# Beats, Flesh, and Grain: Sonic Tactility and Affect in Electronic Dance Music

A particular intimacy appears to subsist between textures and emotions.[[1]](#endnote-1)

Based on titles alone, there seems to be no small amount of feeling in electronic dance music (EDM).[[2]](#endnote-2) From “Feeling You” to “You Make Me Feel (Mighty Real)” to “I Feel Love” to “Push the Feeling On” to hundreds of other permutations, feeling as both a mode of tactile perception and an affective experience appear everywhere on the track-listings of dance music releases.[[3]](#endnote-3) This likely has much to do with the genre’s roots in disco, soul, and gospel—all of which frequently make appeals to feeling as a mode of affective epistemology, where feeling something/someone provides more authentic access to truth than disinterested rationality. And, through the lyrical tropes of love and eros common to these dance music genres, “feeling” can slide into a punning polysemy between (romantic) emotions and (erotic) touch. But many of these titles seem to go beyond the realm of *double-entendre* and blur the boundaries between touch and affect, perception and sensation, contact and impact, encounter and experience. In electronic dance music, this bleed between modes of feeling extends into the sound of recordings themselves, which use vibration to engage with tactile, haptic, and kinaesthetic senses in addition to hearing. Indeed, the aesthetics of EDM seem to focus the listener’s attention to where touch and affect intersect at the level of sonic texture, much like how pitch, rhythm, and timbre melt into a vibratory continuum that spans the thresholds of human perception.

This essay sets out to explore the *tactilization* of sound in EDM, which offers an important sensory-affective bridge between touch, sonic experience, and an expansive sense of connection in dancing crowds. EDM events tend to engender spaces of heightened tactility and embodied intimacy,[[4]](#endnote-4) and so it should not be surprising that their musical aesthetics also highlight tactility. Sound is by no means an intangible phenomenon; it entails vibrations and impacts that can be registered directly by the body’s tactile and haptic sense-organs. Moreover, sound can evoke touch through timbre and sonic texture, conveying something about haptic experience without being routed through representation. While building upon existing studies of EDM aesthetics, this essay strikes out in a somewhat orthogonal direction, attempting to account for aspects of this genre that are not well described by symbolic representation[[5]](#endnote-5) or musical structures.[[6]](#endnote-6) The aim here is to go beyond the representation of tactility in lyrics and visual imagery, turning instead to the sound of EDM itself, which foregrounds percussion, texture, grain, and other sonic elements that resonate with heightened haptic experience.

More precisely, this article focuses on “house” and “techno” styles of EDM, especially the “minimal” continuum of sub-styles that were in ascendancy during the first decade of the twenty-first century. These styles invoke tactility through a range of modalities, of which three will be the focus of this essay: 1) the genre-wide aesthetic convention of foregrounding *beats*, percussion sounds that index objects coming into forceful contact, thus generating a sense of corporeal impact through amplified bass frequencies and sharply-sloped amplitude envelopes; 2) the use of timbre to thematize vibrant and vibrating *flesh*, especially in certain sub-styles that “sample” the sounds of the body as part of an extended sonic palette; 3) the intense focus on sonic *grain*, which enables a cross-modal mapping of texture between the microstructures of sound and material surface. While all three of these modalities will be grounded in sonic analyses, the last of these will also entail a close engagement with Pierre Schaeffer’s treatise on sound-objects. To trace the connections between touch, texture, and affect, this essay closes with a brief turn to Eve Kosofsky Sedgwick and Gilles Deleuze, whose insights on texture provide a means of conceptualizing sonic grain as a phenomenon that exists at sensory and perceptual thresholds.

## Beats: The Sound of Impact

Beats beat not only time, but also surfaces, bodies, listeners, dancers, and crowds. EDM thematizes physical contact through its preponderance of percussive sounds, which serve as sonic indexes of real-world objects striking, rubbing, and vibrating. This is especially the case in the bass register of most tracks, where kick-drum samples and other low-frequency percussive sounds dominate the overall sonic profile, providing a driving stream of regular pulses usually grouped into sets of four. The ubiquity and fundamentality of the bass-kick can be seen in its colloquial nomenclature within EDM scenes as “the beat” or “beats,” ascribing metric-structural qualities to a single layer of sonic texture. Indeed, a common criticism of EDM as a genre is that it is “just beats,” prioritizing elements that would conventionally be considered functional at the expense of musical “content” such as melody and harmony.

But that which signals this genre’s emptiness to its detractors is also what conveys a sense of fullness to its adherents. Indeed, the musical textures of most EDM tracks consist primarily of multiple layers of percussion across multiple frequency-ranges. Take, for example, Parisian DJ and producer Jef K’s remix of The Gathering’s “In My System (Jef K SystemMix),” a down-tempo deep-house track that was ubiquitous over the summer of 2010 in Berlin, played almost weekly at minimal-oriented clubs like Club der Visionäre. The mid-range percussion is relatively spare throughout the track, and its central motif is made up of a string-synthesizer playing a four-bar chord progression under a short loop of a male voice singing “You’re in my system / And you’re in my life tonight.” The entire bass register is repeatedly filled out by a bass kick that has a rounded attack enriched with “sub-bass” resonances (i.e., below 90 Hz). Played on a high-powered sound system like those found in most nightclubs, this track produces a visceral sense of impact even at moderate volumes. Another instructive example is Italian producer Davide Squillace’s “The Other Side of Bed,” a tech-house track that not only features a resonant bass kick, but also a melodic loop pitched down to sub-bass frequencies (beginning at 2:34), where it takes on percussive qualities. The percussion samples used in the mid-range frequencies are notable, in that they feature recognizable real-world percussion instruments (hands, tom-toms, cymbals) that have been compressed and “gated” to heighten their impact and lend them a “punchy” quality. In sound-production parlance, a gated sound is one that has been routed through a *noise gate*, which is a circuit that blocks an incoming signal until it exceeds a particular decibel threshold; it “opens” to let the signal through, and then “closes” shortly after the signal drops below the threshold. This effect was originally developed to “clean up” recordings of instruments by cropping out low-level background noise —especially sonic “bleed” between microphones placed close together on a drum kit—but when the threshold is set high, this creates a short but powerful percussive sound that is often described as “punchy” for its abrupt attack and brief duration.

As these examples suggest, beats do not only play an associative or representational role in relation to touch; they are impactive and tactile in themselves. In a Berlin-based documentary film, *Feiern*, DJ Nick Höppner (who is a resident DJ at the legendary Berlin nightclub, Berghain, as well as the former manager of the club’s label, OstGut Ton) describes the “techno” listening experience as being, “about volume and bass. Not only do you hear the music, but it also has a direct, corporeal impact. Your pant-legs vibrate when you’re standing in front of the bass speaker.”[[7]](#endnote-7) For Höppner, the experience of techno is multi-modal, perceived not only through hearing but also through touch; he grounds this claim in the effects of a combination of low frequencies and high amplitudes that impact, penetrate, and resonate in the body. More precisely, beats in EDM do not only index the event of forceful contact (e.g., percussive sound samples as sonic traces of objects striking, rubbing, crushing, and so on), they also enact it sensorially and non-representationally through the intensity and sharpness of their amplitude envelopes (i.e., sudden spikes in vibrational force striking the skin, flesh, and bones).

An amplitude envelope is a line that traces the contours of a waveform; at its simplest, it joins the peaks of a waveform to create a silhouette. As sound-synthesis technology was being developed in the twentieth century, this notion of amplitude envelope came into use as a paradigm for controlling the output of synthesized sound in response to a trigger-event (usually a key on a keyboard being pressed and released), thus shaping the amplitude at the beginning, middle, and end of the sound-event to resemble the amplitude envelope of various instruments. Over time, those working with sound-synthesis schematized the shape of this envelope into a set of variable durations and amplitude-levels, which could be used together to plot out the curve of amplitude envelopes. By 1965, Vladimir Ussachevsky specified the four-element ADSR envelope (attack, decay, sustain, release), which has come to be the industry standard for audio engineering.[[8]](#endnote-8) “Attack” refers to the time it takes for a sound’s volume to increase from zero decibels to its peak, beginning from when a key or other trigger is activated. “Decay” designates the time taken to decrease from this peak level to the level it will maintain for the duration that the trigger remains activated; this element is particularly important for accurately representing/reproducing percussive sounds, since these always have a prominent “transient”—that is, a brief, spectrally-rich burst that is substantially louder than the rest of the sound. “Sustain” then specifies the maintenance-level for the remaining duration, until the trigger is released. “Release,” finally, indicates the time taken to decrease the sound’s volume from its “sustain” level down to nil, once the trigger has been released.

While the contours of ADSR envelopes vary greatly from instrument to instrument, a few archetypes can be ascribed to instrument-families (see **FIGURE 1, A–D**). Woodwind instruments, for example, usually have a gradual and linear attack-curve, followed by little to no decay, high sustain, and a gradual release. Brass instruments often produce a plosive transient at their onset, which is reflected in a short, angular attack, a brief decay leading down to a relatively lower sustain, and a more gradual release. Bowed string instruments tend to have a short, rounded attack, a brief decay leading to a relatively high sustain, and a gradual release. By contrast, percussion instruments are composed almost entirely of a prominent transient with variable amounts of resonance; that is, they have a sharp and loud attack, a steep decay, no sustain to speak of, and a release that can be abrupt or gradual, depending on how resonant the instrument is (e.g., a woodblock versus a gong).

[**FIGURE 1**, Waveforms of sample instruments with their ADSR envelopes traced and labeled: a) saxophone; b) clarinet; c) violin; d) snare drum.]

Since EDM scenes emerged in close contact with synthesizers and other sound-studio technology, the ADSR envelope has become an important descriptive and compositional paradigm, employed by producers and other technically-focused actors to understand the micro-contours of the sounds they employ. Especially since “Digital Audio Workstation” software (e.g., Logic Audio, Cubase, ProTools) became widely available, EDM producers have been able to visualize, shape, and trim amplitude envelopes with millisecond-precision. And, whether sculpted “by hand” or selected from a range of sampled sounds, it is the percussive amplitude envelope that is by far the most prevalent in EDM. Indeed, the sonic texture of EDM is dominated by multiple layers of sounds with percussive envelopes, characterized by sharp and high-powered fluctuations of air pressure that can be registered as impact across several of the human body’s sensory modes. At high volumes, these sonic spikes *strike* the body in a very concrete way, eliciting sensations not only in the eardrum but also in the body’s skin, flesh, and bones.

But the high-volume transients of percussive sounds are only part of what renders beats experientially tactile; the preponderance of low-frequency sounds is equally important to EDM’s tactility. *The* beat in particular—the regular pulse that provides both metric organization and kinetic energy—is almost always to be found in the lowest register of an EDM track’s musical texture. On most audio-engineering equipment, the frequency-range labeled as “bass” usually extends from 150 Hz (cycles per second) down to 60 Hz or 40 Hz; this is the range of frequencies that give the “thump” to kick-drums and other bass percussion in EDM. But, since the sound-systems of nightclubs and concert venues are capable of reproducing a much broader range of frequencies, it is common for EDM producers to bolster the impact of their beats by employing percussive sounds pitched in the “subbass” range, which extends down beyond the threshold of human hearing (20 Hz). Sound cannot be heard below this threshold, but it can still be felt through the flesh as vibration. Steve Goodman, a theorist of affect in sound studies (as well as a dubstep DJ/producer working under the moniker of “Kode9”), notes that sound “dissolves completely into tactile vibration at frequencies around 20 hertz”.[[9]](#endnote-9) He highlights how low-frequency sounds “bleed” across a range of sensory modes such as hearing, touch, and proprioception, which undergirds his notion of *bass materialism*: “the collective construction of vibrational ecologies concentrated on low frequencies where sound overlaps tactility”.[[10]](#endnote-10) In this sense, low-frequency beats can produce a sense of material presence and fullness, which can also serve to engender a sense of connection and cohesion. Notably, Goodman develops this notion while conceptualizing a “planet of drums,” a “subpolitical” global assemblage of the dispossessed, bound together through the beats of various bass-oriented genres such as dancehall, reggae, baile funk, crunk, reggaetón, kwaito, and kuduro. For Goodman, the materiality of bass beats provides a concrete basis for new political and subpolitical formations. In a similar fashion, an important dimension of EDM’s affective impact is the felt materiality of its beats, which can be experienced as energizing, oppressive, driving, disorienting, and so on. Through volume, bass frequencies, and a preponderance of percussive sounds, EDM’s beats constantly engage the body’s haptic senses during listening and dancing.

## Flesh: Bodily Timbre

Considering the prominent visceral dimension of loud, low-frequency beats—impacting the body’s skin, flesh, bones, and viscera—it should come as no surprise that EDM often dramatizes the corporeality of its own aesthetics by making sonic reference to the body. EDM tracks thus evoke haptic experience through the use of sounds that are recognizable as originating from a fleshy body, such as prominent (and realistic) handclaps, breathing, humming, rubbing, cracking, and so on. In contrast to the non-representational tactility of beats, this evocation of haptic experience functions primarily through association, relying on the ability of listener-dancers to associate certain sounds with an enfleshed sound-source.

The *locus classics* of this fleshy compositional style is Matthew Herbert’s concept album, *Bodily Functions*, which exclusively uses sounds emanating from bodies to produce an entire album of minimalist house music. Although this album was released shortly after the turn of the century, its subsequent success continues to resonate into the present day; retrospectively, it came to be considered by music critics as a foundational work of the “microhouse” sub-style. Indeed, it remained relevant enough throughout the 2000s that it was re-released on Herbert’s own label, Accidental, in 2012 as a double-album containing a full set of remixes. Across all of his musical output, Herbert’s compositional process shows clear influence from *musique concrète*, excluding synthesized sounds altogether and focusing instead on the transformation of recordings taken from real-world objects and events. Herbert makes this explicit in his compositional manifesto, “PCCOM” (“Personal Contract for the Composition of Music [Incorporating the Manifesto of Mistakes]”), which lays out ten rules for studio work. Of particular relevance within the context of EDM production-practice is the first rule: “The use of sounds that exist already is not allowed … No drum machines. No synthesizers. No presets” (Herbert 2005).[[11]](#endnote-11) As a result of these self-imposed constraints, most of his album-length productions are developed from thematically-unified archives of self-made recordings, meticulously annotated in liner notes with the phrase, “Written according to the rules of PCCOM.”

For the entirety of *Bodily Functions*, the primary sonic material was taken from (mostly human) bodies in some fashion, such as manipulating and recording hair, skin, organs, bones, surgical procedures, the voice, and so on. While the entire album features recognizable body-related sounds, the title track, “Foreign Bodies,” most audibly implements this album’s body-oriented concept, assembling its sonic palette out of digestive gurgling, blood, toothbrushing, popping joints, handclaps, speech, non-verbal vocalizations, and singing. The track conveys intensity and effervescence through constantly-bubbling percussion as well as staccato chord-loops that provide a rhythmic *ostinato* mirrored later by vocalist Dani Siciliano’s similarly staccato singing. The “pre-verse” introduction (0:00–0:27) begins with a stream of dripping, bubbling sounds, which settles into a loop incorporating more percussive popping noises that bounce between the left and right audio channels and fill the “mid” frequency range. Strewn atop these layers are the chopped fragments of a muttered conversation between a male and female voice, just below the threshold of intelligibility and punctuated by a sharp intake of breath, a fleshy slap, and a moan (0:15–0:17). After eight four-beat cycles (0:28), the lower-frequency range of the track fills out with a bouncing bass line and chords in syncopated counterpoint, composed of resonant, soft-edged sounds that resemble a low-pressure pipe organ. This multi-layered groove continues in various permutations throughout the rest of the track, evoking Afro-Brazilian styles such as *samba* and *bossa nova* through its asymmetrical division of the sixteenth-note pulse-layer (i.e., 3+3+3+3+4), polyrhythmic layering, and the use of sound-samples that approximate typical samba percussion instruments. In the album notes, the sound-sources that provide this effervescent, samba-inflected percussion are described as “Bodily Function Sounds kindly donated by Strangers”—who are actually listed by name in the credits for the track, along with Siciliano’s digestive sounds and the blood of Martin Schmidt (from the electronic music duo Matmos).

Although this sonic evocation of flesh is mostly representational and associative, it operates primarily through sonic timbre rather than verbal/symbolic cues; that is, it has to do more with recognizing certain qualities in acoustic phenomena that reference the presence of a fleshy body. Timbre, however, is one of the most difficult sonic concepts to define—not least of all because it has often been used as a shunting-ground for any aspect of sound not adequately described by pitch, duration, and volume. This situation has not been helped by the fine-grained visibilization of sound that has become possible with more recent technological advances such as Fast Fourier Analysis and spectrography, which not only provide overwhelming amounts of data that are difficult to parse, but also often fail to show stable relations between what is acoustically present and what is psychoacoustically salient. As “spectromorphological” composer Denis Smalley suggests, “we now know too much about timbre,” in the sense that spectrography has made a mess of traditional distinctions between sonic phenomena, which all now seem to be continuous with each other through frequency harmonics.[[12]](#endnote-12) But despite the confusion and disagreement, Smalley identifies four definitional axes for timbre. The first he describes as the “negative” definition used by most traditional musicians: everything that remains of sound when pitch, duration, and volume are already accounted for. In other words, timbre is what enables a listener to distinguish one sound from another, when they are otherwise equivalent in pitch, duration, and volume. The second definition he attributes to “spectral” composers, who treat timbre as an extension of harmony through the use of spectrography, allowing for the creation of relationships between pitch and other sound qualities. The third he associates with electroacoustic composition and research, in which timbre is seen as a multidimensional phenomenon that is determined through a range of different variables (e.g., transient attack, iteration, harmonics, noisiness, fluctuation). Finally, Smalley points to the term’s colloquial use in everyday language, noting that it often invokes sound’s synaesthetic materiality to make timbral distinctions easily comprehensible, using terms such as bright/dull, compact/spread, and hollow/dense.

Across all of these definitions, the primary perceptual dimension of timbre remains its capacity to imply a sound-source through the qualities of the sound itself. This characteristic forms the center of Smalley’s generalized definition of timbre: “a general, sonic physiognomy through which we identify sounds as emanating from a source, whether that source be actual, inferred or imagined”.[[13]](#endnote-13) Understood in terms of Peircean semiotics,[[14]](#endnote-14) timbre’s relation to its source of emanation is indexical, in the sense that what underwrites the relation between sonic signifier and corporeal signified is neither likeness (icon) nor habitual association (symbol), but trace (index). In Herbert’s *Foreign Bodies*, for example, sonic events of breathing, bones crackling, joints popping, skin rubbing, fingernails flicking, and teeth biting all index the presence of a body as sound-source. Furthermore, sampled sounds imply a cause-effect relation to physical objects in that the sound indexes an event and object of emanation—such as the clapping of hands. Thus, the evocation of flesh in EDM has much to do with how the timbral qualities of its palette of sound-samples index a fleshy sound-source.

Admittedly, Herbert’s *Bodily Functions* is something of a boundary case for EDM aesthetics, since it is a “concept album” that restricts itself to body-sounds; but the sonic evocation of flesh made so explicit here is nonetheless a prominent aspect of most EDM styles. Perhaps the most ubiquitous examples of this would be the use of “acoustic” handclaps (instead of the synthesized approximations available on most drum machines such as the Roland TR-808) or fragmented vocal samples—such as in M.A.N.D.Y. and Booka Shade’s collaboration, “O Superman feat. Laurie Anderson (Reboot’s 20 Cubans Rework),” which samples heavily from Laurie Anderson’s 1981 recording of the same name and features an *ostinato* rhythmic loop composed of layered handclaps and Anderson’s robotic “ha” vocalizations. Herbert’s sonic-corporeal orientation is especially representative of the “minimal” spectrum of EDM styles prevalent during the 2000s, where the exploration of non-conventional sound samples encouraged the use of a wider range of sounds emanating from the body. In a manner similar to the development of “extended instrumental techniques” in twentieth-century avant-garde composition, EDM producers have been continually extending, deconstructing, reconfiguring, and creatively mis-using audio technology to expand their range of available sounds. And, much like the more recent generation of “spectralist” composers, their innovative efforts have been primarily devoted to the extension of timbre. For producers associated with the “glitch”,[[15]](#endnote-15) “microhouse,” and “minimal” sub-styles of the early 2000s, this creative work has included expanding electronic music’s sonic palette in a manner somewhat orthogonal to conventional EDM tendencies towards “realist” instrument-sampling and futuristic, “pure” sound-synthesis.

Indeed, sounds do not need to be sampled directly from the body in order to evoke flesh. A particularly striking example of this is (Berghain resident-DJ) Ben Klock’s remix of (legendary New Jersey house producer) Kerri Chandler’s “Pong,” re-titled “Pong (Bones and Strings Rework).” What do the “Bones and Strings” of the remix’s title refer to? The strings are relatively easy to identify, as Klock takes the melodic loop of string instruments from the original track and makes it more prominent here (starting at approximately 2:00) both by increasing its volume and by stripping away many other layers from the original version. One might identify the “bones” with the sparseness of the track (e.g., a “bare bones” arrangement of the original), but that would ignore the crackling sounds that emerge early in the track (1:14) and remain a salient element throughout. Taking the rhythmic place of handclaps, these sounds are composed of clusters of high-pitched transients that clot together to create a bright crackle, evoking the sounds of joints popping and bones cracking.

Notably, this example seems seems to complicate the indexical relation between sonic timbre and its sound-source; these crackles are manifestly not field recordings of bones cracking, but rather abstract sonic figurations that relate to bone-cracking through iconic resemblance. If timbre’s relation to “real world” objects is primarily indexical, how are we to understand the meaning of timbres that resemble other timbres, rather than indexing a concrete signified object? In this case, the bone-like quality of these crackling sounds must be based on a notion of what “real” bone-cracking sounds like—that is, through a relation of iconic resemblance. But this “real” sound is itself an indexical trace, pointing back to the (recalled, imagined, re-mediated) event of bones snapping. Here, timbre sustains a relation of iconic likeness to the indexical trace itself (i.e,. bone-cracking sounds) rather than to the corporeal signified (i.e., bones). Understood in this multilayered fashion, the evocative approximation of snapping bones produced by clusters of clicks in “Pong (Bones and Strings Rework)” functions as an icon of an index, one sonic sign relayed through another to connect to its object.

But this sonic referentiality only partially explains the tactility of “Pong (Bones and Strings Rework).” There is still more to be said about the track’s “clicks” and “pops,” the temporal clustering of which creates a sustained, aggregate sound with a crisp texture. The temporal microstructure of this cloud of clicks lends it a granularity that is both evocative of the body and rich in textural, tactile detail. In order to better understand the haptic possibilities of this sort of sonic texture, we must go beyond the semiotics of sonic timbre and focus on *grain* itself as sonic microstructure.

## Grain: The Matter of Sound

In addition to the haptic impact of beats and the timbral evocation of flesh, EDM also engages tactility through sonic texture itself. In particular, EDM does so by favoring granular sounds and complex sonic textures, thus offering an auditory experience that indexes haptic encounters with similarly textured objects. By “granular” sound, I refer to the notion of “grain” as developed by *musique concrète* pioneer Pierre Schaeffer and later expounded by Michel Chion.[[16]](#endnote-16) In contrast to Roland Barthes’s more poetic use of the term,[[17]](#endnote-17) Schaeffer’s definition is quite precise: it is the “microstructure of sound,” in the form of irregularities in a sound’s sustain,[[18]](#endnote-18) such that it gives an “overall qualitative perception of a large number of small irregularities of detail affecting the ‘surface’ of the [sound-]object”.[[19]](#endnote-19) Highly granular sounds thus have rapid groupings of sonic impacts, which may sound like a sequence of discrete attacks (e.g., the teeth of a zipper clicking together), a cluster of smaller sounds (e.g., the grains of sandpaper brushing against a surface), or something “noisy” with sonic interference (e.g., white noise, or distortion from a waveform “clipping” as it exceeds the limits of an audio channel). By contrast, “smooth” sounds of low granularity either have little surface fluctuation, such as an oboe, or they have regular fluctuations of pitch with smooth transitions, such as the use of *vibrato* on many instruments. Notably, most smooth sounds have a clear pitch that emanates from sustained vibration, while coarsely granular sounds are usually indeterminate in pitch and tend to arise from percussive impacts.

In *Traité des objets musicaux*, Schaeffer developed a rich (albeit highly schematic) vocabulary for sonic grain. His sonic explorations were very much grounded in epistemologies of laboratory science, conceptualizing sonic events as “sound objects” upon which he would conduct experiments through the manipulation of sound recordings in a systematized fashion. Book VI of his treatise, which contains his definition of “grain,” was entitled *Solfège des objets musicaux* [Music Theory/Grammar of Sound Objects], suggesting that he understood his work as forging new analytical tools for this expanded world of sound. Schaeffer’s elaboration of grain is lavishly taxonomic, seemingly determined to fit all of his musical “criteria of musical perception” into each of the nine columns of “qualifications” and “evaluation” in his *Tableau récapitulatif du solfège des objets musicaux* [Summary Table of the Grammar of Sound Objects], a classification-matrix for the entire sonic universe.[[20]](#endnote-20) While this led to a baroque surfeit of terminology that perhaps undermines the utility of his analytic scheme in music/sound studies, his broader terms for grain are intuitively descriptive, providing useful heuristics for organizing a large field of difficult-to-describe phenomena.

Since Schaeffer considers grain to be an aspect of the sound-object’s sustain, he first organizes sonic grain by the manner in which it sustains itself, distinguishing between non-existent sustain [*entretien nul*], continuous sustain [*entretien soutenu*], and iterative sustain [*entretien intératif*].[[21]](#endnote-21) He equates granular sustain with the micro-temporal organization of attacks, thus positing three corresponding types of grain: resonance grain [*grain de résonance*], rubbing grain [*grain de frottement*], and iteration grain [*grain d’itération*]. Resonance grains consist of the shimmering harmonic vibrations that follow a percussive attack, while rubbing grains are composed of completely random of attacks and iteration grains have a relatively regular microstructure of attacks.

Schaeffer re-names these grains as “pure types” and then combines them into three mixed genres of grain, which provide more descriptive detail (see **FIGURE 2**). Thus, resonance grain becomes harmonic grain, associated with the sonic quality of shimmer [*scintillements*]; rubbing becomes compact grain, associated with friction [*frottements*]; and iteration becomes discontinuous grain, associated with impact [*frappements*]. The combination of the first two pure types of grain produces compact harmonic grains, composed of resonant scrapes [*frottements résonants*] that would include squeaking [*crissement*] and buzzing [*bourdonnements*]. The first and the third combine to form discontinuous harmonic grains, which consist of resonant impacts [*frappements résonants*] associated with grinding [*grincements*] and hammering [*martellements*]. Finally, compact discontinuous grains combine the second and third of the pure types, such as the rolling sounds [*roulements*] found in “zooming” [*vrombissements*] and hooting [*hululements*].

[**Figure 2:** TRANSLATION OF FIGURE 39 IN SCHAEFFER 1966, p. 553]

In the interest of filling out all the columns in his *tableau récapitulatif*, Schaeffer attempts to identify different “species” [*espèces*] of grain based on its location and extension in auditive space, but he finds these parameters both difficult to measure and unhelpful in distinguishing between grains as they are perceived.[[22]](#endnote-22) Instead, he proposes a psychoacoustically-centered descriptive taxonomy that distinguishes degrees of granularity based on the genre of grain. Resonance/harmonic grains, for example, can be quivering [*frémissant*], shimmering [*fourmillant*], and limpid [*limpide*], while rubbing/compact grains would be either rough [*rugueux*], matte [*mat*], or smooth [*lisse*], and iterative/discontinuous ones would be coarse [*tremblé/gros*], medium [*serré/net*], or fine [*fin*]. Based on auditory experience rather than sonic waveforms, this final set of analytic terms is also the closest to tactile experience, using adjectives that are usually applied to surfaces and fluids. For Schaeffer, this analogical usage extends from his treatment of sound-objects as tangible, real-world objects: “To speak of a sound as rough or matte, velvety or limpid is to compare it to a stone, a skin, a piece of velvet, or a flowing stream”.[[23]](#endnote-23) Although these terms describe perceptions that seem to be disconnected from tactile and visual modes, he argues that the underlying analogy is well-founded and intuitively convincing, because, “it is not the objects of vision or hearing that are important in themselves, but rather their assemblage”—that is, their microstructure (1966, 551).[[24]](#endnote-24)

Schaeffer’s analogy is structural, in the sense that aural, visual, and tactile perceptions of grain all refer to the way that small elements form a textured surface. These similarities in microstructure also lead him to understand grain as a perceptual phenomenon that functions across sensory modes, suggesting that tactile, auditory, and visual experiences of texture are not only comparable, but also intersecting and concretely interconnected. This can been seen in the way that sonic grain can provide information to the listener about the texture and physical state of the object(s) used to produce it. An example relevant to EDM would be the “scraper” family of percussion instruments, such as the *güiro* found in many Latin-American traditional percussion sections. This instrument most often consists of a hollowed-out gourd with parallel ridges carved into one side. The performer plays the instrument by scraping these ridges with a stick-shaped tool, thus using the surface irregularities of the object to create an iterative/discontinuous grain that consists of a relatively regular succession of attacks. The frequency, regularity, timbre, and intensity of these attacks are all directly related to the spacing, regularity, and shape of the *güiro*’s ridges, along with the force with which it is being scraped. In this sense, sonic grain does not only resemble material grain, it also has a direct relation to real-world textures, allowing the ear to perceive physical textures usually associated with haptic experience. Thus, the perceptual mapping between sound and touch that Schaeffer achieves through the use of adjectives such as “rough” and “smooth” is not arbitrary; rather, it is a descriptive tracking of how the perception of texture arises across multiple modes at once.

Although the impact of much of Schaeffer’s sonic *solfège* did not extend beyond his immediate circle of collaborators, the concept of sonic grain continued to be of importance throughout the twentieth century—particularly for sound researchers and composers specializing in granular synthesis.[[25]](#endnote-25) Granular synthesis is a method of sound-synthesis that works with what Curtis Roads terms “microsound”—that is, “grains of sound” that have a duration “near the threshold of human auditory perception, typically between one thousandth of a second and one tenth of a second (from 1 to 100 ms)”.[[26]](#endnote-26) Notably, in contrast to Schaeffer’s notion of “sonic grain,” grain here is not a quality of sound, but a rather a thing: a sonic building-block as well as a unit of measurement; the results of granular synthesis, however, do tend to be rich in Schaefferian sonic grain. Whether sampled from pre-existing sources or synthesized using oscillators, these grains of sound are played back at varying time-points, speeds, frequencies, and amplitudes, such that they perceptibly fuse into composite sounds with novel timbres and rich textures. In a manner similar to cinema’s use of a rapid succession of still images to create the illusion of movement, granular synthesis exploits the perceptual phenomenon of temporal continuity in hearing—often termed the “forward masking effect” in psychoacoustics, where one sound masks the perception of a sound following closely thereafter (below a threshold of 200 ms)—to create the impression of one continuous sound.

Although their notion of “sonic grain” diverges from Schaeffer’s, composers working with granular synthesis have remained keenly aware of the tactile qualities of the sounds they produce, usually discussing them in terms of “texture” or “timbre.” For example, Roads’s magisterial tome, *Microsound* shares with Schaeffer a focus on the “microstructure” of sound. Here, the Schaefferian notion of sonic grain reappears as “texture,” the qualities of which Roads defines as a function of “grain duration and density combined,” ranging from continuous/opaque to sparse/transparent textures.[[27]](#endnote-27) Much like Schaeffer, Roads locates sonic grain at the threshold of human auditory perception, where individual sound-events blur into a unified stream. He also describes sounds resulting from granular synthesis as having varying degrees of *granularity*, which echoes Schaeffer’s framing of grain within a continuum from coarse to fine. Although granular synthesis illustrates the production of sonic grain in ways that are clarifying, Schaeffer remains my primary point of theoretical reference, since his focus on sonic microstructure and its relation to physical texture is more relevant to the discussion of sonic tactility here. Specialists in granular synthesis such as Roads tend to use the sound-touch metaphor freely to explain grain at a conceptual and analytic level, but at the psychoacoustic/phenomenological level they seem less interested in how sonic grain might map to touch. In any case, the theoretical framework of granular synthesis as well as its compositional applications preserve the liminal status of sonic grain, in which the tactility of sound emerges from the murky perceptual zone where solid sound-masses dissolve and individual sound-particles melt together.

Using these notions of grain and granularity, one could claim that all EDM is saturated with granular sounds; indeed, to the extent that sonic grain is an aspect of timbre that has inherent rhythmic properties, it makes sense that granular sounds would play an important role in the aesthetic appeal of EDM. This is all the more so for an array of EDM sub-styles that cluster around particular practices that were in ascendancy during the turn of the twenty-first century, such as post-digital “glitch”,[[28]](#endnote-28) the distortion-heavy “lo-fi” aesthetics of “electroclash,” and the “minimal” spectrum of EDM that serves as the primary focus for this article (e.g., microhouse, minimal house, minimal techno).

A clear example of heightened granularity can be heard in German producer Oliver Hacke’s “Millepieds (SLG Remix).” The title refers to the French word for millipede, which translates literally as “thousand-feet;” millipedes move about by advancing each pair of their numerous legs in rapid succession, which conjures up a sonic image of an unbroken stream of footsteps, which seems to inform SLG’s (Łukasz Seliga) remix of Hacke’s minimal techno track. SLG fills in the track’s texture with a proliferation of granular sounds, from coarse to fine-grained, with a particular emphasis on tight iteration grains (i.e., rasping and grating sounds) and short, shimmering resonance grains (i.e., rattles and closed hi-hats). From the beginning of the track, one can hear a rhythmic, three-fold back-and-forth scrubbing/rattling sound that evokes coarse sandpaper (on the third beat of every 4-beat cycle), a zipper-like rasping sound (extending over the third and fourth beats, starting around 0:30), a short hissing sound (from 0:30, at the end of every 8-beat cycle), a lower-mid frequency rumble (marking a 4+3+3+2+4=16 subdivision of the 4-beat cycle, most noticeable when the other layers are briefly removed for 32 beats, 0:13–0:29) and a wide array of other pops and crackles that mark longer metric cycles. By contrast, Martin Stimming’s remix of Berlin-based British producer/DJ Lee Jones’s minimal-house track, “Safari (Stimming Remix)” provides an example of granularity that focuses less on regular, iterative grains. Stimming, whose own production style has often been described as “lush,” enriches the texture of Jones’ original track with a plethora of “noisy” resonance and continuous grains, including chorused handclaps, shakers, heavily gated tambourines, closed hi-hats, rasps, and the occasional use of long “reverb” effects at transitional points to create sonic “clouds” that dissipate as a new loop-configuration emerges; and all of this is held together with a rolling loop of pitched bass kicks, framed by short melodic fragments. Tracks such as these also evoke rich, variegated haptic experience and thus encourage a similarly haptic engagement with sound.

## Feeling Together

As helpful as the concept of sonic grain is to the analysis of tactility in electronic dance music, the term recedes from view the further one moves away from scholarship on Schaeffer, granular synthesis, and electroacoustic music. Instead, it is more often under the rubric of texture that one finds the most fruitful explorations of the relationship between touch and affect. In *Touching Affect*, Eve Kosofsky Sedgwick suggests that, “to perceive texture is always, immediately, and *de facto* to be immersed in a field of active narrative hypothesizing, testing, and re-understanding of how physical properties act and are acted upon over time”.[[29]](#endnote-29) In this account, touch is an inherently interactive mode of perception that not only entails physical contact with its object, but also opens up field of potential action, both past and future. In other words, tactile experience provides potential insight into how an object came to possess a particular texture, as well as what kinds of interaction the object affords. This hearkens back to the analysis of fleshy timbres earlier in this essay: much like surface texture can have an indexical relation to the “life-story” of the object being palpated, the timbre of certain sounds in EDM indexes bodies by evoking micro-narratives of striking, slapping, snapping, squishing, sucking, and so on—which in turn conjure up potential narratives of action and interaction.

Texture, Sedgwick argues, thus belongs to a category of “intrinsically interactive properties” called “affordances,” defined by James J. Gibson as the properties of an object or environment that provide opportunities for action.[[30]](#endnote-30) For example, a doorknob affords grasping, turning, and pulling, all of which can be gleaned through an encounter with the material properties of the object itself. How these potential opportunities for action are felt and embodied can be described in terms of Spinozan *affectus*, as the variation in the *capacity to act or be acted upon*;[[31]](#endnote-31) encounters between bodies (here understood abstractly, as any kind of object) transmit and generate affect, which increase or decrease the potential for further action. The phenomenon of vibration provides a particularly relevant example: oscillating patterns of mechanical energy strike objects, setting them motion, being amplified or dampened by their materiality as they continue to propagate. The impact of vibration—as well as its amplification or absorption in the body—can be registered as movement, force, energy, pain, texture, sound, music, emotion, pleasure, and so on. Both affordance and affect conceptually capture the idea that potential, latent action can be felt in the real world, which resonates with later theoretical elaborations of the virtuality of affect. One can trace a genealogy of virtuality through Henri Bergson (1896), Gilles Deleuze (1994), and Brian Massumi (2002), all of whom describe the virtual as an aspect of lived experience that is immaterial, latent, un-actualized and yet nonetheless real in how it impacts action in the material world.[[32]](#endnote-32) For Bergson, it is the intensity of affective states that pushes the virtual into the real through action, and this “not-yet-but-nonetheless” dimension of affective experience has been further developed and refined by both Deleuze and Massumi. Here, affect is the felt *push* of the possible underneath the surface of the perceived and unfolding present—a push that can be felt on the skin and in the ear. The texture of an object (or sound-object) can thus be understood to carry the affective resonances of its past encounters while also engendering a sense of potential ones in the future. Think, for example, of the worn-smooth patina of ancient stairways, or the brittle fragility of fried dough, or the rubbery grip of running shoes. Texture can thus function as a node of articulation between material encounters and affective experience, through the sensate apprehension of past and future action in the present. This affective account of tactility helps us to understand how the sonic “feel” (texture) of EDM can simultaneously entail “feeling” (tactile perception/physical contact) and “feelings” (affect).

Sedgwick also frames texture as a multi-modal sensory phenomenon, in the sense that texture can be registered perceptually through vision and hearing as well as touch.[[33]](#endnote-33) But perhaps texture should instead be understood as an *amodal* phenomenon, providing a field of experience that extends beyond the remit of any particular sense-organ. Steve Goodman makes a similar argument for rhythm and vibration, where he defines amodality as “ontologically preceding the designation of a sensation to a specific exteroceptive sensory channel (the five senses)”.[[34]](#endnote-34) This leads him to posit a “vibrational substratum” out of which the experience of sound as a specific sensory modality emerges. If we follow Goodman in not assuming that particular phenomena (such as the vibration of air particles) correspond exclusively to specific human sensory channels (hearing), then we could understand texture as a property that does not simply map from touch to other senses by analogy; instead, it is an aspect of the micro-structuring of the lived world that can be simultaneously registered across a range of sensory channels.

Here again, as with Schaeffer and Roads, texture remains closely associated with the thresholds of perception. Indeed, Sedgwick’s general definition of texture closely resembles theirs in its focus on thresholds: “texture, in short, comprises an array of perceptual data that includes repetition, but whose degree of organization hovers just below the level of shape or structure”.[[35]](#endnote-35) Similarly, sonic grain is also a threshold phenomenon, where sound-events coagulate together but do not yet form a continuous whole. Thus, sonic granularity could be said to make the “molecularity” of sound apparent, in contrast to the “molar” wholes of smooth tones;[[36]](#endnote-36) more precisely, as a threshold phenomenon it renders the particularity and dynamism of sonic aggregates perceptible without losing a sense of cohesion. For Pierre Schaeffer, sonic grain emerges from the microstructure of sound-objects, but could its affective resonances not carry further? Perhaps we could also understand grain and texture in terms of a microstructure of encounter and engagement. There is a potential here for sonic grain to operate both non-representationally and metaphorically at the same time, highlighting the threshold between individual and aggregate sounds while also aesthetically figuring a similar threshold between individual and collective sociability.

As I have argued thus far, EDM engages with tactility through beats and bass, timbre and flesh, grain and texture, all of which impact the affective dimensions of embodied dancefloor sociability. And, with its aesthetic foregrounding of sonic grain, EDM’s sonic tactility seems to draw attention to the vague terrain between molecular and molar modes of organization. Is it possible that the “threshold experience” that grain provides between individual sonic particles and smooth tone serves to dramatize similar threshold experiences between individual dancers and a crowd crystalized on the dancefloor? More to the point, can sonic grain’s blurring between modes of sonic organization appeal not only to tactility but to sociability? Perhaps EDM’s aesthetic focus on the middle-ground between disparate and continuous sound speaks to the fluid and blurred social relations that arise on its dancefloors—or, at least, to how that fluidity *feels* to those who participate in it. Considering its contexts of performance and participation, its long history of marginalized solidarities and subcultural utopianism, one can hear in electronic dance music’s aesthetics an especially tactile soundtrack to a sort of social thickening, an intimate world in the making.

# Notes

# References

Amico, Stephen. 2001. "'I Want Muscles': House Music, Homosexuality and Masculine Signification." *Popular Music* 20 (3):359–378.

Barthes, Roland. 1977. "The Grain of the Voice." In *Image, Music, Text*, 179–189. New York: Hill and Wang.

Bergson, Henri. 1896. *Matter and Memory*. New York: Zone Books. Reprint, 1991.

Bradby, Barbara. 1993. "Sampling Sexuality: Gender, Technology and the Body in Dance Music." *Popular Music* 12 (2):155–176.

Butler, Mark J. 2005. "Hearing Kaleidoscopes: Embedded Grouping Dissonance in Electronic Dance Music." *twentieth-century music* 2 (2):221–243.

———. 2006. *Unlocking the Groove: Rhythm, Meter, and Musical Design in Electronic Dance Music*. Bloomington, IN: Indiana University Press.

Cascone, Kim. 2000. "The Aesthetics of Failure: 'Post-Digital' Tendencies in Contemporary Computer Music." *Computer Music Journal* 24 (4):12–18.

Chion, Michel. 1983. *Guide des objets sonores: Pierre Schaeffer et la recherche musicale*. Paris: Buchet/Chastel: Institut national de la communication audiovisuelle.

———. 2009. *Guide To Sound Objects: Pierre Schaeffer and Musical Research*. Translated by John Dack and Christine North. Leicester, UK: Electro Acoustic Research Site (EARS) Project, De Montfort University.

Classen, Maja. 2006. *Feiern*. Offenbach am Main: True People; Intergroove. videorecording (DVD) and sound recording (CD).

Deleuze, Gilles, and Félix Guattari. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Translated by Brian Massumi. 2 vols. Vol. 2. Minneapolis: University of Minnesota Press. Original edition, 1980.

———. 1994. *What is Philosophy?* New York: Columbia University Press.

Gabor, Dennis. 1946. "Theory of Communication." *Journal of the Institute of Electrical Engineers* Part III (93):429-457.

———. 1947. "Acoustical Quanta and the Theory of Hearing." *Nature* 159 (4044):591-594.

Garcia, Luis-Manuel. "On and On: Repetition as Process and Pleasure in Electronic Dance Music." *Music Theory Online* 11, no. 4 (2005).

———. "‘Can You Feel It, Too?’: Intimacy and Affect at Electronic Dance Music Events in Paris, Chicago, and Berlin." PhD thesis, Ethnomusicology, University of Chicago, 2011.

Gibson, James Jerome. 1966. *The Senses Considered as Perceptual Systems*. Boston, MA: Houghton Mifflin.

Goodman, Steve. 2010. *Sonic Warfare: Sound, Affect, and the Ecology of Fear*. Cambridge, MA: MIT Press.

Herbert, Matthew. 2005. "Personal Contract for the Composition of Music [Incorporating the Manifesto of Mistakes]." *Matthewherbert.com*. http://dev.matthewherbert.com/about-contact/manifesto/.

Hesmondhalgh, David. 2000. "International Times: Fusions, Exoticisms, and Antiracism in Electronic Dance Music." In *Western Music and its Others: Difference, Representation, and Appropriation in Music*, edited by Georgina Born and David Hesmondhalgh, 280–304. Berkeley: University of California Press.

Hughes, Walter. 1994. "In the Empire of the Beat: Discipline and Disco." In *Microphone Fiends: Youth Music and Youth Culture*, edited by Andrew Ross and Tricia Rose, 147–157. London: Routledge.

Loza, Susana. 2001. "Sampling (Hetero)sexuality : Diva-ness and Discipline in Electronic Dance Music." *Popular Music* 20 (3):349-357.

Massumi, Brian. 2002. *Parables for the Virtual: Movement, Affect, Sensation*. Durham, NC: Duke University Press.

Meyer-Eppler, Werner. 1959. *Grundlagen und Anwendungen der Informationstheorie*. Berlin: Springer.

Moles, Abraham. 1960. *Les musiques expérimentales*. Zurich: Editions du Cercle de l'Art Contemporain.

———. 1966. *Information Theory and Esthetic Perception*. Translated by Joel E. Cohen. Urbana, IL: University of Illinois Press.

Nyong'o, Tavia. 2008. "I Feel Love: Disco and Its Discontents." *Criticism* 50 (1):101-112. doi: 10.1353/crt.0.0053.

Peirce, Charles S. 1992. *The Essential Peirce: Selected Philosophical Writings*. Edited by Nathan Houser and Christian J. W. Kloesel. 2 vols. Bloomington: Indiana University Press.

Pinch, T. J., and Frank Trocco. 2002. *Analog Days: The Invention and Impact of the Moog Synthesizer*. Cambridge, MA: Harvard University Press.

Roads, Curtis. 2001. *Microsound*. Cambridge, MA: MIT Press.

Schaeffer, Pierre. 1966. *Traité des objets musicaux, essai interdisciplines*. Paris: Éditions du Seuil.

Sedgwick, Eve Kosofsky. 2003. *Touching Feeling: Affect, Pedagogy, Performativity*. Durham, NC: Duke University Press.

Smalley, Denis. 1994. "Defining Timbre — Refining Timbre." *Contemporary Music Review* 10 (2):35-48. doi: 10.1080/07494469400640281.

———. 1997. "Spectromorphology: Explaining Sound-Shapes." *Organised Sound* 2 (2):107-126. doi: 10.1017/S1355771897009059.

Solberg, Ragnhild Torvanger. 2014. “Waiting for the Bass to Drop”: Correlations between Intense Emotional Experiences and Production Techniques in Build-up and Drop Sections of Electronic Dance Music. *Dancecult: Journal of Electronic Dance Music Culture* 6 (1): 68–82. https://dj.dancecult.net/index.php/dancecult/article/view/451.

Spinoza, Benedictus de. 1677. *Ethics*. Translated by G. H. R. Parkinson, *Oxford Philosophical Texts*. New York: Oxford University Press. Reprint, 2000.

Truax, Barry. 1988. "Real-Time Granular Synthesis with a Digital Signal Processing Computer." *Computer Music Journal* 12 (2):14–26.

Wiener, Norbert. 1976. "Spatial-Temporal Continuity, Quantum Theory, and Music." In *The Concepts of Space and Time*, edited by Milič Čapek. Dordrecht: Riedel.

Xenakis, Iannis. 1960. "Elements of Stochastic Music." *Gravensaner Blätter* 18:84–105.

# Audiography

Anderson, Laurie. 1981. “O Superman.” Warner Bros. Records DWBS 49888, vinyl, 12”.

Chandler, Kerri. 2009. “Pong (Bones and Strings Rework)” in *Pong (Ben Klock Unreleased Mixes)*.Deeply Rooted House DRH018R, limited pressing, gray translucent vinyl, 12”.

Gathering, The. 2010. “In My System (Jef K SystemMix).” Silver Network SILVER 027, vinyl, 12”.

Hacke, Oliver. 2006. “Millepieds (SLG Remix).” Level Records LVL-06, vinyl, 12”.

Herbert, Matthew. 2001. *Bodily Functions*. Studio !K7 !K7097CD, compact disc.

———. 2012. *Bodily Functions (Special 10th Anniversary Edition)*. Accidental AC66CD, 2 compact discs.

Jones, Lee. 2008. “Safari (Stimming Remix).” Aus Music AUS0813, vinyl, 12”.

M.A.N.D.Y. and Booka Shade. 2008. “O Superman feat. Laurie Anderson (Reboot’s 20 Cubans Rework).” Get Physical Music GPM098.1, vinyl, 12”.

Nightcrawlers. 1992. “Push The Feeling On.” Great Jones 162-530 620-1, vinyl, 12”.

Omar featuring Stevie Wonder. 2010. “Feeling You (Henrik Schwarz Remix),” in *The Remixes*. Peppermint Jam PJMS0140, vinyl, 12”.

Squillace, Davide. 2010. “The Other Side of Bed.” Desolat X008, vinyl, 12”.

Summer, Donna. 1977. “I Feel Love.” Casablanca Records NBD 20104, vinyl, 12”.

Sylvester. 1978. “You Make Me Feel (Mighty Real).” Fantasy 12FTC 160, vinyl, 12”.

1. Sedgwick, *Touching Feeling*, 17. [↑](#endnote-ref-1)
2. Electronic dance music (EDM) is a broad term originally developed in academic and journalistic contexts to refer to entire field of post-disco, sample-based dance music without reducing it to its venues (e.g., “club music”, “rave music”), prioritizing one style over others (e.g., “techno music”), or conflating it with very different musical fields that have already laid claim to “electronic music” (e.g. “electroacoustic music”). A recent popularization of the term—especially the acronym—in mainstream media, however, has complicated the semantic field, such that it can also refer to a more limited spectrum of dance music genres that have gained mainstream popularity in North America since 2010 (e.g., dubstep, moombahton, trap). Nonetheless, the usage of “EDM” in this article refers to the term’s initial use as an analytic meta-category. [↑](#endnote-ref-2)
3. E.g.: Omar featuring Stevie Wonder, “Feeling You”; Sylvester, “You Make Me Feel (Mighty Real)”; Donna Summer, “I Feel Love”; Nightcrawlers “Push The Feeling On” (see Audiography). [↑](#endnote-ref-3)
4. Garcia, “Can You Feel It, Too?”. [↑](#endnote-ref-4)
5. Amico, “I Want Muscles”; Bradby “Sampling Sexuality”; Hesmondhalgh, “International Times”; Hughes, “In the Empire of the Beat”; Loza “Sampling (Hetero)sexuality; Nyong'o, “I Feel Love”. [↑](#endnote-ref-5)
6. Butler, “Hearing Kaleidoscopes”; Butler, *Unlocking the Groove*; Garcia, “On and On”; Solberg, “Waiting for the Bass to Drop”. [↑](#endnote-ref-6)
7. “Es geht um Lautstärke und um Bass. Also, du hörst die Musik nicht nur, sondern die hat einen ganz direkten, körperlichen Impakt. Dir schlackern die Hosenbeine, wenn du vor der Bassbox stehst.” Classen, *Feiern*. [↑](#endnote-ref-7)
8. Pinch and Trocco, *Analog Days*. [↑](#endnote-ref-8)
9. Goodman, *Sonic Warfare*, 18. [↑](#endnote-ref-9)
10. Ibid., 196. [↑](#endnote-ref-10)
11. Herbert, “Personal Contract”. [↑](#endnote-ref-11)
12. Smalley, “Defining Timbre — Refining Timbre”, 35. [↑](#endnote-ref-12)
13. Ibid., 36 [↑](#endnote-ref-13)
14. Peirce, *The Essential Peirce*. [↑](#endnote-ref-14)
15. See Cascone, “The Aesthetics of Failure”. [↑](#endnote-ref-15)
16. See Schaeffer, *Traité des objets musicaux*; Chion, *Guide des objets sonores*; Chion, *Guide to Sound Objects*. [↑](#endnote-ref-16)
17. Barthes, "The Grain of the Voice". [↑](#endnote-ref-17)
18. The original French term that Schaeffer uses, *entretien*, is difficult to translate precisely, although in everyday usage it is closest to “maintenance” in English. This has been translated variously as “sustainment” (see Dack and North’s translation of Chion 2009) and “continuant phase” (Smalley 1997). I have chosen to use “sustain” instead, in order to emphasize its conceptual and formal similarities with “sustain” as an element of the ADSR amplitude envelope described earlier in this essay. [↑](#endnote-ref-18)
19. Schaeffer, quoted in Chion, *Guide to Sound Objects*, 171. [↑](#endnote-ref-19)
20. See Schaeffer, *Traité des objets musicaux*, 584–587. [↑](#endnote-ref-20)
21. Ibid., 551–552. [↑](#endnote-ref-21)
22. Ibid., 554–555. [↑](#endnote-ref-22)
23. “Parler d'un son rugueux ou mat, velouté ou limpide, c'est comparer le son à une pièrre, à une peau, à un velours, à une eau courante”. Ibid., 551. [↑](#endnote-ref-23)
24. “Ce ne sont pas les objets mêmes de la vision ou de l'audition qui importent, mais leur agencement”. Ibid., 551. [↑](#endnote-ref-24)
25. Gabor, “Theory of Communication”; Gabor, “Acoustical Quanta and the Theory of Hearing”; Meyer-Eppler, *Grundlagen und Anwendungen der Informationstheorie*; Moles, *Les musiques expérimentales*; Moles, *Information Theory and Esthetic Perception*; Roads, *Microsound*; Truax, “Real-Time Granular Synthesis”; Wiener, “Spatial-Temporal Continuity”; Xenakis, “Elements of Stochastic Music”. [↑](#endnote-ref-25)
26. Roads, *Microsound*, 86. [↑](#endnote-ref-26)
27. Ibid., 105. [↑](#endnote-ref-27)
28. Cascone, "The Aesthetics of Failure”. [↑](#endnote-ref-28)
29. Sedgwick, *Touching Feeling*, 13. [↑](#endnote-ref-29)
30. Gibson, *The Senses Considered as Perceptual Systems*. [↑](#endnote-ref-30)
31. Spinoza, *Ethics*. [↑](#endnote-ref-31)
32. See Bergson, *Matter and Memory*; Deleuze, *What is Philosophy?*; Massumi, *Parables for the Virtual*. [↑](#endnote-ref-32)
33. Sedgwick, *Touching Feeling*, 15. [↑](#endnote-ref-33)
34. Goodman, *Sonic* Warfare, 47. [↑](#endnote-ref-34)
35. Ibid., 16. [↑](#endnote-ref-35)
36. Deleuze and Guattari, *A Thousand Plateaus*. [↑](#endnote-ref-36)