself. Aside from importing stuff from neighboring ethnographic fields (where the purification problem persists), ethnomusicology needs to develop suitable analytical tools and methods attentive to the lived experience of materiality and digital materiality: both how materiality shapes the social aspects of studios, and how it shapes bodies and embodied dispositions. Towards that goal, I will reflect on my prior research in Istanbul's studios.

One problem researchers face, when we encounter studios or photographic representations of them, is that the presence of a technology doesn't tell us how it's being used and toward what ends, or even if it's being used at all. In other words, we see evidence of *materiality*, but we don't yet understand the *material semiotics*—the relations between heterogeneous actors inside and outside the frame (Law 2009). For example, looking at two pictures of the control room at Kalan Stüdyo (Figure 1, Figure 2), which in 2009 was a fairly typical Istanbul 3-room commercial studio, what are the important technological objects, for their musical or technical functions, or for their cultural meanings and role in enabling cultural meanings to be made audible? What matters in an ethnography of *this* studio?

Figure 1. Kalan Stüdyo control room. Photograph by Ladi Dell'aira.

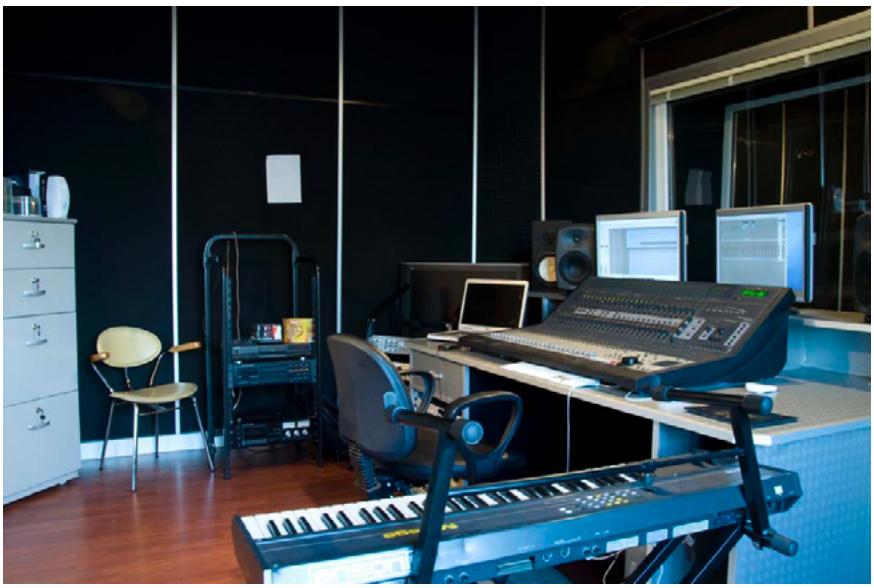

Figure 2. Kalan Stüdyo control room. Photograph by Ladi Dell'aira.

Like many studios, Kalan Stüdyo's studio-ness is marked by several features. The interior architecture is unusual: other kinds of workplaces don't have black fabric walls and double soundproof doors separating rooms. Some technological objects, like consoles or mic preamps, are only found in music or film postproduction rooms. However, not all of this technology gets used. The keyboard is almost never played. The Digidesign Control|24 console is a glorified volume knob and talkback button, used to impress record label owners and film producers but not even fully hooked up. The Avalon mic pre has been broken for two years since it's hard to get replacement vacuum tubes in Turkey; a SPL solid state preamp out of view does all the heavy work. The Genelec speakers were always on, the Yamahas less so. Two other important bits are invisible in these pictures: a Mac G5 computer with Protools HD3 cards, and a Lynx Aurora converter that converts everything between analog and digital. The poorly ergonomically placed mouse and keyboard was how engineers tactilely interact with the computer, and the mouse pad often fell off the desk since the desk was a bit too slippery. In the tracking room, looking at things from the studio musicians' point of view (Figure 3), we see the remaining essential technologies: the Neumann U87ai microphone, headphones, and a Behringer headphone amp.

Figure 3. Kalan Stüdyo tracking room. Photograph by Ladi Dell'aira.

Interestingly, the stories about the acquisition or transport of many studio objects got retold for years after the objects' initial socialization within a studio—stories that contributed to the objects transcending their origins as 'lumps of metal' and becoming cultural actors. I brought the SPL preamp with me from the US in 2005 and gifted it to Aytekin Gazi Ataş in 2007; it went on to figure prominently in much TV music production. The computer was brought and sold by a German-Turkish graphic designer to pay for a holiday visiting his family in Izmir and later was the subject of theatrical studio rituals (Bates 2016: 16). The mostly unused console was the centerpiece of ZB Stüdyo, where we all used to work before it closed in 2007 (it was never fully used there, either, aside from occasional playful antics around the so-called 'producer's knob'). Even though these pictures are somewhat meaningless without knowing the situated milieu, when connected with the stories of each object the pictures overflow with meanings: not just musical meanings, but stories about the circulation of objects and people across workplaces within Turkey and Turkish diasporas.

Therefore, I begin this recording studio ethnography not with the biographies of musicians, or a musical example, but with architecture, infrastructure and other kinds of technology, and with the range of ways that those who work within Istanbul's recording studios interact with and build narratives around these particular technologies. Not only are some technologies used more than others, but certain objects cohere together into systems for accomplishing certain tasks. In these pictures, ignoring the non-used technologies, most of the significant objects are used for *transduction*: the loudspeakers or headphones transduce electrical energy into acoustic sound, and the microphone transduces acoustic sound into electricity. Both types of transduction work together as a system I term *technologies of audition*—technologies that allow both the human participants and the computer to 'hear' what's going on. But beyond the computer's hearing, the computer is more routinely engaged with the storage, manipulation, visualization, and sonification of *data*. Audition and data are of course not specific to Turkey: every 'digital' studio depends upon them. But what I hope to articulate is the push and pull between these phenomena's dual natures: as a priori empirical properties, and as locally specific cultural negotiations. Moreover, situated human-technological encounters with these two assemblages changed the practice and sound of music (Bates 2016).

Encountering Turkey's studios

First, a bit of context about how this research came about. I've been involved with performing music from Turkey since 1992, and engineered several albums for Golden Horn Records, a Turkish-American label. This opened up opportunities to work for Kalan Müzik, Turkey's largest and most successful independent label. I was the house engineer for ZB Stüdyo from 2005-2007, and did projects at several other Istanbul studios during that time and intermittently for the following six years. My primary data set encompasses the production process for 16 commercially released albums, 3 feature films, the score mixing for 48 episodes of a top-rated TV series, and a number of one-off projects for TV, film, and advertising.

My main role was as an audio engineer, meaning I recorded musicians, edited and mixed recordings, and/or did the final stage of mastering engineering. I also contributed as a session musician to several of the projects, either singing or performing oud or keyboards. But my role went beyond that, as was the case for other audio engineers in Turkey. I was a go-to guy for Macintosh repair and software installation, and hard drive data recovery (Istanbul's power grid was unstable, so computers regularly broke or caught on fire). This brought me into contact with the underground of software piracy and grey market computer parts, but also enabled me to see how Turkish engineers dealt with and organized data. What did they keep, what did they care about, and what didn't matter to them? How did they name files and organize sessions, and did they keep or overwrite older versions of song arrangements? Additionally, as part of my apprenticeship at ZB Stüdyo I learned about making and serving tea, the ritual that holds together the recorded music sector of Turkey. I also helped a friend design and build a studio in an apartment building, which introduced us to Istanbul's architectural acoustics trade and electrical contractors. Analyzing these heterogeneous business-to-business relations, and not just the music-aesthetic outputs that make us regard recording studios as an exceptional site, became essential for understanding the studio as a workplace.

As a result of attempting to attend to the variety of experiential domains that we reduce to something called a studio,' in my workplace ethnography only some of the work and my observations of it directly dealt with making 'music.' Consumers of recordings would think about songs, song meanings, and individual or collective emotional-affective responses to songs, which is certainly part of the cultural life of recorded music. In contrast, twenty-first century studios, centered around computer-based digital audio workstations (DAWs) and situated as one node within multi-sited production workflows, are in the business of producing, storing, manipulating and selling *data*—which is also part of the cultural life of this music. While consumers hear what sounds to them like a cohesive, real-time performance of a musical ensemble, studio work is much more characterized by its nonlinearities and recontextualizations, and its dependence upon myriad kinds of technologies, including musical instruments but also computers and an absolutely essential, massive infrastructure that nonetheless usually goes unnoticed.

Situating Turkish studio workplaces

Aside from working in studios I researched two archives: the official documentation of early Republican era folksong collection (1920s–40s), and architectural and labor history. The history of the repertoires that today are described as *gelenksel* (traditional) or exemplars of *folklör* (folklore) contains a vibrant and controversy-laden discourse concerning the activities of folklorists and radio musicians. In fact, there was no widespread concept of 'traditional music' in Turkey that preceded the *aranjman / düzenleme* (arrangement) of the repertoires in question. Of course there *were* rural musics before that, but as in many countries the assemblage of a *national* archive arose from mining the countryside for folkloric resources (Bates 2016: 23), and the *arrangement* of these repertoires to better serve the primacy of nation-building work (Hobsbawm and Ranger 1983). This national project is ongoing; folklore continues

its mining operations, and songs are added to 'the' archive.[1] Therefore, an additional research question concerned the extent to which the practices I observed in Istanbul's digital studios might continue prior modes of arranging tradition. What aspects of folkloristics transferred from other domains to the studio?

As was the case with neighboring Egypt (Fahmy 2011), in Turkey radio and recorded audio were more important than 'print capitalism' (Anderson 1991) in nation-building. Turkey's local recording industry began in 1897 (Ünlü 2004), and private radio broadcasts in the 1920s (Dinç, Çankaya and Ekici 2000, Ahıska 2010), but as often is the case with local cultural adoption and re-inscription of technologies (e.g. Akrich 1992, Zimmermann 2015), these technologies neither meant the same thing nor were used in precisely the same ways as in the nominal countries of technological origin. Radio and recordings became essential for a project that continues to this day: presenting a national music that inscribes the locality or regionality of the repertoires in question, which as a result maintains a national awareness of local and regional cultural differences.

In the 1950s, with the opening of the Istanbul Manufacturer's Bazaar (İMÇ), a series of *blok* (blocks) each housing a separate trade, the recorded music industry appeared to adopt organizational structures from other craft guilds and clustered trades (Figure 4). İMÇ is located in the Unkapanı neighborhood, whose name (*un+kappan*, roughly 'flour exchange') indexes the neighborhood's history as the former Ottoman Empire center of wheat flour milling (Yi 2004: 177). Today, the other five blocks in İMÇ are inhabited by the wholesalers of laminate fake wood floor tiling and fabrics used for pious Muslim women's fashion, amongst others. Unkapanı, as the recorded music guild, is situated literally on the same ground as historical guilds.

Figure 4. The music industry at Unkapanı. Photograph by author.

In fact, the clustering and guild-like dynamics were by design and a mandate provided to the architects of the building, Doğan Tekeli and Sami Sisa, two of the most important post-WWII industrial architects of Turkey (Tanyeli 2001). Their design was inspired by contemporaneous Russian brutalist architecture, but applied towards creating U-shaped buildings that constituted an internal panopticon, enabling all members of the guild to see what everyone else was doing, while the frontage signs advertised the guild to passers by. From the late 1950s, most of the businesses related to recorded music, from the record labels to artist managers

1 Another heterogeneous set of technologies enables authenticating new folksongs to be added to the official register: since the late 1990s this consisted of low-fidelity microcassette dictaphone recordings that alongside a *derleme fişi* (collection record) facilitate an expert-produced transcription of the song lyrics.

to recording studios to media suppliers to the company that controlled the monopoly on wholesale distribution, were housed in this one building.

When examining the guild-like structures of recording studios, I was curious how Ottoman-era craft guilds organized labor around the central machine that did work. One of my theories is that the computer has literally come to occupy the same place as the main production machine that would be the focal point of any guild-based business. It could be a DAW, a flour mill, or a loom. The architectural and social design of industry clusters in Turkey encourages resistance to innovations, but also ensures that when innovations do take hold they can spread very quickly (Öz 2002). Whilst in other countries tape-based recording machines were gradually and incompletely displaced during the adoption of computer-based DAWs such as ProTools after their introduction in 1992, due to the retold biographies that accompany specific technological objects I was able to 'meet' the objects described as the first and second ProTools computers brought into Turkey in 1999—and learned alongside this that by 2000–1 almost all studios had abandoned tape formats and switched to computers running ProTools or Cubase.[2]

From the 1970s, studios started to be built elsewhere in Istanbul, partly to escape the centripetal force of Unkapanı and to facilitate the production of new musical styles (Stokes 1992). The sector was adversely affected by the 1980–84 coup, partly since many musicians and label owners who had supported leftist causes or Kurdish rights were jailed or 'disappeared' by the military junta, while others fled to Europe (Blum and Hassanpour 1996). The 1991 liberalization of the sector gradually opened up the possibility for non-Turkish language song recordings, making possible a latent desire (see later) to produce music in several of the dozens of non-Turkish languages spoken in Anatolia. Despite that, artists continued to be jailed or fined or harassed for recording in Kurdish, Zazaki, or Armenian languages well into the 2000s.

The recorded music industry in Turkey depends upon an ubiquitous and codified division-of-labor, where each category of participant has different economic and social motivations (Bates 2008: 164–80). Although until the early 1990s musicians would perform together in the studio,[3] from the 1990s onwards a single musician comes in and contributes one or more recordings on top of existing tracks that had been recorded previously by other musicians. An album comes about when producers are approached by artists or bands, and producers assess which album arranger(s) they think will best be suited towards accomplishing the task. Producers who own record labels finance albums and take on all the risk, and also are the only party that stands to profit if an album is successful. The arranger decides upon the engineer(s) and studio musicians, and manages the album budget. Even when bands (rock or otherwise) record, on most albums all the parts except the vocals are typically performed by specialist studio musicians.

Album artists hope their album will be successful enough to open up lucrative festival performance opportunities in Turkey and in Turkey's diasporic communities in Europe and North America. Arrangers have an incentive to maintain positive relationships with record labels, since they are dependent upon label referrals for work, and since a few well placed albums may attract the attention of film and TV producers and result in much more lucrative film and TV soundtrack work. Engineers have an incentive to maintain a positive relationship with arrangers, since arrangers are the sole determiners of whether engineers get work or not. They do this by working very quickly, and by successfully anticipating the aesthetic decisions of the arrangers. Studio musicians maintain their status within the sector by being always available for sessions (even at 3AM), and capable of performing their parts perfectly in no more than two takes. Although studio musicians and producers economically profit the most from album work, they ultimately have the least say in what the albums sound like. By the time the song has been edited and rearranged and processed, studio musicians may not even realize that it they indeed had been a performer on it at all.

In many ways, Istanbul's recording studios became a new site for existing labor formations

2 Ali Tosun, personal communication, 12. Jul 2007; Metin Kalaç, interview, 10. Apr 2007.
3 Eyüp Hamiş, interview, 11. Nov 2006.

to be enacted, and for novel technologies to be incorporated in culturally specific manners. I write about *traditions of work* within Turkey, and about a *digital tradition* that governs how new recordings are made of repertoires derived from folkloric resources—concepts I find more productive than maintaining the myth that there is an actual stable *thing* called 'traditional' or 'folk' music (*geleneksel halk müziği*). That said, these professional and economic considerations are not especially surprising in comparison with studio cultures elsewhere. They fail to explain those aspects of the ethnography of Istanbul's recording studios that might tell us why the recordings sound the way that they do, why and how certain technologies are used or not used, or the relations between technologies and users and sound.

Resituating Turkish studios: material semiotics

Earlier we encountered a few technologies at Kalan Stüdyo, but so far we don't know much about them. Space prohibits full accounts of all of them and their encounters with people. That said, I would like to return to two specific assemblages. With that in mind, let me reframe the protagonists of our story:

- Architecture and architectural acoustics
- Audio engineers
- Technologies of audition, particularly microphones, their close cousins headphones and loudspeakers, and the amplifiers/preamplifiers that power them
- Studio musicians
- Acoustic instruments, including several dozen Anatolian folk instruments, modernizations of these, and some foreign 'distant relatives'
- Arrangers
- Computers, particularly the DAWs at the center of studio life
- Folkloric resources as a source of musical ideas
- Data
- Time

To be clear, none of these were arbitrarily chosen to be in our cast of characters. I'm certainly not saying 'we have to pay attention to architecture' just because it exists! Rather, after my own extensive observations, fieldnotes and interviews, which led to yet more observations and fieldnotes and follow-up interviews, alongside photographic and audiovisual analysis of studios and related milieus, these actors emerged as the key ones within a realistic account of how studio production actually manages to happen in Istanbul. You might wonder why 'artists' and 'audience' are missing. This, too, is not arbitrary, but rather related to the idiosyncrasies of Turkey's recorded music industry, where album artists usually have considerably less control of their own albums and rarely come to most of the recording sessions, and where audience reception and critical feedback makes very little impact on the stuff done in studios. During my research I did interview and work extensively with album artists/soloists, and conducted several reception studies and focus group interviews, but I consider this data to be irrelevant since it didn't impact the work done in studios. That irrelevant data *is* relevant for telling other stories—just not the stories about *studio-sited* production.

My interest, moreover, is in when the encounters between three or more of the types of actors I just delimited led to the production of particular audible aesthetics *and* meaningful effects in the world. In other words, when did some complex phenomenon involving people and material objects and digital objects result in a change both in the sound of music and in how people do the things that they do? In previous publications I have explored a number of these encounters, but will highlight two here. The first concerns time-based problems that emerge from the recording process which I group together under the rubric of *latency*: attending to latency necessitates attending to empirical measurements of both the timing aspects of musical events and of technologically imparted latencies, to invariant aspects of human auditory perception, to the details of musical-performative moments, and to sociopolitical

phenomena that affect what can be performed in a studio. The second concerns an ontological shift during film/TV score production workflows from thinking of the creation of completed, discrete *songs* to the creation of flexible *data* that can be reworked in short notice dependent upon decision-making that happens elsewhere in the film production process. The data-ness of recording work also became significant in distributed production environments where the difficulty of transporting data between sites necessitated an adaptive set of embodied, material practices for overcoming sociopolitical obstacles.

Latency

One of the main problems of the studio concerns a certain amount of time delay within actions, or between an action and the cognition of the sound that results from that action. When studio musicians record a part, their direct interaction with instruments, with technologies of audition (headphones, microphones), and their indirect interaction with computers results in particular time-based problems which I group together under the term 'latency' (Bates 2016 134–8). The ability to partially overcome the problems of latency is the number one *technical* skill that distinguishes studio musicians from stage or amateur musicians. I identified six kinds of latencies at play within Turkish studios, each with their own distinct time scale, some of which are locally specific and others which are an a priori of studio-sited music. Two or more of these may be added at any point in time, contributing to a cumulative latency. Latency, here, relates to the following four empirical phenomena:

1. AD-DA conversion (1.5–6ms each direction with available technology in the mid 2000s). While analog recording/playback is effectively instantaneous (hindered only by the speed of electricity), it takes a bit of time to get from electrical signal to computer-storable digital data, and a similar amount of time to convert from data back to an electrical signal that can be transduced into sound.
2. Sound moving through air (1–2.7ms or more from instrument to microphone based on normative mic placement distances in Istanbul, 5–16ms for sound in a control room to travel from speaker to listeners). Since the speed of sound in air (1120 ft/sec) is considerably slower than the speed of electricity, there is a lag from sound production to transduction, whether considering the time for the sound of a voice or acoustic instrument to travel to the microphone, or for sound playback to travel from speakers to listening ears. Here, the audible and perceptual effect comes from the effects of architecture in determining where human and technological objects are placed in the room (Bates 2012). This only considers direct sound transmission, however; architectural acoustics and reflected sound create reflections that potentially increase the perceived latency of transductive processes.
3. The relation of music part timing to groove (Danielsen 2010) and concepts like swing and expressive microtimings (1–45ms). But why is swing a form of *latency*? It becomes so in studios due to the consistent use of click-tracks, and the default utilization of a beat/subdivision grid to *visualize* event timings. More specifically, when editing parts, I noticed that not only engineers but musicians and arrangers would visually notice when a part *looked* like it wasn't 'on the beat' (typically being a bit behind) and be required to make a choice of whether or not to 'correct' the potentially aberrant timing. Some of these discrepancies, however, may have indeed been intentional and regionally appropriate performance gestures. Accurately measuring musical event timing is complicated in that the perceived attack of an event, the P-center (Danielsen et al 2019) may occur quite some time after the initial sound onset, depending upon the frequency of the sound and the length and shape of the sound's attack and release.
4. The relation of sound onsets between two nearly identical parts when double-tracking (5–35 ms).

All four of these are quicker than the so-called shortest musical duration, between 60–100ms.[4] However, this is compounded by another form of latency: the human-cognitive phenomenon of perceptual lag, which was researched extensively by Benjamin Libet and others and sometimes termed the 'missing half-second.'[5] This is the nearly 500ms gap between the raw sensory *perception* of an unexpected stimulus, and the human *cognition* of what that stimulus was or means—a gap which the brain pretends doesn't exist through a process of 'backward masking' (Libet 2004: 51). In other words, performance in the studio is always in the past: delayed by digitization, delayed by air, delayed by swing, delayed by overdubbing, and delayed by the time it takes to know what just happened in the studio. There's a sixth form of latency which is considerably longer and more of a sociohistorical phenomenon. Here I'm thinking of long-term latent desires; for example, the long-standing and until comparatively recently unrealized desire to create Laz and Kurdish-language popular musics.

Beyond the details about learning an instrument, performance practice and repertoire, for a studio musician to master their craft requires a particular overcoming of the temporal problems imposed by their own bodies, by transductive technologies and mediums, and by AD and DA converters; the relation between their always latent musical part with pre-recorded ones stored in the computer as data; and deferred social relations between the musician and other players who made performance decisions that constrain what the studio musician can or should perform now. This is compounded by sociohistorical latencies, including large-scale historical barriers towards being able to perform certain kinds of music at all.

So, what does latency *sound* like? While in many situations the effects of studio-sited latency get engineered out, we can hear the first, second, and fourth forms of latency at play in this video (Video Example 1), which is a clip of a Turkish studio string orchestra called Kempa performing the pre-composed intro to an *arabesk* pop song. This is the second pass through the melody; in total, they overdubbed the 'same' section four times in order to create the illusion of 16 musicians, rather than the 4 that you see here. Try to pay attention to the relation between the sound you hear and the bowing and fingering techniques.

Link » Video Example 1.

Kempa overdubbing a 'string partition'

Part of what made Kempa so desirable was their peculiar approach to overdubbing, something which is visibly obvious to anyone trained in Western orchestral music contexts and who is used to the appearance of synchronized bowing. Although these are trained and accomplished classical musicians, for *arabesk* and Turkish and Kurdish pop a Western string orchestra sound is not the sound ideal, necessitating a different performance practice. The timing between parts needs to be a bit off, but not *too* far off. In fact, in most Turkish overdubbing scenarios, the desired note onset gap appears to be between 5–35ms (Bates 2010). Similarly, the vibrato depth and speed needs to vary a bit, but not *too* much. Kempa musicians deliberately de-synchronize, and change their bowing with each pass! This makes a kind of chorusing effect, but the specific temporalities impart a distinctive local sound that other musicians lack the skill to produce. As a result, Kempa was very much in demand and commanded a top rate for their studio performances.

Let's contrast this with an example where latency became a problem that required correction. When recording one of the several Black Sea regional albums we did, a well known but young *kemençeci* (*kemençe* player) performed some *altyapı* (backing tracks), but despite them being sufficiently in tune and seemingly with the beat, the arranger and singer were upset, calling the musician *tembel* (lazy). To me, the performance sounded a bit *düzgün* (straight), but

4 A sound repeated less than 60ms after its initial onset is not typically perceived as a separate event. This is why humans can combine their sensations of the hundreds of early reflections and reverberations of a sound in an acoustic space into the perception of a singular event. 100ms represents a widely mentioned (although inaccurate) shortest duration of successive musical events, approximately a sixteenth note at a tempo of quarter note=150bpm.

5 See also Brian Massumi's use of Libet as an inspiration for his concept of the virtual (2002: 29-31).

I thought I could have easily edited things by chopping up the audio and shifting its timing in relation to the grid to suit the aesthetic ideals. But as a matter of principle, the arranger, in consultation with the singer, decided to hire a more experienced studio musician to redo the parts. The *tembel kemençeci* complained about the headphones and the volume of the click-track, but blaming the technologies of audition didn't save him the job.

For the first three notes of the *tembel* part (Figure 5) the *kemençeci* began the bowing motion nearly 'perfectly' on the beat (in succession, the initial attack was -4ms, -12ms, and 0ms compared to the metronome), but the P-center of their *kemençe* notes was considerably later (30–45ms) than the initial sound. By synchronizing bow motion to the incidence of the click-track, all the notes sound a bit behind the beat. In contrast, the initial onsets of the same notes for the 'correct' *kemençe* part were -20ms, -26ms, and -19ms. Additionally, the gap between the sound onset and P-center for the correct *kemençe* part spanned a wider 22–45ms range. The studio *kemençeci* bowed *in anticipation* of the metronome, and also was able to produce certain note events with a quicker attack. Interestingly, by the end of the take the *tembel kemençeci* was occasionally correctly anticipating the metronome and achieving some notes with shorter attacks—but couldn't do it consistently.

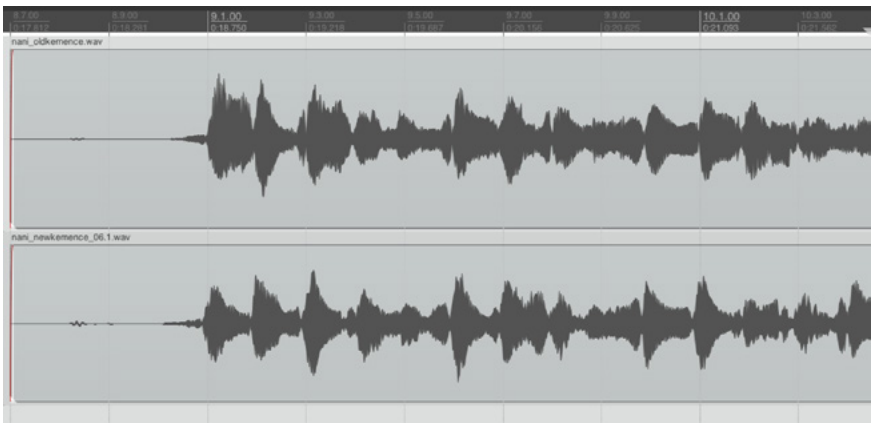

Figure 5. *Tembel* (top) and correct (bottom) *kemençe* parts.

Of course, not only in studios are there human cognitive delays and sound delayed by moving through air. Rather, the specificity of performing in the studio requires the overcoming of this *particular* set of latencies, and coping with the lack of visual cues to assist performer synchronizing as you might have during a live ensemble rehearsal/performance. Several of these latencies are not fixed: a studio musician might experience 3ms total digital conversion latency at one studio, and 12ms at another. While the Kempa string sound leverages a particular set of event offsets, other ensemble effects (e.g. percussion multi-tracking) entail different latencies depending upon the musical style, the studio and/or the preferences of the arranger. A good studio musician can overcome not just one set of latencies, but the *variability* of latencies experienced in different studio environments—which, in the case of the correct *kemençe* part, necessitated anticipating the click-track. Latency might begin as a studio problem, but within local sociomusical contexts can be leveraged to define audible aesthetic ideals (Wilson 1999).

Data and distributed production

As consumers, we're not always aware of the data nature of digital music, nor should we be. After all, if you put a CD on your stereo, or listen to an mp3 on your phone with headphones, it's not radically different than listening to an analog record or tape. Just because technically speaking digital audio is encoded data it doesn't always makes sense to argue about its ontology that way. And despite the fact that when you do a computer-based recording you end up producing a bunch of files stored on a hard drive or SSD or CD-R, studio recording is not always, more than any other 'kind of thing,' best thought of as a data process. However, in two situations the data nature of what we were doing became central, maybe even more so, at least temporarily, than the musical value of the data.

Grup Yorum is one of the top selling musical artists in Turkey's history, since their emergence in 1985 selling between 15–20 million recordings. However, due to their radical socialist politics, they have never been on Turkish radio or TV. Despite a long history of members being jailed for their activism, and having concerts shut down or raided by the police, they continue to be a significant voice for worker's rights and against the prison-industrial complex and imperialism. I worked with them as an engineer and studio musician on their twentieth-anniversary album, *Yıldızlar Kuşandık* (Kalan, 2006). It was a high budget project that consumed hundreds of hours of studio labor in several studios located in Turkey and Germany (Bates 2014).

The nature of that album production was so striking to me, since it illustrated the considerable divergence between some of the dominant discourses we have about the mobility and speed of data flows and digital technologies, and the on-the-ground situation in particular national contexts. One complication with making the album was that one group member was in Germany and unable to come to Turkey to participate in production, most of the band was in Istanbul and unable to leave Turkey, while other individuals important to the group were currently incarcerated in high-security prisons. Yet, the egalitarian ethos of the group demanded that these individuals outside Turkey and inside Turkish prisons needed to contribute to albums, either through writing lyrics, performing parts, or providing approval that the mix of a song was appropriate for a Grup Yorum album.

More specifically, I mapped the transport of physical objects that contained digital data: across borders, and in and out of the supposedly impenetrable F-type prisons. Rather than a smooth and speedy flow of media and ideas through a mediascape or ideascape (Appadurai 1991), for this album production the flow of data was intermittent and precarious. Instead of being massless and instantly accessible at a global scale, the digital data we were attempting to circulate was weighed down by hard drives, flash memory, mp3 players, and often corruptible CD-R and DVD-R media; only through trafficking data across many sites of production and critical audition (Figure 6) could the group's musical and political ambitions be realized. *Yıldızlar Kuşandık* came not from *a studio*, but rather resulted from *distributed production*. Considering that Turkish studio projects are already characterized by disjunctures and non-linearities, this album would seem to be a logical progression of latent sociotechnical formations. This does impart audible effects. On every song, we hear, even if subtly, the sonic signature imparted by a multiplicity of differing acoustic environments and transductive assemblages (microphones, preamps, cables), and the different social dynamics of studio labor result in differing approaches towards the recording and subsequent editing of studio musician performances.[6] The public-facing representations contained on the album (through album art and song themes) are similarly displaced and heterogeneous, juxtaposing depictions of prisons, of victims of the Iraq war, of *çepki* line dances done in Southeastern Anatolia, of Aegean regional legendary folktales, in addition to the unavoidable representations of both the arranged traditions of Istanbul's studios and the related arranged traditions of German-Turkish studios. Distributed production, defined here as the simultaneous co-production of data in

6 An example of the sonic result of distributed recording used in *Yıldızlar Kuşandık* can be heard in the song 'Davet': https://www.youtube.com/watch?v=3MIHpsmbJfs (last access December 28th, 2023).

disparate sites that is eventually aggregated into what becomes perceived as a singular object, was not just a technical problem that left 'the music' untouched, but came to inform the very design of the album itself. But we have a tension, as the artistic goal was certainly *not* to stage encounters with data, but rather to convey a socialist political message despite the ontological, technological, and infrastructural obstacles.

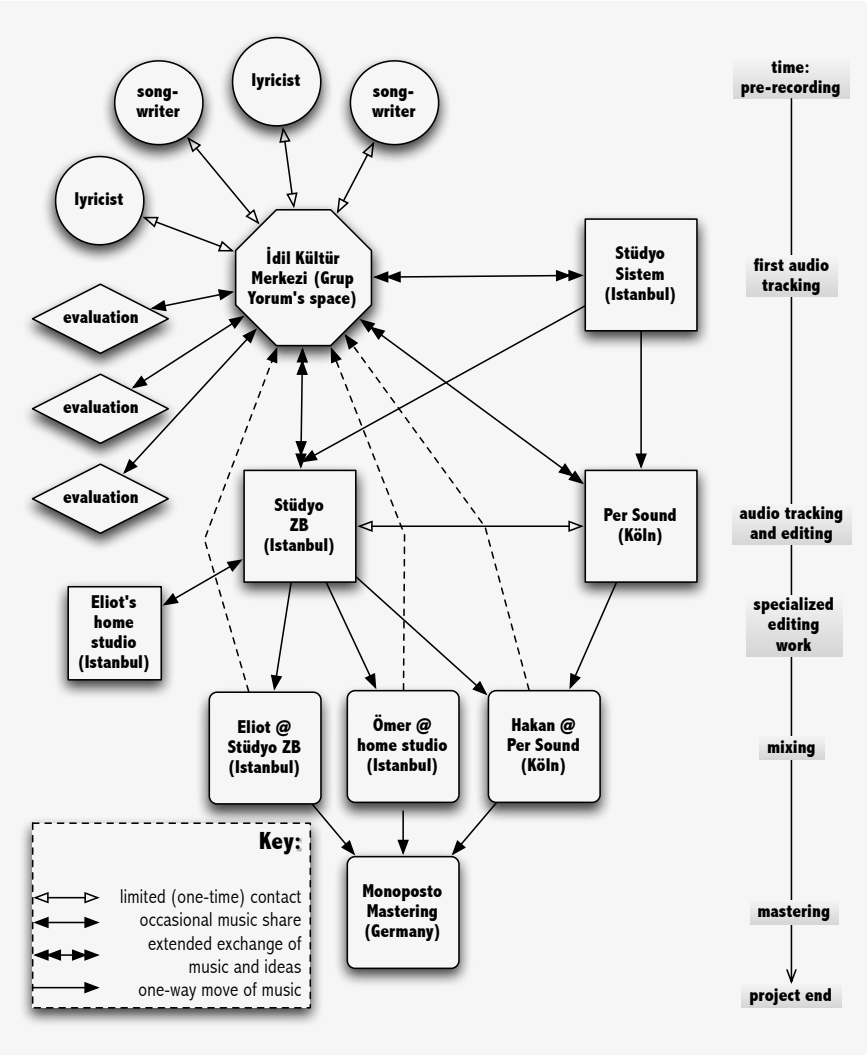

Figure 6. Grup Yorum distributed production.

In a contrasting example, the data-ness of the production was more explicitly useful for the arrangers. Whereas the album productions I worked on tended to converge relatively early in the production process on a semi-stable idea of what 'the song' was, film and TV music production was indeterminate until literally the last moment (Bates 2018). Soundtrack producers need to produce gross excesses of sonic fragments, all while meeting quite a lengthy set of data specifications. They usually go through many rounds of revising the data chunks, with very little time to do so. The overbearing presence of and problems with 'data' that shapes the encounters between the music team and the film production team leads to a considerably different production process than musicians would otherwise be inclined to use. It shapes the nature of the encounters between engineers and musicians and computer-based technologies, and shapes the demands made of the musicians' instruments. The result, in many situations, is a workflow entailing the prolific creation of sound effects that are neither entirely musical not wholly unmusical. And this approach towards using the arrangement of Anatolian instruments to produce nonmusical sound effects folds back into album produc-

tion and seeps into stage performances of so-called folk and art musics.[7] A whole new *kind* of sound became ubiquitous music (Kassabian 2013), one that arose, first and foremost, from problematic encounters between studio professionals and data.

The film I explore here, *Beynelmilel* ('The International'), grapples with the human tragedy of the 1980 coup d'etat and drastic crackdown on leftist movements in a region of southeastern Turkey whose population is predominantly Kurdish. It is an example of a *dönem filmi* (era film), a twenty-first Turkish feature film genre consisting of semi-fictional explorations of major political events in Turkish and Ottoman history. *Beynelmilel* was one of the top 10 feature films of 2006 in Turkey, and won nine awards, including the Thessaloniki award.

Music is central to the film's narrative, which deals with a group of local wedding and dance music musicians who, following the military junta takeover of the town of Adıyaman, are forced into becoming a military band performing for military functions. It roughly chronicles events in the life of Sırrı Süreyya Önder, one of the film's co-directors, who once was a semi-professional *cümbüş* performer, but is better known today as a parliamentarian helped start the Gezi Park environmental-political protests of 2013. Some of the complexity of making music for the film came from aesthetic differences between the director Önder, and the hired arrangers Aytekin Gazi Ataş and Soner Akalın. The arrangers quickly became aware that not only would we be asked to repeatedly change the instrumentation of particular cues or scenes, but would need to change the duration and synchronization of the sound for these cues. The need to produce dozens of derivative versions, and to quickly concoct yet more derivatives if need be, led to a peculiar compositional and arrangement process, entailing the excess tracking of instrumental parts, alternates and variants (Bates 2016: 208–220).

I want to provide some sense of the scope of this labor, and use it to make an argument about the ontology of the film's soundtrack. For *Beynelmilel*, the soundtrack generated 70.8gb of data, 21,286 audio files (which only includes the material used to create the soundtrack and instrumentally derived sound effects, and doesn't include the thousands of files for dialogue, foley, multi-channel mix stems and DTS encoding). Over the course of three weeks running around the clock, I worked as the scoring engineer with the two arrangers to record over 150 distinct instruments, creating 40 musical motifs and instrumental effect motifs that were used in the final soundtrack and 78 that weren't. There were up to 13 variants of some of these motifs. The original film theme (which didn't end up being used) alone was built on 307 audio recordings, but even the simplest underscoring bits contained over 200. Each one of these discrete recordings represents a specific moment in time when a session musician within a sociotechnical context performed a new part above a mix-in-progress—often responding to or embellishing audible cues that were subsequently erased. Each performative moment captured as a singular chunk of audio data, therefore, implies a complex temporality – responding to prior performances, and influencing subsequent ones, not to mention the expressive microtimings and audible latencies within and between the actual performances themselves.

One of the innovations that Aytekin and Soner brought to Turkish film, both through their prior work with the performing ensemble Kardeş Türküler (who created the score for one of the first *dönem* films, *Vizontele* (2000)), and in their TV and film scoring work, was the use of character-specific leitmotifs. While this hadn't been a feature of Turkish soundtracks during the 1970s heyday of the 'Yeşilçam' era Turkish film industry (Kytö 2013), by 2006 their use was standard. For *Beynelmilel*, which follows the evolving political and romantic relationship between Gülendam and Haydar, each needed a leitmotif, and there needed to be a passage symbolizing their shared affection. The three leitmotifs were initially created in a single Pro-Tools session as three sections of a contiguous musical work. The work had been timed to the visuals of a key scene that introduced these characters and their relationship. A wide variety of instruments were enlisted to make this, including moments featuring violin, *kaval*, *lavta*, *buzuki*, clarinet, *duduk*, *rebab*, and/or *cümbüş;* a battery of percussion; and numerous *renk* (color) parts

7 For example, many art music groups performing at Istanbul's top concert halls (e.g. CRR) started in the 2000s employing percussionists to produce sound effects consisting of ocean drums, bell trees and the like, and the same became part of the televised TRT folk music orchestras.

played on guitar, *saz*-family instruments, electric bass, pizzicato viola, and mandolin.

None of that provides evidence for a shift to a data conceptualization, though. To do that, we need to analyze a screenshot taken from the ProTools arrangement window at the moment when the final musical cues were exported and sent to the film producers (Figure 7). There, we find evidence of all kinds of use of the non-linear editing capabilities of DAWs. Because the cue changed in duration several times, musical bits had to be cut out of or added to the leitmotif. Rather than providing evidence of contiguous musical performances, we see that every single part (except the overdubbed second track of pizzicato strings) was cut in many places, and bits copied and pasted around, or slightly shifted earlier or later in time to visually match up with the timing of previously recorded parts (correcting latency problems). Five tracks of percussion are greyed out; they had been made for the Haydar part of the leitmotif but later were muted—but not deleted outright, as was often the case, suggesting a worry that they might need to be brought back. The waveform view of the DAW provided the engineer and arrangers considerable *information* about these recorded samples that enabled several kinds of operations that minimized the need for critical audition.

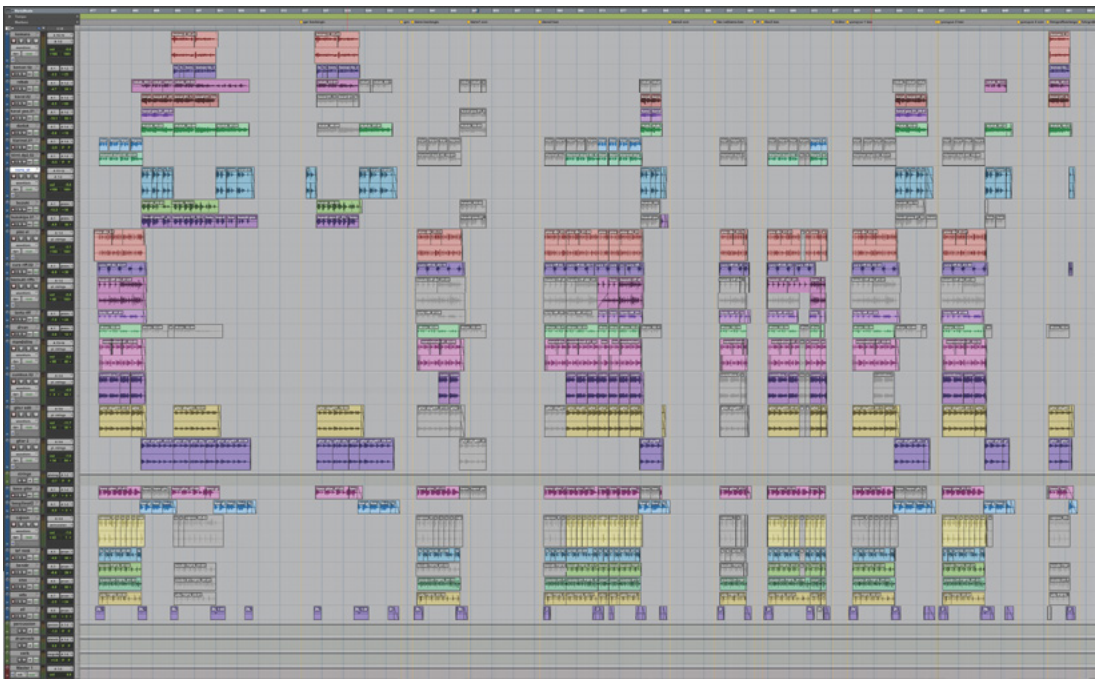

Figure 7. Editing window overview for the *Beynelmilel* composite leitmotifs.

Moreover, this musical work is no longer singular: the session contains this (highly modified) 'original' along with 10 variants, all of which were obviously copy-pasted from the first complete passage and then edited down—sections removed, other parts deleted or muted, and new bits recorded on top. One of the derivative works is not a musical work at all but simply the last note of the composite leitmotif, in other words a polytimbral D overwhelmed by supporting percussion instruments that added an instrumentally produced *tuş* ('touch,' meaning foley sound) to some moment in the film.

Encountering the session in isolation from the production workflow through which it was made, however, misses several important points. As I hinted at, much of the process of making derivatives or adjusting versions was visually, not audibly driven. The location of musical accents was determined by creating markers at specific video frames, and the colored blocks that represented sonic ideas were visually aligned with the markers. With very little time to make modifications to the many derivatives, some decisions were expedited by looking at the session and seeing that if we muted two tracks and unmuted one we'd probably get a sufficiently different sounding leitmotif variant. It wasn't just the music team that worked this way, however, as after we had carefully created all these eleven bits that lined up with video

cues, we learned that the sound team, on behalf of the film's producers, did yet more playing around, in several cases moving leitmotifs specific to one character to a scene which was perceived (visually, perhaps?) as having a sonic deficiency, but where the sound no longer corresponded to the correct character. The ability to visualize music as waveform data, then, produced many knock-on effects, ranging from potentially increased efficiency in making music, to the ability to make non-musical sound out of music, to the ability to recontextualize visualized sonic data without regard to its narrative meanings.

A beginning in the form of a conclusion: methodological and technological assemblages

I encountered a few key problems during my research in Istanbul, but they are not just specific to Turkey. They affect recording production everywhere, and by extension other modes of professional production labor. I will explore one of these here. How do we distinguish between 'musical' and 'technical' activities and things, and correspondingly attend to questions around agency? The conditions of production in computer-based acoustic recording workflows, whether we consider the constraints imposed by studio architecture, or the grids and constraints imposed by software architecture, impose ideas and practices and aesthetics of technicity on all production participants. Was the production of eleven derivatives of the *Beynelmilel* leitmotif, accomplished primarily through judicious use of ProTools editing operations, a musical act or a technical one, and (aside from the positive reception of the film and its soundtrack) does it provide any analytical utility to inscribe the acts as being 'creative'? To what extent were the editing operations guided by the 'lock-in' (Lanier 2010) of ProTools, and the agency of studio participants limited by the scripts (Akrich 1992) embedded in the technology?

These are certainly not new questions for the social study of technological systems—they are at the heart of the distinction between the ANT (Latour 2005) and SCOT (Pinch and Bijker 1987) frameworks of science and technology studies. But music studies has so far not developed their own ethnographically informed alternative to importing methodologies such as these from other social science fields. Nor is it considered imperative that a music studies scholar would understand enough about the technological objects they encounter to be able to discuss with accuracy why they impart the audible aesthetic characteristics that they do, or how their very design affects the actions people do when using them. As Gilbert Simondon noted, cultural analysis—a key outcome of ethnographic study—is impoverished when it insufficiently attends to the 'human' aspects of technologies and 'banishes... technical objects into a structureless world of things that have no signification but only a use, a utility function' (Simondon 2017 [1958]: 16).

The need to attend to architecture, infrastructural technologies, instrumental technologies, bodies synesthesias & kinesthetics, musical notes, (non)musical sound, studio workflows, studio discourses, national discourses, and the Republic of Turkey in the early 21st century—this constitutes a *heterogeneous assemblage*. Yet, despite a nascent interdisciplinary concept of studio studies (Farías and Wilkie 2016), these aspects tend to be analyzed in isolation using *either* architectural criticism, material semiotics, ethnography, music analysis, discourse analysis, the production of culture perspective, grounded theory, ethnomethodology, or (Turkish) cultural studies (Bates and Bennett 2018). Attempting to assemble these competing and often contradictory methodological possibilities towards the problems of studios is an example of *method assemblage*.

It turns out, the heterogeneous assemblage and method assemblage index the same ethnographic problem! Recording production isn't just one kind of thing, and doesn't involve only one way that human beings engage with each other and with the material world in order to produce aesthetic products and effects. While showcasing this mess—and it really is a mess—is unusual within ethnomusicology or music studies, my own process for thinking through this comes most directly from science and technology studies, where, following scholars such

as Michel Callon and Bruno Latour (1981), scholars have addressed ethnographic complexity while minimizing purification. Andrew Pickering, for example, frames science as a *mangle of practice* (1995). Rather than disentangling the mangle, his goal, instead, is to understand how the mangle *itself* is productive of science. This relates to John Law's attempt to create a research methodology out of the idea of *messiness* (2004), which extends his prior collaborative work with Annemarie Mol that thematizes complexity (Mol and Law 2002). Finally, from Mol I borrow the idea of the *ontological multiple* (2002). The recordings I discuss here are to some actors an audible phenomena that becomes a personal emotional-affective response, to other actors are a form of data that needs to be processed or transported, and to other actors are folkloric resources that either contribute towards or hinder nation-building projects, amongst other goals. The recordings may be more or less successful in each of these missions, and that success can change over time. Studio technologies, too, constitute ontological multiples, depending upon whether an actor is directly or indirectly using them (Bates 2016: 159), or if the technology is off limits to them.

So how does the heterogeneous assemblage actually lead to the method assemblage? I'll briefly talk through the examples I explored today. The latency problem relied upon extensive empirical measurement: precise distances between mics and instruments, DAW delay compensation settings, and waveform analysis of event timing. Although latency is typically an infrastructural thing that is neither noticed nor commented upon, when latency became a problem it became discursive, especially when amateur musicians got something wrong (i.e., during malfunctions of the sociotechnical/sociomusical system). These latency failures created opportunities to discuss phenomena that would normally be ignored by both musicians and other engineers. Although you wouldn't know it if you only spent a few days at 'normal' recording sessions, it turned out that studio workers had thought a lot about latency, so my theorization is a consolidation of latent discourses supplemented by my own quantification of normative practices.

The data problem suggested a 'classic' actor-network approach towards following the actors in order to understand a 'material semiotics.' While the difficulties of moving data in materialized form between Germany, Istanbul and Turkish prisons is initially interesting as a historical curiosity, and the stockpiling of massive amounts of visualized sonic data can help us rethink the ontology of a film soundtrack, neither was my goal. Rather, they were ways into providing a pragmatic and realistic account of practices in the studio. While some of the style I've adopted for framing the data problem arises from my own engagement with European STS, I took my cue from participants within the recorded music sector for whom data nonflows also became problematic.

I've presented a story here based on studios in one particular place during a particular time. The cast of characters included infrastructure, audio engineers, technologies of audition, studio musicians, musical instruments, arrangers, digital audio workstations musical ideas, data, and time. Some of these kinds of actors, for example musical ideas or musical instruments, are relatively well documented in music studies literature, perhaps excessively, while others (studio musicians, studio infrastructure, or the role of data in production workflows) are barely discussed at all. We could tell a similar story about production in any milieu during any time period. And some of the actors may end up being very similar, in the case of computers in the studio.

But the nature of the story might need to change; the actors and characters might not be the same. Other actors take central stage in recording studio ethnographies conducted elsewhere: racial dynamics in Louise Meintjes' study of South African recording studios (2003), discourses about miscegenation and cultural cannibalism in Fred Moehn's study of Brazilian MPB recording (2012), and the politics of indigeneity and/or indigenous identities in the ethnographies of Oli Wilson (2014), Chris Scales (2012) and Beverly Diamond (2007). Doing a realistic, pragmatic analysis of production is a difficult task, since we can not assume that one set of factors will have exactly the same importance or behave similarly in all milieus. With a more sustained investigation of the materiality and digital materiality of the studio, and an increased attentiveness to the mess and complexity of studio assemblages, we hopefully will gain a richer ethnographic understanding of what happens in studios.

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