

12. More information is available from the following sites: Palindrome Intermedia performance group, <http://www.palindrome.de/>; STEIM: <http://www.steim.nl/> (accessed April 5, 2002).
13. Two examples of dance and electronic composers/digital artists developing wearable sensor systems for use in interactive spaces are Troika Ranch based in New York City and DIEM based in Aarhus, Denmark: <http://www.troikaranch.org> and <http://www.daimi.au.dk/~diem/digitaldance.html> (accessed April 5, 2002).
14. There are several options for software for mapping input to output, but Mark Coniglio's Isadora offers one of the best for the nonprogrammer to experiment with: <http://www.troikaranch.org/troikatronix/isadora.html> (accessed April 5, 2002).
15. The Wanderley/Ross PDF is available at [http://www.ircam.fr/equipes/analyse-synthese/wanderle/Gestes/Externe/Hunt\\_Towards.pdf](http://www.ircam.fr/equipes/analyse-synthese/wanderle/Gestes/Externe/Hunt_Towards.pdf) (accessed April 5, 2002).
16. More information about Interface can be found at <http://www.arts.rpi.edu/crb/interface/interface.htm> (accessed April 5, 2002).
17. From email correspondence between the author and Dan Trueman on March 10, 2002.
18. David J. Sturman, "A Brief History of Motion Capture for Computer Character Animation," SIGGRAPH 94: [http://www.css.tayloru.edu/instrmat/graphics/hypgraph/animation/motion\\_capture/history1.htm](http://www.css.tayloru.edu/instrmat/graphics/hypgraph/animation/motion_capture/history1.htm) (accessed April 5, 2002).
19. For a description of motion capture technologies and some work involving dance artists, see Scott deLahunta, "Coreografie in bit e byte: motion capture, animazione e software per la danza," in *La Scena Digitale: Nuovi media per la danza*, ed. Armando Menicacci and Emanuele Quinz (Venice: Marsilio Editori s.p.a., 2001), 83–100. An English version is available at <http://www.daimi.au.dk/~sdela/bolzano/> (accessed April 5, 2002).
20. N. Magnenat Thalmann and D. Thalmann, "Computer Animation," in *Handbook of Computer Science* (CRC Press, 1996), 1300–1318.
21. The *Crowd* extension comes with Character Studio, one of the 3D Studio Max animation software applications that is specifically designed to work with motion capture data.
22. Simple rules leading to complex results—emergent and unpredictable—is a conception underlying the computer-aided study of chaos and other complex systems. "Artificial Life" refers to the field of modeling and study of such systems using the computer.

## On Improvisation, Temporality, and Embodied Experience

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Vijay Iyer

As a musician, I believe that musical improvisation can provide some powerful insights about consciousness. I'd like to propose an understanding of certain improvisational music as quintessentially *experiential*, in that it leads us to re-experience our own practice of perception.

I am a pianist, composer, improvisor, and electronic musician engaged with a range of experimental and vernacular musical codes (Iyer 2003, 2005; Iyer and Ladd 2003, 2007; Fieldwork 2002, 2005). In the late 1990s, I wrote a dissertation on the role of the body in music perception, cognition, and performance (Iyer 1998). The central thesis was simply that music is an embodied, situated activity. This means that music depends crucially on the structure of our bodies, and also on the environment and culture in which our musical awareness emerges. Rhythm, especially, is a complex, whole-body experience, and its role in music makes use of the embodied, situated status of the participant. Such claims have a variety of implications; they lead us to appreciate traces of the embodiment in instrumental and vocal music, to notice how musical cultures and individuals variously deal with the role of physicality in music-making, and to understand music perception as an active, culturally contingent process.

The claim that music perception and cognition are embodied activities also means that they are actively constructed by the listener, rather than passively transferred from performer to listener. This active nature of music perception highlights the role of culture and context. For example, the discernment of

qualities such as pulse and meter from a piece of music is not perceptually inevitable; rather, it depends on the person's culturally contingent listening strategies (Iyer 1998, 83–104). In addition, I have argued that certain kinds of rhythmic expression are directly related to the role of the body in making music, and to certain cultural aesthetics that privilege this role. In particular, certain subtle microrhythmic variations in rhythmic performance display strikingly systematic structure, bearing sonic traces of the culturally situated music-making body (Iyer 2002).

As I developed these academic arguments, I found that embodiment had become a central concern of my creative work as well. As an artist I began to pay attention to audible traces of the human body in improvisational music—the sound of pianist Thelonious Monk's hands, for example, or drummer Roy Haynes' dancer-like bearing. I started creating music that foregrounded this relationship between music and the body: allowing my hands to enact a tactile-melodic logic at the piano that would form the basis of my compositions, creating rhythmic structures that alternately engage and undermine our inherent dance impulse, and attuning to the persistent rhythms within my own body as a guiding principle in improvisation and composition.

Generally, when considering issues in music cognition, scientists too often gravitate to the well-trodden examples from pre-1900 European classical tonal music, and ignore nearly every other form of music, including all non-Western music, any contemporary or popular work, or any works that might be categorized as “experimental.” We are led very quickly to ask: how can you make assertions about cognitive universals of human music-making without studying the music of more than one culture? For this reason, in the course of my intertwined creative and scholarly work, I have drawn heavily from the music of the African diaspora, South Asia, and other non-Western cultures.

In the case of the sciences' general avoidance of experimental music, the tacit assumption is that the experimental arts are not concerned with the fundamentals of perception. But often it is precisely through artistic experimentation that we reach new awareness of our perceptual and cognitive processes. The works of Seurat, Monet, and even Picasso, experimental in their time, are well-cited examples in the visual arts; Noé's (2000) work on Serra and Smith provides a rare example of late-twentieth-century artists considered from the point of view of cognition. But how often does one look to African-American experimental composer-improvisers such as Thelonious Monk, Cecil Taylor,

or John Coltrane in terms of the implications of their discoveries for music perception? (Lewis [1996, 1998, 2001–2002] convincingly describes what is called “jazz” as a history of experimental practice, in light of which the artists mentioned here could certainly be characterized as experimentalists.) For that matter, when do scientists consider hallowed twentieth-century composers such as Debussy, Varèse, or Ligeti for perceptual insights?

In what follows, I focus on moments from my musical experiences with two pioneering improvisers, pianist Cecil Taylor and multi-instrumentalist Roscoe Mitchell, and also suggest some ways of thinking about aspects of electronic music, all within the framework of embodiment. But first, I must introduce a handful of basic concepts with which to build our argument.

#### Time and Temporal Situatedness

A fundamental consequence of physical embodiment and environmental situatedness is the fact that *things take time*. Temporality must ground our conception of physically embodied cognition. Smithers (1996) draws a useful distinction between processes that occur “in time” and those that exist “over time.” The distinction is similar to that between process-oriented activity, such as speech or walking, and product-oriented activity, such as writing a novel or composing a symphony.

In-time processes are embedded in time; not only does the time taken matter, but in fact it contributes to the overall structure of the process. The speed of a typical walking gait relates to physical attributes like leg mass and size, and shoulder-hip torsional moment; this is why we cannot walk one-tenth or ten times as fast as we do. Similarly, the rate at which we speak exploits the natural timescales of lingual and mandibular motion as well as respiration. Accordingly, we learn (and indeed we are hardwired) to process speech at precisely such a rate. Recorded speech played at slower or faster speeds rapidly becomes unintelligible, even if the pitch is held constant. The perceived flow of conversation, while quite flexible, is sensitive to the slowdown caused by an extra few seconds taken to think of a word or recall a name.

Over-time processes, by contrast, are merely contained in time; the fact that they take time is of no fundamental consequence to the result. Most of what we call computation occurs over time. The fact that all machines are considered computationally equivalent regardless of speed suggests that time was not a concern in the theory of computation, and that the temporality of a

computational process was theoretically immaterial. Though computational theory is more nuanced today, “real-time” computer applications make use of the speed of modern microprocessors, performing computations so fast that one doesn’t notice how much time is taken. However, this is not what the mind does when immersed in a dynamic, real-time environment; rather, it exploits both the constraints and the allowances of the natural timescales of the body and the brain as a total physical system. In other words, Smithers (1996) claims, *cognition chiefly involves in-time processes*. Furthermore, this claim is not limited simply to cognitive processes that require interpersonal interaction; it pertains to all thought, perception, and action.

### The Temporality of Musical Performance

In intersubjective activities, such as speech or music making, one remains aware of a sense of mutual embodiment. This sense brings about the presupposition of “shared time” between the listener and the performer. This sense is a crucial aspect of the temporality of performance. The experience of listening to music is qualitatively different from that of reading a book. The experience of music requires a “co-performance” that must occur within a shared temporal domain (Schutz 1964). While the essentially solitary act of reading a book also takes time, the specific amount of time is of little consequence. (Literary notions of co-performance, such as Roland Barthes’ idea of “writely texts” [1975], do not fundamentally incorporate the temporality of experience.) The notion of musical co-performance is made literal in musical contexts primarily meant for dance; participatory act of marking musical time with rhythmic bodily activity—dancing, rocking, tapping your foot—physicalizes the sense of shared time, and could be viewed as embodied listening.

The performance situation itself might be understood as a context-framing device. In his study of music of a certain community in South Africa, ethnomusicologist J. Blacking wrote, “Venda music is distinguished from nonmusic by the creation of a special world of time. The chief function of music is to involve people in shared experiences within the framework of their cultural experience” (Blacking 1973, 48). There is no doubt that this is true to some degree in all musical performance, and we can take this concept further in the case of improvised music. The process of musical improvisation in a jazz context can be seen as one specific way of framing the shared time between per-

former and audience. The experience of listening to music that is understood to be improvised differs significantly from listening knowingly to composed music. The main source of drama in improvised music is the sheer fact of the shared sense of time: the sense that the improviser is working, creating, generating musical material, in the same time in which we are co-performing as listeners. As listeners to any music, we experience a kind of *empathy* for the performer, an awareness of physicality and an understanding of the effort required to create music. Empathy is of course a key aspect of how we listen to others in any context. In improvised music empathy extends to an awareness of the performers’ coincident physical and mental exertion, of their “in-the-moment” (i.e., in-time) *process* of creative activity and interactivity. Thus improvisation heightens the role of embodiment in musical performance.

Time framed by improvisation is a special kind of time that is flexible in extent, and in fact carries the inherent possibility of endlessness, similar to that pointed out by Shore (1996) in the case of baseball games. Instances like Paul Gonsalves’ twenty-seven choruses (over six minutes) of blues on Ellington’s “Diminuendo and Crescendo in Blue” and Coltrane’s sixteen-minute take on “Chasin’ the Trane”—significantly, both live recordings—attest to the power that the improviser wields as framer of time, deciding both the extent and the content of the shared epoch.

### Temporal Situatedness and Musical Form

Accordingly, improvisational music requires a different concept of musical form from that of composed music; improvisational musical form can be described in terms of temporal situatedness. It is enlightening to consider the concept of form in the classical improvised music of India:

Syntactical forms are virtually unknown in the music of India. Instead we hear long, cyclical, chain structures and a general progression of organic growth that reveals the guidance of quite different formal models and metaphor. The tactics of form go hand-in-hand with the prevailing models of structure: hierarchical and syntactical forms are naturally implemented by such tactics as contrast, parallelism, preparation, rise, transition, and the like; serial forms [as in Indian music], however, tend to be modular, decorative, incremental, progressive, and open-ended. The Indian version of musical structure tends to emphasize variation of the module: by permutation of its elements, by inflation and deflation of patterns, by pattern superimpositions, and by progressive organic development. (Rowell 1988)

Improvisational African and African-American music can share many of these traits, particularly in the long-term organization of material. The major role of improvisation in many oral musical traditions, combined with the important function of groove, make possible alternative notions of musical form that do not conform to the recursive hierarchies of tonal-music grammars. A teleological concept of form, in which the meaning of music is taken to be its large-scale structure, may be replaced with an alternative, modular approach, in which the meaning of music is located in the free play of smaller constituent units. Such notions of musical structure appear in many African and African-American musics, from Ewe dance-drumming to Detroit techno. Instead of long-range hierarchical form, the focus is on fine-grained rhythmic detail, the dialogic interplay of various musical elements, and superpositional rhythmic hierarchy. Thus, large-scale musical form emerges from an improvisational treatment of these short-range musical ingredients—that is, from the in-time manipulation of simple, modular components.

A prime example is the late, great vocalist–bandleader James Brown’s well-known practice of “takin[g] it to the bridge” (Brown 1991). A typical composition might consist of two different musical spaces or grooves, the transitions between which are cued musically by the vocalist. Hence each section may be arbitrarily long, since all that delineates it is an improvised cue to the next section. Before a given performance of a song like “Sex Machine,” Brown and his band may not know exactly what will happen when; rather, they know what the raw materials are and how to manipulate them during performed time. They are skilled at reacting to environmental cues, individually and collectively, in real time.

As another example, jazz drummer E. W. Wainwright (private communication, 1997) described to me a practice of creating large-scale temporal form out of a relatively open-ended musical environment, as it was done by John Coltrane’s legendary quartet in the early 1960s (see the title track to Coltrane 1993 [1970]). In such pieces, the group would improvise in 4/4 time, using a certain pitch organization as a loose framework, such as a mode or a pedal point. Eventually, formal small-section boundaries would emerge by the systematic doubling of the musical period. As was told to Wainwright by Elvin Jones (the quartet’s drummer and Wainwright’s teacher), the group would initially accent the beginning of every four bars, using intensity as well as rhythmic, melodic, and harmonic parameters. As the piece unfolded, they

would expand the period to eight bars, then sixteen, and so on. The larger the period became, the greater heights the intensity and dissonant tension could reach, and the more effective the unified release at the beginning of the next period. As Jones told Wainwright, this practice emerged organically over the course of hundreds of improvised performances, never having been discussed verbally by any band members. These two examples suggest that aspects of musical form can stem from the collective experience of shared, lived time, and from the ways in which musical variation is executed “in time.”

#### Perception of Musical Motion

Musical motion is often discussed as a structural abstraction in pitch space, involving the play of forms against one another. A typical view is evident in the following quote from noted composer-theorist Roger Sessions. “The gestures which music embodies are, after all, invisible gestures; one may almost define them as consisting of movement in the abstract, movement which exists in time but not in space, movement, in fact, which gives time its meaning and its significance for us” (Sessions 1950, 20, quoted in Shove and Repp 1995, 58).

A more grounded approach is taken by Friberg and colleagues (Friberg and Sundberg 1999; Friberg, Sundberg, and Frydén 2000), who investigate the psychological associations of music with certain rhythmic gaits and other locomotive phenomena. But a review of the concept of musical motion by Shove and Repp (1995) highlights the important and overlooked fact that musical motion is, first and foremost, audible human motion. To amplify this view, Shove and Repp make use of Handel’s (1990, 181) three levels of event awareness: the raw psychophysical perception of tones, the perception of abstract qualities of the tones apart from their source, and lastly the apprehension of environmental objects that give rise to the sound event. At this third level, “the listener does not merely hear the *sound* of a galloping horse or bowing violinist; rather, the listener hears a horse *galloping* and a violinist *bowing*” (Shove and Repp 1995, 59). In this event-based framework, the source of perceived musical movement is the human performer, as is abundantly clear to the listener attending to music in performance (*ibid.*, 60). We connect the perception of musical motion to human motion; from this perspective, music consists of the sound of concerted human action.

### Experientialist Music

With the preceding ideas in mind, I wish to pick up the argument laid out by Nöe (2000), who discusses the possibility of self-reflexive moments that disrupt the *transparency* of experience, by which he means the invisibility of the process of perception itself. As Nöe outlines, when we attempt to perceive the process of perception, we instead perceive the object of perception; the “experience” of perceptual experience, being mediated through the senses, cannot itself be perceived by the senses. Nöe points out that perceptual experience is best understood as a “temporally extended process of exploration of the environment on the part of an embodied animal” (2000: 128)—that is, as *perceptually guided action*. Therefore, “to investigate experience we need to turn our gaze not inward, but rather to the activity itself in which this temporally extended process consists, to the things we do as we explore the world” (*ibid.*).

Nöe suggests that certain artists’ work foregrounds the actual experience of perception (as opposed to the object of perception). He describes the massive sculptural works of Richard Serra as *environmental* in nature, overwhelming in *scale*, *complex* enough to lack a perspicuous vantage point, and *particular* in their uniqueness (i.e., site-specific and not reproducible). Nöe asserts that these traits demand a process of experiential exploration, as opposed to a passive, transparent, instantaneous perception. In this way, they provide an occasion for the self-reflexive experience of perceiving one’s own process of perception.

Encapsulating the embodied process of being in the world, Nöe (2000) describes experience as a “temporally extended pattern of exploratory activity.” This could be a definition of improvisation: real-time interaction with the structure of one’s environment. As with improvisation, it is not a passive interaction, for the perceiver–improviser is engaged in sensorimotor activity, skillfully probing the world at will. This process of embodied action situates the perceiver within the environment; so the perceiver must interact with her embodied self as well. Nöe’s choice of the word “pattern” suggests that the activity is either learned, or grounded in some repeatable behavior.

In this way, we may understand *musical* improvisation as the real-time interaction with the structure of one’s acoustic, musical-formal, cultural, embodied, and situated environment. Musical interaction is not a passive interaction either, because it also *generates* structure—it has its own sonic trace,

which becomes part of the same interactive environment, and is perceived as contributing to this environment. This view of musical improvisation has implications for the study of consciousness, as the following examples may illuminate. Nöe’s notions of scale, complexity, uniqueness, and environment are addressed (though indirectly) in these examples. What I wish to stress is the way in which these improvisational performances foreground their in-time status, drawing attention to the experiential aspect of real-time music making.

### Cecil Taylor

The above concepts came to life in my experience as a performer with Cecil Taylor in 1995. A fearsomely virtuosic pianist–improviser–composer, Taylor has irreversibly influenced contemporary music with his rich and nuanced musical vision. Taylor’s exacting pianistic approach is characterized by a fluid, relaxed, yet powerful technique that could best be described as athletic. His performances are rather reminiscent of high-level martial arts: a physical behavior that is intuitive, improvisational, and interactive, yet at the same time muscular, deeply structured, and surgically precise (Taylor 1975, 2002b).

The occasion was the performance of his “creative orchestra” music, which forty west-coast musicians studied and interpreted under his guidance. (A smaller but similar ensemble can be heard on Taylor 2002a.) Taylor’s approach spoke volumes about improvised music as a collective activity. Composition in an improvising context can take on a variety of forms—perhaps some thematic material as a point of departure, or perhaps some music-generative methods or processual cues. Early on, when we were repeatedly questioning him about the role of the written material, he said, “This [written material] is the formal content of the piece; what I want is for all the players to bring their individual languages to the interpretation and execution of the piece.” Taylor desired that we create a collective embodiment of his material by filtering it through our individual “languages,” framing the music as discourse, individual sound as personal narrative.

In our week of daily rehearsals with Mr. Taylor, the earlier sessions led us to believe that he was a stickler for detail. I recall that we spent the first three-hour rehearsal on one postage-stamp-sized corner of one of his scores; he would continually repeat and rework the material bit by bit, singing or conducting a certain phrase for us, or asking us to permute the written pitches in a certain way. But toward the end of the week, his requirements grew less

stringent, his guidance less direct; he would simply set us in motion and leave the room for a while. I realized that somehow he had taught us his language—his sense of phrasing and repetition, his attention to detail, the way he rigorously reworks and dissects a turn of phrase. Once this had happened, we were free to bring our own ideas to this context—to embody his language. When he returned to the rehearsal room, he would find that we had made something out of his cryptic scores. Evidently, Taylor's aesthetic privileges the sound of personalities interacting over conventional concepts of form. Because of the heightened role that group interactivity played, it felt at times as though we had formed not just an orchestra but a small musical civilization.

Indeed, our group experienced in microcosm the conflict, strife, and tension that a society experiences in macrocosm. Much of this was enacted on a musical level in the performance on October 26, 1995. For example, when some musicians reached the stage, they abandoned their allegiance to the unwritten, brittle orchestral aesthetic that had been developed over the course of rehearsals, choosing instead to yield to the temptation to play nonstop with furious intensity. This behavior raised the issue of (physical) power: clearly, a tenor saxophonist can play with enough force to drown out a section of six violinists, and a drummer can bury a pianist's efforts with ease. It was found that the louder instrumentalists possessed the privilege to control the intensity level directly, while the softer instrumentalists were forced to defer to such control. (Fellow musician Matthew Goodheart [1996] has observed the added role played by the self-serving musical choices made by certain individuals who wanted to get noticed by the legendary pianist for possible career advancement.)

Also, in the absence of a more dictatorial leader figure or a hard and fast text to which to adhere, we found ourselves in frequent disagreement as to what was "supposed" to be happening or what to do next. Different factions formed to conduct their own unified small-group activities, allowing for the emergence of pockets of apparent order in the sonic chaos. The resultant performances (which included Taylor himself) featured truly sublime flashes of fortuitous beauty and moments of brilliantly focused small-group improvisation, amid often-inscrutable orchestral noise.

What about this musical instance could be characterized as "experiential"? Nöe's notions of *environment*, *scale*, *complexity*, and *uniqueness* were each specifically addressed in this performance. In keeping with Taylor's directions, as the audience entered, musicians also entered the stage from the wings and the

hall's aisles, bringing their chairs and music stands onstage while chanting and moving in geometric patterns. The musicians were engaging in a performative ritual of "constructing" the performing environment; this act drew attention to this environment's constructedness, and incorporated the environment into the performance itself. Effectively for the audience, it was unclear at what point in space or time the performance had begun; it was somehow fused with the concert-hall *environment* itself, and with the spectator's entrance into the space. Such performative rituals preface many of Taylor's solo and group concerts; he never takes the setting or occasion for granted, nor does he allow the audience to do so.

The audience members witnessed musical structure emerging in real time as extreme polyphony. From a distance, the overall sound may have seemed vast, dense and unfathomable, fulfilling Nöe's requirement of overwhelming *scale*. But with closer attention, they saw small subgroups of musicians visibly discussing strategies, arriving at collective decisions, and acting on them; they observed individual musicians in the aggregate occasionally electing to foreground themselves by performing soloistically, and they saw and heard the real-time response of other members of the ensemble to such acts. The audience was left to contend with these intra-group dynamics and come to their own conclusions about the proceedings. An individual audience member could zero in on small regions of activity, but no single listener ever possessing one privileged listening perspective. This is the musical correlate to experiential *complexity*, in that there is no perspicuous vantage from which to perceive the entire event, and no particular ordered set of perceptions for the listener to follow passively in order to apprehend the ideal "work." Lastly, the performance was specific to that time and place; as is the case with improvisation in general, it is nonrepeatable in any except the broadest sense of the word, and so it displays the required trait of *uniqueness*.

Throughout this performance, our experience of ensemble-as-social-group highlighted the sense of music as the sound of human action, and the sense of improvisation as an embodied, situated activity. The performance consisted of our enacted, sonorous experience of negotiating the improvisational process. We were an orchestra with our apparatus exposed.

#### Roscoe Mitchell

In recent years I have had the privilege of working in multi-instrumentalist-composer-improviser Roscoe Mitchell's ensemble. A pioneer in experimental

music, Mitchell is a founding member of the celebrated Art Ensemble of Chicago (1991 [1972], 1998 [1975]; see also Lewis 1998) and the hugely influential collective of African American artists known as the Association for the Advancement of Creative Musicians (Lewis 2001–2002). He is noted for his novel approaches to form, texture, timbre, and space, among other things.

Mitchell's work with various wind instruments occasionally finds him exploring the most liminal behaviors of these instruments (e.g., "S II Examples" on Mitchell 1978). He might construct an entire solo improvisation by passing air through the alto saxophone in various fingering configurations so as not to generate an actual tone; the sporadic pitches that arise from this process provide a dramatic emergent form that keeps the listener transfixed. He might circular-breathe through the horn for several minutes, allowing the resultant variation in air pressure to impose a periodic timbral surge on his sound. Or he might find a note on the soprano saxophone that squeaks or cracks, and then work through an understanding of that squeaking right before your ears, constructing a masterful solo piece from this odd, "impure" sound emanating from the horn. On these occasions we witness an intrepid sonic explorer in poignant performative dialogue with his instrument, creating music out of the experiential process of making sound. These performances and the act of listening to them are inherently nonrepeatable, predicated as they are on the process of mutual discovery.

Mitchell's ensemble music covers a wide range of instrumentations, styles, and degrees of complexity, and they vary from fully notated to entirely improvised to anywhere in between. In some of Mitchell's ensemble pieces (e.g., Mitchell 1986), he has the musicians improvise independent, focused streams of musical activity, without self-consciously interacting with the other individual musicians. This would seem at first to go against the standard view of jazz as a highly interactive, dialogic medium. But in fact Mitchell is privileging that very dialogue, insisting on a transparent counterpoint among the various melodic streams. He knows that this dynamic cannot be forced, so his directive to the musicians is to listen closely without "following" or imitating one another. Musical counterpoint can occur in unexpected ways, and in this case it unfolds spontaneously from the juxtaposed sonorous actions of the participants. Having performed such pieces with Mitchell, I can attest to the rich variety and specificity of dynamics, textures, and emergent forms that arise from such deceptively simple principles.

At one point in the course of a weeklong studio recording project (Mitchell 2002), he guided his nine-piece group improvisationally through the sculpting of an introduction to one of his notated pieces, titled "this" and based on a poem by e. e. cummings. A certain utterance he made in the process shed light on his creative perspective. Exploring the available options, he asked percussionist Vincent Davis to tap on a wood block, and then to hit a gong. Then he asked guitarist Spencer Barefield about the sympathetic strings on his acoustic guitar, and had him strum them by way of demonstration. Next, he asked percussionist Gerald Cleaver to try a few tremolo dyads on the marimba, first with hard mallets, then with soft ones. He asked to hear these sounds again, one by one, in various sequences. Then, casually, Mitchell announced, "All right, may I please hear that much music again?"

This request hit me hard, because it hadn't dawned on me that what was happening during this process even was music; I had unconsciously dismissed it all as precompositional timbral exploration. But Mitchell *knew* we had crossed the line into music: a series of human sound events, intentional sonic gestures in organized succession. Of course it was music; how could I have thought otherwise?

In that instant, I learned something profound and difficult to explain. It struck me how the rawest sonic materials and the most primal human acts can be heard as compelling, even beautiful music. I saw that music need not be understood simply as the execution of preordained gestures, and that it can be viewed as a process of inquiry, a path of action, a deliberate sonorous exploration—construction of the world. It struck me, therefore, that perhaps humans are always making music—that counterpoint and form necessarily emerge from the sound of experiential human action in time.

It was also made clear in this exchange that music can be viewed as a consequence of active listening; it is, at some level, *through* informed listening that music is constructed. Placing the skillful listener in such an active role explodes the category of experiences that we call listening to music, because it allows the listener the improvisatory freedom to frame any moment or any experience as a musical one. *The improvisor is always listening; the listener is always improvising.*

Challenging in this way the boundary between music and non-music, Mitchell's perspective suggests a listener-centered, bottom-up inversion of Nöe's characterization. In this view, it is within the improvising listener's

power to reconstruct music from sounds in her *environment*, and to reclassify perceptual experiences of arbitrary *scale*, *complexity*, and *uniqueness*, actively reframing the tumult of everyday action as music. The listener is empowered to *constitute* music, self-consciously and actively, from guided sensory input. This view underscores an *essential identity between perceptual experience and improvisation*.

The standpoint indicated by Mitchell's request resonates with Taylor's own all-encompassing view of music as a way of life, as he articulated in an interview:

It seems to me what music *is*, is everything that you do.... [H]opefully everything that I try to do in this situation has the same kind of *control over the senses* that the making of, you know, the *particular* art of music is. So to read, or dance, you know, to converse, is all a part of the making of music. So that, you know, when one walks down the street, and one looks, if there is a fuchsia-colored awning sticking out on the thirtieth floor, one says, *oh wow*. So that to *me* what it is, is everything one does. (Mann 1981, transcribed by author)

It is important to situate this perspective on musical improvisation, in many ways common to Mitchell and Taylor, in the context of African-American expressive culture. Without question, African-American music has exerted an immense impact on world culture. This fact is especially remarkable given that African-American history has at its foundation a proximity to terror, and a sustained atmosphere of violence imposed from without (Gilroy 1993, 73). In this light, African-American expressive culture can indeed be viewed as a set of tactics for survival in such a context. Here improvisation takes on a crucial symbolic weight. In this context, the phrase "improvised music" suggests not simply that the notes and rhythms are extemporized because of a cultural aesthetic that privileges improvisation (which is certainly true—see Small 1998 [1987]), but moreover that music is created from a position of disenfranchisement, where sheer survival cannot be taken for granted, where one is perpetually improvising through life by making use of whatever is at hand—especially one's own sensory experience. Hence, it has been suggested that we theorize improvisation as a *condition*, shaped by social, cultural, and economic forces. This is not unlike Harvey's formulation of the condition of postmodernity (Harvey 1991). (For more extensive discussions of these issues, a partial list of sources would include Baker 1984, Baraka 1963, Benston 2000, Gilroy 1993, Moten 2003, Monson 2003, Small 1998 [1987].)

### On Electronic Music

Music making and music listening are interrelated, embodied activities. Until very recently in the history of humankind, with few exceptions (such as bird-song or windchimes), the music that humans perceive and respond to has always been human music. Before the last century of technological developments, music was almost always generated by human bodies. This is why the class of events that we recognize as music occur in the timescales of human activity—seconds, minutes, hours—and not in microseconds or decades. Music and humanity have arisen in tandem, the former out of the bodily activity of the latter, and so music necessarily bears rhythmic traces of our embodiment: pulse, phrase, gesture, ornament. We bob our heads or tap our feet to pulsations in the tactus range, and we breathe or sway along with the phrasing of a singer, and we listen to rapid rhythmic filigree as if it were speech (Iyer 2002).

More than a century after the invention of recording technology, we have become accustomed to recorded, disembodied, and electronically generated music. But still, music tends to bear these same traces of embodiment. Pulse-heavy electronic dance music often makes sonic references to the stomping of feet and to sexually suggestive slapping of skin. It is indeed rather telling that today, the most widespread uses of electronic music are in contexts meant for dance; the least humanly embodied music is ironically that which is *most* dependent on our physical engagement with it. It has emerged in recent decades as a cheaper alternative to human music-making. One can re-create the pulsating texture of dance music without the physical exertion previously required to do so. The idea of a drum loop encapsulates this possibility; one can loop a danceable drum pattern indefinitely through digital means, thereby creating a whole new notion of temporality in music that lies outside of human action, but still elicits it.

Often, popular electronic music plays in the grey area between bodily presence and electronic impossibility. Much of the electronica of the most recent decade (e.g., Squarepusher 1997) displays this playful ambiguity. A sampled beat—i.e., a brief recording of a human drummer—is sliced into small temporal units. These units are played back in rearranged orders, sped up or slowed down, multiply triggered, and otherwise manipulated electronically. Because the original sampled recording bears the microrhythmic traces of

embodiment, the result sounds something like a human drummer improvising with often amusing flourishes and ample metric ambiguity. Momentarily regular, almost human-sounding pseudo-drumming devolves into inhumanly rapid sequences of rhythmic attacks, fast enough to resemble digital noise. Such electronic manipulation of familiar musical sounds serves to problematize the listener's image of a human drummer. These manipulations are typically carried out "out of time" in the studio, in a fashion similar to composition, but object of these manipulations is a human performance that took place "in time." Hence this approach is able to alternately engage and confound our sense of embodied empathy, constructing and deconstructing our mental image of the person behind the sounds.

Hip-hop DJs also enact the play of embodiment, in treating turntables as a kind of improvisational percussion meta-instrument (e.g., X-ecutioners 1997, 2004). Using strategically chosen segments of a vinyl record, the DJ moves the record back and forth with one hand, while creating amplitude envelopes with a fader on a mixer in the other hand. The sound generated is of two general types: one is a percussive scratch derived from rapid motion of the record, and the other is a recognizable, meaningful fragment of recorded music or sound. The latter stroke type often hides the sophisticated, impeccably timed physical gestures involved in their creation, as these gestures are unrelated to the sonic material. The scratch sound, however, bears a direct sonic resemblance to the physical motion involved. There is an interesting continuum between these two general types, and that continuum is navigated improvisationally. A fragment of recorded sound can be manipulated percussively in real time, in a manner that temporarily overrides its referential content, causing it to refer instead to the physical materiality of the vinyl-record medium, and more importantly to the "in-time" embodiment, dexterity and skill of its manipulator.

These twin art forms each create a sustained interruption of the transparency of perception. The listener experiences the disruption-breakage of the physical act of performance, as recorded fragments of human musical acts undergo ironic, physically impossible manipulations (the root *manus* meaning *hand* revealing the counter-embodiment of the manipulator). This is the subtext of the term "broken beat," itself an ironic re-tensing of "breakbeat": the perceptual experience of this music consists of the *recognition of the act of breaking music with the hands*—the metamusical sound of broken music,

of hands breaking the body's beats, of one body taking action upon the sonorous actions of another.

### Concluding Remarks

The understanding of music as sonorous human action occurring "in time" is fundamental to our experience of music. It arises as a consequence of embodiment, and it is an aspect of music-making that is largely taken for granted. The experimental musical improvisations that I have described draw attention to this facet of music, helping us realize the inherent musicality of human activity, and the sense of drama we derive from music as sonorous embodied action embedded in time. The examples of Taylor and Mitchell illustrate some ways in which musical improvisation can foreground its own process, playing the role of experience itself, reminding the listener of one's own act of experiencing it.

Taylor's and Mitchell's approaches share with, say, the X-ecutioners' turntable music a grounding in the improvisational music that emerged from African-American experimental practice in the late twentieth century—and they are perspectives too often neglected by the research community. These are the sorts of perspectives that we need when trying to understand the musical mind, or the science of art, or the relationship of the arts to cognition. We need to maintain as full as possible an understanding of the arts, and to do so we must remain engaged with as many forms of artistic inquiry as we are able. As Ione (2000) notes with respect to Cézanne, many artists knowingly spend long periods of time on the frontiers of their own perception and cognition. What they find there often stretches our conventional notions of beauty, aesthetics, and even the fundamentals of expression; precisely because of this, their work has much to teach us about consciousness.

This article originally appeared in slightly different form in *Journal of Consciousness Studies* (2004).

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## Spin the Painting: An Interview with Nadine Robinson

Alondra Nelson

Nadine Robinson is a London-born, Bronx-based visual and sound artist. She incorporates various mediums in her work and is the creator of "boom paintings"—objects that interfuse the modernist painting tradition with the aural architectonics of black urban culture. Robinson applies "sampling" to art historical concerns, in the process bringing into relief what she perceives to be the imperfections of modernist art practice, and highlighting what she deems the greater promise of aesthetics, which are informed by the cut and mix strategies of hip-hop and technoculture. Her work has been exhibited internationally including at the Studio Museum in Harlem (SMH), The Project (NYC), the Bronx Museum of the Arts, and P.S. 1. Most recently, Robinson's work was shown at "Tempo," the inaugural show of MoMA QNS (Museum of Modern Art, Queens, New York).

*Alondra Nelson:* How did you first come to make art that combines music technology and painting?

*Nadine Robinson:* I live in the Bronx but had a studio on the corner of Canal and Hudson streets in Manhattan. I regularly saw sound equipment at the shops downtown. I also saw many of my relatives, and friends from back in the day in the Bronx, down on Canal Street buying speakers to soup-up their sound systems. After a while, I began to shop at these music equipment stores for new kinds of materials.

I made my first "boom painting" in 1997 while at Skowhegan, an artists' residency in Maine. It was ten inches square. I still have this prototype.

# SOUND UNBOUND

**Sampling Digital Music and Culture**

edited by Paul D. Miller aka DJ Spooky that Subliminal Kid

The MIT Press  
Cambridge, Massachusetts  
London, England