The “PoumTchak” Pattern:
Correspondences Between
Rhythm, Sound, and Movement
in Electronic Dance Music

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2010
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Acknowledgements

This study is part of the project “Rhythm in the Age of Digital Reproduction,” led by professor Anne Danielsen, and co-funded by the Norwegian Research Council and the Faculty of Humanities at the University of Oslo.

Numerous people have supported and helped me in the completion of this study. First and foremost, I will express my gratitude to my supervisor Anne Danielsen for her thorough critical reading, for many inspiring discussions, and a true interest in and support of my work.

Several persons at the Department of Musicology at the University of Oslo have read parts of my thesis and given me valuable feedback: Here I will like to thank Stan Hawkins, Alexander Jensenius, Ståle Wikshåland, Hallgjerd Aksnes, Tellef Kvifte and Mats Johansson. The two last mentioned have also participated in a research group affiliated with the project “Rhythm in the Age of Digital Reproduction.” The other participants, Ragnhild Brøvig-Hanssen, Eirik Askerøi, Kristoffer Bjerke, Kristoffer Karlsen, and Kjetil Klette Bøhler, have also taken part in the many fruitful discussions on rhythm in music. Furthermore, I will like to thank Maria Witek and Anne-Britt Gran for helping me with my survey in chapter 3. At the Department of Musicology, I will also mention Rolf Inge Godøy for recommending literature and helping me with scientific terms, Eystein Sandvik for providing me with material on eighteenth century music listening, Mia Göran and Odd Skårberg for several inspiring conversations, and the administration for support and assistance.

Outside of the department, I will like to thank deejay/producer Gaute Drevdal for sharing his knowledge on dance music production, for giving me access to his huge collection of music magazines, and for pointing me to the French house music label Poumtchak. I will also thank producers Ola Haampland, Kai Robøle, and Ulf Holand for discussing production techniques and deejay/producer/A&R Mike Pickering for sharing his experiences from the British dance music scene.

Nils Nadau, my copyeditor, has not only corrected errors and improved my English, but has asked several critical questions along the way. He has also helped me with several English terms.
Arnie Cox and Guy Madison have participated in discussions on related topics via e-mail, while Kai Fikentscher, Eric F. Clarke, Serge Lacasse, Susan McClary, Simon Zagorski-Thomas, and Mark Butler have all, in relation to their visits to Oslo during these last three years, given me valuable feedback on my project.

I will also like to mention my friends Atle Bøckman who introduced me to the club scene of Oslo in the early 1990s and has provided me with several albums and compilations that have been essential, and MD Morten Hagness who has participated in discussions of perceptual and cognitive processes.

Last, but not least, I will express gratitude to my family: Kristin, for her fantastic support, and Kajsa, Julie, and Linnea for their inspiration.
Introduction

Prologue

THE TWIST AND THE TURN, PART I

Elvis Presley not only introduced rock’n’roll to a broader American audience but also demonstrated an immodest corporeal engagement with the music, in a society where the body was significantly constrained by moral and religious anxiety. Presley and his contemporaries showed a whole new generation of listeners how rhythm in music could cause liberating (and enjoyable) bodily movement. A few years later, in 1960, Chubby Checker released a cover version of a song by Hank Ballard and the Midnighters called *The Twist*. The dance move that followed established *individual* dancing once and for all in modern Western culture. Many of the dance records following *The Twist* provided instructions in the lyrics for how to move to them, but participants invented their own variations as well. As Bill Brewster and Frank Broughton observe in their book about the history of the DJ: “It [*The Twist*] required no partner, no routine, no ritual, no training.”

The fitting term “improvised social dancing” further characterizes this practice of enjoying music through body movement, not as prearranged steps or moves but as an improvisational response to rhythmic elements. During the dance fads of the early 1960s, the disco movement of the mid-1970s, and the rave and club scenes of the late 1980s and 1990s, dancing represented the dominant interaction with music for a large number of participants in popular music culture. Perhaps as a consequence, aspects of groove and rhythmic drive have been increasingly important to the producers of popular music throughout this time period.

Interestingly, the general popular and scholarly discourse on 1960s rock portrays a turn *away* from dancing, towards a listening practice supposedly more focused on the music or its performers. The shift towards this mode of reception for rock was probably also influenced by discourses on jazz and Western classical music. Simon Frith describes the classical concert as “measured by the stillness it commands, by the intensity of the

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1 Brewster & Broughton 2006:66.
2 “Improvised social dancing” is adopted from Fiona Buckland (Buckland 2002:7).
3 The negligible attention given to dance and dance music in rock historians’ overviews of the 1960s probably reflects the new rock audience’s disdain for the more dance-oriented rock’n’roll of the 1950s; see, for example, Stuessy & Lipscomb 2003 and Charlton 2003.
audience’s mental concentration, by the lack of any physical distraction. Equal scholarly status for rock music, might have appeared to require a similar concentrated involvement and attitude of respect towards the music and its musicians. Dancing as a form of musical reception did not fit this picture.

THE TWIST AND THE TURN, PART II

In my hometown in the 1970s, we had a disco at my local youth centre every Thursday evening. Here as a teenager I experienced my first real twisting to music, with a DJ, disco lights, and American dance music. My fascination with dancing (and dance music) took root, and it flourished in the 1980s and even more intensively in the 1990s as the wave of club-oriented dance music swept through various European cities. Spending Friday and Saturday nights at central clubs in Oslo, Norway, I learned to appreciate the great potential for creative corporeal response (or dancing) that was present in this new music.

Concurrently, in the mid-1980s I turned towards an academic study of music and was introduced to a culture in which the corporeal response to music was considered less appropriate. The music I listened to (and danced to) received little attention there. As I became more interested in academic research and music analysis, I began to search for approaches that could measure and explain the qualities of dance music. This quest brought me in contact with two pioneers in popular music analysis: Philip Tagg and Richard Middleton. They saw the need for a dedicated study of popular music given what they perceived to be the inadequacy of analytical methods aimed at Western classical music. Among the shared central premises of their work were (1) that the object of analysis had to be placed within a cultural and historical context and (2) that the central position of notation in music analysis should not dictate the musical parameters to be studied. These premises were further discussed and developed by later scholars. Middleton’s utterly unique work from 1993, where he outlines the theoretical and methodical perspectives for an analysis of “musical gestures,” is particularly relevant.

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5 This is to a certain extent comparable to changes in the scholarly discourses around jazz music. Scott DeVeaux writes: “There is an implicit entelechy in the progression from early jazz to bebop: the gradual shedding of utilitarian associations with dance music, popular song, and entertainment, as both musicians and public become aware of what jazz really is, or could be. With bebop, jazz finally became an art music” (DeVeaux 1998:498; emphasis in the original).
6 Central texts here are Tagg 1982 and Middleton 1983 and 1986 (summarized and continued in Middleton 1990, part 2).
here, demonstrating as it does that an analytical approach might also engage corporeality. But this approach was not adequately developed to deal with the challenges of groove-based dance music. Eventually, then, I realized that I would have to form my own approach. I began with a few simple questions: How do I judge the success of a particular dance track? What do I consider to be the most significant quality of dance music?

These initial questions were not too difficult to answer. For me, successful dance music made me want to move but also made dancing itself fascinating, and the most significant quality was the music’s ability to evoke these movements. But what specifically musical elements brought this about? And how might the moving body be used to measure those elements?

These questions were more challenging. Various contributors to popular music studies have been quite productive in engaging with related topics like associative meanings, identity markers, or generic features, but connections between music and dancing had long been disregarded. Though dancing was recognized as an important factor in the popularity of pop and rock, its perceptual and psychological aspects lay dormant in the scholarship. How could the dancing body, and its apparently unlimited creative response to music be subject to scholarly investigation? I needed a theoretical framework that would be relevant to the culture in question and adaptable to academic exposition.

THE POUMTCHAK PATTERN

How, then, could the twist and the turn – the dancing and the theoretical approach – be brought together? I decided to begin with a rhythmic pattern that I found in myriad dance tracks – from 1970s disco to contemporary electronic dance music. I named this pattern the “poumtchak,” “poum” referring to a bass drum sound and “tchak” to a hi-hat sound (or a similar high-frequency sound). A complete “poumtchak pattern” has bass drum sounds on all of the downbeats and hi-hat sounds on the upbeats (off-beats) between them, and it may comprise the “basic beat” of the track.

This rhythmic pattern seemed especially effective at evoking specific movement patterns in response to it. In its proper cultural context and with the right tempo it

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9 This work is discussed later in this introduction.
10 This pattern will be described in detail in chapter 3 but referred to in overview contexts before then as well. See notational representation on page 89.
appeared to represent a starting point or basic structure for dancing as well as a variety of vertical movement patterns, such as head nodding, foot tapping, or upper-body bouncing, that also appeared off the dancefloor. It presented itself as a nexus for the relations among music, general or unconscious movement, and dancing. There also seemed to be a further correspondence between the bass drum sound and a body movement downward (on the downbeats), and the hi-hat sound and a movement upward (on the upbeats), together comprising a continuous and undulating vertical movement pattern performed with different parts of the body.\footnote{Throughout this study I will refer to body movements such as head nodding, foot tapping and upper-body bouncing as “vertical movement patterns,” and I will largely constrain my use of “movement” to contexts of the body, not the music, except when I am discussing ascending and descending pitch movements.}

On the basis of these observations the main questions for this study became the following: Is there a significant and relatively consistent correspondence between the musical poumtchak pattern and vertical movement patterns within the club-oriented dance music culture? If so, how might this correspondence assist in illuminating the musical qualities of dance music tracks?

\section*{The project: choices, limitations and terminology}

\section*{THE MUSIC}

The most important criterion for choosing the music for this study was, of course, the presence of the poumtchak pattern. This pattern is most dominant in a specific genre of club-oriented dance music called “house,” but it also appears frequently in other contemporary genres such as “trance,” “techno,” and “dance,” and in earlier musical influences such as “Chicago house” and “disco.” Though the average tempo of these genres differs, the standard tempo of consideration in this study is from around 120 bpm (beats per minute) to 135 bpm. I have chosen to focus primarily on house music tracks from the “post-rave era” of the mid- to late 1990s, when dance music culture had moved from large rave events to clubs. I will look especially closely at two dance acts, Basement Jaxx (British) and Daft Punk (French), both of which were central contributors to the dance music of this period.

Throughout this study I will use the term “electronic dance music,” to encompass all of the various genres and subgenres of music related to club culture. I will employ specific genre names when they are relevant. I will use the term “groove-based music” to
designate music with an *explicit* focus on groove-producing features. Because I link groove to those body movements that are activated by the rhythmic elements of the music, many musics are in fact “groove based”; furthermore, a focus on song, mood, melody, or harmony does not preclude an equal focus on groove. I use the term “groove-oriented,” then, to refer to music where groove plays a somewhat more subordinate role.

THE MOVEMENTS

To limit the often unrestrained movements of “improvised social dancing” for the purposes of analysis, I take as my point of departure the vertical movement patterns of head nodding, upper-body bouncing, and to a certain extent foot tapping. These commonly anticipate actual dancing within club culture but can also be part of it. Through these basic movements I will be able to present some fundamental features of the corporeal response to electronic dance music, and in particular to the pounmtchak pattern. I will then expand my analysis to include the effect of other interacting sounds and rhythmic patterns in producing variation and suspense to the basic movement pattern.

The cycle created by such vertical movements (which starts at a middle position, drops to a low position, lifts to a peak position, and then returns to the middle position) is my most productive unit of measure. The musical entity corresponding to this movement pattern I have named the “beat-cycle”; instead of referring to four measures of 4/4 as sixteen beats, then, I will call it sixteen beat-cycles. Moreover, when describing the positions of rhythmic events in regard to a rhythmic structure, I will use the terms “downbeats” and “upbeats” rather than “strong beats” and “weak beats” or “beats” and “off-beats.” I explain these choices further in chapter 5.

THE THEORY

My theoretical foundation for this study resides comfortably within hermeneutic musicology and popular music studies, where various analytical approaches have inspired me. First of all, Robert Walser insists significantly that “music analysts need to be able to account for a music’s appeal”12 and promotes research that is concerned with “understanding how music works and why people care about it.”13 Through his objects of analysis he demonstrates that *any* music that has ever been meaningful to a particular

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12 Walser 2003:37.
13 Ibid.:38.
audience is worthy of analytical study. Twenty years before, Philip Tagg had observed further that “it seems wise to select an AO [analysis object] which is conceived for and received by large, socioculturally heterogeneous groups of listeners rather than music used by more exclusive, homogeneous groups, simply because it is more logical to study what is generally communicable before trying to understand particularities.”

Such perspectives validate my interest in (1) a genre of music that is popular among large groups of listeners but not often the target of music analysis, and (2) a rhythm pattern whose simplicity might otherwise discourage musicologists, musicians, and music enthusiasts from pursuing it. Stan Hawkins’s writings on dance music and Anne Danielsen’s studies on grooves in funk music further validated my choices.

Tagg’s hermeneutic-semiological method for popular music analysis also introduced “musemes” as “minimal units of expression.” He describes musemes as meaningful components in music (similar to morphemes in language) and uses them in his analytical model to elucidate content and meaning in music. Tagg’s examples from his own analytical works do not involve corporeal reactions to music, but the musemes would appear to be equally relevant there. Richard Middleton then formulated the term “musematic repetition” on the basis of Tagg’s musemes to describe the consistent recurrence of shorter, typically rhythmic units over longer periods in a piece of music (in contrast to “discursive repetition” which involves longer units and more variation). Among Middleton’s many examples of musematic repetition are rhythmic patterns such as the “back-beat” or the “eight-to-the-bar.” Following from these early studies in popular music analysis, I have come to regard the poumchak pattern as a “minimal unit of expression” as well, one that plays a significant role in lending meaning to music.

Tagg also observed that “a holistic approach to the analysis of popular music is the only viable one if one wishes to reach a full understanding of all factors interacting with the conception, transmission, and reception of the object of study.” He then pointed out that the level of multidisciplinary knowledge that would be required for such an approach is beyond the reach of the individual researcher who might instead pursue

14 Tagg 1982:47.
16 Tagg 1982:45. The term “musemes” was originally invented by Charles Seeger (Seeger 1960).
17 See Middleton 1983:238.
18 Ibid.:258.
19 Tagg 1982:44.
“degrees of inter- and intradisciplinary outlook.” In this study I have attempted to introduce different theoretical perspectives in hermeneutics and the humanities, building upon the inclination in popular music studies to incorporate work from cultural studies, anthropology, and media studies. Moreover, I have been interested in exploring contributions from disciplines such as linguistics, psychology, and neuroscience. Certain perceptual and cognitive processes can illuminate connections between rhythm in music and body movement. Studies that are particularly relevant here include James J. Gibson’s publications describing his “ecological approach” to perception and Eric F. Clarke’s book Ways of Listening, which builds on Gibson’s approach with regard to music; Mari Riess Jones’s theories about attention and expectation in music listening, and especially her description of “entrainment”; and the metaphor theory of Lakoff and Johnson within cognitive semantics concerning verticality in music. These scholars’ work is presented in more detail in chapter 4 (part 2).

Other relevant theoretical contributions will arise in this study as various topics require them. Later in this introduction I will discuss corporeality in music listening in relation to various fields of musicology, including especially music psychology, ethnomusicology, and popular music studies. Two analytical works that are both relevant to my own approach are Richard Middleton’s discussion of gestural analysis of popular music and Jan Petter Blom’s studies of Norwegian folk dances.

The first two chapters of this study introduce the historical and cultural context of my objects of analysis. I present theoretical perspectives concerning, for example, authenticity in club culture (Thornton), and the relevant literature mainly arises from the field of cultural studies and its related disciplines. Though my work is obviously firmly linked to popular music studies through its focus on popular music and its culture, several issues that are familiar to the field will not come up much, including questions of ethnicity, gender, race, and class. My focus here remains on musical features within grooves and their correspondences to patterns in body movements. Nevertheless, the

20 Loc. cit. Emphasis in the original.
22 See, for example, Fikentscher 2000 and Buckland 2002.
cultural context where the music in question is produced is presented to provide an essential backdrop to the discussions and analyses of the music.23

I discuss theoretical perspectives connected to the topics of rhythm and groove in chapter 5, preceding my analyses of rhythm in chapter 6. Two central books – Anne Danielsen’s Presence and pleasure: the funk grooves of James Brown and Parliament and Mark Butler’s Unlocking the grooves: rhythm, meter, and musical design in electronic dance music – present interesting if diverging approaches constructed in turn on the rhythm theory of African and African American music (Danielsen) and of Western classical music (Butler). Butler’s book also comprises the most thorough academic study of club-oriented music to date, offering discussions and analyses of rhythmic structures in relation to musical meter. Not many other popular music studies of club-oriented music exist that include music analyses, save for articles by Tony Langlois and Phillip Tagg from the early 1990s and a few later studies by Stan Hawkins.24

Books and articles dealing with research on music technology and sound within popular music studies have informed my analyses of sound elements in chapter 8, which are preceded by a chapter in which relevant theoretical perspectives are introduced.

THE SURVEY

Philip Tagg’s analytical method for popular music includes a technique he calls “hypothetical substitution”25 for testing our assumptions about various qualities of this music. He finds “items of musical code”26 first in the object of analysis, then in the music to which he will compare it, and then he tests for similarities and differences by changing out the items between the two musics. I will return to this technique in chapter 3, but I mention it here to draw attention to his belief that popular music can be approached by avenues other than mere subjective interpretation.

Since the poumtchak pattern is my analytical point of departure, I think it is vital to establish a wider perspective concerning its significance to the audience in question. This perspective, presented in chapter 3, includes a survey that I have conducted with music students, preceded by an additional, more exploratory survey I conducted with respondents from a Facebook group related to house music. The main survey was

23 Butler lists numerous possible topics and subtopics that can be relevant to the study of electronic dance music; see Butler 2006:6.
25 Tagg 1982:45.
26 Ibid.:49.
intended to gauge the extent to which people tend to move in the same direction when listening to music with the poumtchak pattern. It was carried out as a web-based survey, where eleven questions were connected to five musical excerpts and respondents were asked to report on their experiences of body movements. (A further description of the survey follows in chapter 3.)

THE ANALYSES

In early attempts to analyze popular music, approaches were simply borrowed from the Western classical music tradition without any real challenge to their relevance.27 When more appropriate methods for studying popular music would be developed, they would typically satisfy the specific desire to elevate popular music studies within the established musicological tradition. Thus many analyses continued to reflect the values commonly attributed, rightly or wrongly, to Western classical music. Anne Danielsen writes: “Linear, teleological, or ‘closed’ musical forms are in a larger historical and geographical context the exception rather than the rule. All the same, they hold a privileged position in the West, not only within musicology but in the general populace: the underlying values of this notion of music, such as unity, development, and complexity, have come to characterize the very notion of music itself.”28 In her study of funk music, on the other hand, Danielsen determines that grooves are the most significant components of the reception of the material in question, while linearity and development are less relevant.29 Grooves are my main interest here as well, because they expose the relevant correspondences between music and body movements. Thus, there are no analyses of large-scale structural forms in this study.30

Numerous scholars within various fields of musicology have emphasized the importance of movement to the reception of music.31 In popular music the capacity to evoke body movement is constantly under consideration, even when the music is not specifically regarded as dance music. Still, there have not been many attempts to develop methods for studying the relationship between musical features and body movements,

27 See Middleton 1990:115–118 and Moore 2001:11ff for discussions of studies that are problematic in this respect.
28 Danielsen 2006:150.
29 See also Walser 2004, where grooves are very important to his understanding of the popularity of the group Earth, Wind and Fire.
30 Examples of analyses of large-scale structural forms in electronic dance music can be found in Hawkins 2003 and Butler 2006, chapter 6.
and I try to rectify this through my analyses of grooves in electronic dance music tracks. The poumtchak pattern is my point of departure, and other elements and events are analyzed primarily in relation to this pattern. The potential for movement in specific grooves was first apparent from my own subjective experiences; this gives rise in turn to suggestions for movement patterns that are then drawn into notational representations or sonograms of the music.

In relation to this, it is important to address the presence of the writer and especially the body (and mind) in the analyses of music in this study. Being white, male, heterosexual, European, and in my mid-forties, I am part of the dominant group of contributors to musicology. But my background with clubbing and dancing may allow me further insight into the culture in question, in relation to corporeality and to the production of music there. Around the turn of the millennium I took part in a music project (with four musicians) that focused mainly on house and techno music; we released a twelve-inch single and performed at various clubs in Oslo. I have been composing and performing music using sequencers, drum machines, and synthesizers since I first played in a synth band in the mid-1980s. I therefore do not attempt to inhabit some sort of neutral position in relation to this music. On the contrary, my background as a musician, fan, and dancer clearly resonates throughout the whole study. Thus, in line with Richard Middleton’s description of the “scholar fan” in his article on musical gestures from 1993, this study is conducted with an honest devotion to the music.

I have decided mainly to deal with cultural context, rhythmic elements, and aspects of actual sound separately, though I attempt to unite them in my concluding analysis here. Sonograms support the analyses in chapter 6 and 8 because their visual display with a vertical axis that reflects musical verticality (from low to high frequencies) resonates well with the vertical movement patterns of my interpretations. I will briefly introduce my use of sonograms here; my analytical approach is presented in chapter 6.

**Sonograms**

Sonograms (or spectrograms) represent sound through stored digital information in a sound file. The computer program analyzes this file (using FFT, or “fast Fourier transform” algorithms) and displays the result as a graph, with frequency on the vertical

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33 The sonograms in this study are made in the software computer program Amadeus Pro.
axis and time on the horizontal axis. Dynamics are displayed through degrees of density in the colouring. Harmonic sounds appear with the fundamental tone (with most density) lowest and with its harmonics as identical lines above. I consistently use a logarithmic scale for the frequency axis, as seen in fig. 0.2, which allows for lower frequencies to occupy a larger portion of the visual representation, so as to demonstrate more clearly the contrast between high and low frequencies. In contrast to a linear scale (fig. 0.1), this option also better parallels what we actually hear when listening to music, since the frequency (and loudness) response of the ear is more accurately represented logarithmically.\(^\text{34}\)

In the two sonograms above, the bass drum sounds are seen as four dark areas towards the bottom (on figure 0.1, they are in fact only thin dark lines), while the hi-hat sounds are displayed as four pillars. As can be seen, the hi-hat sounds occupy a much larger portion on the sonogram using the linear scale than on the logarithmic version. In my analyses I take advantage of the options in the computer program to alter my logarithmic settings, zooming in on those features I want to portray. Thus the settings will not be constant across sonograms (except when two or more are placed within the same figure). Both the horizontal and the vertical axes may occupy different areas in relation to time or frequency range, and the density that represents dynamics can be altered as well to display the elements in question most clearly. The FFT window size has for the most part been set to 1024 samples (sample rate 44.1kHz), but has occasionally been varied for the

\(^{34}\) Hawkins uses a sonogram with a linear representation of the material in his study of a dance music track. The area below 1000 Hertz, however, which is generally very important in dance music, then occupies only 1/17th of the vertical scale. See Hawkins 2003:93.
same purpose. Similarly, I mainly use a rectangular window type.\textsuperscript{35} I intend for these sonograms, sometimes in combination with traditional notation and amplitude representations, first and foremost to escort listening by displaying those musical elements that I want to highlight in my analytical interpretations.

**Music and body movements**

Corporeality in music has been a rather neglected issue in musicology. Why is this so? And how is this related to prevailing opinions about music listening? Is corporeality dealt with differently in the various fields of musicology? Can it be addressed in a music analysis? As an introduction to the topics of this study, these questions will be considered here.

**CORPOREALITY IN MUSIC LISTENING**

The connection between music and body movement seems immediately obvious already in light of how musical sound is made. Body movements produce sounds on instruments, and very few musicians are able to play properly without a repertoire of auxiliary movements as well:\textsuperscript{36} the jazz pianist might tap his or her foot to keep time, while the classical clarinettist might embody his or her melodic phrases through dips of head and shoulders.\textsuperscript{37} Such connections are equally apparent in the reception of music, and especially dance music – body movements respond to specific features in the music of choreographed classical ballet, stylized folk dance, and improvised club dance. But movement is also part of the reception of music not intended specifically for dancing. As Simon Frith writes in the influential book *Performing Rites*, “A good rock concert . . . is measured by the audience’s physical response, by how quickly people get out of their seats . . . by how loudly they shout and scream. And rock performers are expected to revel in their own physicality too, to strain and sweat and collapse with tiredness.”\textsuperscript{38} In most popular music, jazz, and almost any folk music, the connection between music and body movement for performer and listener is obvious from various incidences of foot

\textsuperscript{35} FFT window size determines the lengths of the “time windows” used in an FFT analysis. Both time and frequency features are resolved fairly well at the medium length 1024 Hz. See Roads 1996:564–566 for an outline of the advantages of various window sizes. Window type determines the shape of these “time windows.”

\textsuperscript{36} See further discussion of musician’s movement repertoires in Jensenius 2007:54.

\textsuperscript{37} The music educator Emile Jacque-Dalcroze (1865–1950) advocated an educational method (“eurhythmics”) that centred on rhythm and body movement; see Abramson 1986, Waadeland 2000:95ff.

\textsuperscript{38} Frith 1996:124.
tapping, head nodding, body swaying, clapping, singing along, doing dance-related movements, or in various ways mimicking sound-producing actions (playing “air guitar”).

In the Western classical music tradition this connection may well appear less relevant. The conductor may gesticulate exaggeratedly and the musicians certainly move while producing sound, but concert hall audiences are generally supposed to sit perfectly still, participating in the event only through mental concentration. Describing the listening environment of the concert hall, Patrick Shove and Bruno Repp write, “A social proscription against overt movement by listeners has long been in effect.” The ideal of silent, attentive listening in concert halls is a social phenomenon that advanced only during the nineteenth century. Richard Sennet writes:

To sneer at people who showed their emotions at a play or concert became de rigueur by the mid-nineteenth century. Restraint of emotion in the theater became a way for middle-class audiences to mark the line between themselves and the working class. A “respectable” audience by the 1850s was an audience that could control its feelings through silence; the old spontaneity was called “primitive.” The Beau Brummell ideal of restraint in bodily appearance was being matched by a new ideal of respectable noiselessness in public.

While Sennet occupies himself with the sociological causes for this shift, James Johnson views it in relation to the music that was introduced at the time – for example, the work of Beethoven, which according to Johnson, simply demanded more concentrated listening. Johnson, as well as Lydia Goehr, disdains the eighteenth-century audience for being primarily occupied with social activities when attending concerts. William Weber in turn takes both to task for endorsing a specifically post-Romantic view of listening that is replete with distrust of “any fusion between music and mundane social activities which are felt to violate the integrity of musical experience.”

Eric F. Clarke suggests that an ideological component – some understanding of what constitutes “proper listening” – may be “the most significant factor in the listening environment.” And the noisier and rather unrestrained listening environment of the eighteenth century may well have been more receptive to music that invited corporeal involvement. After the premiere of his Symphony No. 31 (the “Paris” symphony) in

39 Shove & Repp 1995:64.
40 Sennet 1974:206.
41 See Johnson 1995.
1778, Mozart wrote the following in a letter to his father: “Just in the middle of the first Allegro there was a passage which I felt sure must please. The audience were quite carried away – and there was a tremendous burst of applause. But as I knew, when I wrote it, what effect it would surely produce.” The passage Mozart refers to has two quite intense ascending pitch movements, each followed by a slower descending movement, and they probably inspired the applause, figuratively (and perhaps literally) lifting the audience. Mozart would almost certainly not have achieved the same overt response from his audience a century later, and this absence of an immediate and satisfying response to the corporeal effects of music may have pushed subsequent generations of composers in new directions.

The shift to an ideal of silent, attentive listening during the nineteenth century is probably part of a complex train of events regarding new musical priorities. Jeremy Gilbert and Ewan Pearson point to Western philosophy’s dismissal of corporeality in musical experiences.

Music is understood by this tradition as being problematic in its capacity to affect us in ways which seem to bypass the acceptable channels of language, reason and contemplation. In particular, it is music’s apparent physicality, its status as a source of physical pleasure, which is problematic. By the same token, this tradition tends to demand of music that it – as far as possible – be meaningful, that even where it does not have words, it should offer itself up as an object of intellectual contemplation such as is likely to generate much meaningful discourse. Even those forms of modernist music which have aspired to pure abstraction (in particular the tradition of serial music), have been written with an emphasis on complexity and a deliberate intellectualism which foregrounds the music’s status as objects of rational contemplation rather than as a source of physical pleasure.

Though the Western philosophical tradition obviously comprises a wide range of understandings and beliefs, Gilbert and Pearson raise a compelling point. Its emphasis on rational thought has probably encouraged composers, musicians, critics, and scholars to focus on intellectual approaches to music rather than corporeal ones. The ultimate ascension of the intellectual approach to music listening – for example, the descriptions of listening types by Theodore Adorno – and its emphasis on the structure,
development, and linearity of musical works are at least partially to blame for the Western scholarly disinterest in connections between music listening and body movements even in the twentieth century. Andrew Dell’Antonio observes that “structural listening highlights an intellectual response to music to the almost total exclusion of human physical presence – whether that of the performer or that of the listener.”

In contrast, new listening environments connected to jazz and popular music from the mid-twentieth century on not only endorsed corporeality in music listening but if fact sought it. The music, with its focus on rhythm, encouraged participation via overt body movements and dancing. And at the end of the century, needless to say, these new traditions had come to dominate Western music cultures.

The longtime suppression of corporeality in Western classical music shaped the various fields of musicology and their areas of interest, few of which involved the body. Even in the field of music psychology, most of the research projects related to music listening have been conducted using Western classical music. Thus the attentive but physically passive way of listening associated with this music culture has provided the overarching model for research in this field. With the more recent interest in corporeality within the field of cognitive psychology this has begun to change, but the discipline is still influenced by its traditional tendency to discount the human body in its inquiries.

CORPOREALITY IN THE FIELD OF MUSIC PSYCHOLOGY

In her book Deep Listeners: Music, Emotion, and Trancing the ethnomusicologist Judith Becker points to the influence of Cartesian mind/body dualism on Western thinking in general, and theories of music psychology in particular: “Musical thinking was clearly

translated into corresponding physical movements (bobbing, oscillating, tapping, and so on). Adorno does not account for this.

Within aesthetic philosophy in recent years, however, there has been a turn towards an engagement with bodily experience. Writers like Jean-Luc Nancy, Jonathan Ree, Richard Shusterman, and Hans Ulrich Gumbrecht have situated the body solidly within the aesthetic experience. See, for example, Nancy 1996, Ree 1999, Shusterman 2000, and Gumbrecht 2004, all of which are influenced in various ways by Maurice Merleau-Ponty’s Phenomenology of Perception (1962). Roland Barthes’s several texts on the significance of the body in music listening are also relevant (see Barthes 1985).

Dell’Antonio 2004:8. Structural listening is also discussed in Subotnik 1988 and Cook 1990.

Music psychology (or music cognition) has not been recognized as a discipline within musicology until recent years. Its flowering in the 1980s marked the beginning; the first edition of Diana Deutsch’s (ed.) The Psychology of Music was published in 1982; the Society for Music Perception and Cognition was established in 1983; the first issue of the journal Music Perception came out the same year; and the first International Conference on Music Perception and Cognition was held in Kyoto, Japan in 1989.
within the realm of *res cogito*, intentional, imaginative, cognitive, in the brain.”

The linguist Noam Chomsky largely maintained a Cartesian dualism in his own works, focusing exclusively on mental as opposed to physical processes concerning language.

Through his contributions to theoretical linguistics and generative models of grammar, he exerted a powerful influence upon musicologists who sought similar models for music.

Within music psychology, such models also provided an important theoretical and methodological foundation whose hierarchical relationships in musical structures could be in turn reapplied to cognitive matters. Chomsky’s focus on mental processes transferred particularly smoothly to models where musical entities were treated exclusively as “mental products imposed on or inferred from the physical signals.”

Vijay Iyer critiques this view:

However, because so much musical behaviour is nonlinguistic in nature, music tends to challenge dominant linguistic paradigms, which reduce all cognition to rational thought processes such as problem solving, deductive reasoning, and inference. With its emotional and associative qualities and its connection to dance and ritual, music seems to provide a counterexample to such theories of mind.

Musicology in the 1980s was even more centred on Western classical music than it is today, and so music psychologists formed the various areas of investigation within their discipline accordingly. Problems related to rhythm were thus given far less attention than those related to pitch or melody. Norms for listening practices from classical music concert halls were relocated to the laboratory, where experiments were conducted in sedentary, undisturbed settings far removed from social contexts (and often actual musical contexts as well). A typical rhythm study might be carried out as a scientific experiment with headphones and non-musical sounds, whereby subjects would be asked to perform various finger tapping operations in the interest of quantifiable data. In such experiments, body movements related to the music (other than the finger tapping) were

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52 Becker 2004:5, emphasis in original.
53 See Chomsky 1966. For a critique of Chomsky’s reliance upon Cartesian dualism, see Lackoff & Johnson 1999, chap. 22.
58 In the first edition of Deutsch’s *The Psychology of Music* (1982) there are four chapters concerned with pitch and one chapter concerned with rhythm and tempo. Benadon discusses the same disparity in studies of jazz music; see Benadon 2006:73.
59 See, for example, Deutsch 1983. Since music psychology in this way inclined to the natural sciences rather than the humanities, it failed to impact traditional musicologists concerned with aesthetics or history.
rarely an issue. Moreover, the relevance of different aspects of sound for the perception of rhythm was hardly ever discussed. While such experiments certainly produced significant empirical material, an ignorance or dismissal of their shortcomings often led to debatable conclusions, especially with regard to those musical cultures that are relatively distant from Western classical music.60

In the 1980s, then, the field of cognitive science came to rely upon a theoretical approach to human cognition that likened it to the information processing of a computer. In such models music could be reduced to strings of symbols that might in turn be subjected to algorithmic operations. Faith in quantitative scientific methods and the ultimate transparency of mental processes underpinned all.61 This information-processing model probably shaped thinking on issues related to cognition considerably, as Eric F. Clarke writes: “The standard information-processing account tends to be disembodied and abstract, as if perception was a kind of reasoning or problem-solving process, reflecting the strong influence of cybernetics, information theory, and artificial intelligence on cognitive psychology.”62

Within the discipline of music psychology, then, processes related to music perception were modelled on computers, often in collaboration with computer music research and the development of software for algorithmic composition.63 Yet computers could not deal with too many perspectives or conditions simultaneously.64 As computers expanded in processing power, more sophisticated artificial models of cognitive processes began to arise. Following certain developments in the fields of psychology and computer science,65 “connectionist computer models” replaced rule-based systems in realizations of “artificial neural networks.” The main improvement of the connectionist model was its ability to learn from experiences.66 In a book on music and connectionism, Peter Todd and Gareth Loy describe the heady possibility of such models: “Their ability to learn and store information, satisfy multiple constraints simultaneously, categorize stimuli, abstract features, create new representations, complete patterns, and generalize to

60 See Windsor & Desain 2000:xiv for a prudent position concerning the pros and cons of laboratory-based rhythm research.
61 The most categorical accounts of this approach are usually labelled “cognitivism”.
62 Clarke 2005:15.
63 See, for example, Piszczalski & Galler 1982.
64 An important critique of the computer model came from Hubert Dreyfus; see, for example, Dreyfus & Dreyfus et al. 1986.
65 These developments were initiated in part by Rumelhart and McLelland and their two-volume work Parallel Distributed Processing from 1986.
66 See Todd & Loy 1991 for articles on music and connectionism. See also Clarke 2005:25–32 for a comparison of connectionism to an ecological approach to perception.
novel inputs in ways akin to human and animal behavior makes these systems particularly attractive for modeling a variety of phenomena. Tasks such as classifying melodies based on certain learned empirical material within a restricted musical context could be achieved rather successfully, but even quite sophisticated models were unable to emulate the complex, often unconscious interaction of body and mind in human perception. In music cultures focused on dance and bodily participation, these are pivotal issues, as Becker points out:

To those who use the traditional models of music cognition, the idea of incorporating a much messier, much more complex, and uncertain model based on biology and phenomenology can seem like a giant step backward, away from scientific elegance, away from empirical controls, away from universality. Yet we experience music with our skins, with our pulse rates, and with our body temperature. To subscribe to a theory of musical cognition which cannot deal with the embodiment of music, of the involvement of the senses, the visceral system, and the emotions is to maintain a Cartesian approach of mind/body dualism.

Certain individual contributions within the field of music psychology – especially those related to rhythm – defy this stereotypical lack of “embodiment.” Paul Fraisse, a distinguished contributor within the field, incorporates an awareness of various corporal practices as a starting point for an understanding of rhythm: “Both animals and people move about with rhythmic movements characteristic of their species.” Certain other studies of rhythm and/or performance from the 1980s also integrate an understanding of the moving body into music psychology in various ways.

More recently there has been an increasing awareness of (and interest in) the cultural and body-related aspects of cognition. A growing literature within the fields variously connected to cognition (including neuroscience, psychology, linguistics, and computer science) deals with topics like embodiment, the embodied mind, the embodied existence, embodied interaction, or embodied cognition. As professor of philosophy Shaun Gallagher writes in his 2005 book How the Body Shapes the Mind: “Bodily

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69 Fraisse 1982:151. For a short introduction to the work of Fraisse; see Clarke 1999:473ff. Clarke writes that “the relationship between perceptual capacities, sensorimotor organization, and human development is paramount” in the work of Fraisse (1999:474). In one study Fraisse found a regular 1:1 movement to be by far the most common result of spontaneous tapping among test subjects: “Fraisse regarded this as intimately connected with anatomical and motor properties – most notably the bilateral symmetry of the body, the pendular movements of the limbs in walking and running, and the regular alternation of exhalation and inhalation in breathing” (1999:474). These connections are also relevant to my considerations of movement patterns related to the rhythmic poutchak pattern.
70 See, for example, Baily 1985, Kronman & Sundberg 1987, and Parncutt 1987.
movement is closely tied in various ways to perception and to other forms of cognition and emotion. Indeed, there is now a large amount of evidence from a variety of studies and disciplines to show that the body, through its motor abilities, its actual movements, and its posture, informs and shapes cognition.” These changes in scholarly approach are also visible at international conferences on music and gesture and within a growing literature on embodied perspectives in music. Mark Leman suggests the following premises for an embodied music cognition:

The human body can be seen as a biologically designed mediator that transfers physical energy up to a level of action-oriented meanings, to a mental level in which experiences, values, and intentions form the basic components of music signification. The reverse process is also possible: that the human body transfers an idea, or mental representation, into a material or energetic form. This two-way mediation process is largely constrained by body movements, which are assumed to play a central role in all musical activities. The embodied music cognition approach assumes that the (musical) mind results from this embodied interaction with music.

CORPOREALITY IN ETHNOMUSICOLOGY AND POPULAR MUSIC STUDIES

Ethnomusicology and popular music studies have also been influenced by the priorities within musicology, so corporeality in music has been a somewhat controversial issue. Nevertheless, the presence of a connection between music and body movements has typically been more evident in the various music cultures engaged by these disciplines, and the topic has been discussed in a variety of ways.

Ethnomusicological studies of African music cultures have in particular contrasted those habits of musical participation, body movement, and dance with their Western alternatives. John Blacking, an influential figure in ethnomusicology and writings on African music, edited a volume entitled The Anthropology of the Body in 1977. Though Blacking’s interest was in cultural processes and the body in social constructions, some of the volume’s contributors dealt more directly with music and bodily movements, in both performance and reception (that is, participation in various music-centred gatherings). John Miller Chernoff wrote in 1979 that the most fundamental cultural aesthetic in Africa is probably expressed through bodily

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74 Leman 2008:xiii.
75 See, for example, Kubik 1977 and Baily 1977.
participation: “When you ask an African friend whether or not he ‘understands’ a certain type of music he will say yes if he knows the dance that goes with it.”  

This close relationship between music and dance was also emphasized by J. H. Kwabena Nketia in his 1974 book on the music of Africa:

> Although purely contemplative music, which is not designed for dance or drama, is practiced in African societies in restricted contexts, the cultivation of music that is integrated with dance, or music that stimulates affective motor response, is much more prevalent. For the African, the musical experience is by and large an emotional one: sounds, however beautiful, are meaningless if they do not offer this experience or contribute to the expressive quality of a performance.  

In a chapter titled “Interrelations of Music and Dance,” Nketia continues, “Motor response intensifies one’s enjoyment of music through the feelings of increased involvement and the propulsion that articulating the beat by physical movement generates.”  

This also holds true, of course, for the audiences of popular music and dance music, and may partly explain those genres’ immense increase in popularity over the previous century.

The link between music and body movement also enters discussions concerning the African influence on African American music, as Olly Wilson observes about “music-making within the Afro-American context”: “This attitude is an important part of the approach to making music which the ‘African exiles’ brought with them as subliminal cultural baggage when they came to the Western Hemisphere.”  

Frith discusses the problems associated with defining African culture “as the body, the other of the bourgeois mind,” arising as it does from a musical mind/body split where some music is “heard as physical (fun), other music as cerebral (serious).”  

Barbara Ehrenreich points out that the European conquerors of the sixteenth to the nineteenth centuries continuously met with indigenous rituals consisting of dancing, singing, and chanting, often by people in ecstatic or trancelike states: “Europeans tended to view such activities, wherever they found them, as outbreaks of devil worship, lasciviousness, or,
from a more ‘scientific’ perspective, hysteria.”

This gave rise to a connection between the “savage” or “primitive” and the physical dimension of music related to dance and rhythm. Anne Danielsen describes further how Europeans have identified themselves in opposition to African culture: “The representation of African or black culture as barbarian in this sense has been part of the Western understanding of itself for centuries.”

She identifies a “metonymic relation” here, where concepts related to the culture-nature axis “such as (mind-)body, (intellect-)emotions, (complexity-)simplicity” are associated with European or African culture, respectively. Danielsen also observes that studies of African music have in fact been reduced to analyses of rhythm, and how the consideration of physicality within black music has revolved mainly around sexuality.

In popular music culture, the “otherness” of African American music is often elevated and valued for the same dubious reasons it was traditionally suppressed within European music culture. Gilbert and Pearson describe, for example, how rave culture uses implications of “primitivism” such as “ecstatic rituals” and “dance tribes” in their advertisements.

In an article from 1994, Susan McClary and Robert Walser discuss the theorization of the body in African American music, warning against dichotomies between music cultures based on their relation to the body.

For in such accounts, the mind and culture still remain the exclusive property of Eurocentric discourse, while the dancing body is romanticized as what is left over when the burdens of reason and civilization have been flung away. The binary opposition of mind and body that governs the condemnation of black music remains in force; even when the terms are inverted, they are always ready to flip back into their more usual positions.

Popular music scholars, then, may be reluctant to address corporeality in music for fear of constructing dichotomies like those described by McClary and Walser. One way around this is to make perfectly clear that considerations of the body relate to all music and to elevate the purpose and meaning of corporeality in music. A dismissal of the issue

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85 Loc. cit.
86 Loc. cit.
87 Western dichotomies between manual labour and intellectual work, or physical education and theoretical subjects, may also contribute to the elevation of the intellectual approach in these studies.
89 Ibid.:27.
91 McClary & Walser 1994:76.
altogether may on the other hand work against those genres of music where the appeal to participation with a moving body is most apparent.

Dance music and club culture has occasionally been a focal point of investigation in popular music studies and, to a greater extent, in the related field of cultural studies. The contextual significance of body movement has been present in most of this work. Buckland describes how “the pulse felt as if it was coming from deep inside your body. This connected the body with the soundscape environment, so that, rather than being acted upon, participants actively engaged and intervened with the soundscape.” Though a few scholars of musicology have tried to tackle the challenges put forward by club-related dance music, new analytical methods are needed to address the connections between the body and these “soundscapes” more thoroughly.

CORPOREALITY IN MUSIC ANALYSIS

But how should a music analysis incorporate corporeality? This question has rarely been tackled. In the following I will present two attempts to do so, one from popular music studies and one from ethnomusicology. They represent influential precedents to the analysis I will present in this study.

The gestural analysis of popular music

In his 1993 article “Popular Music Analysis and Musicology: Bridging the Gap,” Richard Middleton pursues a “theory of gesture” that recognizes affective, cognitive, and kinetic aspects of music. He asserts that “how we feel and how we understand musical sounds is organised through processual shapes which seem to be analogous to physical gestures.”

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93 An exception is Philip Tagg’s article on rave music from 1994. He explicitly rejects the issue of corporeality, instead focusing on the non-individualist character of both the music and the culture. See Tagg 1994:211–212.
94 Buckland 2002:70.
95 See, for example, Hawkins 2001, 2003 and 2008, and Butler 2006.
96 Krumhansl and Schenck (1997) have conducted an experiment on how a dance performance may reflect the structural and expressive qualities of Mozart’s Divertimento No. 15.
97 His use of the term “gesture” resembles how Rolf Inge Godøy and Marc Leman defines the term “musical gesture” as a combination of sound and movement that affords meaning. See Godøy & Leman 2010.
98 Middleton 1993:177. His use of the term “gesture” resembles how Rolf Inge Godøy and Marc Leman defines the term “musical gesture” as a combination of sound and movement that affords meaning. See Godøy & Leman 2010.
99 Anne Danielsen, on the other hand, uses “figure” and “gesture” to distinguish between sounding and non-sounding reference levels – “figure” comprises a virtual aspect of the “gesture,” then, in line with the relationship between “sentence” and “utterance” in linguistics. A figure might be fulfilled through a variety of gestures but remains virtually present within the musical “schema” regardless. Danielsen does represent the figure through notation, but she is quick to point out the limitations involved here, especially with regard to a funk groove. “Schema” recalls the work of the Danish linguist Louis Hjelmslev; Danielsen also relies upon the philosophers Gilles Deleuze, Paul Ricoeur, and Mikhail Bakhtin, and the linguists Ferdinand de Saussure and Emile Benveniste. See Danielsen 2006:46ff.
100 Middleton 1993:177.
Concerned that the actual sounds in music are not sufficiently studied via traditional approaches, Middleton wants to renegotiate “the level of primary signification”\(^{99}\) in order to bring “the patterns created in the sounds themselves back into the foreground.”\(^{100}\) He presents the proposals of Hungarian musicologist János Maróthy regarding a broad appreciation of rhythm as a basic principle of human existence, and rhythmic sensations as fundamental to universal human experience.\(^{101}\) Emphasizing also the cultural implications regarding Maróthy’s thinking, Middleton then defines the “musical gesture” as a communicative performance “of somatic processes through structurally analogous musical processes”.\(^{102}\) He therefore highlights similarities or (figurative) resonance between aspects of musical sound and corporeal experiences. He further recognizes the need for a means of identifying and categorizing such structures, above and beyond their obvious rhythmic underpinnings: “There are vital roles too for the rhythms governing phraseology; chord and textural change; patterns of accent and intensity, of vocal ‘breathing,’ vibrato, and sustain; not to mention the micro-rhythms responsible for the inner life of sounds themselves, and the quasi-‘spatial’ rhythms organising the hierarchies of relative pitch strength and tonal tension, both in melodic contour and in harmonic sequences.”\(^{103}\) Middleton’s theory builds on Maróthy’s spectrum of corporeal movements using rhythmic groupings such as periods, measures, beats, and subdivisions of the beat. The “obvious corporeal movements at one end”\(^{104}\) resemble the longer periods, measures, or beats, while the “neural pulsations at the other”\(^{105}\) resembles smaller microrhythmic subdivisions.

Based on this theoretical framework, Middleton explores an analytical method that in fact relies upon correlations between sounds, movement, and significance. He applies his gestural analysis to Madonna’s Where’s the Party (1985) and Bryan Adams’s (Everything I Do) I Do It for You (1990); the former, which is more groove-oriented, will interest me here. Middleton’s analysis consists of two-dimensional diagrams followed by a few paragraphs of text; the verse and chorus are located above and below the double

\(^{100}\) Middleton 1993:177.
\(^{101}\) Middleton refers to a typescript translation of a text by Maróthy and Batári (n.d.) that I cannot locate. Many of the same ideas seem to appear in Maróthy’s article “Rite and Rhythm,” however: “‘Rhythm’ should include all periodic structures, that is, in music, also sound and tonal qualities on this side and formal structures on the other side of rhythm proper; and beyond music, all possible wave-like motions in the micro- and macrocosm” (Maróthy 1993–94:421).
\(^{102}\) Middleton 1993:178. For a further discussion on the concept of musical gesture, see Jensenius 2007:35.
\(^{103}\) Ibid.:178–179.
\(^{104}\) Ibid.:179.
\(^{105}\) Loc. cit.
line in the diagram, respectively. Middleton describes five elements of the music: the groove, the shapes of the repeating chord sequences, the vocal phraseology, the micro-gestures of individual sounds, and the texture. The first three elements are illustrated in some way in the diagram.

Several of Middleton’s illustrations are closely connected to issues of musical verticality – for example, the chord sequences that are rendered with descending and ascending lines according to pitch-based movement. The most direct relationships between musical structure and bodily movement, Middleton finds, concern the groove: “In typical disco fashion, this is founded on a heavy regular beat – that is, on the feet. But predominantly strong-beat bass is complemented by back-beat snare drum (sways of body?), strung on a sixteen-to-the-bar cymbal chatter (felt as a sort of muscular vibration?).”

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106 In his introductory discussion to the analyses Middleton recognizes several problems with both the transition of musical gestures to verbal descriptions and the limitations of two-dimensional illustrations, 1993:110.
107 In addition to the diagram there are two note examples of a guitar/keyboard riff and a bass variant (ibid.:183).
108 Ibid.:182.
109 Verticality in music will be discussed in chapter 4.
110 Ibid.:181.
also alludes to a “hit-point,” which he pictures as a possible upper-body jerk. Finally, he discusses the relationship between strict metrical divisions and actual performed rhythms.

Most compelling here, perhaps, is Middleton’s identification of three possible body movements in relation to various rhythmic groupings. The feet and the body sway seem to be connected to quarter notes (the heavy regular pulse, as well as the strong-beat bass on 1 and 3 and snare drum on 2 and 4), while “muscular vibration” seems centred on sixteenth notes. But how are these relations represented in the diagram?

Middleton only appears to illustrate two rhythmic elements: the sixteen black triangles above and below the undulating line for the verse and the chorus most likely indicate the strong-beat bass and back-beat snare drum. According to the chord sequences and vocal lines, the horizontal musical periods provided here consist of four measures (of 4/4 time), so the triangles below the line probably indicate the strong-beat bass (on 1 and 3) while those above indicate the snare drum (on 2 and 4). The undulating line is not totally consistent but seems to point to sixteenth notes, thus referring to the cymbal “chatter” described in the quotation above.

Middleton’s presentation of the groove in the diagram, then, is sketchy. Do the triangles and undulating line in fact represent specific musical gestures? Are they connected to the music’s production, reception, or both? Do they in fact illustrate probable body movement patterns? A challenge with such diagrams is to address as many priorities as possible but also to reflect their relative importance. I find the heavy regular pulse that Middleton identifies as the foundation of the track to be so important that it should be represented more explicitly in the diagram – an undulating line indicating head nodding, foot tapping, or similar movement patterns would probably be recognized by many readers. Lastly, the effect of the cymbal on muscular vibration is probably more sporadic than steady, as it is rendered here.

Middleton’s written description certainly illuminates a few more aspects concerning other instruments as well, but his diagram here serves more as an introduction to new analytical practices than as a thorough analysis of the groove of this track. Nevertheless, his work here is exceptional in popular music studies in its presentation of a theory and method that seek to explore the connection between music and body movement and find better ways to illustrate it.
The analysis of the patterned “libration” of folk dances

In his studies of Norwegian folk music,\textsuperscript{111} Jan-Petter Blom is consistently concerned with the relevance of dancers’ body movements: “My point of departure is the hypothesis that the perception and expression of musical rhythm is intimately linked to experiences of body movements, and that our concepts of rhythm are mirrored by the way in which we move our body in synchrony with music.”\textsuperscript{112} Blom positions this hypothesis contextually: members of the same local group will learn to associate between music and movement in order to coordinate their dancing; dancers and musicians (the fiddlers) “base their interaction on shared notions of rhythm.”\textsuperscript{113} Thus Blom proposes this shared rhythm as a basis for his analysis: “A conceptualization of such implicit understandings should preferably take the concrete rhythm of the dance as its point of departure (rather than the mere abstract and generalized musical expression) and use the models of such rhythms as the basis for musical interpretation.”\textsuperscript{114} Blom continues with a description of locomotory body movements in folk dances that leads to his focal point, a “patterned libration of the body’s centre of gravity”\textsuperscript{115} that in essence corresponds to an up-down body movement. The vertical extremes are connected with straight lines and visualized in a y=space and x=time graph. He begins with a comparison between a normal elastic gait and a Norwegian waltz.

![Blom's comparison between a normal gait and a Norwegian waltz](image)

Blom uses both notation and beat markers (numbers) to visualize relations between beats in the music and the movements of the dancers, and as the waltz example demonstrates,

\textsuperscript{111} Blom 1981, Blom & Kvifte 1986.
\textsuperscript{112} Blom 1981:305.
\textsuperscript{113} Loc. cit.
\textsuperscript{114} Loc. cit.
\textsuperscript{115} Loc. cit.; emphasis in the original.
\textsuperscript{116} Loc. cit.
notation alone would have been insufficient for Blom’s interpretation of the rhythm. He also notates which foot is being used (R, L) and uses hyphens and ties to portray changes in or continuity of support in the movements.

Blom later introduces the terms “thesis” for a falling bodily movement and “arsis” for a lifting bodily movement and uses them to describe relationships between phases of the movement over the duration of a beat. Blom uses his method and his visualizations to illustrate various types of Norwegian folk dances as well as local variations upon them.

![Figure 0.5: Blom’s comparison of two local variations of the folk dance “springar.”](image)

In a published dialogue with Tellef Kvifte, Blom argues for an interpretation of metrical ambiguity that derives from how dancers interpret the rhythm.

The dancers’ movements, however, are consistently performed in unevenly divided beats (2:1 or 1:2) and never transformed to a 3 x 2/8 meter, on the basis of which I predict: (i) that dancers, irrespective of musical context in terms of phrasings, features of tonality and melodic structure always experience the musical meter of the bowing figures M as inferred behaviourally by them, and (ii) that traditional fiddlers who are constantly involved in situations of dance in the role of leader, synchronizer [sic] and inspirer, are expressing and communicating the particular rhythm of the swinging bodies and therefore also experience their own and others’ performances accordingly. Hence the striking isomorphism between music and dance can be inferred as a case of symbolic transformation.\(^{118}\)

\(^{117}\) Blom & Kvifte 1986:504

\(^{118}\) Ibid.:509; emphasis in the original.
Musicians and dancers, then, share experiences of how their bodies swing according to the rhythm. Nevertheless, Kvifte criticizes Blom’s theory for its disregard for experiential qualities: Blom does not allow for the potential of a certain groove to relate to different possible patterns of movement. This points to Blom’s principal difference with Middleton as well. While Middleton tries to interpret structures in the music that might relate to body movements, Blom privileges the performance practice itself.119 A folk dance involves relatively more structured and specific moves, of course, whereas Madonna’s track relates to a practice of improvised social dancing where dancers may switch among several suitable patterns of body movement. Still, Blom’s notion of “the rhythm of the dance”120 also applies to more improvised dancing styles. Though various musical structures might trigger body movements in dance music, some of those structures are more prominent than others. Blom points out that his “procedure is analogous to what conductors do to music when performing their rhythmic gestures in front of the orchestra.”121 This comparison recalls studies of movement in Western classical music.

The German musicologists Gustav Becking (1894–1945) and Alexander Truslit (1889–1971) were both also concerned with pulse, rhythm, musical motion, and bodily movement. Becking argued for a “dynamic rhythmic flow” that existed beneath the music’s surface, a continuous up-down motion that “connects points of metric gravity which vary in relative weight.”122 He further claimed that various composers favoured particular distributions of these weights. Truslit did not see this flow as existing below the musical surface; he was interested in the direct information of rhythm, musical motion and bodily movement in the sound patterns themselves. But, like Becking, he distinguished between three basic types of motion curves to describe basic patterns of movement.123

With regard to music’s fundamental rhythmic level and its connection to bodily movement, then, a conductor’s “rhythmic gestures,”124 as Blom describes them, might in turn evoke Truslit’s motion curves or Becking’s personal distributions of weights by various composers. In electronic dance music, of course, such a rhythmic level can be

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119 Blom notes that “the article is primarily based on the author’s own observations and analyses” (Blom 1981:305), but how those observations and analyses were conducted is not clear.
120 Blom 1981:305.
121 Loc. cit.
overtly demonstrated by head nodding, foot tapping, upper-body bouncing, and other body movements by both performers (DJs) and receivers (listeners/dancers). Truslit in particular emphasizes the information directly available in the sound patterns, and in this study I will present sources for such information in the music in question and subsequently discuss its possible effect upon body movement.

**Outline of the thesis**

**THE APPROACH OF THE DANCE MUSIC PRODUCER**

The structure of this study follows a typical dance music production. Since a producer’s starting point is obviously his or her cultural affiliation, I begin with the cultural context of the music in question, which affects compositional work, the choice of music equipment, and production techniques. The next step in a producer’s work on a particular track is to establish a basic beat, the rhythmic pattern that will likely evoke the basic movement pattern of the music. When the basic beat is in place, he or she will introduce other rhythmic patterns. The final step relates to the sound – both the specific sounds used in the track and the outcomes of the effect processing and mixing. These, then, are the four parts of my thesis: the cultural context, the basic beat, the rhythm, and the sound.

The analogy of the producer also resonates with the process of writing. The producer may, with a digital sampler, extract pieces of music from earlier recordings and use them in his or her own production. Similarly, I use quotes from books and articles to support arguments and illuminate certain issues. The honest producer will reference those original recordings in the CD booklet, but some samples may be altered to such an extent that they are no longer recognizable (or able to be credited). Though I have not deliberately altered any material without giving credit to its originator, I am convinced that in the process of studying and writing, the thoughts and ideas of others have been co-opted.125 Hopefully, I have done them all justice.

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125 The works of Michel Foucault and Jacques Derrida, for example, were somewhat influential in the chapter on cultural context with regard to identifying negotiations about the meanings of words and concepts (Foucault) as well as dichotomies and power relations (Derrida). I do not use their approaches systematically, however, and their influence derives largely from secondhand knowledge rather than any detailed investigation of their works. There are no references to any books or articles by these writers, then, despite their general relevance to the study.
OUTLINE

Introduction

Part 1: The cultural context
The first part of this study consists of two chapters that introduce the cultural context of electronic dance music. In chapter 1 I present a historical overview that extends from 1970s disco music culture to 1990s electronic dance music culture. I identify several influential contributors, clubs, and events, but I mainly focus on those developments that shaped expectations and fields of tension within the respective cultures. In chapter 2 I focus on developments in the production of dance music and changes in music technology within the same time period.

Part 2: The basic beat
The focal point in the second part is the basic beat of the track – in this case, the poumtchak pattern. In chapter 3, I thoroughly explore the poumtchak pattern and introduce the intimate link between this pattern and vertical movement patterns. The chapter ends with a survey mapping the congruence of body movement direction among listeners exposed to the poumtchak pattern.

In chapter 4, I present theories that in various ways support, elucidate, or explain the proposed correspondence between the musical poumtchak pattern and a vertical movement pattern. The chapter starts out with discussions about attention and perception and continues with motor processes. Central topics include an ecological approach to music listening, the theory of entrainment and how we attend to musical rhythm, motor-mimetic processes, and musical verticality. This material informs my subsequent analyses and discussions of electronic dance music.

Part 3: The rhythm
In the third part I examine the rhythmic elements of electronic dance music. In chapter 5, I discuss how an approach to rhythm via body movement and dance challenges traditional views of rhythm perception. I also discuss the term “groove.” Chapter 6 contains my analyses of rhythm, which aim to illuminate musical elements with regard to their potential for evoking body movement, particularly with regard to the interaction between the poumtchak pattern and other rhythmic elements or patterns.
Part 4: The sound
In the fourth part I consider the analysis of sound. In chapter 7, I discuss certain central problems that are involved here and introduce some methodological tools in relation to my own analytical approach. Chapter 8 contains my analyses of sound, especially those aspects of it that may relate to body movement and the poumchak pattern. I delve into the various characteristics of specific sounds as well as the possible impact of mixing processes and effects assigned to longer segments of the dance track.

Conclusion
In the conclusion, I sum up the content of the four parts by bringing all of these different areas of interest together in one final analysis of an excerpt from an electronic dance music track. I then reflect on the relevance and limitations of my study and propose directions for future research.
No work is created in a cultural vacuum, and this study, like its music, is no exception. A music production nestles in a very specific historical and cultural context, and it is essential to acknowledge it in any relevant interpretation.\(^1\) Pioneering popular music scholars revealed how traditional music analysis in fact seldom tended to position the music within a specific cultural setting – faith in the universal meaning of music, however variously defined, had blinded musicologists to the music’s cultural affiliations. Richard Middleton demonstrated how even early studies of popular music were influenced by this same faith, lacking a “concern with practice – how all these texts worked as culture.”\(^2\) Stan Hawkins adds, “The analysis of music only becomes meaningful when positioned in relation to the social space it is received in.”\(^3\) Similarly, Jason Toynbee asserts that “musicians work within a radius of creativity, or range of possibilities, determined by the prevailing discourses and practices in their field.”\(^4\) The history of a genre (or the construction of the history or genre) and the music maker’s relationship to it, as well as the prior or contemporary contributors he or she identifies

\(^1\) An anthropological perspective of studying music in its cultural context, traditionally adopted by ethnomusicologists studying non-Western music, has now entered most fields of musicology, according to Robert Walser: “The split between musicology and ethnomusicology is no longer useful because its constitutive dichotomies – self/other, Western/non-Western, art/function, history/ethnography, and text/practice – are no longer defensible” (Walser 2003:24). Gary Tomlinson (2003:31ff) discusses the demarcation of anthropology and history and how these perspectives, long considered opposing, are in fact equally essential to musicological analyses.

\(^2\) Middleton 1990:110 (emphasis in the original).

\(^3\) Hawkins 2003:18.

\(^4\) Toynbee 2000:140.
with, are likewise central to creative decision-making processes. Contemporary cultural contexts both absorb and reflect prevailing opinions and values that are themselves often situated within fields of tension.

The following two chapters comprise an introduction to the cultural context of the music that is dealt with in the analyses of this study. This context chiefly concerns the producer of electronic dance music in the 1990s dance music scene. Since many rock historians have offered rather shallow accounts of dance music genres and their historical roots, I see it as necessary here to offer a chronological narrative and present some of the central issues at stake within this culture. This introduction is intended primarily to enrich the following analytical discussions by providing a backdrop that links the music to its cultural affiliations.

I have brought together information from the relevant literature, my own clubbing experience, consultations with Norwegian DJs/producers, and participation on relevant web forums. In the first chapter I present a historical overview that extends from 1970s disco music culture to 1990s electronic dance music culture and identifies influential contributors, clubs, and events. Its main focus is on the historical developments that shaped expectations and fields of tension within the culture. In the second chapter I look at the same time period but focus on developments in the production of dance music and changes in music technology.
Chapter 1:

Introduction to the cultural context of electronic dance music

The rhythmic structures of dance music arise primarily from the genre’s focus on moving dancers, but they reveal other influences as well. The poumtchak pattern has strong associations with both disco music and various genres of electronic dance music, and these associations affect the pattern’s presence in popular music in general. Its status and musical role there has varied according to the reputation of these genres.

In the following introduction I will not present a complete history of related contributors, places, or events but rather examine those developments that shaped prevailing opinions and fields of tension within electronic dance music culture in particular. This culture in turn affects the choices that must be made in dance music production, for example involving the poumtchak pattern. My historical overview extends from the 1970s to the 1990s and covers predominantly the disco era, the Chicago house scene, the acid house/rave era, and the post-rave club-oriented house scene in England.5

The disco era of the 1970s

DISCOURSE ON DISCO

The image of John Travolta in his disco suit from the 1977 motion picture Saturday Night Fever has become an icon of the disco era and its popularity. Like Blackboard Jungle and Rock Around the Clock two decades earlier, this movie was an important vehicle for the distribution of a new dance music culture to America and the entire Western world, and the impact of its construction of disco was gigantic.6 It became a model for local disco cultures around the world and comprised the core of a common understanding of disco in mainstream popular music culture.

6 See Lawrence 2003:306ff. In discussing the impact of the film, Lawrence points out the economic and racist undertones of its choices of protagonists and music: “The film deleted any trace of the downtown night network: out went Manhattan’s ethnic gays, black funk, drugs, and freeform dancing, and in came suburban straights, shrill white pop, alcohol, and the Hustle” (ibid.:307).
The image of John Travolta therefore also evokes the enormous commercial success of *Saturday Night Fever* itself, and in turn the later exploitation of disco music and culture by those with economic, rather than artistic, designs upon it. Disco fell from grace after only a few years (especially in the United States), overtaken by a constellation of disapproving notions about its commercialism, decadence, rigid rhythms, and deleterious effect on “real” music. Walter Hughes writes, “Few forms of popular culture receive the kind of opprobrium that has been lavished on disco music since its emergence in the seventies . . . Even at the height of its popularity, it was widely condemned, most vociferously by the admirers and consumers of popular music themselves.”

Recent writers on disco and dance music have focused less upon *Saturday Night Fever* and its wider promotion of disco and more upon the underground dance music culture related to nightclubs, DJing, and dancing that arose primarily in New York City. This new emphasis introduces fresh aspects of authenticity, integrity, and the resistance of subjugated groups (for example, African Americans, Hispanics, the working class, homosexuals) into the discussion. Yet the elevation of these overlooked cultural contributors has led also to new dichotomies between authentic and inauthentic appreciation within the dance music culture.

Middleton observes that authenticity is used in discourses on popular music “to mark out the genuine from the counterfeit, the honest from the false, the original from the copy.” Keir Keightley describes it as “the compass that orients rock culture in its navigation of the mainstream.” He further notes that authenticity is not actually an audible feature in the music, but instead “a value, a quality we ascribe to perceived relationships between music, socio-industrial practices, and listeners or audiences.” As Allan Moore has pointed out, the important question here is who decides upon this authenticity, with regard to tracks, performers, or whole genres. The issue is as divisive in dance music culture as it is in popular music culture writ large, though the rules for

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7 Brewster and Broughton rather graphically describe the lack of interest in the origins of disco culture by latecomers to the industry after 1977: “Plenty of marketing men would figure it out just enough to rip out its heart and suck out every last drop of blood” (Brewster & Broughton 2006:177). Though this is certainly overwrought, scholars and critics do agree that the music industry itself was at least partly responsible for the music’s rapid decline in popularity.

8 Hughes 1994:147.

9 Prior to 1995, very few books on disco had been released: “Jazz, rock 'n' roll, reggae and now rap all have not only devoted listeners but intellectual defenders; conspicuously missing from this canon, however, is disco” (Hughes 1994:147). For an overview of the literature until 1999, both academic and non-academic, see Fikentscher 2000:19ff.

10 See, for example, Peter Shapiro’s derogatory description of roller disco (Shapiro 2002:213ff).


13 Loc. cit.

14 Moore 2002.
what is considered authentic for the former arise from somewhat unique principles of value.

An important relationship with regard to those principles involves constructions of the “mainstream” and the “underground.” These constructions were very relevant to club culture in the 1990s but impacted disco culture as well. The hits of the Bee Gees represented mainstream appreciation, while the obscure disco tracks of Barrabas or Eddie Kendricks belonged to a more “authentic” underground disco culture. Disco dance music that has proven in time to be influential arose from both sources; Tim Lawrence, in his book on the American dance music culture of the 1970s, asserts that “creativity and innovation didn’t just emanate from the underground but also from the much broader downtown party network.”

Writers on disco do agree that widespread ignorance of the original motivations and practices associated with this New York dance culture eventually doomed it. The real (and positive) trappings of disco culture gave way to mistaken but viral impressions of its hedonism, decadence, and acceptance of drug use, as well as to poor imitations of its music. Brewster and Broughton write that “many of the people involved with its early days blanch at using ‘disco’ to describe the music and clubs they knew and loved. They don’t really have an alternative name, but they have a strong need to distinguish their music – funky and soulful – and their scene – small, gritty and underground – from what disco eventually became and from how disco is seen by most people today.”

Recently scholars have attempted to restore disco’s original reputation. Kai Fikentscher, in his study of underground dance music in New York City, argues that definitions of disco have progressively distorted from “first referring to a specific musical environment, then to a type of popular music, and later to various styles of dress and hair and a leisure-time philosophy of extravagance, hedonism and, to some, decadence.” Fikentscher prefers to return to a concept that denotes “a particular performance environment in which technologically mediated music is made immediate at the hands of a DJ, and in which this music is responded to via dance by bodies on the

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15 Lawrence 2003:434.
17 An etymological description of the word “disco” may be found in Fikentscher 2000:23 or Lawrence 2003:14.
18 Fikentscher 2000:22.
dance floor.” This reclaims the term from its culturally pejorative connotations and places its music front and centre.

“Disco music” is often used as a catchall for various genres (funk, soul, Latin) that in fact share few common traits other than their role in a certain specific space (discos) at a certain specific time (the 1970s). Brewster and Broughton claim that an amalgamation of these musical styles took place upon the arrival of the major record companies to the disco scene:

As disco became a financial force, the music changed considerably. It had begun not as a genre, but as an amalgam of whatever danceable records the DJs could lay their hands on. Rock, soul, funk, Latin: there was no single style or tempo which characterized the music played in the disco’s underground years. In its commercial period, the opposite became true. Few major label A&R executives had any great understanding of the club scene from which this music had emerged, so they could only see it in terms of its most basic generalities. They looked at the records which had crossed over, noted a few common denominators, and concluded that there was a simple formula for making disco.20

While diversity characterized original disco music, at some point a formula surfaced for a particular “disco beat” and “disco bassline” that in turn became a self-fulfilling prophecy for disco as a musical genre. The pountchak pattern was part of this formula and it promptly disappeared from most popular music production in the 1980s, probably as a casualty of its strong association to that stereotypical disco music of the late 1970s.

THE ORIGIN OF CLUB CULTURE

All histories are constructs, and some are more reliable than others. This holds true for music as well. Joseph G. Schloss, for example, asserts that hip-hop “grew through a series of small innovations that were later retroactively defined as foundational.”21 A list of these sorts of pivotal innovations necessarily involves a simplification of reality but can nevertheless provide a starting point for investigation. In the case of electronic dance music and its roots in disco, we might start our own history of small innovations with a singular New York nightclub: the Loft.

In 1970, David Mancuso started arranging parties in his own home (a loft) at 647 Broadway in New York; when he later changed homes, the parties went with him. Mancuso is not the first DJ, and the Loft is not the first nightclub, but the two would set the disco bar. Brewster and Broughton describe the Loft as “more influential than any

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21 Schloss 2004:27.
nightclub before or since, it was the place where the music you dance to today, and the place you go to do it, were first envisaged.” Its foundational principles included the following: a focus on dancers and dancing; an appreciation of the obscure track; a mediation of music through a dedicated sound system; and a distinction between members and non-members. These principles have followed club culture throughout its historical development and therefore merit further discussion here.

THE APPROACH OF THE DISCO DJ, PART 1: THE FOCUS ON THE DANCERS

The Loft’s focus on dancers and participation in general was explicit. Mancuso considered the DJ to be a provider of good dance music, but not in any way a focal point for dancers. This dictate points to ways in which the experience of dance music culture diverges from a conventional popular music concert experience, where people do in fact watch the “performer.” Mancuso’s approach required a full commitment to the act of being moved by the music that was incompatible with a focus on the DJ’s performance. Nevertheless, the major record companies who moved in on this culture saw music exclusively driven by an artist or group: “to make disco work for them, they squeezed it into the star-based marketing structures which had worked so well with rock . . . Most major labels, used to marketing famous people whose poster you could buy and whose career you could follow, only felt comfortable with this club music if they could dress it up with all sorts of artists and group-based fronts.”

Marketing fame and stardom did not coincide with Mancuso’s original approach, however; popularity interfered with the idea of the DJ as fundamentally beholden to the dancers. But when disco suddenly became profitable, avoiding recognition meant missing opportunities, and not only of the economic variety. A DJ’s natural ambition to expand his loyal followers (for his club, or a particular music genre) would likewise suffer. Lawrence describes a “contradictory and irresolvable tension between protecting oneself from overexposure while simultaneously transforming the world.” The risk of DJ overexposure, of course, evokes constructions of underground versus mainstream and authenticity versus “selling out” – the perception that one has abandoned one’s principles for commercial success. This is a central theme in observations about corruption by

22 Brewster & Broughton 2006:150.
23 Ibid.:201.
commerce in popular music culture as well. But in a dance music context, it all comes back to the dancefloor.

In the electronic dance music scene of the 1990s, this tension around influence persisted as DJs grew ever more popular. Their numerous performing aliases perhaps represent an attempt to avoid focus, and most CD covers and music videos of dance music acts avoided a lot of face time for the performers. But acts did begin to happen in traditional concert venues as well,\(^{25}\) despite the fact that they were simply not as visually interesting as a rock band or pop artist. Because these later audiences saw themselves as spectators rather than participants (and were largely unaware of the cultural codes of the dancefloor), dance acts had to provide (often artificial) visual focal points,\(^{26}\) such as background movies, slide shows, light shows, dancers, vocalists, or instrumentalists. Tony Langlois, in his article on house music from 1992, affirms those producer-DJs as largely unassuming characters, despite the drawbacks: “Even when showcasing their own material, perhaps on television pop shows, they tend to remain in the background, usually in ‘groups’ fronted by ‘featured vocalists’ who give the music a visual and compositional focus.”\(^{27}\) A DJ who sought approval from original fans and cultural insiders had to avoid attention at the risk of being deemed arrogant by new or potential fans. In production processes this dilemma may be reflected by choices of auditory focal points that can double as visual focal points in performances (or the lack thereof).

THE APPROACH OF THE DISCO DJ, PART 2: THE OBSCURE TRACKS

To find obscure dance tracks and to introduce them successfully to dancers was another of Mancuso’s dictates. At the Loft one would often hear music that was played nowhere else. Though Mancuso was probably not the most inventive or influential of DJs, – for example, he insisted on playing tracks in their entirety rather than mixing them – his taste in music established a powerful precedent for the disco scene. Brewster and Broughton in

\(^{25}\) When the Chemical Brothers played at the Roskilde Festival in 1999, they were placed at the “Orange Scene,” which has a capacity for 60,000 people. The crowd was predominantly faced towards the stage trying to distinguish the visually introvert actions of the two men. For a few “insiders” the message concerning the music and the dancing was probably crystal clear, but for the majority of the crowd this message was probably misconstrued, and the “concert” was rather unfavourably received as a consequence.

\(^{26}\) “Lighting . . . has become an elaborate accompaniment to the music, emphasizing its rhythms, illustrating its chords. . . . Computer-generated fractals and other abstract designs of coloured light can act as visual equivalents of the instrumental sounds of house and techno music, while film, loops, slide projectors and music videos punctuate the space with figurative entertainment” (Thornton 1995:57).

\(^{27}\) Langlois 1992:234.
fact point to Francis Grasso as “the first modern DJ.” Grasso started DJing in 1968, and he was renowned for his ingenuity in keeping the beat going, forming his music sets in a narrative manner using mostly rather obscure tracks: “Grasso stormed the profession out of servitude and made the DJ the musical head chef. DJ Francis didn’t follow the pop chart menu, and he didn’t meekly bring the customer what he’d ask for. Instead, he cooked up a nightly banquet of new and exotic musical dishes which the diners, though they devoured them eagerly and came back for more, might never have known to order.”

A similar attraction to obscure music arose in the northern English club scene at the same time. The “Northern Soul” scene accommodated a new passion for dancing to early Motown soul music and the like, and DJs competed to turn up old or underappreciated recordings. Brewster and Broughton observe that “northern soul’s most significant contribution to the DJ’s trade was to introduce the idea of connoisseurship . . . until soul, dance music had been largely about playing the hits of the day. Since the northern scene thrived on rarities, it made the DJ’s profession as much archaeology as record playing.”

This knack for “archaeology” came to characterize the successful DJ of any musical style, and it found even more momentum in the subsequent era of digital sampling. Of hip-hop producers, for example, Schloss writes: “The process of acquiring rare, usually out-of-print, vinyl records for sampling purposes has become a highly developed skill . . . Individuals who give themselves to this quest are held in high esteem.”

Consequently, the DJ who tries to please the crowd with likeable, popular tracks may garner less respect than the DJ who presents his or her individual taste in music (provided it is good). Brewster and Broughton agree: “The real work of a DJ happens behind the scenes – searching dark record stores, devouring endless lists and daunting stacks of vinyl, and sniffing out the wonders they contain.”

Playing popular tracks, on the other hand, carries risks. These tracks have the advantage (or disadvantage) of being recognized and thereby evoking associations, either good (linked to earlier positive dancing experiences) or bad (seeming lame or predictable). If dancers come to

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29 Ibid.:139.
30 Ibid.:107; see also Shapiro 2005:37–44.
32 Lawrence recalls how the legendary DJ Larry Levan would play a certain unknown track repeatedly until the crowd learned to like it as he did: “Larry would rarely give in. Not only would he leave the record on until the end. He would also start to play it week in, week out, until finally everyone wanted to dance to it” (Lawrence 2003:356).
33 Broughton & Brewster 2002:12.
expect to hear music they have not heard before, they may be disenchanted by the choices of the less progressive DJ.

Playing popular tracks may get the crowd dancing, then, but it can also harm the DJ’s reputation. The lure of obscurity remains strong in the digital era in the choice of material for sampling or copying\(^{34}\) as well as in less obvious decisions concerning rhythm patterns (like the pountchak pattern), basslines, specific sounds, melodic themes, and the use of effects.

THE APPROACH OF THE DISCO DJ, PART 3: THE FOCUS ON GOOD SOUND

The sound system at the Loft was constantly upgraded and refurbished to offer the best experience to the dancers. Mancuso collaborated with sound engineer Alex Rosner to improve sound systems particularly for nightclubs, with “Mancuso supplying the visionary ideas for Rosner’s practical expertise.”\(^{35}\) Larry Levan, the most famous DJ from another club, the Paradise Garage (1977/78–83), was also known for his commitment to sound quality, according to Lawrence: “Because the room’s acoustics were in a state of constant flux, Levan would also tweak the system as the night progressed, introducing modifications to take account of an additional two thousand bodies on the dancefloor, subsequent shifts in humidity levels, and eventual ear fatigue, and this remorseless quest for perfection meant that [sound engineer Richard] Long had to re-equalize the system every Friday and Saturday.”\(^{36}\)

A focus on good sound and a dedicated sound system distinguishes genuine dance clubs. This focus is not unique among contemporary live music scenes, but certain aspects of sound are more significant to the dance music scene than elsewhere, such as the ability to control low frequencies to produce an effective bass-drum “punch.” With digital recording techniques the process of choosing and shaping sounds using compression and equalization has become more straightforward, but the demands concerning these matters have become more stringent as well. In this sense it is helpful to be both a DJ and a producer so that one might test how certain mixes behave on a dedicated sound system and thus learn about essential details for mixing techniques.

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\(^{34}\) Early Chicago house producers frequently copied basslines from various disco tracks; see chapter 6, page 180.


\(^{36}\) Lawrence 2003:357. See also Bidder 2001:10.
THE APPROACH OF THE DISCO DJ, PART 4: THE UNDERGROUND POSITION

The Loft remained a private club to avoid certain city ordinances, and one needed an invitation to be admitted.\textsuperscript{37} DJ and clubgoer David DePino described the situation to Lawrence: "Finding the door in the first place remained a formidable obstacle. 'These were the first parties where you had to know somebody to get in,' says David DePino, who went to the Broadway spot several times. 'You couldn’t find out about them by asking around because nobody knew and they were never advertised. You had to be invited. It was very underground.'"\textsuperscript{38}

The (sometimes arbitrary) determination of insiders versus outsiders is not unique to dance music cultures, but the abuse of the privilege of doing so (for example, the infamous rudeness of the doormen at Studio 54 in New York) has become linked to disco. The concept of a dance "underground" could be said to have originated with these first unlicensed parties. According to Fikentscher, New York’s initial underground (in the 1950s) “referred to a socio-cultural avant-garde\textsuperscript{39} that included beat poets, performance artists, painters, musicians, and other groups that defined themselves somehow in opposition to the public in general and also by and large to the commercialization of culture. When DePino describes the Loft as “very underground,"\textsuperscript{40} he refers to the club’s status as beyond the reach of almost anyone save a small group of the invited. The Loft also evokes traditional associations of the underground with some sort of illegal resistance activity that is hidden from the government in power. But while disco as a dance culture in New York City arose as a type of countercultural lifestyle that was largely unknown to the general public, these associations gradually fell away as it became more popular. So how are the succeeding constellations of disco/dance clubs, music styles, and record labels even recognizable as part of an inherently underground scene? Lawrence admits that this is “a slippery concept"\textsuperscript{41} in relation to disco culture, since the reality of the situation defied such expectations: "Should it include cutting-edge discotheques, even though they were open to the general public? And should it be applied to radical DJs, even if they were generating chart smashes and playing commercial

\textsuperscript{37}"The Loft was situated in a building that had been set aside for industrial use in which Mancuso organized ostensibly commercial parties without a certificate of occupancy, a cabaret license, or officially sanctioned fire exits. Going to the Loft and keeping quiet about it wasn’t a pose. It was a pragmatic practice" (Lawrence 2003:53).
\textsuperscript{38}Lawrence 2003:22.
\textsuperscript{39}Fikentscher 2000:10.
\textsuperscript{40}See quotation above; Lawrence 2003:22.
\textsuperscript{41}Lawrence 2003:433.
Disco’s connection to the underground, however, would be vital to countering the negative associations with it that emerged at the end of the 1970s.

Fikentscher uses “underground” as a prefix in his book on dance music to explain “that the associated type of music – and its cultural context – are familiar only to a small number of informed persons. Underground also points to the sociopolitical function of the music, framing it as one type of music that in order to have meaning and continuity is kept away, to a large degree, from mainstream society, mass media, and those empowered to enforce prevalent moral and aesthetic codes and values.” In comparison to the ultimate (over)exposure of disco, the dance music of the 1980s definitely happened outside the public eye and remained comfortably “underground.” But the difficulty of negotiating this status re-emerged with the popularity of dance music in the 1990s. Its early illegal raves and associations with drugs preserved for it a sort of underground status, even when its events attracted huge crowds and massive public attention. By the new millennium, though, its widespread popularity demanded a fresh reappraisal of its “underground” status.

In Sarah Thornton’s study of club culture, she writes: “The term ‘underground’ is the expression by which clubbers refer to things subcultural. More than fashionable or trendy, ‘underground’ sounds and styles are ‘authentic’ and pitted against mass-produced and mass-consumed. Undergrounds denote exclusive worlds whose main point may not be elitism but whose parameters often relate to particular crowds.” According to Thornton, then, “underground” may be used rather liberally to indicate any degree of subcultural affiliation; she also links it to a certain type of authenticity that eschews overexposure. But “authenticity” in dance music culture can be even more problematic than the “underground.”

42 Ibid.:434.
43 Fikentscher 2000:5.
45 Thornton explores authenticity in club cultures at length: “What authenticates contemporary dance cultures is the buzz or energy which results from the interaction of records, DJ and crowd. ‘Liveness’ is displaced from the stage to the dancefloor, from the worship of the performer to a veneration of ‘atmosphere’ or ‘vibe.’ The DJ and dancers share the spotlight as de facto performers; the crowd becomes a self-conscious cultural phenomenon – one which generates moods immune to reproduction, for which you have to be there” (Thornton 1995:29–30; emphasis in the original). Thornton also distinguishes between two kinds of authenticity: one relates primarily to DJs, involves “issues of originality and aura” (1995:30), and “draws upon definitions of culture as art,” and the other, which is more widespread and concerns “being natural to the community or organic to subculture” – that is, involving culture as lifestyle. She frames the DJ’s role as uniting these two authenticities in the act of collecting and playing records and leading the crowd without demanding its attention. The crowd, then, takes on the role of the live performer in giving life to the objects that are presented by the DJ. Thornton (1995:66ff) also discusses four characteristics through which certain records and music genres are perceived as authentic; their assimilation and legitimization by a subculture; the distance between production and consumption; the environment of production; and the ideological vagaries of genres.
are central focal points in dance music cultures, hierarchies of authenticity necessarily differ from pop music scenes in which the live performance typically underpins authenticity.\textsuperscript{46} In this respect, “underground” thus depends upon the common knowledge shared by insiders of dance music–related subcultures. Insiders, once the relatively few invited members of the Loft, have come to comprise an intricate network of subcultural environments, one with many “undergrounds” and an equal number of opposing “mainstreams.”

Thornton criticizes earlier works in cultural studies that rely upon definite dichotomies between certain groups and an established “mainstream.”\textsuperscript{47} Such dichotomies almost always involve the reduction and oversimplification of real life. She also points to the role of the media in club culture and specifically that culture’s assertion of its subcultural identity.\textsuperscript{48}

As I have tried to demonstrate, the meaning of “underground” has changed with various developments in the music cultures that rely upon the concept. Nevertheless, it remains relevant. In both DJing and music production, constructions of “underground” and “mainstream” affect many choices about both the art and the context of its appreciation.\textsuperscript{49}

THE END OF THE DISCO ERA

Disco music is a disease. I call it disco dystrophy . . . The people victimized by this killer disease walk around like zombies. We must do everything possible to stop the spread of this plague.\textsuperscript{50} – Radio DJ Steve Dahl

Steve Dahl has become a vehicle for the disapproval of disco music in the United States. He is associated with the “disco sucks” slogan and the infamous “Disco Demolition Night” at baseball’s Comiskey Park in Chicago on July 12, 1979, where reduced admission was offered in exchange for old disco records that were in turn blown up inside a container partway through the game. An anti-disco riot ensued that ultimately

\textsuperscript{46} See Fornäs 1994 for a comparison of authenticity in house/techno and other popular music genres.
\textsuperscript{47} She discusses primarily Hebdige 1979 and Mungham 1976 (see Thornton 1995:93ff). See also Bennett 1999 for relevant discussions on subculture theory linked to the dance music scene of the 1990s.
\textsuperscript{48} Thornton 1995:116ff.
\textsuperscript{49} On the St. Germain (Ludovic Navarre) track What’s New? there is a monologue listing DJs whom he believes play “real house music”: “This is what we call easy-listening underground house music, with much respect to Smack Production and music stations, our favourite underground house label” (2:15–2:35). This method of positioning oneself within a history of other legitimate or authentic figures is relatively common; see also Daft Punk’s Teachers (1996).
\textsuperscript{50} Steve Dahl quoted in Brewster & Broughton 2006:290.
prevented the game from finishing. Brewster and Broughton observe that this protest was in fact not unique: “Dislike for disco was everywhere. The rock generation saw it as the antithesis of all that was holy: no visible musicians, no ‘real’ stars, no ‘live’ performance. It was music based wholly on consumption, music with no aesthetic purpose, indeed with no purpose at all other than making your body twitch involuntarily. Dehumanizing, expressionless, content-less – the judgements were damning.”

Following the incident in Chicago, disco clearly fell from grace, at least in the United States. The major record labels had forced this dance-related music culture into a typical star performer-oriented package, and the public in turn experienced lip-synching, derivative arrangements, and other studio “fakery” as evidence of disco’s (rather than the disco business’s) illegitimacy. The major labels saw disco as a passing phenomenon that had to be “exploited as quickly and thoroughly as possible.” This fate would then become self-fulfilling.

The capitalist exploitation of this cultural phenomenon appears to have involved not only record companies but also corporations of all sorts. The casualties of this rather short period of excessive exposure must have worried later dance music insiders as well. While acts (or at least their music) need attention, too much of it can present a problem.

Two other issues may also have contributed profoundly to disco’s fate in the United States: its African American musical roots and its strong connection to gay culture. A majority of the performers in disco music were African Americans. Racist tendencies were still quite common in the United States in the 1970s and the major record labels may have been worried about the prejudices of the general American

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51 In an NBC-TV interview with Steve Dahl on the twenty-fifth anniversary of the event, the focus was more on the disturbance to the baseball game rather than the indignity foisted upon the music (see webpage 1.1). Many people who were there have left personal accounts on a webpage dedicated to the event (see webpage 1.2).
53 According to Shapiro, not only the major labels were to be blamed. The independent label Casablanca’s executive Neil Bogart created hype with false sales to promote new artists: “Puffing up no-talent acts with a load of hot air became the norm for the record industry during the disco boom” (Shapiro 2005:223). In her study of house music culture, Hillegonda Rietveld asserts that the market at the end of the 1970s was in fact flooded with “second-rate” music – that is, “music that was not made with the same sensibilities and without a finer understanding of the aesthetic forms from which disco had developed, such as funk, soul and gospel” (Rietveld 1998:115). See Brewster & Broughton 2006:201, Fikentscher 2000:29, and Shapiro 2005:222 for similar accounts.
54 Brewster & Broughton 2006:201.
55 Shapiro describes examples of disco-related TV advertisements and children’s TV programs, and even a religious dancefloor passion play; see Shapiro 2005:224ff.
public. After disco’s demise, African American performers would generally lose ground in the public eye until hip-hop increased in popularity in the late 1980s.57

The gay clubs of New York City (and Fire Island) had been very influential in the shaping of disco culture since the early 1970s. The decade was formative for the gay liberation movement, and its celebration in disco culture made a difference in this regard. The Village People, assembled by Jacques Morali and Henri Belolo in 1977, was probably the first group in popular music history to overtly display a connection to gay culture while gaining widespread commercial success.58 Many Americans in fact probably missed the group’s connotations of a gay lifestyle as they bought the music.59 But for those who hated disco and all of its associations, the Village People, with their constructed history and exceptional focus on image, became a perfect target for disdain.60

In his study of underground dance music in New York City, Fikentscher considers its relations to African American and gay culture, arguing that dance music’s perpetuation in the 1980s was to a large extent due to these cultural groups: “Larry Levan’s reign at the Paradise Garage, as well as Frankie Knuckles’s rise to ‘Godfather of House’ or Junior Vasquez’s long-term association with the Sound Factory cannot be explained without considering the consistent support these DJs had and have in gay communities and/or those defined by ethnicity.”61 Because disco faded from public awareness early in the 1980s, producers and DJs could explore new variations upon dance music that were more in line with the needs of their supporters. Buckland assumes that most Americans by late 1981 had turned their attention to the economy and unemployment, and that “under these circumstances, the core audience for dance music, a significant segment of whom were urban gay clubgoers, became an even stronger influence on the artistic direction of the music.”62

57 MTV avoided music videos by African American artists between its launch in 1981 and the arrival of Michael Jackson’s Thriller videos. They claimed to be formatted as “rock’n’roll” at a time when few African American artists were seen as such. MTV was accused of racism by several African American artists and ultimately changed course when Jackson’s music videos came to them in early 1983. See Rose 1994:8 and Kaplan 1987:15.
58 The name refers to Greenwich Village in New York City, which at the time was famous for having a substantial gay population.
60 Brewster and Broughton describe how Steve Dahl gave away one hundred tickets to a Village People concert, provided the recipients would throw marshmallows bearing the words “Disco Sucks” onto the stage; Brewster & Broughton 2006:290.
62 Buckland 2002:68.
The 1980s continuation of dance music culture

(PARADISE) GARAGE AND (THE WARE)HOUSE

Both the Paradise Garage in New York and the Warehouse in Chicago opened in 1977. Larry Levan and Frankie Knuckles had been participants in the New York dance scene since the early 1970s; they had been regular visitors to the Loft and had DJed together at the Continental Baths. Larry Levan turned down an offer to DJ at the Warehouse in Chicago because of his commitment at the new Paradise Garage. He in turn recommended Frankie Knuckles, who accepted.

The Paradise Garage and the Warehouse are probably the most important links between 1970s disco and the electronic dance music scene of the 1980s and 1990s. Fikentscher writes, “Paradise Garage may very well have been the most influential nightclub worldwide, especially in its heyday during the early 1980s. It was a dance mecca to a group of loyal regulars, most of them gay and African American, who came every Saturday to pay homage to Larry Levan, the resident DJ, regarded as one of the most influential figures in underground dance music.” Paradise Garage was a refuge for the genuine appreciation of disco music and culture in its later years. It presents an evocative counterpoint to the more famous Studio 54, which exploited the more artificial aspects of disco culture while slighting the music and the dancing.

The Warehouse in Chicago is more renowned for its role in the development of house music. It was placed in a former factory building in West Central Chicago with a capacity of around two thousand people. The crowd was predominantly black and gay and club nights could last from midnight Saturday to midday Sunday. Simon Reynolds writes: “It was here that Knuckles began to experiment with editing disco breaks on a reel-to-reel tape recorder, reworking and recombining the raw material . . . that would soon evolve into house.”

Two of the main genres of electronic dance music, in fact, have names announcing their origins in these clubs: “garage” and “house.” Most of the music

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63 DJ Nicky Siano had also influenced the duo. Siano was famous for setting up the nightclub called the Gallery, and for his beat-mixing and creative use of equalizers. See Brewster & Broughton 2006:160–164.
64 Fikentscher 2000:70.
66 The Detroit musician Juan Atkins, on the other hand, claims that a “house” record was slang for an obscure import; see Trask 1988a (in Kempster 1996:46).
Frankie Knuckles played at the Warehouse and Larry Levan played at the Paradise Garage at the end of the 1970s and the beginning of the 1980s was disco derived and had no explicit resemblance to the later genres. But it was their perpetuation of a particular approach to dance music that allowed for those later breakthroughs. When the production of disco music withered in the United States after 1980, these DJs found new material in genres like European synth-pop and Italo disco. With the inclusion of drum machines in the DJ’s music set, new genres of dance music were in the offing.

Frankie Knuckles left the Warehouse in 1983 to open the Power Plant. The Warehouse was shut down, and a smaller club called the Music Box was opened: Ron Hardy was hired to DJ there. His style was wilder than Knuckles’s; Sean Bidder, in his book on house music, describes how “he’d mess with the EQ, clatter beats together for minutes on end, phase the bass in and out violently.” 67 The friendly rivalry between Knuckles and Hardy would give rise to many innovations with regard to entertaining and challenging their crowds, introducing new material, and using new music technology.

Through experiments with inexpensive drum machines and synthesizers, a new style of dance music and new production techniques began to transform the scene.68 The independent labels Trax and DJ International were responsible for all of the releases of Chicago house music between 1985 and 1989. The productions, from tape copies to vinyl, were very simple and involved minimal financial risk; distribution took place primarily through special local stores.69 DJs at clubs and local radio stations (for example, the Hot Mix 5 at WBMX) did the promotional work through simply playing the music. Interestingly, Chicago house music’s first major impact would be overseas.

AMERICAN DANCE MUSIC IN BRITAIN

The music of the clubs in Chicago was predominantly introduced to Britain via New York and the Balearic island of Ibiza. In 1986, DJ International representatives brought Chicago house records to the New Music Seminar in New York. Pete Tong, a radio DJ and A&R scout for the British company London Records, attended the showcase and brought the music back to his employers. In Britain he contributed to the House Sounds of Chicago compilations, spreading the music while establishing the genre’s name.

68 The production of Chicago house music will be further outlined in chapter 2.
69 After the music’s initial success, these record companies began to use more professional studios in Chicago, according to Chris Kempster, who disputes what he calls “Chicago’s extensive mythology” (Kempster 1996:16) – that is, the impression that all Chicago house productions were put together without any traditional studio equipment.
The initial appreciation of house music in Britain occurred mainly in northern cities, especially Manchester. The Haçienda Club, open since 1982, jumped in popularity when the house music of Chicago was introduced. Haçienda DJ Mike Pickering attributed this to the prior Northern Soul scene in that part of Britain: “I think Northern Soul probably played a part in house music taking off . . . there were a lot of similarities with house. It was very soulful, four to the floor fast music. I mean when we started the Friday night at the Hac [Haçienda], we got quite a lot of the old northern boys coming down. I was playing Adonis’s ‘No Way Back,’ and could see lots of people doing Northern Soul dances.”

House music became popular in London roughly a year later, beginning with a legendary birthday party at Ibiza and a rather small city club called Shoom. The Argentinean DJ Alfredo (Alfredo Fiorillo) worked at the Ibiza club Amnesia, and he usually started playing after 6.00 a.m. to attract partygoers returning from other clubs (Amnesia was an “after hours” club). He had been introduced to Chicago house music through a record dealer from New York and mixed these tracks with old and new dance music from all over the world. In September 1987, Paul Oakenfold had gone to the island to celebrate his twenty-sixth birthday with a few friends, all of whom were in some way involved with London’s club scene. Their experience of the Ibiza club, Alfredo’s music mix, and the recreational drug Ecstasy inspired them to introduce a similar scene in London. Shoom was not their first attempt in this respect, but it was the most significant in triggering the popularity of house music in the south of England.

These stories involve the transferences of a music culture and the means through which a local culture appropriates an imported one. This issue has been discussed thoroughly in the field of culture studies, particularly through a critique of stereotypical views of “globalization” as the passive consumption of culture shaped by multinational commercial corporations (mainly American). John Storey argues that “globalization is not simply the production of a homogenized American global village in which the particular is washed away by the universal. The process is much more contradictory and complex, involving the ebb and flow of both homogenizing and heterogenizing forces and the meeting and mingling of the ‘local’ and ‘global’ in new forms of hybrid

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70 Bidder 2001:150.  
71 Pickering quoted in Bidder 2001:54.  
72 Bidder 2001:89.  
73 See Norris 2007, chapter 4.  
74 See, for example, Connell & Gibson (2003) and Biddle & Knights (2006).
cultures.”\(^{75}\) Jan Nederveen Pieterse argues that the concept of hybridization here is in effect a tautology since cultures always have been hybrids.\(^{76}\) Storey agrees and emphasizes that “all cultures have appropriated what was at first ‘foreign,’ which was gradually absorbed as ‘second nature.’”\(^{77}\) He finds it more relevant to describe “routes” than “roots” in order to demonstrate “the nomadic nature of global cultures.”\(^{78}\)

Chicago house music’s appropriation in England suits this more complicated view of cultural transference. Contrary to the larger music industry, which was led by the major record companies, Chicago house music culture was always dominated by small, independent record companies, rather inexpensive productions and minority cultural groups. Nor does British urban culture suit the expected profile of globalization, given its more established role as an exporter rather than an importer. Interestingly, however, initial musical influences of the Chicago scene can be traced to a wide variety of local scenes, including British new wave and synth pop (as well as the New York clubs, Italo disco, and Philadelphia Soul).\(^{79}\) Furthermore, as Hillegonda Rietveld describes, Chicago house music was indeed later exported from Britain as part of an even more developed “entertainment package called ‘acid house party’ or ‘rave’”\(^{80}\) that included music, drugs, dancing, party events, clothing styles, and so on.\(^{81}\) In the subsequent dance music culture, an awareness of all of these early “routes” became an increasingly relevant indicator of “insider knowledge.” Some trace these “routes” to early Chicago producers, while others venture further back to Mancuso’s Loft or – as in the Chemical Brothers track *It Began in Africa* (on the album *Come With Us* from 2002) – all the way to the pre-slavery era.

Negative attitudes towards disco and dance music late in the 1970s never took over in Europe as they did in the United States. This allowed house music to flourish in Britain quite quickly and then spread to other European countries. Fikentscher observes that house remained largely underground in America – like disco, it was “associated with an urban, primarily non-Caucasian and/or gay core following,”\(^{82}\) connections that had

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\(^{75}\) Storey 2003:112.
\(^{76}\) Nederveen Pieterse 2004:82.
\(^{77}\) Storey 2003:119.
\(^{78}\) Ibid.:117.
\(^{79}\) Hillegonda Rietveld describes how she, through her fieldwork in relation to Chicago house music, encountered that her own participation in a British band called Quando Quango at the beginnings of the 1980s had inspired several contributors in Chicago (Rietveld 1998:261-264).
\(^{80}\) Rietveld 1998:40.
\(^{81}\) Gradually this “package” would even return to the United States.
\(^{82}\) Fikentscher 2000:78. Fikentscher points out that house music later gained popularity in the United States as “electronica” (Fikentscher 2000:113).
little impact upon the British appropriation of it. Thornton adds that anti-disco sentiments in Britain were “more directly derived from classist convictions about mindless masses and generational conflict about the poor taste of the young,” while the American discourse connected to the “disco sucks” campaign was more homophobic and racist. She observes that disco in fact had a huge straight white working-class following in Britain, as it did for a brief time in America as well before it retreated underground.

With the erasure in a new country of its conflicted past, then, a new wave of dance music was underway.

THE “BELLEVILLE THREE” AND THE RISE OF TECHNO

During the early 1980s and concurrent with the development of house music in Chicago, musicians in Detroit were also trying out new equipment and producing tracks with drum machines, sequencers, and synthesizers. Among them, Juan Atkins, Derrick May, and Kevin Saunderson have been credited with developing a distinct genre that was eventually named Detroit techno. Since they had attended the same high school, they were nicknamed the Belleville Three.

In 1987, Neil Rushton, a former Northern Soul DJ, noticed that some of the house music imported from America was produced in Detroit. Through earlier connections in that city, Rushton managed to obtain licensing rights to some of these producers, and the following year he convinced Virgin Records to release a compilation of their tracks. First called The House Sound of Detroit, the release was renamed Techno! The New Dance Sound of Detroit to stress its differences from the Chicago releases. Juan Atkins’s contribution to the compilation, actually called Techno Music, may also have informed the choice of name. To promote the album, Rushton brought British journalists to Detroit to meet some of the producers. As a result, John McCready wrote an article for the New Musical Express in July 1988 with the title “Welcome to the Phuture: Techno” that started with the following quotation from Alvin Toffler’s book The Third Wave: “The Techno Rebels are, whether they recognise it or not, agents of the Third Wave. They will

83 Thornton 1995:44.
84 Brewster and Broughton suggest that even the slogan “disco sucks” is homophobic, implying gay oral sex; see Brewster & Broughton 2006:290.
85 Rietveld’s description of the Warehouse as “away from any mainstream leisure area of Chicago,” “specifically aimed at young homosexuals,” and “mostly from an African-American and Latino background” (1998:18) describes this context. The AIDS epidemic also made gay communities more introverted during the 1980s.
86 Belleville is a small, rural town outside Detroit.
87 Stuart Cosgrove, who also went to Detroit, wrote a similar article in The Face entitled “Seventh City Techno.”
not vanish but multiply in the years ahead. For they are as much a part of the advance to a new stage of civilisation as our mission to Venus, our amazing computers, our biological discoveries, or our explorations of the oceanic depths." McCready then paints a picture of a desolate setting for this musical movement, quoting DJ May’s intriguing imagery inspired in turn by Toffler: “I would work through the night and I would see the city waking up – the face without the makeup. At night you would see the heat rising in the air from the stacks of old factory buildings. Now, when I listen to those tracks I see that view, I see the confusion of a city lost in transition from one age to another. The city is dying but Juan [Atkins] and the rest of us are all part of the Third Wave, the future.”

Since their music is made using “all the technological advancements Roland and Yamaha can come up with,” May claims that the producers of Detroit are the “Techno Rebels . . . musical agents of the Third Wave who see the fusion of man and machine as the only future.” Pointing to the desolated city, May explains; “Now you understand why we make this music . . . We can do nothing but look forward.”

Most writers consider Juan Atkins to be the foremost Detroit producer, both musically and intellectually. He claims that the synth aesthetics of Kraftwerk and the funk music of Parliament/Funkadelic have had the strongest influence on him. Dan Sicko, in his book Techno Rebels, observes that Atkins was introduced to Toffler’s literature in high school. At about the same time he started producing tracks with Richard Davis, an “aspiring electronic musician” whose material was, according to Atkins, “real abstract . . . avant-garde, electronic montage stuff.” In a 1988 interview in Music Technology Atkins describes how he produces music not only for clubs and dancing but also to listen to at home: “The music is not for everybody. It’s for certain people that want a little twist. Some people are perfectly content with everyday pop – they don’t have an open enough mind to consider something new. Those aren’t the people I’m playing for; they’ll come around eventually, because they’re basically followers. When they’re told that this is what’s happening, they’ll go along with it.” Sicko claims that the

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88 Toffler 1980:169. In Toffler’s book the “Third Wave” follows the “Second Wave” (the age of industry and mass production) with a society based on new technology and individualization (that is, information processing and knowledge production).
90 May quoted in McCready 1988.
91 Loc. cit.
93 Sicko 1999:69.
underlying philosophy of techno, then, “had less to do with futurism . . . than with the power of the individual and personal visions of Utopia.”\textsuperscript{95} Toffler’s Third Wave involved a rejection of mass production and mass consumption that, in the case of music, would appear to align with the individual artist’s exclusive works rather than the dance music DJ’s interest in satisfying his or her crowd. Jeff Mills, an influential Detroit contributor, even defines techno as “something completely new.”\textsuperscript{96} He says that if you “hear something that kind of sounds like you’ve heard it before, then it’s not techno.”\textsuperscript{97}

The British journalists visiting Detroit were fascinated by this new technological music created in response to Toffler’s vision. It in fact articulated a sort of manifesto with a condition (the symbols of the Second Wave are deteriorating), a position (new technology is the future), and an intention (to bring their city into the Third Wave). This manifesto was of course appropriated in many different ways in Britain’s emerging club scene, but its potential opposition to the dance party priorities of Chicago house remained an issue. Sheryl Garratt had written an article in *The Face* two years earlier, after her visit with producers of house music in Chicago. She described a production session “where everyone else comes down to watch” and there is “a party going on in the control room.”\textsuperscript{98} And her interview with DJ Marshall Jefferson situated the music directly within the club scene: “House music? I couldn’t even begin to tell you what House is. You have to go to the clubs and see how people react when they hear it. It’s more like a feeling that runs through, like old-time religion in the way that people jus’ get happy and screamin’. It’s happening! It’s . . . House!”\textsuperscript{99} In contrast to this earthy movement-oriented description, Detroit techno tends to be framed as much more rational and intellectual. This dichotomy would gain a foothold in the discourses connected to the music; Chris Kempster writes in his book on house music, “While house music was a post-modernist art form, ruthlessly eclectic to the point where some early house hits were simply thinly veiled rewrites of other songs, techno’s driving force was innovation. In its purism, its emphasis on stepping into the unknown, it is as modernist as Cubism. Detroit pushed dance music into the abstract, built not upon the legacy of disco, but on the spaces of funk.”\textsuperscript{100}

\textsuperscript{95} Sicko 1999:28.
\textsuperscript{96} Mills quoted in Kempster 1996:17.
\textsuperscript{97} Loc. cit.
\textsuperscript{98} Garratt 1986.
\textsuperscript{99} Jefferson quoted in Garratt 1986.
\textsuperscript{100} Kempster 1996:17.
Brewster and Broughton, on the other hand, criticize this intellectualized construction of Detroit techno. They point out that the Detroit musicians first appeared via the Chicago club scene, which Derrick May visited regularly with his music in tow. Only when the Detroit techno genre became established did producers begin to imitate the new “formula.” Thornton further remarks upon the British press’s portrayal of techno as the sound of Detroit “despite the fact that the music was not on the playlist of a single Detroit radio station, nor a regular track in any but a few mostly gay black clubs.”

The techno philosophy of the Detroit producers raises several interesting issues. The most obvious is perhaps the idea of a “pure new music” arising from the Third Wave’s break with earlier traditions. Inventions are seldom truly new but instead part of an ongoing process of development, as these DJs themselves acknowledge. Derrick May describes how he was “subconsciously inspired” in relation to his music production while Juan Atkins pointed to the influences of Kraftwerk and Parliament/Funkadelic.

The uniqueness of the Detroit movement was undoubtedly overemphasized. The tracks from the city that were most popular in Britain had obvious connections to the Chicago house scene. Nevertheless, the absence of a vibrant club scene in Detroit probably did foster an alternative mentality with regard to music production, and tracks that were later seen as influential upon the techno genre did comprise different musical features, such as faster tempo, more variety of drum patterns, effect processing, and a more exclusive use of electronic instruments where vocals or acoustic instruments were almost absent.

When British producers started to create their own electronic dance music tracks, these Detroit musicians became an important inspiration, both musically and intellectually. Within a few years, techno had become one of the most dominant genres of electronic dance music, signifying anything instrumental and electronic, whether it was intended for dancing or simply listening. While producers of house music undoubtedly made dance music, techno producers were also exploring other directions, transporting the music away from the dancefloor. The differences musically distinguishing house and techno could sometimes be only minor details, but the notion of their somewhat

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101 Parts of their 1999 chapter on techno were rewritten for their 2006 revised edition, and some important sections concerning these issues were removed; see Brewster & Broughton 1999, chapter 12, and 2006, chapter 13.
102 Thornton 1995:75.
103 Ruben 2000:127.
104 For example, see Rhythm Is Rhythm/Derrick May’s Strings of Life (1986) or Inner City/Kevin Saunderson’s Big Fun and Good Life (both 1988).
105 For example, see Model 500/Juan Atkins’s Night Drive (1985) and Off to Battle (1987).
diverging approaches and mentality persisted. The increased use of techno as a genre name early in the 1990s also helped detach this music from the drug-associated “acid house” scene. Instead, its musical roots and inspiration could be traced via Detroit techno to Kraftwerk, thereby avoiding the rather fraught disco association of the Chicago house scene.

**ACID HOUSE, RAVE, AND ECSTASY**

Ecstasy, or methylenedioxymethamphetamine (MDMA), is inseparably linked to the history of club culture. A drug that released feelings of openness, euphoria, empathy, love, and happiness, and even encouraged one’s appreciation of music and movement, was the perfect prescription for a club night. Simon Reynolds describes rather vividly how “Ecstasy turns the entire body surface into an ear, an ultrasensitized membrane that responds to certain frequencies.”\(^{106}\) He states that “all music sounds better on E – crisper and more distinct . . . House and techno sound especially fabulous. The music’s emphasis on texture and timbre enhances the drug’s mildly synesthetic effects so that sounds seem to caress the listener’s skin. You feel like you’re dancing inside the music; sound becomes a fluid medium in which you’re immersed.”\(^{107}\) Others certainly agree,\(^{108}\) and Ecstasy would play a significant role in the emergence and ultimate widespread popularity of acid house and rave culture. On the other hand, it succeeded only in carefully negotiated combination with the music itself, loud sound systems, and ferocious dancing.\(^{109}\) Jesse Saunders, one of the originators of Chicago house music, writes: “Some people have taken the drug ecstasy while listening to the music to take the feeling to new heights – they wanted to extend it as much as possible – but it was never necessary.”\(^{110}\)

The third volume in the London Records compilation series of Chicago house music was subtitled *Acid Tracks*.\(^{111}\) Following the success of Phuture’s track of the same

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106 Reynolds 1999:85.
107 Ibid.:84.
108 See, for example, Collin 1997b and Malbon 1999.
109 Reynolds suggests a strong connection between drugs and music production that features a repertoire of effects, textures, and riffs (Reynolds 1999:85). The effect processing and the specific sounds that he describes, however, have been transmitted to other genres within electronic dance music and elsewhere in popular music since the late 1980s even where there are no drug associations. While the Ecstasy experience probably nourished this unfamiliar sound environment in the late 1980s, it is problematic to view that music solely in its light.
111 Most of the tracks on this compilation would not be regarded as “acid house,” however, relative to how this genre came to be defined.
name, numerous new tracks using the Roland TB-303 arrived in England as well.\footnote{112} Subsequently “acid house” came to specify both the music and the scene it spawned.

The spread of acid house parties in the summer of 1988 in Britain has been called the “Second Summer of Love,” linking them to the hippies while emphasizing the amorous aspects of Ecstasy.\footnote{113} The music, the party, and the drugs appealed to an ever-increasing number of youngsters while inspiring fashion stores, major record labels, and even public newspapers. In Phil Sutcliffe’s 1989 article “Acid House: The Selling of Smiley Culture,” he describes how the \textit{Sun} spent September 1988 promoting fashion guides, hit lists, and T-shirt offers related to the acid house scene, only to devote October to warnings about the “evil of Ecstasy.”\footnote{114} Such publicity in turn motivated police raids on warehouse parties, official anti-drug campaigns, BBC bans on songs with “acid” in the title or lyrics, and so on. Newspaper headlines and attempts to control events had the paradoxical effect of creating more curiosity than anxiety,\footnote{115} and David Hesmondhalgh sees this as vital to “constructing dance music as oppositional”\footnote{116} and thus increasing its popularity even more. More patrons also required more space to party, so events were sometimes moved from inner-city places (clubs and warehouses) to larger spaces in more rural areas (such as open fields). These larger events became known as “raves” or “rave parties,” all-night dance events with DJs, large sound systems, light shows, video screens, laser effects, and so on.\footnote{117} This first wave of parties lasted until around the end of 1989, when police activity and increased penalties for unlicensed parties resulted in a slowdown.\footnote{118} Reynolds explains: “Gradually, the ravers became disenchanted: not only were there more and more rip-off events with shitty sound systems, no-show DJs, and none of the advertised facilities, but there was a good chance the raves wouldn’t happen at all.”\footnote{119}

\footnote{112} The Roland TB-303 was a small bassline synthesizer used to produce the characteristic sounds of acid house. See page 71 for a further account of the instrument.
\footnote{113} The gatherings in the Haight-Ashbury District of San Francisco in 1967 comprise the first “Summer of Love.” Regarding the affectionate side of Ecstasy, Reynolds writes about football hooligans “so loved-up on E they spent the night hugging each other rather than fighting” (Reynolds 1999:64).
\footnote{114} Sutcliffe 1989.
\footnote{115} This curiosity unfortunately also arose among those in the drug trade itself, and the more law-abiding party organizers were eventually scared away by the combination of increased police interest and vulnerability to criminals.
\footnote{116} Hesmondhalgh 1998:237.
\footnote{117} Approximately 25,000 people, for example, attended the Sunrise/Back to the Future Dance Music Festival on August 12, 1989.
\footnote{118} The Entertainments (Increased Penalties) Act of 1990 raised the maximum fines for unlicensed parties to £20,000 plus six months’ imprisonment. See Bidder 2001:142 and Huq 2006:100.
\footnote{119} Reynolds 1999:78.
The dance music culture of the 1990s

A second, even larger wave of rave parties lasted from 1990 to 1992. These were predominantly legal commercial raves or “all-night-rave-style clubs,” and they spread rapidly from their origin in London and Manchester. British producers had gradually taken over the scene through their own tracks and although these tracks were for the most part dance music made with electronic instruments, various directions were clearly emphasized and identified through specific genre names.

MYRIADS OF GENRES

During the 1990s, the electronic dance music scene has been characterized by a multitude of genres and subgenres. The following names, for example, identify only variants of house music in particular; acid house, ambient house, Chicago house, dark house, deep house, dream house, French house, hip house, Latin house, progressive house, tech house, and tribal house. An ability to navigate among these various subgenres has been important both to discourses within the dance music culture and to the DJs and producers providing the musical material.

Jason Toynbee sees “genres” in popular music as serving at once “as an essence, as a collection of traits, and in structured opposition to other genres.” His first solution to this bewildering multiplicity of functions is “to recognize that genre never can be a static system of classification” – we must therefore understand genres both as flexible in any current usage and as changeable over time. Drawing on Steve Neale’s work on genres in film, Toynbee emphasizes the tension between repetition and difference – a “structure-deterioration model” – in his discussion of genre changes within the dance music scene. Neale particularly relies upon the notion of repetition in production to

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120 See Reynolds 1999:113.
121 Ishkur’s Guide to Electronic Music is a huge interactive website of genre maps with introductions and excerpts to most of the essential genres. See webpage 1.3. Wikipedia also offers an extensive introduction to electronic music genres, with 19 main genres and 195 subgenres. See webpage 1.4.
122 Two standard approaches to the classification of genres appear in these examples; an evolutionary approach that points to influences and roots, and an approach of similarity that privileges like qualities over developmental links. “House” points to the historic Warehouse club and the original “house music” in Chicago, while words like “dark,” “deep,” “dream,” or “tribal” indicate some sort of association or resemblance among certain musical elements. Other names might be geographical (Chicago house, French house, Detroit techno, Goa trance, U.K. garage) functional (trance, rave, dance, jump up), technology-oriented (electronica, techno), instruments-oriented (drum’n’bass), or linked to other contemporary genres (hip house, tech house, Latin house).
124 Loc. cit.
satisfy a desire to repeat an earlier experience of pleasure. If this is so, Toynbee argues genres will mutate at different speeds according to the demand for variations in order to continue “to offer the promise of bliss.”

In dance music these processes are deeply related to the dancefloor and how the music moves the dancers. However, in the 1990s, numerous external processes were active as well. Many genres and subgenres were constructed by the press or record companies. British magazines of the 1990s (for example, i-D, Q, Mixmag, or DJ) raced each other to discover new trends and establish new genres. The magazines filled a sort of double role, both distributing “insider knowledge” about current trends and suggesting or satisfying the need for new trends. The content of what was considered “insider knowledge” had to be constantly altered, concerning not only music and music genres, but also clothing, clubs, DJs, producers, labels, drugs, slang, and so on.

These processes influenced producers and DJs. They had to balance the demands of the dancefloor, where people would not dance if the music did not fulfil their needs, with the demands of the culture to be inventive and expand the forms of the genre. In the 1990s this situation would lead to changes in dance-related genres as well as the development of more “listening-related” genres.

THE POST-RAVE CLUB SCENE

Around 1994 the dance scene in Britain moved once and for all from raves to clubs. The Criminal Justice and Public Order Act of 1994 specified restrictions and fines that succeeded in putting an end to raves, and the result was a flowering of clubs and club culture that ultimately introduced dance music to an even wider audience worldwide. Clubs of all sizes and types opened in most major cities, first in Britain and then in the rest of Europe; they ranged from large, profit-seeking clubs with several dancefloors playing various music genres to small, gritty clubs run by idealists interested only in a

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126 Loc. cit.
127 Sarah Thornton’s “subcultural capital” – derived from Pierre Bourdieu’s notion of “cultural capital” – describes the knowledge necessary for status within a specific subculture. Knowledge, in this context, includes not only what you know but also whom you know, how you dress, how you act, and so on. Thornton identifies “objectified subcultural capital” within club cultures as “fashionable haircuts and well-assembled record collections” (Thornton 1995:11) and “embodied subcultural capital” as “being ‘in the know,’ using (but not over-using) current slang and looking as if you were born to perform the latest dance style” (11-12). The significance of being an “insider,” or at least adequately on the inside as opposed to those on the outside, has been part of club culture since the required Loft memberships of the 1970s.
128 The most incongruous name of a genre might be “intelligent dance music,” specifying music not intended for the dancefloor.
129 The act even defined rave music as “music wholly or predominantly characterised by the emission of a succession of repetitive beats” (Huq 2006:101).
particular genre. Superclubs like the Ministry of Sound in London or Cream in Liverpool evolved into whole corporations and brands that included magazines, clothing, compilation CDs, dance club tours, and so on (not unlike the many businesses associated with disco culture at the end of the 1970s).

During the 1990s several DJs/producers from the dance music scene had major international hits, and the position of the DJ was elevated to a level equivalent to the popularity or status of any major rock artist. The most successful DJs, like Fatboy Slim, the Chemical Brothers, DJ Tiësto, or DJ Sasha, were paid extremely well for a few hours of DJing, a special remix, or a compilation album. They became important dance music figureheads as the larger clubs promoted their shows and the record companies spread their music around the world. But this massive surge of attention conflicted with one of the basic approaches to DJing: “After we let the DJ become a superstar, we stopped listening to the music, we believed the hype, we all went crazy for their first record even if [it] was utter rubbish.”

Many of disco’s dilemmas thus recurred for its heir. The involvement of major record labels (or their dedicated sub-labels), large clubs, magazines, fashion design, and the drug business increased as the popularity of dance music reached new heights. Brewster and Broughton assert that “by the end of the nineties dance music had become big business, with superclubs, superstar DJs and the dance press wrapped in a sweaty love triangle . . . Never before had a musical culture been so thoroughly infiltrated. Despite being rooted in acid house ideals, the dance world had been built by opportunist entrepreneurs, and it didn’t have many qualms about selling out.”

Around 2002 the popularity of club culture gradually started decreasing, as the creativity and innovation of its proponents and performers waned. The overwrought involvement by corporations and various partakers had turned attention away from the music and dancing themselves, as it had with disco. The overall reputation of the music and culture did not ultimately suffer in the same way, however, and many clubs have continued business as usual across Europe. The influence of the music is also present in

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130 Fatboy Slim (Norman Cook) marvelled at the transition from being “just the bloke who stood in the corner and put records on” (Brewster & Broughton 2006:523) to being a star who was offered “figures so high that he found it difficult to refuse” (ibid.:524).
131 Ibid.:540.
132 Loc. cit.
current popular music in various ways, and new dance acts gains popularity from time to time.\footnote{133}{For example, the French dance act Justice (producers/DJs Gaspard Augé and Xavier de Rosnay) had several international club hits in 2007.}

The late 1990s, then, was the high point for creativity and diversity in electronic dance music. The clubs could pick and choose from a huge variety of tracks, and European nightlife experienced an unprecedented flourishing.

A PRESENTATION OF TWO DANCE ACTS

I will now introduce two central dance acts from this period: Basement Jaxx from London and Daft Punk from Paris: Their music will occupy several analyses in chapters 6 and 8.

**Basement Jaxx:** Simon Ratcliffe and Felix Buxton made some important contributions on their way to stardom with their album *Remedy* in 1999.\footnote{134}{See Lynskey 1999 for an account of the impact of the album. For a brief biographic overview, see Bush 2001:40–41; see also Bidder 1999:26–29.} They started arranging club nights in an impoverished Irish pub in Brixton, an inner city suburb of London with around 25 percent of its population of African and/or Caribbean descent.\footnote{135}{Brixton has become somewhat trendier but still suffers from unemployment, high crime, poor housing, and so on. It is notorious for the Brixton riot of 1981; see description in Hughes 1999:32.} They both DJed at these club nights, attracting a substantial following and earning a reputation for hosting great parties.\footnote{136}{See Wain 1996/97:8 and Mellor 1997/98:52 for positive reviews of the club nights of Ratcliffe and Buxton.} Ratcliffe and Buxton also formed an independent record label, Atlantic Jaxx Records, and started producing their own material while working on remixes and productions for other artists. Their releases got good reviews from several legendary DJs within the scene, and for their first full album release in 1999, they signed with the larger independent label XL Recordings. Ratcliffe and Buxton have mostly kept in the background but have hired various vocalists, generally ethnic minorities, to serve as focal points for live performances. Since their breakthrough in 1999, they have released several more successful albums, played large stadium concerts, produced music videos, given interviews, and so on. This popstar status has somewhat hobbled their position within club culture.

**Daft Punk:** Guy-Manuel de Homem-Christo and Thomas Bangalter took the name Daft Punk from a *Melody Maker* review of their former project, Darlin’, that characterized their music as “a bunch of daft punk.”\footnote{137}{Collin 1997:109. For a brief biographic overview, see Cooper 2001:114–115 and Bidder 1999:69–72.} For the new act, they changed
musical direction and started producing electronic dance music, releasing their debut in 1994 on Soma Records, an independent Scottish techno/house music label. In 1996 they signed with Virgin and released *Homework*, a success with both critics and the public. Homem-Christo and Bangalter are famous for having their faces concealed on photographs, either behind masks or, since 1999, with robot helmets.\(^{138}\) In an interview with *Mixmag* magazine, they explain their position:

Matthew Collin: “Do you think you can hide from stardom?” Daft Punk: “In a word, yes. Because we are Daft Punk and we don’t need to show our faces to get on a magazine cover or sell shitloads of records . . . Because we remember Juan Atkins and Frankie Knuckles and all the greats who went before us and didn’t get the respect, the money or the magazine covers. Because, like them, we’re ordinary boys who happen to make thrilling tunes; characters thrown up by a culture where it’s the track’s impact on the dancefloor that counts, not the artist’s image.”\(^{139}\)

Daft Punk released their second full-length album in 2001 (*Discovery*) and a Japanese animated film visualizing its music in 2003.\(^ {140}\) The group has since released one studio album and several remix and concert albums. Their popularity has gradually diminished with the general dropoff of interest in club culture.

Each group draws attention to certain important issues relative to the club cultural landscape. The Brixton club of Basement Jaxx represents a real dedication to the most central issue of club culture: making people dance. Its location may have been coincidental but nevertheless communicates the correct “underground” approach in its distance from the more trendy and rich areas of London. The fact that they first formed their own label and then signed to an independent one also signifies their interest in avoiding the most notorious commercial sides of the business. The use of non-Caucasian artists to front their project relates probably to the desire for a specific sound but may also evoke earlier influential genres (funk, disco, Chicago house) or contributors to the scene.\(^ {141}\) Finally, their success may have been at the expense of their impact on the dancefloor – too many magazine covers, music videos, stadium concerts, celebrity contributors,\(^ {142}\) and so on may have turned the “inside” clubgoer against them. The Daft Punk members’ tactic of hiding their faces successfully deflects this “inappropriate” focus. Furthermore, their robot outfits link them to Kraftwerk, among other important

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\(^{138}\) See Rayner 2001.

\(^{139}\) Collin 1997a:108.

\(^{140}\) The film in question is titled *Interstella 5555: The Story of the Secret Star System*.

\(^{141}\) See Danielsen 2006, chapter 2 for a discussion of Otherness in white European culture.

\(^{142}\) For example, Me'Shell NdegéOcello, Dizzie Rascal, and Siouxsie Sioux (of Siouxsie and the Banshees) contributed to their *Kish Kash* album, released in 2003.
precursors. Daft Punk also evokes the intellectual avant-garde through, for example, the subversive use of a critical review.\textsuperscript{143} Their Japanese animation film also represents an unexpected and original move that demonstrates artistic independence as well as a certain hipness, at least in some contexts.

In this study, I selected the music of Basement Jaxx and Daft Punk for both its quality and its impact. The various moves they have made in the cultural landscape demonstrate their focus on producing good dance music and their acknowledgement of core principles within the culture.

**Summary**

Several important subjects in this chapter are related to the early developments of club culture in New York City. David Mancuso, who started the Loft in the early 1970s, had specific notions about what constituted a dance event and what role the DJ ought to play: the focus should be on the dancers, not on the DJ; the DJ should introduce music to the dancers that they had not heard before; and the club’s sound system should be the best it can be. Also relevant to the Loft was its underground status and corresponding distinction between “insiders” and the uninvited. Issues of authenticity in dance music cultures relate directly to this status and its related “insider knowledge” and proper attitude towards mainstream exposure. This last topic has been highlighted through examples of the overexposure of disco culture towards the end of the 1970s and its sudden decline in popularity around the turn of the decade.

During the early 1980s the perpetuation of disco music was especially vital to underground clubs in Chicago (the Warehouse) and New York City (Paradise Garage), and new genres of dance music arose in disco’s wake. Chicago house music was in turn imported to Britain and spawned a new wave of dance music culture involving massive followings and huge events (raves) that were also linked to the drug Ecstasy. A parallel musical import came from Detroit producers, whose more intellectual approach provided the roots also for an electronic music that was less directly linked to the dancefloor.

In the 1990s electronic dance music splintered into intricate hierarchies of genres and subgenres. The issue of “insider knowledge” arose particularly around the ability to navigate among them. The dance culture continued to grow in popularity both in Britain

\textsuperscript{143} The subversive artistic exploitation of socially negative objects recalls the Dadaists or Surrealists – for example, Marcel Duchamp’s urinal installation.
and worldwide, and its most famous DJs were elevated to levels of popularity or status matching those of any major rock artist. The issue of overexposure also arose again as superclubs evolved into large corporations and spawned numerous businesses related to the culture. A decline in the popularity of dance music began around 2002 amid decreasing creativity and innovation within the scene.

Dance music acts like Basement Jaxx and Daft Punk participate in (and to some extent create) this story. They define themselves according to the prevailing opinions and fields of tension within the culture, especially with regard to appearances in the press, choice of record label, or balance between DJing and producing, to say nothing of their music itself. From the 1970s to the 1990s, major changes occurred in the circumstances of music production. In the following chapter I will more closely examine contexts related to music production and the major developments in music technology.
Chapter 2:
Dance music production and the development of music technology

The development of related technology has been a core issue for electronic dance music throughout its existence. Several genre-defining musical features are in fact directly linked to specific pieces of equipment, and production techniques are likewise linked to the pivotal transition from analogue to digital formats. New possibilities within music production have been vital to the genre’s repetitive form and emphasis on sound and rhythmic structures. Moreover, the role of the DJ has gradually expanded into the field of music production due to new products such as the twelve-inch dance remix, and to new and less expensive musical equipment.

An awareness of these various relationships and some ability to distinguish among the different types of music equipment and production techniques are both part of the genre’s “insider knowledge” and intricately linked to the many issues of authenticity that exist in dance music cultures. In the following I will outline some of the changes that occurred as this music developed.

Dance music production from the 1970s to the 1990s

THE PRODUCTION OF DISCO MUSIC

Disco in the 1970s relied exclusively upon analogue studio production techniques. The genre enjoyed a virtually limitless number of recording tracks compared to music of the previous decade, and more tracks (up to forty-eight in professional studios in the late 1970s) offered more possibilities for overdubbing and accommodated larger musical ensembles. Editing was only possible through the cutting and pasting of actual pieces of tape, however – a decidedly laborious process relative to the succeeding digital era.

The use of click tracks to keep a steady pulse became increasingly common during the 1970s, especially in disco productions, where a firm, constant beat was highly prized. The click track, along with disco’s overdubbing techniques, was at the time denigrated as insincere or artificial by popular music authorities outside the genre. Because the rock concert still represented the ideal for what was done in the studio, the
techniques that best evoked live performance were more highly regarded, at least in some popular music circles.144

Two contrasting examples of disco production are the Philadelphia soul sound (from the record label Philadelphia International) of Kenneth Gamble, Leon Huff, and Thom Bell, and the so-called Eurodisco of Giorgio Moroder.145 The Philly sound arose among studio musicians that had spent years honing their musical interaction and remarkable reputations; John A. Jackson describes them as “Philadelphia’s ‘A-team’ of studio players.”146 He further observes that “the core of this endowed group was its rhythm section, ‘a family [that] worked together and played off of each other.’”147 An essential element here was the hi-hat patterns and the distinct hi-hat sound clearly elevated in the mixing process. In addition, string and brass ensembles and overdubbed vocals in the Philly productions contributed to define the lush sound of disco.

Among Moroder’s productions, Donna Summer’s I Feel Love from 1977 is often seen as the clearest counterpoint to the generally acoustic Philly sound – its backing track, in fact, was produced mostly by one person with a Moog synthesizer. Even the hi-hat and snare drum sounds were produced electronically, though the bass drum had to be overdubbed to get the proper punch.148 In addition to the highly influential Kraftwerk albums from the 1970s, this track anticipated later electronic dance music developments both with its sound and its production techniques.

These two production approaches, the group of musicians playing together and the single person with his/her machines, resonate with very different discourses on authenticity in popular music culture.149 The contrast between organic, dynamic interaction (music that is “with feel”) and the mechanical and automatic (“without feel”) is immediately relevant to discussions about rhythm and conceptions of groove.150 In the production of electronic dance music, of course, machines have become increasingly

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144 For a discussion of differences in ideals of music production, see the comparison of pop and rock music production in Warner 2003, chapter 1.
147 Loc. cit.; Jackson is quoting trombonist Fred Joiner.
149 Nelson George juxtaposes these two variants of disco productions: “At least the Philly disco records sounded like they were made by humans. Soon, Eurodisco invaded America, initially from Munich, and later from Italy and France. It was music with a metronomelike beat – perfect for folks with no sense of rhythm – almost inflectionless vocals, and metallic sexuality that matched the high-tech, high-sex, and low passion atmosphere of the glamorous discos that appeared in every major American city.” (George 1988:154). Also see discussions about authenticity and music technology in Frith 1986, Théberge 1997, chapter 7, Knakkergaard 2000, and Warner 2003.
150 See discussion of groove on page 153.
important, but the tension surrounding them remains and influences producers to this day.¹⁵¹

THE REMIX AND THE TWELVE-INCH

The dance remix, often released on a twelve-inch single, and the production techniques associated with it are also important to the development of dance music in the 1970s.¹⁵² These innovations are attributed to producer Tom Moulton, who was frustrated by the disruption of the flow of the music when DJs had to rely upon ordinary singles, produced primarily for radio, which lasted only three minutes or so.¹⁵³ Using simple tape-recording techniques, Moulton produced a mixed tape with forty-five minutes of continuous music whose success gave rise to, among other things, a part in the production of Gloria Gaynor’s album Never Can Say Goodbye (1974). This record would feature a side-long medley of three songs, segued together as if played by a DJ. Moulton did this by extending the instrumental sections of the songs, a technique that would become basic to mixing techniques in dance music. In 1975, Giorgio Moroder produced an extended version of Donna Summer’s Love to Love You Baby that occupied an entire side of an LP at almost seventeen minutes long.¹⁵⁴

The qualities that made the twelve-inch as a product so effective for dance music are said to have arisen by accident.¹⁵⁵ Tom Moulton and his assistant José Rodriguez were short of seven-inch blanks and decided to fill a ten-inch blank with the three-minute track instead. Rodriguez had to raise the level by +6 decibels to make the grooves fill the disc, and the resulting dynamic improvements were clearly audible, in both low- and high-frequency areas, in turn introducing more bass and more brightness. Will Straw, in his article on the twelve-inch single, writes: “The wider grooves made possible in the twelve-inch format lent themselves strikingly to the demands of superior dance club sound systems, and low-end frequencies could be heard with greater clarity.”¹⁵⁶ The first commercial twelve-inch disco mix was Double Exposure’s Ten Percent from 1976, which was produced by Walter Gibbons and released on Salsoul Records. The track

¹⁵¹ This topic is discussed further at the end of this chapter; see page 82.
¹⁵² Remixing originated in Jamaica in the 1960s (see Brewster & Broughton 2006:116ff).
¹⁵³ See Lawrence 2003:71.
¹⁵⁴ An analysis of this track’s bass drum sound is presented in chapter 8 (see page 212).
¹⁵⁶ Ibid.:167.
comprises two long verse-chorus sequences, one with vocals and one without. Gibbons’s emphasis on percussion is considered integral to the twelve-inch “sound.”

Prior to this mass release, the twelve-inch had been produced exclusively for DJs, and this practice continued alongside the commercially produced versions. DJ copies (usually clearly labeled “promotional – not for sale”) contributed significantly to the DJ’s standing in the music community as someone with special access to material. The labels on these copies did not display images or logos of the performers. Given its alliance to the principle of purposely deflecting the attention of the crowd, this practice became more and more common in the 1980s and 1990s, even extending to commercially released remixes.

The impact of the twelve-inch has certainly been commercial as well as cultural, though the dancefloor has remained the priority here – the twelve-inch’s arrangements and mixing derived from ideals other than (and even opposed to) those of radio play. Moreover, as Straw argues, twelve-inch disco mixes came to be identified with the “appropriate” records for DJs: “The original sense of disco records, as those which ‘crossed over’ from other musical fields, would diminish as the process of crossing over became inscribed in the text of records destined for the disco market, like the disco versions of soul, pop, rock, Broadway and classical pieces which continued through the late 1970s.” Taking into account all of the twelve-inch disco mixes produced during the second half of the 1970s, a standardization in style becomes obvious, especially in those disco versions of previously released material. But stylistic variety exists as well. The twelve-inch discs usually consisted of tracks from five to nine minutes long whose expanse invited creative experiments with the verse/chorus format. Build-up sections, long groove-oriented breaks, and vocal or instrumental improvisations with a rhythmic emphasis all lent themselves remarkably well to the dancefloor.

The twelve-inch also brought DJs into the studio, where their club experience helped them to decide exactly which features to emphasize in the remix or which sections

157 According to Brewster and Broughton, forerunners to this practice of “white labels” appear in the Northern Soul scene, where DJs would cover up or alter record labels to prevent anyone from finding out what dance music gems they had discovered (Brewster & Broughton 2006:110). Hip-hop DJs also soaked off labels to protect the identity of favourite “breaks.”
158 See discussion on page 39.
159 Straw describes how record companies tried to use the twelve-inch as a teaser to promote an upcoming album, though with limited success (Straw 2002:171).
160 Ibid.:168.
161 See also Brewster & Broughton 2006:200.
162 For the twenty-one tracks on Give Your Body Up: Club Classics & House Foundations that were originally twelve-inch releases (with release dates ranging from 1975 to 1984), the average duration is 7:05.
to extend for maximum impact on the dancefloor. From spinning records to assistance in mixing and then independently remixing existing material, the role of the DJ has gradually expanded to full-scale music production, which contributed also to the DJ’s eventual rise to star performer in the dance music scene of the 1990s.

THE PRODUCTION OF CHICAGO HOUSE MUSIC

The development of Chicago house music is closely linked to the new musical instruments produced early in the 1980s. The analogue Roland drum machines were especially effective in DJ sets, and crowds would often continue to dance only to them, once the song had ended. This experience in turn encouraged Chicago-based DJs to attempt to produce dance music with synthesizers, drum machines, and tape recorders outside of the traditional studio.

One of the very first contributors to this “homemade” Chicago house music was the DJ Jesse Saunders, who recorded and released On and On in 1983–84 using a Roland TR-808 drum machine, a Roland TB-303 bassline synthesizer, a Korg Poly 61 synthesizer, and a four-track tape recorder.163 The record was very popular at influential Chicago house clubs, and when the rumour spread that this simple but effective track was produced by a local DJ, it led to many similar attempts. As Marshall Jefferson, an important DJ/producer within the Chicago house scene, states: “That was the single most important record to me of the twentieth century, because it let the non-musician know that he could make music. It was the revolution.”164 Jefferson is describing a democratization process within music production that began after the 1970s. The increasing availability of music production tools outside of the professional studio gave new groups of contributors a chance to make their own dance music.165 Reduced prices on equipment such as digital synthesizers and drum machines in the early 1980s were, according to Paul Théberge, caused in part by “marketing decisions made by synthesizer manufacturers themselves but also because of falling prices in microprocessor technology, improved manufacturing, and the entry into the field of powerful new competitors.”166 Furthermore, digital technology’s bright, noise-free sound and reduced

163 See Brewster & Broughton 2006:328.
164 Quoted in Bidder 2001:30.
165 A local pressing plant for vinyl in Chicago also played a part by offering accessible vinyl production (ibid.:31).
166 Théberge 1997:73. Théberge also points out two less obvious but equally influential factors in the spread of digital musical instruments: a small cottage industry supplying sound programs for synthesizers and samplers that appeared during the mid-1980s, and the design and development of MIDI (ibid.:74ff).
prices made analogue drum machines and synthesizers perfectly functional and less expensive on the secondhand market. In Chicago, pretty much any participant in the club scene (DJs or clubgoers) could buy a Roland TR-808 drum machine and a Roland TB-303 bassline synthesizer for quite reasonable prices and, inspired by the success of others, begin to create music.

Ideally, popular music cultures represent arenas of creativity that are open to anyone with talent regardless of economy, contacts, musical training, cultural position, and so on. But since the major record companies have always possessed the economic means to produce and release records of good quality, they have typically retained the power to select who could demonstrate their talent to the public. This hegemony was finally challenged through developments in music technology early in the 1980s, and a host of smaller independent record companies then emerged.  

Another sign of the presence of democratization processes within dance music culture derives from DJ practices. Participants of the culture could actually inform decisions concerning which tracks would be released or how they would sound because DJs frequently brought unreleased material to their clubs to try it out. The dancers’ response was then taken into account in the continuous process of mixing and selecting tracks. In the electronic dance music scene, the possibilities and issues related to the do-it-yourself approach and the democratization of music production have remained relevant. New technical innovations (samplers, digital synthesizers with various signal processing systems, and so on) and the transitions from traditional analogue units to computer-based digital software – accompanied by the reduced prices and increased capabilities of home computers – have made music production accessible to numerous individuals. Nevertheless, dance music cultures still construct hierarchical power relations that result in undemocratic conditions as well, based more on positions in a cultural field than on access to music equipment. The new positions of power include DJs, journalists, club owners, and owners of small independent record labels.

167 The DIY (do-it-yourself) approach of English punk a few years before arose from a similar flouting of the established authority of record companies (see Toynbee 2000:93).
169 In newer musical cultures (such as the Chicago house scene) these positions of authority seem less fixed than they are in traditional cultures.
THE ACID HOUSE SOUND

An interesting outcome of the democratization process in music production is described by the now legendary birth of the “acid house” sound from the Roland TB-303 bassline synthesizer.\(^{170}\) This synthesizer, released in 1982, had an analogue signal-processing system, a programmable sequencer (with no display), and a few knobs to control vital parameters.\(^ {171}\) It was thought that the TB-303 could replace a bass guitar player, possibly in tandem with the matching drum machine TR-606 Drumatix, but it sounded nothing like a conventional bass and was difficult to program as well. Still, for Chicago house music producers, its artificial bass sound and programming capabilities would prove useful;\(^ {172}\) when DJ Pierre (Nathaniel Pierre Jones) started playing around with the machine in 1985 at the opposite end of its intended low frequency range, he discovered some truly strange sounds. The TB-303 was used in the production of the track *Acid Tracks*, where the knobs on the machine were constantly being turned. Described as the “squeaks and bleeps” of the 303,\(^ {173}\) these sounds started the massively popular acid house genre. Despite DJ Pierre’s lack of understanding of the synthesizer, he managed to use it to produce unconventional (and ultimately desirable) music.\(^ {174}\) Sounds that were considered artificial or “failed” in comparison to acoustic instruments were definitely both real and successful in the production of dance music in Chicago.\(^ {175}\)

DANCE MUSIC PRODUCTION IN THE 1990s

The increasing availability of music technology that had begun in the 1980s sped up in the 1990s. The broader distribution of home computers with music programs offered easier access to music production, and external (and then internal) CD burners made it possible to complete a product from start to finish on a single computer. This


\(^{172}\) When dealers realized that the TB-303 had failed in its original purpose, they reduced its price considerably as well, improving its accessibility; Taylor 2001:163.


\(^{174}\) See Rose 1994:74ff for similar accounts of “abuse” of the Roland TR-808 drum machine in hip-hop cultures.

\(^{175}\) Wiebe Bijker, discussing another technological artifact, the safety bicycle, writes, “the ‘working’ or ‘nonworking’ of an artifact are socially constructed assessments, rather than intrinsic properties of the artifact.” (Bijker 1995:75). This is certainly true of the TB-303 and its counterparts in the early 1980s.
convenience partly explains the huge amount of electronic dance music produced in the 1990s and its spread around the globe.\textsuperscript{176}

During the 1990s the sound of electronic dance music was constantly changing. Improved equipment gave producers ever better tools for shaping and controlling their sound, as Martin Knakkergaard points out: “Today, it is possible to manipulate almost every musical and acoustical phenomenon in ways which the past dared hardly imagine. Music can be shaped, moulded and performed independently of the limitations set by traditional acoustic instruments and we cross the borders between the old and new technology without leaving any traces.”\textsuperscript{177} Various partakers of the electronic dance music scene (journalists, record company executives, and so on) constantly sought out new genres and new sounds, and many producers arose to satisfy this demand.\textsuperscript{178}

While the various Chicago house music productions started with quite similar types of equipment and production techniques, this would change during the 1990s. The machines that dominated the music early in the decade (for example the Akai MPC-60 and the Roland TR-909) gave way to an increasing number of alternatives for every part of the production process. A growing number of prefabricated sound loops (mostly drums) made producing an entire track relatively straightforward. One could either meticulously shape one’s sounds and carefully placing them in the “correct” positions (often nudging entries back and forth), or one could insert various loops, copy them a sufficient number of times, and add a few other tracks with quantized patterns. Certain techniques also developed in relation to specific dance genres, such as cutting up and stretching out the audio elements in drum loops within the drum’n’bass genre.\textsuperscript{179} Usually such novel techniques would become standard options in different types of equipment and thus available to almost anyone.

The so-called workstation – a synthesizer with a sequencer, a digital sampler, and an effect processor combined into a total production unit – completed the development of electronic music equipment in the 1990s. Simultaneously, computer-based DAW programs became more advanced due to ever more powerful processors. While this has cumulatively resulted in a simpler production process overall, it also gave rise to a host of new shortcomings or weaknesses in the equipment itself (for example, software bugs, software bugs, software bugs.

\textsuperscript{176} This democratization process has continued into the new millennium, with improved music software, even more powerful home computers, and the distribution of music via the internet (for example, on myspace.com).
\textsuperscript{177} Knakkergaard 2000 (article in Popular Music Online, no page number).
\textsuperscript{178} See discussion in chapter 1, page 58.
\textsuperscript{179} See Brown & Griese 2000:107ff for more on drum’n’bass production techniques.
faulty operating systems, deficient processors) that could sometimes disrupt the producer’s creative process. Early in the 1990s, producers often combined a MIDI sequencer (external or computer-based) with a digital sampler, a synthesizer, a drum machine, various effect processors, a mixer, and an analogue or DAT tape recorder; by the end of the decade, most of these functions had become software programs that could be connected using sequencer programs.\textsuperscript{180} Equipment targeted at the growing dance music scene arrived in the late 1990s as well. The first piece was the Roland MC-303 “groovebox” (1996), an external sequencer unit equipped with sounds, filter knobs, and an arpeggiator.\textsuperscript{181} This was succeeded by improved models with more effects and possibilities (the Roland MC-505, Korg Electribe, and Yamaha RM1x), and they served as complete production units or stage instruments. The first loop-based sequencer program that was especially suitable for dance music was Sonic Foundry’s Acid Pro, launched in 1998, but the major digital audio workstations (Pro Tools, Cubase, Logic, Digital Performer, Cakewalk/Sonar) soon incorporated similar functions to satisfy the growing number of dance music producers.

The development of music technology during the 1980s and 1990s

The changeover from analogue to digital technology in music equipment impacted the creation of electronic dance music in various ways, in terms of both new production methods and new sounds. Chris Kempster writes:

Just as the birth of rock’n’roll was inextricably linked with the arrival of the electric guitar, house music would have never happened without the emergence of affordable electronic instruments. The synthesizer, drum machine and sequencer were the tools with which house and techno musicians fashioned a new genre of music, and the experimentation which these tools encouraged resulted in a fresh and new type of sound experience. The use and abuse of this technology may have not been how the manufacturers originally envisaged their instruments being used, and not all house music producers were ‘musicians’ in a traditional sense, but these factors meant that [there] were no rules as such – if it sounded good, then that was enough.\textsuperscript{182}

During the 1980s digital technology was introduced to various types of existing equipment that already had stature within music production. Synthesizers, drum machines, sequencers, and even the MIDI system and digital sampler all had analogue

\textsuperscript{180} Propellerhead Software’s computer program Reason, launched in 2000, emulates a producer’s “rack” with sequencers, synthesizers, samplers, a drum machine, a mixer, and various effect processors.

\textsuperscript{181} An arpeggiator is a device that generates series of tones when one presses a key on the keyboard. These may be structured according to various patterns of pitches, rhythm, and accent, and can be made to fit a certain tempo.

\textsuperscript{182} Kempster 1996:155.
predecessors. But their positions were strengthened after the introduction of digital components and they even brought their analogue counterparts along for the ride. Especially within dance music, electronic instruments and equipment thus moved from the periphery to the very centre of music production.

In the 1990s most recording studios likewise went from analogue tape machines to computers and digital hard-disc recording. MIDI sequencers had already transitioned from external units to software-based computer programs in the late 1980s, and during the early 1990s digital sound recording was integrated as well, all thanks to the development of personal computers. High-quality digital audio recording required far more processing power and computer storage capacity compared to the MIDI system. Later in the 1990s, effect processing and automated real-time mixing functions could also be gradually integrated into software programs as computer processing power increased.

In the following I will briefly outline the development of the instruments and equipment most relevant to the transition from the analogue era of the 1970s to the digital era of the 1990s, according to the priorities of this study.

SYNTHESIZERS

Digital components were gradually introduced in synthesizers at the end of the 1970s and immediately addressed two profound deficiencies in their analogue counterparts: voltage-controlled oscillators were unstable in their tuning, and it was not possible to store sound settings. The Prophet 5 from Sequential Circuits (1978) was one of the first analogue/digital hybrids with a microcomputer to control tuning and store program settings.

The Yamaha DX-7 (released in 1983) was the first commercially successful all-digital synthesizer. Kempster writes: “The DX7 offered a range of incredibly life-like sounds that made analogue synths sound very one-dimensional. While a Roland synth could make a vain attempt at imitating a flute, the DX7 managed an almost perfect

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183 When the company Opcode expanded their Vision sequencer into audio recording (calling it Studio Vision) in 1990, they relied on an external sound recording unit from Digidesign. In 1993, a few Macintosh models were released with an integrated sixteen-bit sound system, which soon became standard, and sequencers could then run audio recording software without any external sound card.
184 These priorities relate first and foremost to the analyses of sound in chapter 8 and the focus on production aspects in my descriptions of sound. The possibility of producing a track with many rhythmic patterns working together is also relevant in relation to the analyses of rhythm in chapter 6.
185 A great deal of the information on release dates and various technical details concerning the equipment in question is taken from the webpages of Vintage Synth Explorer (see webpage 2.1) and Synthmuseum.com (see webpage 2.2).
186 The Prophet 5 was also one of the first successful polyphonic synthesizers.
rendition of that instrument – thanks to the sophistication of its Frequency Modulation synthesis system.”\textsuperscript{187} This FM signal-processing system was in fact rather difficult to program, and, in contrast to analogue synthesizers, most of the DX7’s sound-controlling devices were removed from the front panel and organized in sections that were reached by pushing buttons or using a data slider. The small LCD display also introduced a rather hidden and abstracted or theoretical way of creating sounds in contrast to the more intuitive, physical options of the analogue synthesizers. Though the introduction of digital synthesizers in many ways led to a democratization of the music production process, their programming requirements actually had the opposite effect at first. To keep prices low, the controller knobs and sliders were kept to a minimum, making the systems even more complicated to access and understand.

As a consequence, the demand for ready-made sounds increased and a small cottage industry for producing those sounds arose as well.\textsuperscript{188} Juan Atkins, one of the originators of Detroit techno, complained in 1988, “Synthesizers used to be synthesizers that a synthesist could play. Now manufacturers are going for presets and they make it really hard to get beyond those presets to program your own sounds.”\textsuperscript{189}

One feature that was lost with the introduction of digital synthesizers was the ability to change sounds substantially while playing. The “pitch bend,” “aftertouch,” “modulation wheel,” or “joystick” of a digital synthesizer could usually be programmed to various parameters, but compared to the numerous knobs and buttons on most analogue synthesizers, its possibilities were quite limited. In addition to lingering advantages in price, status or acceptability, and sound,\textsuperscript{190} then, this fact alone may explain why analogue synthesizers were often preferred in dance music production even in the late 1980s and 1990s.\textsuperscript{191} Digital synthesizers with front-panel controllers that imitated

\textsuperscript{187} Kempster 1996:157.
\textsuperscript{188} Théberge points out that synthesizer users were initially regarded (by the industry) as creators or programmers of sounds, but during the 1980s they came to be seen instead as consumers of ready-made sounds. (Théberge 1997:75). The popularity of ready-made sounds introduces the issue of how technology influences the creative process. Technological determinism refers to the belief that “technology is assumed to transform its users directly” (Taylor 2001:26). Opposing this view is the notion of voluntarism, which stresses our free agency and individual will relative to technology. Timothy Taylor, however, dismisses this dichotomy, seeing the use of technology “as caught up in a complex, fluid, variable dynamic of each [voluntary and deterministic]” (ibid.:30). The fact that users turned to preset sounds instead of attempting to program their own sounds supports the deterministic view, but overall, digital synthesizers were only one of several contemporary innovations, so the time saved by using pre-programmed sounds may have been applied very creatively elsewhere.
\textsuperscript{189} Quoted in an interview with Simon Trask; see Trask 1988a (also in Kempster 1996:45).
\textsuperscript{190} Digitally synthesized sounds can have a brightness or clearness that can be problematic when mixed with other sounds. Producer and sound engineer Kai Robøle in fact often processes digitally created sounds through an analogue device (a compressor, amplifier, or filter) to resolve the discrepancy; email to the author, received 1 Sept. 2008.
\textsuperscript{191} Issues related to various associations with analogue equipment will be discussed towards the end of the chapter.
analogue synthesizers were introduced at the end of the 1990s; their sounds emulated analogue systems as well. The Roland JP-8000 led the way in 1996.\textsuperscript{192} Repeating patterns with sounds that are constantly modulated characterize many genres within electronic dance music, and knobs are therefore vital. Other means of controlling sound also appeared during the 1990s, such as the ribbon controller on the Korg Trinity (1995) and the D-beam on the Roland SP-808 (1998).\textsuperscript{193}

DRUM MACHINES

Drum machines underwent much the same sort of development as digital synthesizers. Microcomputers were primarily installed to replace voltage control, introducing additional options for programming and saving drum patterns.\textsuperscript{194} The sound systems remained analogue until the early 1980s, when digitally sampled sounds arrived to the general public with the Linn LM-1 (1980) and the LinnDrum (1982).\textsuperscript{195} Roland’s drum machines from this time period, the TR-808 (1982) and the TR-606 (1983),\textsuperscript{196} were analogue. Though Roland intended these products primarily for use in the production of demo tapes and other relatively trivial musical occasions, they were scorned in relation to their contemporary counterparts whose sampled acoustic drum sounds better resembled a real drummer. Like the TB-303 synthesizer, however, the Roland drum machines found a “real purpose in life”\textsuperscript{197} only after their production was discontinued: “This is when kids in Detroit and Chicago, and soon afterwards Britain, picked up the 808 and liked its sound for what it was – synthetic percussion that bore no resemblance to real drums, but sounded great anyway. Everyone started to use the 808, and its sound soon became common currency in house music.”\textsuperscript{198} In the dance music scene, the drum machine’s resemblance to an authentic drummer was not as relevant. The British musician and DJ (now in A&R at Sony BMG) Mike Pickering says it is “the greatest drum machine of all

\textsuperscript{192} The Yamaha CS1-X, also from 1996, was an inexpensive synthesizer especially made for the electronic dance music market, offering six knobs on the front panel that made at least some of its most essential sound parameters accessible.

\textsuperscript{193} The ribbon controller is a small rectangular area on the synthesizer that registers linear motions from finger movements. The D-beam is a device with two infrared beams of light that registers hand movements. The Roland SP-808 is not a synthesizer, but the beam-controller did appear on later Roland synthesizers, such as the V-Synth (2003).

\textsuperscript{194} See for example, the Roland CR-78 from 1978.

\textsuperscript{195} Only around five hundred models of the Linn LM-1 were produced.

\textsuperscript{196} The Roland TR-909, released in 1984, introduced a few digital sampled sounds (cymbal and closed and open hi-hat) and MIDI (the TR-808 and the TB-303 did not have MIDI). The TR-909 and TR-808 are considered the most legendary Roland drum machines from the early 1980s and have been used extensively in electronic dance music and hip-hop.

\textsuperscript{197} Kempster 1996:159.

\textsuperscript{198} Loc. cit.; see also Théberge 1997:196–198 for accounts of the TB-808 drum machine.
times ‘cause it didn’t pretend to be drums.’ What mattered to clubgoers was whether the sounds worked on the dancefloor, and the short, dry sounds of the Roland drum machines did.

While most instruments have a firm link between their sounds and what is being done to them, the drum machine did not. As Théberge writes:

The drum machine, on the other hand, bears no resemblance to traditional drums and drummer practice. The instrument has no direct, physical sound-producing mechanism; instead, it reproduces digital recordings of drum and/or synthesized sounds that are stored in its memory. It can be played, or programmed, with a series of buttons on its front panel, a keyboard, or a computer, and requires none of the physical coordination and discipline of a drummer. Finally, most drum machines not only contain drum sounds but also include preset rhythmic patterns, programmed in a variety of musical styles, that can be freely combined to create the rhythm track for a song. As a result, one’s sense of musical style and language can be relatively more abstract in nature (e.g., as with the often-cited concern for the number of beats-per-minute in the production of dance music) and more mediated in origin.

Most dance music producers in the Chicago house scene were not experienced musicians, so their approach to their technical equipment was not influenced by actual technique or instrumental capacity. In the manual of the Roland TR-808, of course, the tutorial drum patterns are basic rock patterns that a live drummer would play, indicating that the user was expected to imitate what a drummer would do. Many drum patterns programmed by the Chicago house producers, on the other hand, were impossible to actually play; hi-hat parts would be too fragmented, instruments played with the same hand on a conventional drum set would be triggered simultaneously, several instruments would trigger independent patterns that would be impossible to play simultaneously, and so on. What’s more, the TR-808 added to the basic sounds of a drum set a variety of percussion instruments (congas, claves, and maracas) that could further participate in ways that were unlikely to ever occur live.

One of the very first Chicago house tracks, *On and On* by Jesse Saunders (1984), has a section lasting over a minute with only sounds from the TR-808 drum machine (3:03–4:22).

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200 See page 213 for discussions and analyses of drum machine sounds.
202 The Chicago house producer Adonis (Adonis Smith) was an exception as a former bass guitarist.
203 The manual may be downloaded from the TR-808 resource site (see webpage 2.3). See page 16 in the manual for an example of a tutorial drum pattern.
In this notated excerpt from the drum section both the hi-hat pattern and the handclap pattern would be quite difficult to perform live. The former in particular differs radically from how a drummer commonly uses this instrument to produce a continuous drive. Furthermore, there are congas and handclaps in addition to the standard drum sounds; these would require more musicians in a live performance.

Such characteristics appear to reinforce what Théberge writes about the abstracted nature of the drum machine, at least relative to traditional drum practice, but the processes of programming must also be seen in relation to the motion on the dancefloor, where those patterns were ultimately tested and evaluated. Though legendary drum machines like the Roland TR-808 and TR-909 were used extensively in electronic dance music during the 1990s, they have since been mostly replaced by external machines combining sequencing and digital sampling (like the Akai MPC-series), at least within production.

MIDI: MUSICAL INSTRUMENT DIGITAL INTERFACE

MIDI is a digital communication system. Compared to today’s standards, it is quite simple and slow. It was introduced in 1983 in order to link synthesizers regardless of

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204 The instrument names have been written with the abbreviations on the Roland TR-808 as capital letters.
manufacturer. Several companies had already developed their own systems of communication among their own pieces of equipment, but these were only partly compatible and were primarily limited to equipment produced by that specific company. Though most producers of musical equipment were slow to utilize all of the possibilities of MIDI, it was a great improvement for users. As Théberge observes, MIDI “contributes to an increased compatibility between instruments by different manufacturers, thus stabilizing the marketplace and strengthening consumer confidences.”

MIDI made it possible to connect two synthesizers and work with sound from both simultaneously, but it had other abilities as well, and its real revolution regarding music production involved the use of MIDI sequencers. The simplicity of MIDI made the system straightforward (and inexpensive) to install into different types of equipment, and it has proven to be extremely resilient despite the rapid development of more advanced digital technology.

SEQUENCERS

Sequencers arrived in the early 1970s, but with digital technology and the standardization of MIDI came the possibility of composing entire tracks with complete arrangements using sounds from a variety of synthesizers and drum machines. The very first external MIDI sequencers, such as the Roland MSQ 700 from 1984, had definite storage deficiencies, but these problems were solved on later models through the use of disk drives to extend the internal memory. None of these early external sequencers was equipped with more than a rather small display, however, and complex programming was not supported as such.

As with drum machines, early sequencers were strictly organized according to fixed note values. Real-time recording made it possible to ignore this grid, but editing functions were then rendered useless. Both quantization and the process of step-write recording allowed for the transmittal of MIDI messages at exact positions within the grid of note values, with a precision that simply could not be replicated “live.” Especially

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205 MIDI uses serial ports and transfers messages at a speed of 31,250 bps (bits per second). The standard MIDI message byte consists of eight digits (bits). A task communicated through MIDI will use two or more bytes, where one (the status byte) directs the message to its proper task and MIDI channel (1–16), while the other(s) (data byte[s]) number between 0 and 127 and point to certain entities (notes, sound patches, and so on) or parameter settings (volume, panning, and so on).
206 Théberge 1997:89.
207 The EMS Synthi A from 1971 had an integrated sequencer.
208 Playing in a synth band myself in the mid-1980s, I coupled the Roland MSQ-700 in shows with a Roland MSQ-100. The memory storage only held one song at a time, so I had to reload one sequencer with data information from a cassette player while the other was playing.
209 See, for example, the Korg SQD-1 from 1986.
through the combined use of sequencers and digital samplers, any sound could be applied without reservations around how it might be produced on an acoustic instrument.

The Akai MPC-60, released in 1988, was a combined sequencer and digital sampler that became tremendously popular for hip-hop productions but also within the different genres of electronic dance music. It was succeeded by various models in the 1990s, including the MPC-3000 (1994) and MPC-2000 (1997). The MPC line managed to compete with computer-based sequencers, which became the standard during the late 1980s and 1990s.\textsuperscript{210}

Nevertheless, computer-based sequencers also had a major impact on music production practices in the 1990s. Musicians and producers who had been using external sequencer units slowly began to turn to the newer units for their improved functionality. In addition, the computers attracted new users who were abandoning their traditional analogue studio practices or notation-based composing/arranging processes.\textsuperscript{211} A third group used computer-based sequencers as their initial tool for music production. These users’ interest in music was frequently accompanied by a general interest in computers, at least in the earliest period, when computers were less common and programs less user-friendly. The major advantage with computer-based technology was the ability to view the recorded MIDI information (and eventually audio recordings, effect processing, and mixing) in different kinds of windows of various types, facilitating editing immensely. Early computer-based sequencers varied in how they displayed this information, but a few common features gradually developed.

At the end of the 1980s the most widely used computers in music production were either Apple Macintosh or Atari. After Microsoft released Windows 3.0 in 1990, the PC began to become more popular as well, gradually capturing Atari users after Atari production ended in 1993.\textsuperscript{212} Digidesign’s Pro Tools was the standard digital audio workstation (DAW) for professional studios during the 1990s, while Steinberg’s Cubase, Emagic’s Logic, MOTU’s Digital Performer, and Cakewalk (Sonar) have competed for the amateurs and semi-professional users.

\textsuperscript{210} The Akai MPCs had more reliable timing and offered useful settings for shuffled or swung quantizing. The computer-based sequencers worked with processors that did many tasks simultaneously, while the “clock” of the MPCs controlled only the sequencer.

\textsuperscript{211} For my master’s thesis I interviewed twelve film music composers in Oslo in 1993 on the use of computers and MIDI-based equipment. Most found them necessary but challenging in terms of the technical difficulties; see Zeiner-Henriksen 1994 (in Norwegian).

\textsuperscript{212} Opcode’s MIDIMAC (1990, Vision) and Passport’s Master Tracks Pro were early Macintosh sequencer programs; Notator and Cubase were early Atari programs; and C-Lab’s Supertrack and Cakewalk were MS-DOS programs.
DIGITAL SAMPLERS

Among all of the new technological instruments introduced in the 1980s, the digital sampler has proven to be the most controversial. While the act of recording an excerpt from an earlier production and including it in a new one was not new,\(^\text{213}\) digital samplers made this practice widespread, especially in certain music cultures (predominantly hip-hop but also electronic dance music, to a certain extent).\(^\text{214}\)

Early digital samplers such as the Fairlight CMI and the Synclavier (both appeared in 1979) were incredibly expensive and therefore applied mostly to high-end studios and pricey productions.\(^\text{215}\) The E-mu Emulator I (1982) and II (1984) were also expensive and furthermore became outdated by newer technology (better bit rates and storage capacity) in the second half of the 1980s. Comparably inexpensive digital samplers like the Ensoniq Mirage (1984) and E-mu Emax (1986) eventually made this technology almost as accessible as synthesizers, sequencers, and drum machines. By the second half of the decade, rack-mount models like the Akai S-900 (1986) had become standard equipment in professional recording studios and were also common in smaller home-based studios.

Though synthesizers could to some extent *imitate* the sounds of acoustic instruments, the revolutionary impact of the digital sampler resided in its ability to directly reproduce them. The creative re-use of old recordings took place alongside an explosion in prefabricated sampled instruments, so MIDI sequencer productions could now inexpensively include almost any acoustic instrument.

But how “true” was the sound when acoustic instruments were being played from a keyboard or programmed on a MIDI-sequencer? While this issue was central to popular music discourse in general, it did not register with the producers of dance music in Chicago. The most important issue was simply that the music sounded good and worked on the dancefloor. Most of the Chicago house music producers had started with drum machines, and they probably took that aesthetic with them when programming the MIDI

\(^{213}\) Tellef Kvifte observes that the term “sampling” is in fact used in the literature to denote a variety of things, including the conversion from analogue to digital, the recording of single sounds, and the use of earlier recordings; Kvifte 2007b:106–108.

\(^{214}\) In hip-hop, digital samplers gave producers an effective tool for recapturing the actual DJ practice of playing small excerpts from various tracks. The earliest hip-hop releases (for example, from Sugar Hill Records) were productions where this DJ practice was transferred to a traditional recording practice using acoustic instruments (see Greenberg 1999:23–32). Thus productions with digital samplers were considered closer to the original hip-hop culture and therefore more “authentic.” The use of digital samplers in electronic dance music did not have the same roots in DJ practice. See also discussion on digital sampling in Katz 2004, chapter 7.

\(^{215}\) For example, Kate Bush, *Army Dreamer* (1980); see Cunningham 1998:289.
sequencers that triggered digital samplers. This tendency is especially obvious in tracks where vocals from a digital sampler are triggered by a MIDI sequencer.\textsuperscript{216} Gilbert and Pearson describe the characteristics of house music as follows: “Its sampled snippets of sung or spoken vocal do not add up to coherent verses, rather instead becoming part of the rhythmic syntax of the track itself. Its ability – by means of the sampler and the sequencer – to turn any sound into a rhythmic element remains the basic template for most contemporary dance music.”\textsuperscript{217} Though the more extreme stuttering effects of digitally sampled vocals were soon abandoned, expectations about how certain instruments should be heard were increasingly being violated, particularly rhythmically. This unconventional approach to any and all musical sounds was essential to the development of electronic dance music.

**Music technology and issues of authenticity**

How do these changes in production techniques and the development of music technology involve the producers of dance music? How do they relate to this particular musical material?

Experience in and expertise with music technology, as well as a familiarity with older pieces of equipment and their “stories,” are an important part of an “insider knowledge” among the producers of dance music. As mentioned previously, authenticity may well have a different connotation for dance music cultures than for popular music culture in general.\textsuperscript{218} This is true of music technology as well, especially regarding the appropriateness of particular musical equipment and production techniques. Gilbert and Pearson write: “It is important to recognize that musicians delineate the equipment they use in relation to a complex matrix of values, characteristics and associations.”\textsuperscript{219} This matrix may have many of the same implications and associations that it does in other music cultures, but the restrictions and limitations differ.

The relationship of digital to analogue is central here, as Tellef Kvifte explains: “The very concept ‘digital’ has for many people strong connotations in the direction of ‘machine,’ ‘automatic,’ ‘not human,’ etc., while ‘analogue’ has a much more human and

\textsuperscript{216} For example, Steve “Silk” Hurley’s *Jack Your Body* (1985/86) or Adonis’s *We’re Rocking Down the House* (1986). Many of the early Chicago house producers did not use samplers. Compared to the secondhand purchase of a synth or drum machine, even the more inexpensive samplers were considered a luxury.

\textsuperscript{217} Gilbert & Pearson 1999:74; emphasis in the original.

\textsuperscript{218} See note 46 on page 45.

\textsuperscript{219} Gilbert & Pearson 1999:122.
authentic feel.”

Digital technology has proven to be efficient and reliable, and it introduces possibilities beyond those of analogue equipment. Still, analogue synthesizers, drum machines, mixers, tape recorders, effect processors, and vinyl twelve-inch records remain favoured by many. The extent to which this relates exclusively to actual differences in the two types of technology, as opposed to the cultural connotations of “analogue,” is hard to say.

Several distinctions may apply with regard to the attractiveness of analogue. The ease of digital technology may make it appear less valuable or “real” than the (more laborious) analogue alternatives. Recording a drummer or creating unique drum sounds on an analogue synthesizer is harder but also more satisfying, perhaps, than using prefabricated digital drum loops or pre-programmed sounds. In an interview with the Chemical Brothers in Keyboard magazine, Tom Rowlands and Ed Simons (favourably) contrast their work using an ARP 2600 (an analogue synthesizer from the early 1970s) to that of their colleagues in other groups who buy brand new (digital) synthesizers. Rowlands and Simons convey reluctance about anything mass-produced and mass-consumed. Older equipment can also acquire status simply through its age, especially in relation to influential genres or legendary originators of music in the same tradition.

But how are these issues communicated to the audience? When drum machines first arrived, it was rather easy to identify their sound, but this was not the case for long, particularly when increasingly more advanced digital technology became involved. An electronic dance music track from the 1990s usually reveals little information about its production techniques, aside from the obvious use of electronic instruments and perhaps various effects (delays, filters, vocoder, extreme auto-tuner, and so on). Most fans and listeners therefore hardly notice such things. In contrast, producers, DJs, musicians, readers of specific music magazines, and so on may be quite engaged by such matters,

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220 Kvifte 2007b:120. The connotations of “digital” apply to “technology” as well.
221 I will not discuss the differences between the two technologies regarding these various types of equipment. This issue raises complex questions of both production and reproduction of sound, where preferences are difficult to evaluate objectively. See discussion in Kvifte 2007b.
223 See Auner 2000 for a discussion of sounds associated with old machines or old sound-producing techniques.
224 In an interview with DJ Times Magazine, Simon Ratcliffe of Basement Jaxx emphasized that their equipment is all at least ten years old. Though most of the equipment is still digital, then, older remains better; see Moayeri 1999.
225 Brøvig-Hanssen makes a distinction between “opaque” and “transparent” mediation. The former describes instances where production techniques are made audible and the focus is directed towards them. The latter describes instances where the focus is directed away from production techniques. She exemplifies opaque mediation through tracks from the British group Portishead; see Brøvig-Hanssen forthcoming 2010.
and it can be very important for producers/DJs to account for their production techniques in interviews and reveal the equipment used in their stage performances.

An analogue synthesizer from the 1970s on stage certainly has different connotations from a digital workstation from the late 1990s or a laptop computer with its various programs. The new machines have numerous advantages regarding both production and performance, but they may carry negative associations as well in relation to authenticity. However, the importance of these associations may decrease when the music is good and the dancefloor is packed. The restrictions or limitations concerning what is appropriate or authentic change continuously, and, in a dance music culture, often in advance of similar changes in popular music culture in general.

**Summary**

Major changes in the production of dance music from the 1970s to the 1990s involved (1) the transition from group-based performances to more individual programming; (2) a shift from analogue technology and the use of acoustic and electric instruments to digital technology and its sequencers and electronic instruments; (3) the expanded role of the DJ within the production process; and (4) an increased availability of music technology, which opened up the production process for new groups of contributors. But these issues are all closely connected. Disco music from the 1970s was comprised of arrangements and instrumentation that resulted from sessions in professional studios with experienced musicians, while the Chicago house music scene welcomed DJs (and other participants) to take part in the production process through the new and inexpensive electronic equipment. Innovations like the dance remix and the twelve-inch had already created a need for DJs in the recording studio in the 1970s, but with the development of electronic dance music their contributions to the production process rapidly expanded, and music was freed from the grip of record companies or expensive recording studios.

The most significant development in music technology in this period was the changeover from analogue to digital technology. New digital equipment offered improved recording techniques that eased the music production process in many ways. Synthesizers, drum machines, sequencers, and later recording units and effect processors have all transitioned to the digital era. Complemented by the digital sampler and the MIDI system, they have become the core instruments of the dance music producer. But
many still use old analogue equipment and twelve-inch vinyl as well, often in combination with newer digital equipment.

As we have seen, the notion of authenticity in dance music culture relates to, among other things, one’s use of technology. The relationship between analogue and digital is central to this struggle, and the status a producer acquires through the throwback use of legendary equipment should not be underestimated. An awareness of the cache of particular pieces of equipment or production techniques is part of the “insider knowledge” that points to credibility within the culture.

These processes have musical consequences as well, but superseding everything is the simple fact that the music must work on the dancefloor. And the DJ that wants to make a crowd dance has to make them start moving to the music. How might the producer create a track that accomplishes this? How is movement accommodated over the course of the production? What is his or her point of departure?

These questions introduce part 2 of this study, where I will present the basic beat of the dance music track and consider its connection to movement in more detail.
An electronic dance music production might follow many paths. Its starting point or creative origin could be a bassline, a particular synthesizer sound, a drum loop, a melodic theme, or even a vocal phrase. However, literature on dance music production and remixing most often begins with the drums,¹ and basic processes involve selecting a time signature, setting a tempo, and choosing what Erik Hawkins in his introduction to remixing calls the “basic beat.”²

A typical course of action might be to set one’s sequencer to a 4/4 time signature (which is probably the default), decide on a tempo between 120 and 135 bpm (beats per minute), select one or two drum sounds, and start to record (or program) a few basic patterns. These patterns may form the rhythmic basis or basic beat of the composition, and the poumtchak pattern is one example. Within the many subgenres of electronic dance music, this pattern is primarily associated with house and trance music. Rick Snoman describes the production techniques of different dance music styles: “Generally, house relies heavily on the strict four-to-the-floor rhythm with a kick drum laid on every beat of the bar. Typically, this is augmented with a 16th closed hi-hat pattern and an open hi-hat positioned on every eighth (the off beat) for syncopation. Snares (or claps) are also often employed on the second and fourth beats underneath the kick.”³ A straightforward “four-to-the-floor” bass drum pattern and a hi-hat attack on every upbeat supplies a

² Hawkins 2004:77.
perfectly adequate starting point for any further variation, and this combination is in fact found in innumerable electronic dance music tracks.

My focal point in the following two chapters will mainly be the track’s basic beat, and its correspondence to body movement. In chapter 3, I begin with a thorough introduction to the poutchak pattern that includes comparisons to other rhythmic patterns, an overview of its historical roots, and a brief review of its shifts in popularity since the 1970s. I also examine a club remix and a music video, discuss the use of the poutchak pattern in music for workout sessions, and conclude with a survey concerning the congruence of body movement direction among listeners exposed to the poutchak pattern.

In chapter 4, I present theories that in various ways support, elucidate, or explain the correspondence between the musical poutchak pattern and a vertical movement pattern. The chapter includes discussions on attention and perception processes, on sources for the development of vertical movement patterns, on motor processes connected to the activations of these movements, and on reasons for why the poutchak pattern is especially effective in this task. The theoretical perspectives I will present and discuss include an ecological approach to music listening, the entrainment of attentional energy, views on motor-mimetic processes, and metaphor-theory. This material then informs my later analyses and discussions of electronic dance music.
Chapter 3:

The poumtchak pattern and body movement

In this chapter I will address the first of the two main questions of this study: Is there a significant and relatively consistent correspondence between the musical poumtchak pattern and vertical movement patterns within the club-oriented dance music culture? I will work mainly within this musical culture but also draw from a wider cultural context, and I will begin with an introduction to the poumtchak pattern itself.

The poumtchak: a basic beat in electronic dance music

A PRESENTATION OF THE POUMTCHAK

This rhythmic pattern actually consists of two sound components that may also appear separately. One of these components already has a name – the “four-to-the-floor” (or “four-on-the-floor”) indicates bass drum sounds on all four downbeats of a 4/4 measure. The other is the complementary high-frequency sound, usually the hi-hat cymbals, that occurs on the upbeats between the bass drum sounds, as shown here:

![Notational representation of the poumtchak.](image)

While this is perhaps more commonly known as “the disco beat,” I prefer a name related to the actual sound it makes. “Poumtchak” is an onomatopoeia: “poum” imitates the bass drum sound and “tchak” the hi-hat. (Poumtchak is also the name of a small French house music label.)

The poumtchak pattern closely resembles other common popular music rhythmic patterns. A backbeat snare drum pattern recalls the poumtchak when the tempo is above

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4 Lawrence uses “four-on-the-top” in a similar way to indicate a snare drum sounding on all four beats of the measure, as was typical in 1960s Motown productions, for example. The name four-on-the-floor likely reflects the literal location of the bass drum as well as the sound’s musical function (Lawrence 2003:120).

5 See Lawrence 2003:120. The term “disco beat” would probably be perfectly clear to many drummers and other musicians but not to most disco fans. This beat was not used often in its pure form in the 1970s, at least compared to the more established “backbeat.” Its role is particularly pronounced in 1990s electronic dance music, however, so it would appear to merit a new name now.
200 bpm (for example, Chuck Berry, *Maybellene* from 1955, 238 bpm), and if the snare drum is replaced with a handclap or a tambourine, the resemblance is even stronger (for example, Fats Domino, *I’m Walkin’* from 1957, 220 bpm). The alternating octaves typical of some disco basslines from the late 1970s (for example, the Sylvester tracks *You Make Me Feel (Mighty Real)* from 1978 or *Do You Wanna Funk* from 1982) or similar ostinatos by other instruments may also evoke the poumtchak.

In other genres and traditions we find similar musical structures, mostly in music related to dance or marching. The accordion’s bass and chord buttons lend themselves to a poumtchak-like alternation in its accompanying figures, as in a polka, for example. A certain rhythmic pattern common to many marching-band arrangements is also quite similar to the poumtchak, with the bass drum on the downbeats and the snare drum on the upbeats (the example below is in alla breve).

The locomotive movement of marching, of course, corresponds to many dance-related movements in other forms of music. Marching to the above rhythmic pattern is comparable to the head nodding or foot tapping initiated by a poumtchak pattern: the feet hit the ground at every bass drum downbeat and lift up at every snare drum upbeat.

In these two excerpts from the Norwegian composer Edvard Grieg, the accompanying figures in the left hand have structures evocative of the poumtchak, probably as a result of Grieg’s interest in Norwegian dance-oriented folk music (*gangar*).

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6 William H. McNeill describes the emotions aroused by the collective experience of “drilling” and its similarity to other forms of rhythmic movement to music, especially around the bonding of “keeping together in time” (McNeill 1995:4).
Several sources credit origin of the upbeat hi-hat pattern to Philadelphia drummer Earl Young on the recording by Harold Melvin and the Blue Notes titled *The Love I Lost*, 1973. Session drummer Allan Schwartzberg also played an important part in spreading the upbeat hi-hat pattern.

Schwartzberg, who played for everyone from Stan Getz to Judy Collins and James Brown – sometimes in one day – pays tribute clearly to the trendsetting work of MFSB drummer Earl Young in such up-tempo Philly classics as Harold Melvin and The Blue Notes’ “The Love I Lost.” But Schwartzberg got most of the notice for developing disco’s characteristic sound: a driving, open, high-hat cymbal. He often fielded calls from producers and drummers for step-by-step instructions in disco technique: “It sounds like it’s just ‘shh, shh,’ but you’re actually playing [the cymbal] double-time and opening the high-hat on the ‘and,’” he explained to them.

The bass drum was not very dominant in recordings of the early 1970s even when played on all four downbeats of the measure. Producer Giorgio Moroder decided to bring it up in the mix. With regard to Donna Summer’s *Love to Love You Baby* from 1975, Moroder describes his process: “The four-on-the-floor beat of the bass drum was elevated to the centre of the mix . . . I just felt the bass drum was so important . . . The thought was, ‘Why not help the dancers to dance even better by making the drum into more of a stomping sound?’”

There are not many well-known disco tracks with the pountchak’s four-to-the-floor bass drum and upbeat hi-hat pattern. Either a backbeat pattern with a snare drum on beats 2 and 4 overwhelms the steady bass drum or the hi-hat alternates among a variety

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7 See Lawrence 2003:120 and Shapiro 2005:140. A similar cymbal pattern can be heard in a recording of the Caribbean group the Beginning of the End called *Funky Nassau* from 1971. According to Lawrence (2003:84), this recording was played by the New York DJ David Mancuso at the Loft in the period 1970–73. The group Osibisa, with three Caribbean and three Ghanaian members, was also vital to the process of introducing African/Caribbean rhythms to the American audience. In the recording *Dance the Body Music* from 1976, the cowbell pattern (struck on the last three upbeats of a 4/4 measure) has a similar rhythmic effect to Young’s hi-hat pattern.
8 Chin 1999:32–33.
9 Moroder was probably inspired by the German production duo Michael Kunze and Silvester Levay and their 1975 hits with Silver Convention (*Fly, Robin Fly* and *Save Me*).
of patterns. In the following tracks, however, the pountchak is quite evident, at least in longer sections:

Thelma Houston: *Don’t Leave Me This Way* (1976)
Cerrone: *Love in C minor* (1976)
Trammps: *Disco Inferno* (1976)
Baccara: *Yes Sir, I Can Boogie* (1977)
Donna Summer: *I Feel Love* (1977)
Sylvestor: *You Make Me Feel (Mighty Real)* (1978)
Gloria Gaynor: *I Will Survive* (1979)
Abba: *Gimme! Gimme! Gimme! (A Man after Midnight)* (1979)

After disco’s popularity declined, producers of popular music became reluctant to use musical elements associated with it. The four-to-the-floor bass drum and upbeat hi-hat pattern are found in very few 1980s tracks, save for a few disco productions early on and the tracks by Chicago house producers. In these productions the four-to-the-floor was much more consistently used than the upbeat hi-hat pattern – drum machines were mostly programmed with alternating hi-hat patterns to provide variety throughout the tracks. Still, there are Chicago house tracks where a poumtchak pattern appears in longer sections:

Ralphi Rosario, featuring Xavier Gold: *You Used to Hold Me* (1987)
Joe Smooth: *Promised Land* (1987)
Phuture: *Acid Trax* (1987)

Of these tracks, Jefferson’s was probably the most influential; its clear opening poumtchak pattern may have even provided a template to later house music producers in Europe in the 1990s. Club-related dance tracks eventually spread to radio and the music charts, bringing the poumtchak pattern to other pop genres as well, such as the British entry for the 1996 Eurovision Song Contest, Gina G’s *Ooh Aah . . . Just a Little Bit*, the Danish teen-oriented pop-dance act Aqua’s *Barbie Girl* and *Doctor Jones* from 1997, or Cher’s hit *Believe* in 1998. A list of the tracks with a definite poumtchak pattern that reached the UK Top 10 from 1998 to 2002 illustrates how widespread the phenomenon was during this period (in parentheses: highest position / year).

Aqua: *Doctor Jones* (1 / 1998)

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Spacedust (Bob Sinclair): *Gym & Tonic* (1 / 1998)  
Cher: *Believe* (1 / 1998)  
Mr Oizo: *Flat Beat* (1 / 1999)  
The Vengaboys: *Boom Boom Boom Boom* (1 / 1999)  
A.T.B.: *9pm (Till I Come)* (1 / 1999)  
Chemical Brothers: *Hey Boy Hey Girl* (3 / 1999)  
Eiffel 65: *Blue (Da Ba Dee)* (1 / 1999)  
Modjo: *Lady (Hear Me Tonight)* (1 / 2000)  
Robbie Williams: *Rock DJ* (1 / 2000)  
Rui Da Silva, featuring Cassandra: *Touch Me* (1 / 2001)  
Basement Jaxx: *Where’s Your Head At?* (9 / 2001)  
Chemical Brothers: *It Began in Afrika* (8 / 2001)  
Roger Sanchez: *Another Chance* (1 / 2001)  
Scooter: *The Logical Song* (2 / 2002)  
Chemical Brothers: *Star Guitar* (8 / 2002)

Since 2002, club-oriented dance music has lost some of its popularity, so tracks with a definite poumtchak pattern do not appear as frequently on the charts. Nevertheless, websites with house music productions still bring forth innumerable tracks with the poumtchak pattern solidly in place, and in countless clubs and discos the world over people still dance to the same basic beat.

THE EFFECT OF THE POUMTCHAK

My interest in the poumtchak pattern arises from the effect I believe it has on the body. A DJ who wants to make a crowd dance has to start their bodies moving to the music, as Phil Jackson describes: “The infectious nature of the music gradually permeates their bodies: heads nod, feet tap, hips wriggle, torsos bounce. No one’s dancing out in the open yet. They’re chatting, watching, teetering on the edge, but they are beginning to move into the dance by experiencing the music as an irrepressible embodied force.”¹³ The poumtchak pattern seems to have exactly this effect. It appears to be particularly well-suited to triggering up-and-down movements like head nodding, upper-body bouncing,

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¹³ Jackson 2004:18 (Phil Jackson).
foot tapping, and so on.\textsuperscript{14}

The explicit poumtchak features related to movement are its contrasting sound components, and especially their alternation. This alternation follows the musical structure, so that low-frequency sounds correspond with downbeats and high-frequency sounds with upbeats:

![Figure 3.5: A sonogram of a poumtchak pattern from Daft Punk’s *Phoenix*, 1996, 00:15–00:17.](image)

The use of downbeat and upbeat instead of beat and off-beat resonates with how this pattern may move the body: a body movement down on the bass drum (on the downbeat) and up on the hi-hat (on the upbeat) seems most common. In Buckland’s study of club culture, her informant Thomas describes the subgenre “hard house,” where the beat has subsumed the music: “It’s not really music anymore, it’s just rhythm. Up and down, up and down.”\textsuperscript{15} The general tempo of this subgenre (140 to 165 bpm) is considerably faster than the standard house music genre (120 to 135 bpm), which may have caused Thomas’s discontent. The pleasure associated with moving up and down probably depends upon the pace demanded by the music, and when a tempo feels too fast, moving may no longer be desirable. Various tempi therefore affect dancing.\textsuperscript{16}

\textsuperscript{14} Why this might be so will be discussed in detail in the next chapter.

\textsuperscript{15} Buckland 2002:72.

\textsuperscript{16} Various tempi and how they shape movements also define genres. A comparison of the music video for the hip-hop artist Hodge’s *Head Nod* (1995), with a tempo of 89 bpm, with the music video for Basement Jaxx’s club remix of Missy Elliott’s *4 My People* (2002), with a tempo of 131 bpm, reveals many similar movement patterns that are performed at different speeds and in various manners. The differences in how the movements are performed signify how corporeality in music is linked to questions of identity and cultural affiliation.
Examination of the pounmtchak effect

I have observed that the pounmtchak pattern is especially effective in activating movement patterns like foot tapping, head nodding, and upper-body bouncing. These activities are prevalent not only in dance music cultures but in popular music cultures in general, as well as in other music cultures where groove-based music is common. Yet the pounmtchak evokes them with more immediacy than most rhythmic patterns.

In the following I will contextualize my hypothesis about the pounmtchak through a survey I have conducted among music students. As an introduction to this survey, however, I will present other material that supports my observation about the widespread occurrences of the pounmtchak pattern in dance music contexts and further demonstrate its connection to the movement patterns in question. First, I will discuss a short, culture-specific “test” inspired by Phillip Tagg’s technique of hypothetical substitution. Then, I will present an analysis of a music video in light of the correspondence between the pounmtchak pattern and vertical movement patterns, and, finally, I will discuss the widespread use of the pounmtchak pattern in aerobics music.

THE CLUB REMIX

In Phillip Tagg’s analyses of popular music, he employs a technique he calls “hypothetical substitution.” In his 1982 article “Analysing Popular Music: Theory, Method and Practice” he demonstrates this technique through a comparison of the Swedish national anthem (AO = analysis object) with other national anthems (IOCM = interobjective comparison material), given the assumption that a national anthem is “assumed to be of a traditionally solemn and positively dignified yet confident character.” He then tests this assumption by substituting various discrete musical parameters (melodic contour, upbeat, key, phrasing, tempo, lyrics, metre) of the AO with different alternatives and comparing the results with the IOCM. Through this process he comes to identify the parameters that determine the affective qualities of the anthem.

One might evaluate a dance music track in the same way, beginning with the assumption that the track, by definition, should be effective in motivating body

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17 The music video for Paul McCartney’s Nod Your Head (2007) is filled with head nodding (and upper-body bouncing) throughout the video. All of the examples are in synch with the tempo and in the same direction – that is, going down on the downbeat and up on the upbeat.

18 Tagg uses the term “interobjective” to refer to “consistency of sound events between two or more pieces of music” (Tagg 1982:49).

19 Ibid.:51.
movements. Other tracks from the same genre and with the same basic beat could be introduced for comparison and the various parameters could then be altered. Interestingly, however, dance music culture already offers a version of this process: the club remix of a pop song varies only certain parameters of the original and so represents a provocative variation on Tagg’s hypothetical substitution. The aim with a club mix is to make the song suitable for a club environment, after all, which means making it more effective in motivating body movements (and dancing).

As an example of a typical club mix I have chosen Todd Terry’s remix of Everything but the Girl’s Missing from 1994. After a slightly longer intro than the original version, the remix follows the form of the original from the first verse to the last refrain. But important changes have been made to it. The following is a comparison of how the second verse is rendered in the two versions (starting at 0:48 in the original and 0:55 in the remix).

**Identical elements:**

*Tempo:* Both versions have a tempo of 123 bpm.

*Key/chords:* Both versions have the same key (a minor) and mostly the same chords.

*Vocals (melody/phrasing/lyrics):* Tracey Thorn’s vocal contribution is identical in the two versions, except that it is mixed a bit lower and has slightly more reverb in the remix.

*Strings:* A slow ascending string melody enters in the second part of the second verse in both versions.

**Substituted elements:**

*Instrumental (harmonic) accompaniment:* A plucked acoustic guitar (broken chords with eighths) and an electric piano (sustained chords at the first beat of every second measure) appear only in the original version. In the remix these elements are replaced by a short synthesizer sound (doubled every fourth entry with an acoustic guitar sound) playing a counterrhythmic pattern (standard pattern), as follows:

![Figure 3.6: A counterrhythmic pattern from Todd Terry’s remix of Everything but the Girl’s Missing.](image)

20 Todd Terry is a legendary New York house DJ/producer, and Everything but the Girl (EBTG) is the name of an English pop duo (Tracey Thorn and Ben Watt). EBTG moved from traditional pop to electronic dance music during the 1990s.

21 This is not in fact especially typical of club remixes, but it is an advantage for this type of comparative study.

22 Counterrhythmic patterns are discussed in chapter 6.
The bass guitar and bassline of the original are replaced with a synthesizer bass playing a part that follows the same counterrhythmic pattern as the synthesizer.

**Drums/percussive accompaniment:** The drums of the original play a standard backbeat pattern, with snare drum attacks on beats 2 and 4 and the hi-hat on unaccented eighths. The bass drum has entries on the first, sixth, and last eighth of the measure, and a cowbell (pitched rather low in the mix) plays on all of the downbeats. In the remix, the poumtchak pattern is loud in the mix, with bass drum sounds on all four downbeats and hi-hat sounds on the eighths between them. In addition to the poumtchak pattern, there is a snare drum on beat 2 and 4, a shaker pattern on sixteenth notes, and a short pattern of a mid-tone percussive sound that partly follows the counterrhythmic pattern of the bass and synthesizer. The drums sound as if they are programmed rather than played “live” on both versions.

We may assume that Todd Terry has examined the musical elements of the original and decided which to include and which to replace, using a process similar to Tagg’s technique of hypothetical substitution. Those elements Terry changed while turning this song into a club mix point to ways that music motivates body movement and dance in a club environment. The basic beat of the track was altered from a backbeat pattern to a poumtchak pattern, and other accompanying elements were replaced with more pronounced rhythmic elements and a counterrhythmic pattern. These two changes participate in a strategy of building a simple but solid rhythmic framework and then combining it with other rhythmic elements that interact in a somewhat conflicting manner.\(^\text{23}\) The poumtchak pattern is present in many club remixes of tracks that originally relied upon other basic beats, which indicates its special role in a club and dance-related musical context, a role I will investigate further over the course of this study.

THE MUSIC VIDEO

A second source of material that proves to be relevant in linking the poumtchak pattern to movement patterns – and to *vertical* movement patterns in particular – is music video. It is, however, beyond the scope of this study to do a more systematic investigation of a larger material. I thus intend to do a qualitative case study of one exemplary music video.

\(^\text{23}\) Why the poumtchak pattern is especially effective as a basic beat will be considered in chapter 4, while the tension created by counterrhythmic elements will be discussed further in chapter 6.
made for a dance track that relies heavily upon the poumtchak pattern. The music video for Basement Jaxx’s \textit{Jump n’ Shout} from 1999/2000 is particularly replete with body movements that are not choreographed. It includes recurring scenes of various individuals and groups of people filmed at outdoor locations close to Basement Jaxx’s club and studio in Brixton, London. These participants seem to have been loosely instructed to dance, jump, or just move to the music while the camera was running.

The music video was directed by Simon Bisset and consists of more than one hundred clips of various lengths from about half a second up to a maximum of eight seconds long. The longer clips display the lead toaster, Slarta John, performing the vocal parts of the track while moving through a corridor, together with the assistant toaster, Madman Swyli. The shorter clips display primarily people who appear to be randomly chosen from the Brixton area, mostly dancing or jumping in front of a graffiti wall or in and around a covered street market. In addition, there are clips of two capoeira dancers, an Anubis statue, and an old Caribbean man in a poncho in a large open field, as well as a face-painted girl, a group of children, a boy or girl with an alien outfit, and several appearances of Felix Buxton and Simon Ratcliff of Basement Jaxx. Certain clips also consist of still photos with basically the same material.

I studied the music video using the digital audio workstation Logic Studio 9. I set the sequencer of the computer program to the appropriate tempo (127 bpm) and placed the music within the metric grid of the sequencer. I then studied the movements in the music video in detail according to the metric structure of the music and made the following notes.

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24 There are several DVDs that display scenes from club and dance environments – for example, \textit{Modulations: cinema for the ear} (1998), \textit{Intelect: techno house progressive} (2003), and \textit{Maestro} (2005). These show many scenes from clubs with head nodding and upper-body bouncing that quite convincingly connect the poumtchak pattern to vertical body movements, despite the fact that the audio tracks for these DVDs seem to have been added to the scenes afterwards.

25 This track also undergoes extensive musical analysis both in chapter 6 and in the concluding part of this study, and thus represents an opportunity to link video analysis to musical analysis.

26 Several scenes are shot at the Brixton Market. Brixton has a large population of African and Caribbean descent that dominates the scenes from the area in the music video.

27 Toasting is a Jamaican-influenced rap style.
<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0:04–0:05</td>
<td>The N in the title – placed in the middle – bounces up and down in synch with the music.</td>
</tr>
<tr>
<td>2 0:08–0:11</td>
<td>Man in a black T-shirt with a large P dances with slow movements – slightly up-and-down movements (half time).</td>
</tr>
<tr>
<td>3 0:09–0:11</td>
<td>Two men in the background carrying a pallet. The one in front is head nodding in synch with the music.</td>
</tr>
<tr>
<td>4 0:12–0:14</td>
<td>Participant with alien mask. The mask dangles a bit but his or her head swings up and down – somewhat ambivalent movements at the end of the scene.</td>
</tr>
<tr>
<td>5 0:17–0:18</td>
<td>Basement Jaxx’s Felix Buxton dances in the background with up-and-down movements.</td>
</tr>
<tr>
<td>6 0:18–0:19</td>
<td>Basement Jaxx’s Felix Buxton and a woman at his side raise arms (and body).</td>
</tr>
<tr>
<td>7 0:22–0:25</td>
<td>Girl in white T-shirt dances with up-and-down movements of her body throughout most of the scene.</td>
</tr>
<tr>
<td>8 0:25–0:27</td>
<td>Old man in poncho – head nodding – clearly in synch with the music.</td>
</tr>
<tr>
<td>9 0:28–0:30</td>
<td>Old man in poncho (new scene from different angle) – again head nodding.</td>
</tr>
<tr>
<td>10 0:31–0:33</td>
<td>Woman with sunglasses and white singlet – dancing, moving up and down in the beginning of the scene. Other people in the background also moving up and down.</td>
</tr>
<tr>
<td>11 0:33–0:34</td>
<td>Young man with blue hat – one up-and-down movement (a bit chaotic).</td>
</tr>
<tr>
<td>12 0:46–0:51</td>
<td>Assistant toaster jumps up and down around the main toaster mostly in synch with the music.</td>
</tr>
<tr>
<td>13 0:53–0:55</td>
<td>Basement Jaxx’s Simon Ratcliffe is head nodding in the background.</td>
</tr>
<tr>
<td>14 1:00–1:04</td>
<td>A group of children jumping up and down (three short scenes). A bit chaotic in the first scene but in the two last scenes a young girl with rasta braids jumps clearly in synch with the music.</td>
</tr>
<tr>
<td>15 1:06–1:07</td>
<td>Camera moves back and forth (up and down).</td>
</tr>
<tr>
<td>16 1:12–1:15</td>
<td>Young man in black singlet dances with up-and-down movements in synch with the music.</td>
</tr>
<tr>
<td>17 1:21–1:23</td>
<td>Main toaster moves upper body up and down in synch with the music.</td>
</tr>
<tr>
<td>18 1:28–1:29</td>
<td>Assistant toaster moves whole body up and down in synch with the music.</td>
</tr>
<tr>
<td>19 1:33–1:34</td>
<td>Main toaster in a crowd – moving up and down.</td>
</tr>
<tr>
<td>20 1:41–1:44</td>
<td>People in an elevator – jumping up and down (chaotic).</td>
</tr>
<tr>
<td>21 1:46–1:47</td>
<td>Basement Jaxx’s Felix Buxton head nodding while DJing.</td>
</tr>
<tr>
<td>22 1:55–1:57</td>
<td>Both toasters head nodding (in turn) – very explicit movements (close-up shot) in synch with the music.</td>
</tr>
<tr>
<td>23 1:59–2:00</td>
<td>Both toasters jumping up and down (a bit chaotic).</td>
</tr>
<tr>
<td>26 2:21–2:22</td>
<td>Group of children jumping up and down. A bit chaotic but mostly in synch with the music.</td>
</tr>
<tr>
<td>27 2:25–2:27</td>
<td>Group of people jumping/raising arms up and down.</td>
</tr>
<tr>
<td>28 2:54–2:56</td>
<td>Young man with blue hat head nodding in synch with the music.</td>
</tr>
<tr>
<td>29 3:01–3:02</td>
<td>Children moving/jumping up and down (very short scene).</td>
</tr>
<tr>
<td>30 3:06–3:09</td>
<td>Five people dancing together. Moving up and down in synch with the music.</td>
</tr>
<tr>
<td>31 3:11–3:12</td>
<td>Young woman with cowboy hat dancing. Movements up and down.</td>
</tr>
<tr>
<td>34 3:20–3:21</td>
<td>Felix Buxton moving up and down (a bit out of synch).</td>
</tr>
<tr>
<td>35 3:22–3:23</td>
<td>Felix Buxton in front of a group, moving up and down in synch with the music.</td>
</tr>
<tr>
<td>36 3:26–3:27</td>
<td>Children in white T-shirts jumping up and down (chaotic).</td>
</tr>
<tr>
<td>37 3:27–3:28</td>
<td>Young man in crowd (up and down) – a bit out of synch with the music.</td>
</tr>
</tbody>
</table>

Fig. 3.7. Occurrences of head nodding, upper-body bouncing and other up-and-down movements in the music video of Basement Jaxx’s *Jump n’ Shout*. 99
The table above shows thirty-seven unique examples of up-and-down movements mostly in synch with the music (though some of the scenes are a bit chaotic). The total duration of these examples adds up to approximately 1:26, or 38 percent of the total length of the music video (3:46). Specific sections of the music video do not feature that many occurrences of up-and-down movements, including the toaster’s verse sections and the breakdown section. The lack of vertical movement patterns in the breakdown section (from 2:31 to 3:01) is particularly telling, since the poumtchak pattern is also absent from the music at this point. For example, the old man in the poncho, who is head nodding very distinctly in the earlier parts of the music video, keeps his head still in this section. On the other hand, the main toaster’s disinclination to move up and down while toasting, even though the poumtchak pattern is present, is probably necessitated by the performance itself. An up-and-down movement might make his vocal delivery too staccato and accentuate the downbeats too much. Excluding these sections from the music video, then, and only counting the parts where the poumtchak pattern is present gives a total length of 1:54. The total duration of the scenes with up-and-down movements in this portion of the track adds up to 0:53, or 46.5 percent of the total length.

The poumtchak pattern’s correspondence with vertical movement patterns in this music video, then, is quite convincing, but to what extent is this music video a reliable source of a common pattern of this culture? The director’s work has obviously influenced the results and the “jump” in the title has led him to encourage jumping in his subjects. Nevertheless, there is a profound sense of cultural priority around these movements and this rhythmic pattern. Not all of the occurrences of up-and-down movements in the music video decisively correspond to the common tendency of going down on the downbeats and up on the upbeats. Some are chaotic, short clips; others are examples of movements and movement patterns that simply go in both directions (jumping, particular types of dancing). Yet the general congruence of direction in most of the movement patterns demands further consideration.

THE POUMTCHAK PATTERN IN AEROBICS MUSIC

Besides clubs and dancefloors, the poumtchak pattern also appears frequently in music accompanying workouts and physical training. Although many genres and styles of popular music fill this role, the workout tracks themselves are typically remixes in a
dance/house style with an unambiguous pounchak pattern as the basic beat. Might this be because of the pattern’s unique ability to move bodies up and down? Productions that are intended for workout sessions tend to elevate the basic beat in the sound mix, as Tia DeNora describes: “Aerobic music firms select and tailor the musical and stylistic features of individual numbers. One of the first things they try to do is heighten rhythmic clarity. Rhythm is typically positioned in the musical foreground, with vocals often relegated to the background. Features that might detract from this clarity (for example complicated transitions) are deleted.” In studies of music and aerobics the usefulness of the music’s rhythmic aspects is invariably emphasized. Sophie Belcher, in her research on how music was used in aerobic classes, compared “failed” sessions with successful ones: “In this way it is possible to illuminate the musical characteristics that afford aerobic embodied agency, that enable the particular bodily movements, endurance, motivation, arousal and co-ordination, and that constrain the perception of fatigue.”

Class members reported confusion when the music had “lots of different beats going on at once” and no clear movement “signal.” Anne Kari Øysæd also notes from an interview with aerobics instructor Ellen Berntsen that a training session becomes more demanding if the instructor starts with an upward movement on a clear downbeat. Successful sessions instead map their various movements directly onto structures or features in the music. A session usually lasts forty-five minutes, and the music mix is supposed to lead participants from a warm-up stage into a steadily intensifying training period and finally back to a resting state. The tempo of the tracks shapes these transitions. Changes in the music accompany variations on repeated movement patterns, and new tracks introduce different sections of the workout.

DeNora questions any “automatic” effect of music on the body, however, instead pointing to efforts by producers, instructors, and class members to create successful

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28 See, for example, productions by Pure Energy, Power Productions, Koreography Klub, and Muscle Mixes; see also webpage 3.2.
29 See Karageorghis & Terry 1997 for an overview of research related to the general effect of music in sports and exercise.
31 For example, DeNora 2000:88–103 and Øysæd 2003.
32 This study was a part of a project led by Tia DeNora and presented in her book Music in Everyday Life from 2000.
33 DeNora 2000:89.
34 Ibid.:96.
35 Øysæd 2003:60.
36 A diagram in DeNora’s book of a successful aerobics session shows a tempo starting at 130 bpm, increasing to 140 bpm, then concluding at 127 bpm (DeNora 2000:94).
37 Electronic dance music tracks are often structured in shorter sections of four, eight, or sixteen measures, where small variations are introduced at the beginning of each new section. Such forms are well suited to workout sessions.
training sessions: “Thus, to say that music will ‘cause’ things to happen, that it makes the body do things or that its objective properties will automatically entrain the body in particular ways, is to miss the collaborative dimension of how music’s effectiveness is achieved, for it is always in and through the ways that it is appropriated that music provides structuring resources—devices that enable and constrain the body.”

This statement recalls Gilbert Rouget’s conclusions that the relationship between movement and music is not causal or deterministic. He does not believe that heavy, fast drumming or repetitious melodic phrasing specifically incites certain types of trance, instead attributing the state to the cultural expectations surrounding it. The widespread use of the poumtchak pattern in aerobics music, however, suggests at minimum a specific functional role for it, if not true causality: the participants of an aerobics class tend to work out harder and longer when the beat supports their vertical movement patterns. As one of the informants of Belcher’s study says, “[Music] can make me work harder . . . if it’s just a simple strong beat then it’s easier to work with . . . and if it very slowly gets faster . . . I don’t sort of realize it.”

In the same way, occurrences of heavy drumming or repetitious melodic phrasing in “trance” contexts also appear to indicate that some musical features are simply more efficient than others in producing certain bodily responses. This does not have to lead to a mechanistic or deterministic view of the effect of music. Music certainly requires a social setting with certain accompanying expectations in order to succeed in producing these body movements. An aerobics instructor may experience potent images of or urges around body movements while listening to an aerobics mix on an mp3 player, but will not subsequently start exercising in a setting where it would not be welcome (the subway, a classroom, and so on). While certain social settings, then, seem to demand appropriations of various musical features and their structuring effects, the music has a specific role in this process. The poumtchak pattern, for example, seems to have spread from dance settings to workout sessions as a result of its ability to facilitate movement.

The aforementioned aerobics instructor, Ellen Berntsen, also observes that a movement ought to go down in congruence with the downbeat in the music.

38 DeNora 2000:96.
41 Becker stresses the cultural richness and variability of trance-related contexts but still points to certain “defining characteristics” (Becker 2004:43). These also concern the music involved.
42 Øysæd 2003:60.
poumtchak pattern appears to demonstrate an unambiguous rhythmic structure quite well. Still, to what extent the poumtchak pattern causes congruence of direction in vertical movement patterns needed further investigation.

Survey on the poumtchak pattern and body movement

My survey was intended to gauge the extent to which people move in the same direction when listening to music with the poumtchak pattern. I was also interested in whether movements were influenced by the level of complexity of the music in question and whether people would report any similar experiences related to how the effect was realized.

My hypothesis was that the poumtchak pattern would activate a movement downward with the bass drum sound and upward with the hi-hat sound. I also suspected that this effect would depend upon the level of complexity of this musical feature, and that the pattern creates an experience of being physically “pulled” in various directions.

PRELIMINARY EXPLORATORY SURVEY

Initially, I conducted a preliminary exploratory survey with members of a Facebook group interested in house music. I sent an invitation with a short introduction and three questions to the first three hundred members on the group’s list, and thirty-seven individuals from all five continents (but mostly from Britain) responded to the survey, including ten females and twenty-seven males. The questions were:

1. Do you recognize this beat: Poum-tchak-poum-tchak-poum-tchak-poum-tchak? (“Poum” represents a bass drum sound and “tchak” a hi-hat or similar sound.)

2. If you nod your head (rather than dance) to this beat, will your head instinctively go down with the poum and up with the tchak?

3. If you hear only tchak—tchak—tchak—tchak (usually played on a hi-hat), will you nod your head as if the “poum” (the bass drum) were present?

The respondents (quantity in percentage) answered as follows:

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43 The Facebook group is named Addicted to house music and has more than five thousand members worldwide (as of September 2008).
44 The full Facebook message is included here as Appendix 1. This preliminary survey took place in May/June 2007.
1. Yes: 94.4%, No: 5.6%.
2. Yes: 85.3%, No: 9.4%.\(^{45}\)
3. Yes: 71%, No: 22.6%, Not Sure: 6.4%.\(^{46}\)

Even though the questions were leading, the results provided a basis for continuing the study with a methodically valid and more reliable survey. The response to the first question indicated a familiarity with the pountchak pattern, and the second supported my initial hypothesis. Answers to question 3 were less consistent, which is probably due to its more ambiguous structure.\(^{47}\)

MAIN SURVEY: METHOD

Participants

All of the music students (340) affiliated with the Department of Musicology at the University of Oslo were invited by e-mail to participate in a web-based survey.\(^{48}\) A total of ninety-four students participated (a response rate of 27.6 percent). All responses were anonymous.

Music students were chosen due to their musical skills and their ability to recognize the various instrumental sounds in the survey. A group of clubgoers would have given more accurate results relative to the culture in question but would probably have required an observational rather than a self-reported study.\(^{49}\)

\(^{45}\) In addition, two respondents provided other alternatives: “Side to side” and “Side to side and up and down with a slightly swung rhythm.” Among the few who answered “No” to the second question was “Daniel,” a DJ from South Africa, who told me how participants of his club milieu moved in the opposite direction of what was predominant for the pountchak pattern. This opposite movement pattern was in his club considered to be more “rhythmical”: “Maybe, subconsciously, dancers and djs here react in a pulsating way, imitating a throbbing subwoofer (which expands on the bass drum). However, I must admit that on second thought, I don’t think that the movement can be regarded as purely instinctual. It could be more of a cultural difference which is developed through experience on our dancefloors. It is forced upon those who do not want to look out of place (or rhythm!)” (Facebook message from Daniel 26/5/2007).

\(^{46}\) Some supplied more information, such as “I would only tilt my head vertically, I would not do strong headbut movements. Or maybe clap my hands,” or “If it’s only that sound, the movement nearly always tends to come from my hands (not dancing). I have a habit of marking the hi-hat with wags of my right index finger.”

\(^{47}\) The many affirmative answers may indicate a relation to movement more connected to musical verticality than to structure. But how the question immediately follows a realization of the pountchak pattern has to be taken into consideration. In a break section of a track where the bass drum has been removed, it is likely that the listener would continue to nod upward on the tchak, but then structural aspects undoubtedly are in play. Whether a sole repetitive hi-hat sound, heard out of context, will make the respondents move upward remains unclear.

\(^{48}\) See Appendix 2.

\(^{49}\) Due to difficulties concerning anonymity issues, I decided not to conduct a study that incorporated filming people in clubs.
Questionnaire design

The survey included a short introduction that suggests how to answer the questions, followed by eight sections.\footnote{See Appendix 3.}

1–2: Demographics

3–8: Questionnaire on rhythm and movement

Sections 3–8 concerned supplied musical excerpts. Respondents were asked in the introduction to sit in front of a computer and listen to the music through earphones or speakers. They were further asked to move their head and/or upper body to the music without reading ahead in the questions until a movement pattern was established. They were also told to answer “Don’t know” and continue on to the next question/section if they could not understand the question or did not have an answer.

Stimuli and Questions

Section 1: The respondents were asked to report gender and age.

Section 2: Music tradition/genre preference was addressed through questions asking for (1) their primary tradition/genre of performance and (2) their preferred tradition/genre for listening, with the following choices: Pop/Rock, Jazz, Classical, Folk Music, and Others; (3) They were also asked if they had listened/danced frequently to house/dance/techno, with the following choices: Yes, Some, or No.

Section 3: An excerpt was taken from Chuck Berry’s *Maybellene* from 1955 (0:00–0:40). This track has a basic backbeat pattern that evokes the poumtchak pattern at its tempo of 238 bpm,\footnote{See page 89.} and it seem to initiate either a type of body movement triggered by this similarity (that is, going up on the snare drum) or a double-speed movement pattern (going down on the snare drum). The question here was to what extent this ambiguity would be present in comparison to songs with clear poumtchak patterns. (1) The respondents were asked to move their heads/upper bodies up and down when listening to the excerpt and report the position in correspondence to the snare drum sounds, with the
following choices: Up, Down, and Don’t Know. (2) The relation between basic pulse and movement was also addressed through a question about the position of the snare drum sounds in relation to the main pulse, with the following choices: Between the Beats, On 2 and 4, or Don’t Know.

Section 4: The excerpt was taken from The Beginning of the End, *Funky Nassau*, 1971 (0:00–0:32, tempo 119 bpm). This track has an unambiguous upbeat cymbal pattern that is clearly noticeable in the first part. It was included in the survey to test the consistency of responses related to a track in a different genre that featured only one of the components of the poumtchak pattern. The respondents were asked to move their heads/upper bodies up and down and report the position relative to the cymbal sounds, with the following choices: Up, Down, or Don’t Know.

Section 5: This excerpt included a poumtchak pattern without any other elements taken from Daft Punk’s *Phoenix*, 1996 (0:00–0:32, tempo 127 bpm). The track starts out with a solitary four-to-the-floor bass drum pattern. (1) Respondents were first asked to move their heads/upper bodies up and down and report the position relative to this bass drum sound, with the following choices: Up, Down, or Don’t Know. An upbeat hi-hat pattern then appears halfway through the excerpt, establishing a typical poumtchak pattern. (2) Respondents were asked to continue to move their heads/upper bodies up and down and to report whether the movement pattern changed with the introduction of the hi-hat, with the following choices: Yes, No, or Don’t Know. (3) Respondents were further asked for the position relative to the hi-hat sound, with the following choices: Up, Down, or Don’t Know. (4) They were also asked if the body movement was experienced differently after the hi-hat was introduced, with the following choices Yes, No, or Don’t Know. (5) Those that answered yes to question 4 were also asked about the character of this difference, with the following choices: Stronger Pull Upwards; Stronger Pull Downwards; Stronger, But Not In Any Direction; Weaker; Don’t Know.

Section 6: The excerpt was taken from Chemical Brothers, *Star Guitar*, 2002 (4:47–5:25). A poumtchak pattern provides the basic beat for the second half of this excerpt (5:02–5:25), but it is completely integrated with other rhythmic and melodic patterns. The questions were identical to questions 3, 4, and 5 of the previous section.
Section 7: The excerpt was taken from the track Cübik, 1990, by 808 State, with an added upbeat hi-hat pattern in the second part. This excerpt includes a counter-rhythmic pattern (4:3):

![Figure 3.8: A notational representation of the synth-bass theme from 808 State’s Cübik (1990).][52]

In relation to the poumtchak pattern, the counter-rhythmic component might have been expected to evoke incongruent movement patterns, but it was joined by an upbeat hi-hat pattern after four measures. Respondents were asked to move their heads/upper bodies at the start of the song and continue the movement through the introduction of the hi-hat pattern, then report the position of the head/upper body relative to the hi-hat sound, with the following choices: Up, Down, or Don’t Know.

Section 8: Respondents were asked to listen to the excerpts once more and alternate between (1) moving and (2) sitting and listening without moving. They were asked to report on the more satisfying/engaging alternative, with the following choices: While Moving; While Sitting Concentrated Without Moving; Just As Satisfying/Engaging; Just As Satisfying/Engaging, But In A Different Manner; Varying Related To The Different Excerpts; Don’t Know.

Procedure

The questionnaire was made in cooperation with the web-survey section at the Centre for Information Technology at the University of Oslo. The music students received a username and a password to log into the webpage, and no username/password could be used for more than one response. The webpage was open to the respondents for one month (February 2008), and those that had not answered were e-mailed a reminder halfway through this period.

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[53] For a discussion of counterrhythmic patterns in electronic dance music, see page 189.
MAIN SURVEY: RESULTS

Demographics

Section 1: Gender and age.
The respondents consisted of forty-five females (47.9 percent) and forty-nine males (52.1 percent), and the mean age was twenty-six years (SD = 6.98),\textsuperscript{54} with a range of nineteen to sixty-nine years.\textsuperscript{55}

Section 2: Preferences according to music tradition/genre.

<table>
<thead>
<tr>
<th></th>
<th>Pop/Rock</th>
<th>Classical</th>
<th>Jazz</th>
<th>Folk Music</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Primary tradition/genre of performance</td>
<td>43.6%</td>
<td>28.7%</td>
<td>13.8%</td>
<td>0%</td>
<td>13.8%</td>
</tr>
<tr>
<td>2) Preferred tradition/genre of listening</td>
<td>50%</td>
<td>12.8%</td>
<td>18.1%</td>
<td>2.1%</td>
<td>17%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Some</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>3) Listened a lot to dance/house/techno?</td>
<td>11.7%</td>
<td>36.2%</td>
<td>52.1%</td>
</tr>
</tbody>
</table>

Results from questionnaire:

Section 3: Chuck Berry: Maybelle.

Figure 3.9: Percentages of respondents reporting a position of head/upper body as “Up” or “Down” in relation to the snare drum sound of Chuck Berry’s *Maybelle*, 0:00–0:40.

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\textsuperscript{54} SD (standard deviation) measures the dispersion of the collected values.

\textsuperscript{55} The sixty-nine-year-old respondent represented an outlier (relative to the rest of the group), but I decided not to remove the respondent since the answers did not deviate particularly from the majority (except for section 6, where the respondent answered Don’t Know on all three questions). Without this respondent, the mean age would have been 25.5 with a SD of 5.35, with a range of nineteen to forty-eight years.
The majority reported “Up,” which may suggest that most of the respondents moved with the tempo of 119 bpm rather than 238 bpm. Nonetheless, the relatively large group of respondents answering “Down” points to the metrical ambiguity of the track.

Figure 3.10: Percentages of respondents reporting the position of the snare drum sound in relation to the main pulse when listening to Chuck Berry's *Maybellene*, 0:00–0:40.

In relation to a backbeat pattern, the placement of the snare drum should be heard on beats 2 and 4 at the tempo of 238 bpm, and one might have expected a group of music students to use this fact to determine the pulse. This was not the case, however: 54.2 percent of the respondents answered “Between the Beats.” Thus the pulse seems to relate instead to an experience of body movement or a preferred (or more natural) tempo. Many of the respondents may have located the pulse at half tempo (119 bpm) simply because a vertical body movement or foot/finger tapping seems more familiar (or comfortable) at this speed.

Section 4: The Beginning of the End, *Funky Nassau*.

Figure 3.11: Percentages of respondents reporting a position of head/upper body as “Up” or “Down” in relation to the cymbal sound when listening to The Beginning of the End, *Funky Nassau*, 0:00–0:32.

Almost three-quarters of the respondents reported the same direction of body movement related to this excerpt, which is considerably higher than was reported for the Chuck Berry excerpt. Because the *Funky Nassau* excerpt has a more defined structure regarding

56 This assumption would probably have been more applicable to a group of music students who were also experts in rock’n’roll music from the 1950s.
57 See, for example, Fraisse 1982:151ff and McKinney & Moelants 2006 for discussions on preferred tempo.
movement and tempo than the Chuck Berry excerpt, these results support the hypothesis that consistency in body movements depends upon the song’s level of structural complexity.

Section 5: Daft Punk, *Phoenix*.

Figure 3.12: Percentages of respondents reporting a position of head/upper body as “Up” or “Down” in relation to the bass drum sound when listening to Daft Punk’s *Phoenix*, 0:00–0:14.

Figure 3.13: Percentages of respondents reporting whether the movement pattern changed (“Yes”) or not (“No”) when an upbeat hi-hat pattern was introduced at 0:15 in Daft Punk’s *Phoenix*.

Figure 3.14: Percentages of respondents reporting a position of head/upper body as “Up” or “Down” in relation to the hi-hat sound in Daft Punk’s *Phoenix*, 0:15–0:32.

Figure 3.15: Percentages of respondents reporting whether the body movement was experienced differently (Yes) or not (No) after the introduction of the hi-hat pattern at 0:15 in Daft Punk’s *Phoenix*. 
Almost 95 percent of the respondents reported the same direction of vertical movement in response to the poumtchak pattern, in relation to both the bass drum sound and the hi-hat sound. The results for the question concerning the changing direction of the pattern do not correspond entirely in percentage with the preceding and succeeding answers concerning position, but the deviations are not substantial. When it comes to how the introduction of the hi-hat was experienced, 45.7 percent of the group reported a stronger pull upward (which is 64.3 percent of those who experienced a difference at all). Though this does not represent a majority of the respondents, it does represent the largest single group with an identical answer. The results of this section in fact support all of my hypotheses concerning the directions of the movement patterns, the level of corresponding musical complexity, and, at least to some extent, the presence of the experience of being physically pulled in various directions.

Section 6: Chemical Brothers, *Star Guitar*.

Figure 3.16: Percentages of respondents that answered “Yes” to the previous question (Figure 3.15) reporting the experience accompanying the introduction of the hi-hat pattern at 0:15 in Daft Punk’s *Phoenix*.

Figure 3.17: Percentages of respondents reporting a position of head/upper body as “Up” or “Down” in relation to the hi-hat sound when listening to Chemical Brothers, *Star Guitar*, 5:02–5:25.
Figure 3.18: Percentages of respondents reporting whether the body movement was experienced differently (Yes) or not (No) after the introduction of the hi-hat pattern at 5:02 in Chemical Brothers, *Star Guitar*.

Figure 3.19: Percentages of respondents that answered “Yes” to the previous question (Figure 3.18) reporting on the experience of the introduction of the hi-hat pattern at 5:02 in Chemical Brothers, *Star Guitar*.

Compared to the Daft Punk excerpt, the Chemical Brothers excerpt produced less consistent answers, but a definite majority of the respondents reported positioning that corresponds to the previous movement pattern. The experience of difference after the introduction of the hi-hat pattern, however, is less dominated by the stronger pull upward. Most reported a somewhat stronger pull but more people than previously did not report any specific pull in any direction at all related to this experience. The tendencies are predominantly the same as before, but the potential variation in bodily movement increases in the context of a more complex sound mix.

Section 7: 808 State, *Cübik* (modified).

Figure 3.20: Percentages of respondents reporting a position of head/upper body as “Up” or “Down” in relation to the hi-hat sound when listening to a modified version of 808 State, *Cübik*. 
The result here points to notable consistency in the body movements elicited by the Cübik excerpt. These results, however, should be interpreted with caution, as we do not know whether the respondents actually started their movement with the counterrhythmic pattern and continued it despite the succeeding hi-hat pattern.

Section 8: Listening preferences.

![Figure 3.21: Percentages of respondents reporting on the most engaging or satisfying way of listening to the excerpts for the survey.](image)

Only a slight majority reported a greater satisfaction/engagement while moving. It is of course possible that music students, who are generally trained in a sedentary, concentrated practice of music listening, are more comfortable that way that participants in club culture would be. A similar survey with excerpts from different genres and traditions, conducted with people from diverse music cultures, would offer more perspectives on this issue.

MAIN SURVEY: DISCUSSION

The direction of the vertical movement patterns reported by the respondents predominantly follows a pattern of going down on the bass drum and up on the hi-hat (or similar high-frequency sound). The excerpts with relatively few rhythmic patterns (Daft Punk and 808 State) produced more identical answers than those with a more complex rhythmic mix. This supports my hypothesis that the effect of the poumtchak pattern depends on the level of complexity of the music. Since the 808 State excerpt is rhythmically complex, for example, the poumtchak effect increases only according to its
prominence in the mix.

Relatively large groups of respondents reported a stronger pull upward at the introduction of the hi-hat sound in a dance track (see the Daft Punk and Chemical Brothers excerpts). Therefore a notion of verticality would appear in fact to be relevant to the movements elicited by the poumtchak pattern to some extent.

In relation to the 808 State excerpt, we probably should account for the contextual expectations of the genre: the synth sound of the 4:3 pattern signals a type of music where the poumtchak pattern is dominant, so that the pattern might be supplied “virtually,” if not actually. In introductions to tracks such as the example from 808 State, then, this could be the case; even if the poumtchak pattern is not acoustically represented in the rhythmic components, its main pulse and rhythmic structure will be realized through contextual expectations. When a track is played with others of the same genre (as in a DJ performance), these expectations grow.

The results of the survey largely support my initial hypothesis regarding congruence in body movement direction among listeners exposed to the poumtchak pattern. The relationship of this congruence to culturally learned behaviour, the alternation of high and low sounds and the notion of verticality in music, the metric structure, and other such matters are less obvious from these results (these issues will be discussed in the next chapter). But the survey at least partly supports the possibility that the poumtchak pattern facilitates a vertical movement pattern, because relatively large percentages of respondents reported a pull upward.

MAIN SURVEY: LIMITATIONS AND FUTURE RESEARCH

An important issue regarding the validity of the present study is the extent to which the respondents are relevant representatives for this research. Only 11.7 percent of them reported that they had listened/danced a lot to dance/house/techno. On one hand, music students may be considered expert listeners because they are trained in performing musical tasks (practical and theoretical), which would have helped them to answer questions requiring technical expertise. On the other hand, they are not experts regarding this specific music culture – they have divergent musical preferences, and most lacked experience with dancing in clubs. However, 50 percent reported that popular music was their preferred listening tradition/genre, and, as I indicated earlier, I believe that the correspondence between rhythm and movement that is in question here can be detected in
a wider range of popular music listeners as well. All of the respondents have been to a greater or lesser degree exposed to popular music through their participation in Western society.58 The results of the preliminary survey indicate that a similar survey conducted with participants from a club cultural context would be congruent.

A further issue related to reliability concerns the research method here. Variables could have complicated the process that are not obvious in the results: misreadings of the questions, misreadings of the sounds to be recognized, disturbing movements from other body parts, and so on.59 The sound quality available from respondents’ computers is also an ungovernable condition. The participation of music students, however, lessens the likelihood of sound-related misunderstandings. Nevertheless, other research methods might prove more reliable, such as filming respondents moving to music in an approved location. The size and composition of the present participant sample prohibited the statistical analysis of the effect of musical preferences and cultural background on the bodily experience of the poumtchak pattern. This makes them more indicative of rough trends than of infallible conclusions. Still, they provide a compelling starting point for more detailed research into variations in movement patterns related to music.

Though listening while sitting in front of a computer is not ideal for sound quality or physical activity (and is nothing like a club context), participants nevertheless had the advantage of a rather private space where they were not influenced by others or constrained by knowing that they were being observed.

In future research, securing an appropriate sound system and high volume would be particularly useful for the low-frequency sounds in the music excerpts and therefore enhance the effect of the poumtchak pattern – a similar survey under those circumstances might have resulted in more consistency of response, especially regarding the more complex rhythmic mixes. Another direction for further research might be surveys using groups with different musical preferences or cultural backgrounds.60 Furthermore, comparisons with other rhythm patterns might be relevant. The respondents in this survey were asked to perform a specific type of movement (head nodding/upper-body bouncing). The extent to which this was experienced as a natural response was not

58 I do not see it as a problem that the group self-selected by deciding to participate or not. The intention was not that the respondents should be representative of the larger group of music students but that they represent examples of moving bodies.
59 Moving the feet or lower body, for example, might cause the upper body to compensate by moving in the opposite direction, thus reversing the (expected) direction of movement.
60 The nature and size of the present participant sample prohibited the statistical analysis of the effect of musical preferences and cultural background on the bodily experience of the poumtchak pattern.
examined, but the relatively large number of respondents who reported a pull downward and then upward in congruence with the downbeats and upbeats of the rhythmic structure at least partially indicates that the sounds of the poumtchak pattern facilitate body movements.61

**Summary**

In this chapter I examined various connections between the poumtchak pattern and body movement to gauge the strength of the correspondence in various environments. A comparison of the poumtchak pattern with other patterns reveals its resemblance to music mainly related to dancing or marching, and its historical roots are located mainly in the disco period of the 1970s. A review of its surges in popularity since the 1970s demonstrates that its position in the production of popular music is connected to the popularity of specific dance genres.

A comparison of Todd Terry’s club remix of Everything but the Girl’s pop song *Missing* with the original version shows that a basic beat in the form of a poumtchak pattern and various counterrhythmic patterns were the basic elements that turned a pop song into a club track. This supports the assumed prevalence of the poumtchak pattern in club music (as opposed to popular music in general). An examination of the music video for Basement Jaxx’s *Jump n’ Shout* displays several correspondences between the poumtchak pattern in the music and various vertical movement patterns.

To further support my hypothesis regarding the poumtchak pattern’s particular effectiveness in activating vertical body movement patterns, I turned to the practice of aerobics. Music accompanying workouts and physical training often uses the poumtchak pattern, placed in the front of the mix, in connection with vertical body movements. An unambiguous basic beat seems to inspire participants to work harder and longer, introducing again the possibility of processes that facilitate the activation of body movements.

My listener survey largely supported my hypothesis regarding congruence in body movement direction among listeners exposed to the poumtchak pattern, though this effect depends on the level of complexity of the music. The survey also at least partly

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61 Since few respondents used the “Don’t Know” alternative, and a slight majority also experienced the most satisfaction/engagement while moving, it would appear that these movements were generally comfortable for this group.
supported the possibility that the poumtchak pattern facilitates the body movements in question, because several respondents reported an experienced pull downward and upward in response to the rhythmic structure of downbeats and upbeats.
Chapter 4:

Theoretical contributions to the study of music and movement

The path from music to body movement involves several complex systems: our sensory system, our central nervous system, and our musculoskeletal system. My aim in this chapter is not to give a systematic account of these various systems but rather to present selected theoretical perspectives that will shed light on the correspondence between the poutchak pattern (at a tempo from 120 to 135 bpm) and a vertical movement pattern such as head nodding or upper-body bouncing. In the illustration below, various aspects of music perception and performance are mapped according to the areas of the human brain (mainly in the right hemisphere) that may be involved with them.\textsuperscript{62} This illustration demonstrates the complexity of music listening and its many processes and potential cerebral interactions.

![Diagram of processes connected to music perception and performance](image)

Fig. 4.1 Processes connected to music perception and performance mapped according to the areas of the human brain that may be involved with them.

Several studies have demonstrated that activity takes place in both the auditory and the premotor areas of the brain during either the perception or the production of music.\textsuperscript{63} This overlapping of activity has been especially apparent with regard to the rhythmic aspects of music. Joyce Chen and her colleagues observed activity in the same premotor areas of

\textsuperscript{62} This illustration is part of a larger illustration that includes the brain and its various areas (from an article by neurologist Mark Jude Tramo; see Tramo 2001:55).

\textsuperscript{63} For an overview, see Zatorre et al. 2007.
the brain whether subjects were asked to tap along with a rhythm or simply sat and listened without tapping along.64 Such findings indicate the strong connection between musical rhythm and movement, whether virtual/imagined or actual/realized.

Extending our native connection between rhythm and movement to specific rhythmic and movement patterns is a challenging task, given the many complex processes involved in the proposed correspondence. Our sense of hearing, first of all, is profoundly influenced by our other senses – the vibration of rhythmic pulses can also be detected by skin receptors and internal receptors in muscles and joints, for example. Furthermore, we must allow for the possibility of an interdependent relationship between music perception and body movement so that a correspondence in the opposite “direction” (from movement to music listening) is also potentially relevant here.65 In what follows, I will focus first on the various ways we attend to and perceive music and then on the ways motor processes are formed and activated.

The general perspectives on perceptual/cognitive processes put forward by the theories of embodied cognition and the ecological approach to perception will inform my discussion. Embodied cognition recognizes a mode of understanding wherein “body and mind are brought together,”66 in the sense that the body’s impact on cognition must be accounted for when we consider otherwise “mental” processes.67 The ecological approach to perception originates in the work of psychologist James J. Gibson (1904–1979), who was particularly concerned with the impact of our moving body on perception. Drawing heavily upon evolutionary biology, Gibson saw the process of perception mainly as a search for what the environment around us has to offer.68

**Attention and Perception**

In a dance club, our senses are overwhelmed with stimuli: music, lights, dancing and moving individuals, faces, clothing, voices, laughter, smells, tastes, and so on. How, then, might a simple repeating alternation of a bass drum and a hi-hat sound compete for our attention?

64 Chen et al. 2008.
65 The sound system, volume level, type of event, conditions of the physical listening environment, and so on also influence the outcome of a listening experience.
66 Varela et al. 1991:27.
67 In their influential book on embodied cognition from 1991, Francisco Varela and his colleagues point specifically to Buddhist meditative psychology, where reflection is a form of experience that is performed with an awareness of one’s physical presence.
68 Gibson 1979.
Musical sound from speakers is energy in the form of waves in the air that propagate according to their frequency content, loudness, and acoustics of the surroundings. These waves cause vibrations in our ears that in turn become impulses in our central nervous system, and our attention processes register some and ignore others.\(^6^9\) Gibson’s concept of “affordance” will help us clarify those processes.

**AFFORDANCES OF THE POUMTCHAK PATTERN**

Gibson based his work upon evolutionary biology’s role in perception, given that human beings evolved from animals and therefore share their perceptual capacities: “The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill . . . It implies the complementarity of the animal and the environment.”\(^7^0\) When sensing our surroundings, Gibson believes that we actively select only the information that we anticipate will be significant to us and ignore the rest. On the dancefloor at a club, this means that the people talking loudly somewhere behind us are much easier ignored than the musical sound from the speakers, which contributes significantly to what we are at the club to do. It demands our attention, particularly as we begin to couple rhythmic bodily movement to it. It is useful to us; the chatter at the bar, on the other hand, is not.

Gibson, significantly, sees perception and action as closely connected.\(^7^1\) We do not hear sounds and subsequently interpret their meaning, but instead understand them directly and intuitively. We therefore can act on them instantly. From the evolutionary perspective, of course, animals that lack this ability have less chance of survival.\(^7^2\) Crucial to the ecological approach, then, is the notion that we are not passive receivers but active collectors of information: “Perceiving is an act, not a response, an act of attention, not a triggered impression, an achievement, not a reflex.”\(^7^3\) Gibson links perception and action very closely in any human encounter with the outside world;

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\(^6^9\) Space prohibits a detailed description of the physiological processes of sensory transduction.

\(^7^0\) Gibson 1979:127.

\(^7^1\) Graham Pike and Graham Edgar point to Gibson’s occasionally ambiguous explanations of the processes that actually link perception to action. They see his description of the ways in which the perceptual system resonates with the information from the surrounding environment, without the intervention of cognitive processes, as lacking as an explanation of, for example, how a memory of prior experiences affects the actions (see Pike and Edgar 2005, 80–90).

\(^7^2\) According to an article by Stephanie Pain (1999) in the magazine *New Scientist*, the California ground squirrel has evolved to be able to determine a rattlesnake’s size and body temperature (a warm snake is more dangerous than a cold one) by its rattling sound. This information is used to instantly gauge the threat the snake represents.

\(^7^3\) Gibson 1979:149.
perception leads to actions that in turn lead to new perception. This perception-action cycle is basic to the processes involved when we attend to our environments.\(^\text{74}\)

While Gibson’s work primarily deals with visual perception, Eric F. Clarke’s *Ways of Listening* from 2005 extends Gibson’s conclusions to aural perception, and especially music.

![Image of a page from a book]

The interdependence between perception and action that is emphasized in ecological theory suggest that every perceptual experience will bear the trace of an action component. In the case of music, these traces are not hard to find—they are displayed overtly in the foot-tapping, head-nodding, and body-swaying that are commonly observed in even the most constrained circumstances of the Western art music tradition.\(^\text{75}\)

The correspondence between the musical poumtchak pattern and a vertical movement pattern seems to resonate with the perception-action cycle that Clarke describes.\(^\text{76}\) The musical sounds are perceived with their afforded actions: the bass drum affords downward movement, while the hi-hat affords upward movement. Therefore we attend specifically to these sounds despite many potential distractions because they are coupled with certain specific actions. We respond actively only to those affordances that matter. With electronic dance music, we attend to those auditory patterns or specific sounds that afford movement, and when we respond to them, we initiate a self-reinforcing perception-action cycle (the patterns become more and more present to us as we move to them).

Clarke observes that “music affords dancing, worship, co-ordinated working, persuasion, emotional catharsis, marching, foot-tapping, and a myriad other activities of a perfectly tangible kind.”\(^\text{77}\) In other words, a musical sound event can have many affordances. Typically, one or two affordances may dominate, however, while others may be present only remotely. A poumtchak pattern at the beginning of a dance track can afford foot tapping, head nodding, dancing, or (virtual) playing along, as well as assorted mental activities such as recognizing the producer’s style, recalling the track from another time or place, figuring out what production techniques are being used, and so on. Gibson does not limit the affordance to either absolutely subjective or absolutely objective relations; it may be totally contextually dependent, completely basic and universal, or some combination of the two. Certain affordances can be handled

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\(^{74}\) The term “perception-action cycle” was first introduced by the psychologist Ulric Neisser (see Neisser 1976).

\(^{75}\) Clarke 2005:62.

\(^{76}\) See Clarke 2005:19ff for further discussion of the perception-action cycle.

\(^{77}\) Clarke 2005:38.
simultaneously, without complication or competition, because they activate discrete parts of, or systems within, our bodies; others in fact comprise rival interpretations. These mostly unconscious choices guide our attention processes, or the act of hearing. The social context also helps to determine how (or which) affordances will be perceived; if no one in the club has started to dance yet, for example, a dance track will typically afford only more modest movements, such as foot tapping or head nodding.

ENTRAINMENT AND ATTENTIONAL ENERGY

The work of Gibson also inspired the research of neuropsychologist Mari Riess Jones, particularly around her use of the entrainment concept. A centerpiece of her theories about attention and expectation in music, this compelling concept directly addresses the fact that rhythmic processes tend to adjust themselves to other occurring rhythms. Presented with music with an isochronous rhythm, which is typical for a club environment, we might then be expected to respond by synchronizing our foot tapping or head nodding to it. Jones assumes that in such cases our attentiveness will oscillate, determining in turn how we perceive various subtleties of rhythm, time, and pulse in music. She makes three assumptions regarding our “entrainment” to such events. First, she describes time as fundamentally related to event structures explaining that events may be “driving rhythms” or “environmental happenings arising from animate or inanimate activities.” Second, she describes time as it exists in the structures of inherently rhythmic organisms with diverse biological oscillations (such as ourselves) – our physiological systems or processes function as “driven rhythms.” Finally, she considers the interaction between event time and organism time, or a driving rhythm and a driven rhythm. In line with ecological theories of adaptation in environmental processes, she concludes: “Rhythmic organisms interact, more or less effectively, with

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78 My summary of Jones’s theoretical perspectives is largely based upon her book chapter “Attention and Timing” from 2004, which is in turn based on earlier studies (see Jones 1976, 1990 and 1992). Her productive work with Edward W. Large is presented in their joint article titled “The Dynamics of Attending: How People Track Time-Varying Events” from 1999.

79 The notion of entrainment dates back to the seventeenth century, when Christiaan Huygens noticed that two pendulum clocks placed on a common support would eventually synchronize with one another. See Clayton et al. 2005:4ff for a historical overview of the concept.

80 A relevant topic beyond the scope of the present study concerns neural activation patterns: psychologist Daniel N. Stern, for example, points to “oscillatory” neural processes in describing how “adaptive oscillators” act like clocks and how their rate of neural firing can be “adjusted to match the rate of an incoming stimulation” (Stern 2004:80). Miriam Zacksenhouse has also identified “intrinsic oscillators” in neural circuits as the “basic building blocks of central pattern generators” (Zacksenhouse 2001:301).

81 See also Gibson 1979:93ff.

82 Jones 2004:50.
dynamic flow patterns of events via entrainment: An event’s driving rhythm shapes an organism’s driven rhythm through adaptations of period and phase. This entrainment process extends to rhythms that reflect the ebb and flow of attending energy. In music, the driving rhythm is the energy a track passes along, while the driven rhythm is our perception of or action upon this energy. During this process we might “attend to” a flow of sound events as we orient ourselves: “Attending entails a synchronization of many internal attending periodicities with corresponding time spans within an event.”

Jones suggests that the process of attending is not stable or uniform but “requires a selective allocation of attending energy at critical points in time.” Within the dynamics of this process she describes “anticipatory attending” and “reactive attending”: the first involves the expected onset of the relevant sound in an already recognized pattern, while the second involves the unexpected onset (or sound) or violated pattern. When synchrony is achieved through anticipatory attending, interestingly, “it ensures that attention is allocated just before the onset of an expected sound.” This form of synchronization resembles a phase-lock between the oscillation formed by expected sounds (in the music) and the oscillation formed by our anticipatory attending.

Entrainment models illuminate both music that is inclined to synchronicity and music that incorporates more challenging rhythmic strategies (time variations, early/late onsets, and so on). The poumtchak pattern is certainly of the former type: the four-to-the-floor bass drum pattern and upbeat hi-hat pattern offer clear, regular indications of orientation. Based on Jones’s illustrations of how period and phase govern the entrainment of an internal oscillator to a stimulus’s timing, I have made illustrations that demonstrate these mechanisms in relation to the poumtchak pattern.

Figure 4.2: Attention illustrated as an oscillation in relation to a repeated bass drum sound, with the peak of the phase representing the peak of attention (which is located just before the expected sound).

Figure 4.3: Attention illustrated as an oscillation in relation to a repeated hi-hat sound, with the peak of the phase representing the peak of attention (which is located just before the expected sound).

83 Loc. cit. Emphasis in the original.
84 Loc. cit.
85 Loc. cit.
86 Ibid.:52.
87 Ibid.:53, 57.
When the two patterns are brought together, the occurrences of expected sounds double in number.

A characteristic feature of the poumtchak pattern in relation to other patterns in groove-oriented music is the multitude of reference points in its rhythmic structure. Moreover, the basic beat in club-oriented dance music is often kept more or less unaltered for very long periods. This multitude of reference points, and their stability, makes the chances of a phase-lock (synchronization) extremely good. Jones writes: “When an event is rhythmically regular (i.e., very coherent) phase synchrony tends to be high and a narrow attentional pulse develops, indicating precise temporal expectations.”

The poumtchak pattern’s strict rhythmic regularity easily accommodates this precise temporal expectation. This is significant for two reasons. First, in electronic dance music tracks where the poumtchak pattern is present, there are often specific periods where the bass drum drops out (the “breakdown”). During the breakdown, then, listeners will be able to maintain their entrained oscillation even in the absence of the anticipated sound of the bass drum, and building up to the bass drum’s reappearance in fact represents an excellent opportunity for DJs/producers to tease and excite their dancers. Second, the poumtchak pattern accommodates what Jones calls “attunement shifts,” which “[direct] some attending energies away from the referent period to another level.” Thus various other rhythmic patterns can be attended to while one is still phase-locked to the poumtchak pattern. Jones calls this flexibility “skilled attending” to various event

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88 In the illustrations, the oscillations representing attention are portrayed as uniform waves, though it is in fact likely that attention will peak in particular at the introduction of the pattern or when the pattern is interrupted by a conflicting sound or a shift in character. “Habituation” refers to a reduction in degree of response after a stimulus has been repeated several times; it may occur at various points and reduces one’s attentional energy (Purves et al. 2008:330). The complementary energy from a moving body probably shapes these processes; moreover, the poumtchak pattern normally occurs in connection with other rhythmic patterns, and these combinations will of course impact habituation as well.
89 Jones 2004:54.
91 In Albert S. Bregman’s book Auditory Scene Analysis: The Perceptual Organization of Sound (1990) he explains stream segregation in the perceptual processes of the human auditory system. His theories can elucidate how we group the various entries of a complex sound mix into separate streams.
levels. During a track there might be periods where dancers/listeners completely leave the referent level of the basic beat to attend (and move) to other patterns. Such shifts may be encouraged by certain emphases in the musical production, or the music may offer several event levels simultaneously, among which the dancers may choose.

Jones is primarily focused on perceptual processes involving how we attend to and perceive time and rhythm in music, so she does not discuss if or how body movements are then activated by the music. Ethnomusicologist Martin Clayton, on the other hand, observed physical movements (playing and beat marking) to determine how synchronized actions in music performance occur. His study focused on the production of music and thus included those motor processes that activate movements and he encountered “the emergence of complex hierarchies of entrained movement patterns in the course of producing music.” These observations might also be relevant for a clubgoer’s head nodding or foot tapping, though those movement patterns may be simpler than the movements linked to the musicians in Clayton’s study.

The poumtchak pattern has repeating sounds that clearly attract attention, and Gibson’s and Jones’s theories both shed light on how a listener/dancer who is familiar with the poumtchak pattern perceptually responds to it by allocating attentional energy to the sounds that constitute the basic beat and then entraining to the rhythmic structure of the music. But how is this process then taken to the level of specific synchronized body movements?

**Motor Processes**

The skeletal muscles contract when the muscle fibres are excited by motor neurons, and these contractions (and relaxations) of the muscles produce body movement. In what follows I will first discuss how motor memory related to vertical movement patterns is formed on a more general level. Then I will discuss how these movement patterns are activated, and why the poumtchak pattern seems to be particularly effective at doing so.

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93 See Naish 2005 and unit 4 of Purves et al. 2008 for further descriptions of attention processes.
MOTOR MEMORY AND PERCEPTUAL LEARNING

We store information on how to perform physical tasks in our memories, and we are typically able to access this information in a straightforward and immediate fashion.\(^{95}\)

The series of motor actions required to ride a bike, for example, comes without thinking, but to consciously account for them takes much more effort. This information is encoded through bodily participation; when we first learn to ride a bike, we must consciously perform the required actions in the proper succession; later on however, we simply do them. So how is this type of motor learning accomplished for vertical movement patterns that are performed in response to a musical rhythm?

Returning to the ecological approach to perception and the close link between perception and action, we appear to learn actions related to perceptual inputs through both individual and guided experiments throughout our lives. Gibson sees all knowledge as an extension of perception:

> The child becomes aware of the world by looking around and looking at, by listening, feeling, smelling, and tasting, but then she begins to be made aware of the world as well. She is shown things, and told things, and given models and pictures of things, and then instruments and tools and books, and finally rules and short cuts for finding out more things. Toys, pictures, and words are aids to perceiving, provided by parents and teachers. They transmit to the next generation the tricks of the human trade. The labors of the first perceivers are spared their descendants.\(^{96}\)

Through what Gibson describes as “perceptual learning processes” our knowledge of the world around us matures.\(^{97}\) The members of a new generation inherit the “tricks of the human trade” from their parents and other role models, who teach them how to act based upon their own experiences. In a milieu where dancing is a common activity, then, we learn how to move to music, and movement becomes a likely affordance of music. If we, on the other hand, grow up in a milieu where dancing is not common, music that appeals especially to movement makes no sense. Dance music’s affordances are therefore perceived differently, and the poumtchak pattern is no exception.

In describing perceptual learning processes, Eric Clarke also emphasizes that we become “increasingly sensitive to distinctions within the stimulus information that were always there but previously undetected.”\(^{98}\) Perceptual learning processes allow us to

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\(^{95}\) See, for example, Snyder 2000:chap. 6 and Rutherford 2005 for descriptions of long-term memory.

\(^{96}\) Gibson 1979:258; emphasis in the original.

\(^{97}\) His wife, the psychologist Eleanor J. Gibson, has also done substantial research on perceptual learning processes; see, for example, Gibson & Pick 2000. For perceptual learning processes in relation to music, see Clarke 2005:22ff.

\(^{98}\) Clarke 2005:22.
improve upon our ability to differentiate between subtle variations. With reference to Gibson’s theories, the musicologist Björn Vickhoff describes how the sound engineer learns to “differentiate features in music [that are] unperceivable to others.”\textsuperscript{99} Two bass drum sounds that appear alike to most listeners might be quite distinct to the professional producer of dance music – moreover, one might be preferred based upon its specific perceived capacity to evoke body movement.\textsuperscript{100} Among dancers, basic perceptual learning leads to the ability to move in synchrony with a returning rhythmic pattern, while more advanced differentiation might include the ability to hear differences in the sounds of various tracks and then translate those differences into slightly divergent movements. As one listens more, one recognizes more patterns in more complex mixes, as well as minor differences in timing or sound-related realizations.

The existence of perceptual learning processes may account for a connection between music and movement at a general level. The specific vertical movement patterns like head nodding and foot tapping that are often performed in connection with musical rhythm, however, demand further investigation. We recognize right away the similarity of these patterns to basic human movements like walking, running, or jumping, which rely upon quite similar patterns of contraction and relaxation of the muscles.\textsuperscript{101} In an article from 2004 about groove in popular music, Lawrence Zbikowski “explore[s] a way to model the knowledge basic to producing and understanding musical grooves.”\textsuperscript{102} First he links basic human experiences to musical rhythm: “Our conceptions of rhythm in general, and of musical rhythm in particular, are strongly informed by the manifold regularities basic to human experience – the regular cycles of our breathing, the alternation of our limbs in walking or the repeated actions that accompany our physical work.”\textsuperscript{103} He then forms a conceptual model that comprises the basic cognitive structures of regularity, differentiation, cyclicity, and embodiment.\textsuperscript{104} Central to Zbikowski’s article is Lawrence Barsalou’s theory of perceptual symbol systems, which Barsalou summarizes as follows:

\textsuperscript{99} Vickhoff 2008:85.
\textsuperscript{100} Certainly the Western inclination to favour melody as the main focal point in popular music will hinder listeners’ ability to differentiate among sounds that are considered to be “accompaniment.”
\textsuperscript{101} The bio-kinetics of movement and the effects of gravity and various inertial forces on the moving body might also be relevant for my discussions. See van Norden 2010. Among the topics Van Norden discusses are connections between human locomotion, dance, and tempo in music (157ff).
\textsuperscript{102} Zbikowski 2004:273.
\textsuperscript{103} Ibid.:277-278.
\textsuperscript{104} Ibid.:276.
A perceptual state can contain two components: an unconscious neural representation of physical input, and an optional conscious experience. Once a perceptual state arises, a subset of it is extracted via selective attention and stored permanently in long-term memory. On later retrievals, this perceptual memory can function symbolically, standing for referents in the world, and entering into symbol manipulation. As collections of perceptual symbols develop, they constitute the representations that underlie cognition.105

According to Barsalou, then, a subset of a perceptual state is stored for use later on in various cognitive processes. Zbikowski uses Barsalou’s theory mainly to describe a route from embodied knowledge to an abstract understanding of rhythm. This understanding then has to be transferred back into bodily movement when we play an instrument or move/dance while listening to music. In the context of consideration here – a rather simple movement pattern performed by participants of a culture where music is not written down or learned systematically – it would appear more likely that movement patterns are in fact stored and retrieved directly. In this case, then, the “neural representation of physical input” not only functions symbolically but also directly informs our motor processes.

The link between rhythm in music and movement may originate early in our childhoods. Several books on music and children address prenatal sound experiences and their assumed relevance to the development of a child’s musical abilities.106 The human foetus hears rhythmic sounds like its mother’s heartbeat and breathing. It also experiences movements – its own and its mother’s.107 The prenatal development of the vestibular system is likely relevant to our equation of music and movement, because it is anatomically and physiologically connected to our auditory system. Located in our inner ear, the “saccule” consists of sensory cells that communicate information about head movement to the brain. Interestingly, Jessica Phillips-Silver and Laurel Trainor have conducted studies of seven-month-old infants to see whether the metrical interpretation (duple or triple meter) of an ambiguous musical rhythm would be influenced by body movement.108 In tandem with other studies conducted with adults, they concluded that “the strong, early-developing relation between the auditory modality and movement-

105 Barsalou 1999:577–578. Barsalou contrasts his theories with “amodal symbol systems” where “perceptual states are transduced into a completely new representational system that describes these states amodally” (ibid.: 579). Here he intersects with Gibson, who also favoured a view of perception whereby information is directly interpreted from its stimulus, in contrast to a view of perception as an act of gathering, organizing, and interpreting unstructured data by our brains.
related sensory inputs is maintained in adulthood\textsuperscript{109} and that “musical rhythm patterns elicit movement, that movement of the body can influence auditory perception of the metrical structure of rhythm, and that vestibular and auditory information is integrated in perception.”\textsuperscript{110} In his book on the musical lives of young children, John Flohr writes “Children are predisposed to move to the sound of music.”\textsuperscript{111} This inclination appears to be grounded in the interaction between the perception of sounds and the proprioception of body movements at early stages of human development.\textsuperscript{112}

Lily Chen-Hafteck has studied her own daughter’s development of physical movement to music. In the first months of life, a lack of muscle control limits her daughter’s ability to exhibit any bodily interaction with music, but between seven and twelve months she begins to move, mainly to the beat. Infants start to perform up-and-down movements with the torso and feet (while lying on the floor) as soon as they are able to, and in line with Chen-Hafteck’s observation, rhythmic music with a definite beat can intensify or interact with such movements. She further reports that by thirteen months her daughter “walked and bounced in standing position to the music.”\textsuperscript{113} Such activities demonstrate that vertical movement patterns might well have roots in early childhood and already comprise likely affordances to rhythm in music. In cultures where dance and movement to music is prevalent, music/movement relations would probably develop even faster.

A wide variety of individual participants appear in a typical club environment, however. They all have different bodies with different predispositions for moving to the music. How are consistent vertical movement patterns then spread throughout such a culture? What mechanisms are significant for activating them?

\textsuperscript{109} Philips-Silver & Trainor 2007:543.
\textsuperscript{110} Philips-Silver & Trainor 2008:100.
\textsuperscript{111} Flohr 2005:98.
\textsuperscript{112} It should be noted that because a mother’s movements and vocal sounds (singing, talking, dancing, playing an instrument), as well as the sounds from outside, communicate a specific cultural context, this stage/process of human development should not be considered “universal.” Middleton writes: “Modern genetic theory insists that the question of whether ‘nature’ or ‘nurture’ has priority is in principle not susceptible of resolution; this is because it is impossible to find, or to conceive of finding, even the smallest, the most embryonic bit of human nature which is not already nurtured” (Middleton 1993:178).
\textsuperscript{113} Chen-Hafteck 2004:3. The pleasure children derive from bouncing, jumping and swinging may also have a biological basis. Hodges writes: “The cerebellum is directly linked to the limbic system, specifically a region of the hypothalamus known as the pleasure center. The result is that body movement brings pleasure” (Hodges 1996:44).
MOTOR ACTIVATION

People have an inclination to imitate movements made by others. The recent discovery of “mirror neurons” reveals that motor networks used to perform a certain action are partly triggered by the act of observing someone else performing it.\textsuperscript{114} This discovery applies also to sound stimuli. In 2003 the neuroscientist Christian Keysers and his colleagues identified audiovisual mirror neurons that discharged regardless of whether the subjects (monkeys) performed, heard, or saw a specific sound-related action.\textsuperscript{115} Istvan Molnar-Szakacs and Katie Overy explain how mirror neurons may apply to music listening:

The experience of music thus involves the perception of purposeful, intentional and organized sequences of motor acts as the cause of temporally synchronous auditory information. Thus, according to the simulation mechanism implemented by the human mirror neuron system, a similar or equivalent motor network is engaged by someone listening to singing/drumming as the motor network engaged by the actual singer/drummer; from the large-scale movements of different notes to the tiny, subtle movements of different timbres.\textsuperscript{116}

When we hear someone playing an instrument, then, our mirror neurons will activate parts of the motor system in our brains and thus evoke experiences of movement as if we were actually playing too. This hypothesis is central to the theoretical framework for motor-mimetic processes in the perception of music.\textsuperscript{117} Rolf Inge Godøy emphasizes further the embodied relationship and close connection between perception and action as well as our multimodal manner of perception: “The idea of gestural affordances of musical sound initially rests on the assumption that musical sound is a transducer of source-information, meaning both the actions that go into producing the sound . . . and the material properties of the sound source.”\textsuperscript{118} The movements (or gestures) required to produce sounds on an instrument are viewed as a source for a meaningful experience of “sound as movement” for the listener. More precisely, the musical sound evokes our awareness of the instrument as a source for producing it.\textsuperscript{119}

Compared to a concert situation, where musicians are visually present, a club environment usually lacks the visual stimuli of relevant source information. But the

\textsuperscript{114} See Rizzolatti & Craighero 2004.
\textsuperscript{115} Keysers et al. 2003.
\textsuperscript{116} Molnar-Szakacs et al. 2006:236.
\textsuperscript{117} The term “motor-mimetic” was introduced by Rolf Inge Godøy (2001). He and his colleagues use the term “musical gesture” to denote a combination of sound and movement that affords meaning. See Godøy & Leman 2010.
\textsuperscript{118} Godøy 2010:106; emphasis in the original.
\textsuperscript{119} In an experiment on “air piano,” Godøy and his colleagues investigated how the instrument provided source information to respondents of different knowledge levels. They found a fairly clear correspondence between the participants’ movements and the actions that were actually needed to produce the sounds on the instrument, though obviously the experts were able to imitate this more closely (Godøy et al. 2006).
effect of mirror neurons could still be active on a visual level, because clubgoers watch each other: when someone sees someone else nodding her head or tapping her feet, motor regions for performing these actions may be activated. Many DJs move a lot while they work, providing another potential visual source for vertical movement patterns. Furthermore, according to studies of dance-related motor simulation, this correspondence or imitation is more likely regarding actions with which we have real physical experience. Thus body movements that are already common to a culture will readily recur within it.

To what extent do the musical sounds of electronic dance music serve as a “transducer of source-information”? Even though the club environment is almost devoid of traditional visual musical sources, listeners may draw on related experiences with musical and other sound-producing sources. Depending upon a listener’s knowledge of acoustic drumming, for example, the pountchak sounds might evoke the action of playing the drums. The four-to-the-floor bass drum pattern is produced with a regular downward movement of the foot on a pedal, one that corresponds perfectly with straightforward (non-drumming) foot tapping. On a more general level, drum sounds may evoke the action of hitting a batter-head with a downward strike. Knowledge of the actual production processes of electronic dance music, however, may counteract this particular motor-mimetic action because the drums are usually programmed (or played on a MIDI-keyboard) rather than played “live,” and they are recognizable as such.

Musicologist Arnie Cox emphasizes the embodied human experience involved in how we make sense of sounds. He believes that we unconsciously compare “sounds we hear with the sounds we have made ourselves,” and that we imitate these sounds (actually or virtually) when we listen to music. Since all humans have a voice box, he sees the voice as vital to these acts of imitation, and it would seem logical that an active use of the voice in making sounds is also relevant to how we experience dance music. The “human beatbox” (the production of rhythmic sounds with the mouth) is a

120 Vertical movement patterns probably also derive from the auxiliary movements of musicians, which audiences pick up through motor-mimetic processes. By watching musicians playing rhythmic patterns while moving their heads, upper bodies, or feet, spectators adopt the same vertical movement patterns and gradually transfer them to listening scenarios. Musicians are at times also spectators as well and may transfer performance-related movements to the activities of listening or dancing.
122 Leen De Bruyn and colleagues conducted an experiment with children and adolescents who were dancing to music that compared a situation in which they could see each other with one in which they could not. It demonstrated that both intensity of movements and mean synchronization to the beat were greater in the former situation, which indicates the significance of social interaction when dancing and moving to music (De Bruyn et al. 2009).
123 Cox 1999:59.
widespread hip-hop phenomenon that may have influenced musical participation in adjacent music cultures. Vertical movement patterns could be affected or even activated by a vocal imitation of the sounds of the poumtchak pattern. However, in order to explain why the poumtchak pattern works so well in this regard, we must look to other mechanisms.

As mentioned earlier, the steady stream of sounds in the poumtchak pattern provides many critical points of attention. In accordance with Mari Riess Jones’s theories of dynamic attending these critical points can drive bodily oscillations in our distribution of attentional energy. To what extent do such bodily oscillations also equate with the activation of motor commands? Daniel Schneck and Dorita Berger describe correspondences between rhythmic pulse and muscle activation:

Rhythmic pulsation embodies a consistent symmetrical balance of energy output, of fall and rebound . . . of tension and relaxation. Rhythmic vibration in music involves the same steady stream of force–rest–force–rest, of systematic strong and weak impulses, of alternating flexion (contraction), release (relaxation), and extension as in the case for paired and coupled muscular behavior.\(^\text{124}\)

A symmetrical rhythmical balance obviously happens in music to varying degrees (when it exists at all), but the poumtchak pattern is an extreme example of such balance, with its specific sounds for both downbeats and upbeats. It communicates an unambiguous rhythmic structure that allows the listener to easily determine the main pulse and convert it to a movement pattern. But, as Schneck and Berger imply, might the rhythmic pulse also activate the muscle commands directly? When a vertical movement pattern is synchronized with the poumtchak pattern in the music, there is powerful correspondence between the alternating sounds and the contractions and relaxations of the muscles (force-rest-force-rest). The movements in either direction are supported by a unique sound, which means that there is a direct relationship between sounds and movements.\(^\text{125}\)

The extensive use of the poumtchak pattern also in aerobic mixes further indicates its connection to muscle activation. As pointed out by one of the informants of Sophie Belcher’s study of aerobic classes, music with a simple strong beat made him/her work out harder.\(^\text{126}\) This may be because the oscillation of attentional energy initiated by the steady stream of critical points in the rhythmic pattern also causes oscillations in

\(^{124}\) Schneck & Berger 2006:139.

\(^{125}\) A simple experiment to test sound’s significance for movement is to compare (1) a side-to-side or up-and-down head movement accompanied by a tic-toc-tic-toc with (2) the same movement accompanied by only tic–toc– (same tempo, but without the toc in between).

muscular behaviour – the external rhythm (in the music) drives the internal rhythm (in the body), not only in terms of perception but also in terms of actual rhythmic movement of the body.

VERTICALITY IN MUSIC

But why down on the downbeat and up on the upbeat? Here I will pursue the idea that motor schemas are formed through our perceived understanding of verticality in music – of high and low, up and down, above and below, and ascending and descending.\textsuperscript{127} This will clarify the link between low-frequency and high-frequency sounds and the low and high positions in a vertical movement pattern.

Sound waves, of course, do not actually move up or down in physical space with the pitch we are experiencing, as Arnie Cox points out: “Verticality is not inherent in music (let alone in its notational representation); it is not \textit{there} to be observed (heard) in the music, but it is instead a product of logical, metaphoric conceptualization.”\textsuperscript{128} Or as Björn Vickhoff adds: “Although there are no obvious directions of melody movement, most listeners feel directions in music. When the melody is moving ‘upwards’ or ‘downwards’ you get a feeling of spatial direction.”\textsuperscript{129} Such processes of conceptualization have been addressed by cognitive semantics.\textsuperscript{130} In \textit{Philosophy in the Flesh} from 1999, linguist George Lakoff and philosopher Mark Johnson employ the concept of “primary metaphors” (as opposed to “complex metaphors”) to illustrate the basic connection that exists between abstract and literal expressions.\textsuperscript{131} Primary metaphors are metaphors that have been incorporated into our worldview so thoroughly that we no longer see them as metaphors. They are based on correlations between expressions and embodied experiences and are, according to Lakoff and Johnson, fundamental to all thinking regarding subjective experience and judgement:

\begin{quote}
We do not have a choice as to whether to acquire and use primary metaphor. Just by functioning normally in the world, we automatically and unconsciously acquire and use a vast number of such metaphors. Those metaphors are realized in our brains \textit{physically} and
\end{quote}

\textsuperscript{127} I use the simple plural form “schemas” instead of the standard form “schemata”.

\textsuperscript{128} Cox 1999:50; emphasis in the original.

\textsuperscript{129} Vickhoff 2008:52.

\textsuperscript{130} See Lakoff & Johnson 1980 and 1999, and Johnson 1987. Also see Echard 1999, Aksnes 2001 and 2002, Larson 2002, and Gur 2008 for analyses drawing upon the Lakoff-Johnson theory of metaphor as related to meaning in music.\textsuperscript{131} The distinction was introduced by Joe Grady, who used “primitive” and “compound” in an article from 1996 (Grady et al. 1996) before settling upon “primary” and “complex.”
are mostly beyond our control. They are a consequence of the nature of our brains, our bodies, and the world we inhabit.\footnote{Lakoff & Johnson 1999:59, emphasis in the original.}

With reference to Christopher Johnson’s “theory of conflation,”\footnote{Johnson 1999.} Lakoff and Johnson then describe how primary metaphors are formed: “For young children, subjective (nonsensorimotor) experiences and judgments, on the one hand, and sensorimotor experiences, on the other, are so regularly conflated—undifferentiated in experience—that for a time children do not distinguish between the two when they occur together.”\footnote{Lakoff & Johnson 1999:46.}

Lakoff and Johnson use the example of the subjective experience of affection and the sensory experience of warmth through being held.\footnote{Loc. cit.} Even when children eventually develop the ability to differentiate between them, they will preserve associations from one domain (the “source domain”) to the other (the “target domain”). Thus “affection” and “warmth” will be connected, and in relation to affective meaning, “warmth” may be used where no actual (literal) high temperature is present. Similarly, metaphors are linked to movements: when we use “falling” metaphorically in the phrase “falling asleep,” the downward movement is projected upon the transition from consciousness to unconsciousness. Yet we have not “fallen” anywhere.

Verticality underpins our understanding of music as well, though the adverbs “up” and “down” and the adjectives “high” and “low” imply nonexistential spatial orientations there.\footnote{My eldest daughter at the age of six already had ideas of “up” and “down” in music, even though she was not familiar with notation. If I asked her to sing a “high” note, she tended to stretch her upper body so as to reach “up” to the pitch, and vice versa. These movements may point to the fact that it is easier (and therefore more natural) to lift the head/upper body and stretch the throat to make “higher” pitches; on the other hand, perhaps my daughter had already adapted to the metaphoric understanding of verticality in music. Zbikowski confirms that “low” sounds resonate in our chests while “high” sounds do not (they seem instead to be located nearer to our heads); Zbikowski 1998:3.9. On the question of the universality of verticality in music Zbikowski also remarks upon how other languages characterize pitch relations differently: “Greek music theorists of antiquity spoke not of ‘high’ and ‘low’ but of ‘sharpness’ and ‘heaviness’; in Bali and Java pitches are not ‘high’ and ‘low’ but ‘small’ and ‘large’; and among the Suyá of the Amazon basin, pitches are not ‘high’ and ‘low’ but ‘young’ and ‘old’” (Zbikowski 1998:3.5). See Cox 1999:31ff for further discussion of the various cultural sources of vertical relations.} According to Lakoff and Johnson such parallels “arise from the fact that we have bodies of the sort we have and that they function as they do in our physical environment.”\footnote{Lakoff & Johnson 1980:14.}

Motor schemas and image schemas are parts of the conceptual structure we form through sensorimotor experience and visual perception. Bob Snyder describes schemas as “memory structures created by generalizations made across seemingly similar
situations in the environment.”\textsuperscript{138} These affect perception and shape actions. In the same way that we use image schemas as points of departure for producing images when we are told stories, we use motor schemas to form motor commands when listening, dancing, conducting, singing, or playing an instrument. A motor schema related to tempo in music will support a correspondence between fast rhythms and rapid body movements; a motor schema related to verticality in music will encourage vertical movements in response to pitch. This latter motor schema has been shaped through our encounter with sources of verticality in music. Cox refers to ten such sources that possess both literal and metaphoric features:

Of the ten sources of verticality, three are based on literal vertical relations—(1) verticality in staff notation, (2) verticality in vocal experience, and (3) the propagation of sound waves—and seven are based on metaphoric verticality—(4) “higher” and “lower” frequencies, (5) the “higher” and “lower” perceived loudness levels of high and low notes, (6) the “higher” and “lower” amounts of air used for high and low notes, (7) the “higher” and “lower” magnitudes of effort needed for high and low notes, (8) the “higher” and “lower” degrees of tension in producing high and low notes, (9) the association of “high” levels of emotional intensity and pitch at climaxes, and (10) the metaphoric state-locations of tones in pitch space.\textsuperscript{139}

Several of these sources are mainly corporeally experienced and do not have to trigger any explicit knowledge before helping us to form motor schemas. In a culture where music is written (as notation) and actively learned, verticality in music likely arises from a mixture of rational and corporeal knowledge. Presumably the participants in the main survey presented in the preceding chapter are to some extent familiar with notation, possess at least some vocal experience, and recognize the concept of “high” and “low” frequencies. Music students are undoubtedly more accustomed to notation and the conventions surrounding singing and playing instruments than clubgoers are as well. Still, a producer of dance music, it should be noted, constantly confronts the notion of “high” and “low” frequencies. The sound systems in clubs are usually organized with separate subwoofers and tweeters that are situated vertically, so that “low” sounds come from the speaker beneath the one that produces “high” sounds.\textsuperscript{140} The loud volume level in clubs also intensifies how sounds resonate in our body. Low-frequency sound waves have a greater impact than high-frequency waves in how they are felt most noticeably in

\textsuperscript{138} Snyder 2000:102.
\textsuperscript{139} Cox 1999:18–19. Some of these sources are based on the experience of singing or playing certain instruments and are blended with other metaphoric associations of “high” and “low,” especially greater or lesser quantities/magnitudes (“more = up, less = down”) (Lakoff & Johnson 1980:15).
\textsuperscript{140} This vertical placement has little specific impact upon low frequencies, but high frequencies are generally more directional, so tweeters are often placed at ear height. See Rossing et al. 2002: chap. 24.
boneless body regions like the abdomen, which is obviously below our ears (and eyes), thereby contributing to the physical realization of a “low” frequency.\textsuperscript{141}

Sensorimotor experiences are important to both image schemas and motor schemas. The alternation of “low” and “high” is not as obviously “vertical” as a continuous pitch movement either up or down, but in relation to a vertical movement pattern, the structural parallel is pivotal. The bass drum sound evokes the “low” position of verticality, while the hi-hat sound evokes the “high” position. While theories of motor-mimetic processes view musical sound as a “transducer of source-information,”\textsuperscript{142} it may also be a transducer of verticality-information, from music to spatial orientation. The information that is part of the alternating “low” and “high” in the poumtchak pattern is thereby transduced to analogous up-and-down movements.\textsuperscript{143}

Head nodding, upper-body bouncing, foot tapping and similar vertical movement patterns are also performed in response to music with other rhythm patterns, but certain features seem to make the poumtchak pattern especially effective in evoking them.

1. \textit{The steady stream of reference points (critical points of attention) using specific sounds to mark out the downbeats (the bass drum) and upbeats (the hi-hat) of a basic rhythmic structure.} The alternating pattern of bass drum and hi-hat sounds not only marks out the rhythmic pulse but communicates the basic rhythmic structure very clearly. This steady stream of reference points makes it easy to achieve synchronization of attentional energy and motor commands.

2. \textit{The regular alternation of the low-frequency bass drum sound and the high-frequency hi-hat sound.} These alternating sounds offer the listener a musical verticality that can be mapped directly onto the “down” and “up” positions in a vertical movement pattern. When a motor schema of up and down is mapped onto the “up” and “down” in music, the “low” bass drum and the “high” hi-hat can be experienced as literally generating “up” and “down” movements.

3. \textit{The interaction of these two features.} In the figure below, an undulating line is drawn onto a sonogram of the poumtchak pattern. The bass drum sounds are the four dark areas

\textsuperscript{141} The bio-kinetics of movement and the effects of gravity and various inertial forces on the moving body might also be relevant for my discussion. See van Norden 2010.

\textsuperscript{142} Godøy 2010:106; emphasis in the original.

\textsuperscript{143} Descending pitch movements are common features in the bass drum sounds created for electronic dance music tracks; see chapter 8.
at the lower part of the sonogram, while the hi-hat sounds are the four pillars between them. The positioning of the sounds in the sonogram emphasizes their vertical relation, and the metric grid on top displays the rhythmic structure of downbeats and upbeats. The undulating line illustrates a vertical movement pattern but might also indicate oscillatory processes such as the distribution of attentional energy (where both the peaks and the troughs indicate peaks of attentional energy) and muscle commands (where the peaks and troughs indicate contractions and relaxations of the muscles).

Figure 4.5: A sonogram of a poumtchak pattern (from Daft Punk’s *Phœnix*, 1996, 0:15–0:17) in a grid showing the metric structure with an undulating line illustrating a possible movement pattern and/or oscillations in bodily processes such as the distribution of attentional energy or muscle commands.

Notions of verticality, which are embedded in our understanding of musical rhythm (downbeat/upbeat), form clear expectations about which sounds are appropriate in what positions in a rhythmic structure. If the bass drum sound is associated with “heaviness” and the hi-hat with “lightness,” this leads to notions of accented and unaccented beats and ultimately to assumptions regarding the overall metric structure. It may be difficult to pinpoint which of these features is at stake when a correspondence between the poumtchak pattern and a vertical movement pattern occurs. However, the fact that their combination and interaction is likely to increase the chances of such an occurrence seems to be beyond doubt.

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144 After I posed a question concerning the poumtchak pattern and its corresponding movements on djforums.com in June 2007, a discussion started between two DJs about sounds and verticality versus rhythmic structure in determining up-and-down dance movements: see webpage 4.1.
Summary

In this chapter I have presented and discussed various theoretical contributions towards the elucidation of the correspondence between the musical pountchak pattern and a vertical movement pattern. I have discussed how the pountchak pattern contains impulses for synchronized movements and, moreover, how its conveyed verticality leads to expectations about direction of movement.

In the realm of attention and perception processes, James J. Gibson’s theories of ecological perception, and his term “affordance,” suggest ways in which a musical pattern might capture our attention. Gibson proposes that the “affordances” of the environment guide our perception and direct our attention to what is relevant in specific situations. If the pountchak pattern affords movements in a club environment – that is, it is relevant because we can move to it – then we attend to it.

Mari Riess Jones’s works on entrainment and the ways in which we attend to music offer a theoretical explanation for how a “driven rhythm” – a responding oscillation of attentiveness in the listener, may align itself with the “driving rhythm” of the music. She claims that certain critical points in the music demand our attention and, in turn, encourage the forming of expectations regarding when such critical points are likely to reoccur. The pountchak pattern has a steady stream of reference points that would work as these critical points in the distribution of attentional energy, in turn facilitating the synchronization between musical rhythms and bodily oscillations.

Gibson’s theories on perceptual learning processes clarify connections between vertical movement patterns and musical rhythms. According to Gibson, we acquire connections between perception and action through individual experimentation and guided learning throughout our lives. In this way we come to code vertical movement patterns onto the input of a rhythm pattern (like the pountchak). Lawrence Zbikowski even suggests a link between rhythm in music and basic physical human activities like walking or jumping. Correspondences between musical rhythm and body movement at early stages of a child’s development strengthen this presumed link.

The prevalence of vertical movement patterns in a club environment, and the mechanisms that activate them, may be further explored using research and theories on motor-mimetic processes. Our inclination to imitate others, first of all, is supported by the discovery of “mirror neurons” – motor networks are activated not only when we perform an action, but also when we observe one. Thus motor networks related to the production
of sounds on instruments may be activated when we observe or hear someone else who is playing.

The poumtchak pattern consists of a steady stream of alternating sounds that clearly communicates a rhythmic structure of downbeats and upbeats. The resemblance between rhythmic pulsation and coupled muscle behaviour facilitates a conversion of musical pulse to vertical movement patterns and reveals the link between the alternating sounds of the poumtchak pattern and the activation of muscle commands. The movement in a specific direction (down on the downbeat, up on the upbeat) must be associated with a commonly shared experience of perceived verticality in music. The metaphor theory of Lakoff and Johnson elucidates how such a notion of verticality might originate in metaphors at a basic, unconscious level, which is useful, given that verticality in music is simply a construction of our understanding (sound waves do not move up or down). Lakoff and Johnson explain how our use of metaphors is linked to sensorimotor experiences that form our understanding and shape image schemas and motor schemas. Bodily experiences of musical verticality thus contribute to motor schemas that provide a direct link between the “low” and “high” sounds of the poumtchak pattern and the “low” and “high” positions of a vertical movement pattern.

Three points stands out as especially relevant to the correspondence between the poumtchak pattern and a vertical movement pattern; (1) the steady stream of structural reference points in the music, (2) the alternation of two sounds with opposite frequency content, and (3) the interaction of these two characteristics. The poumtchak’s rhythmic clarity and verticality work together to activate the proper motor commands and synchronize a vertical movement pattern with the music.
PART III:

THE RHYTHM

In the previous part I focused on the basic beat of the track and its connection to movement, stressing the importance of this rhythmic foundation for our experience of the groove. Producers of dance music use this basic beat as a point of departure or rhythmic foundation for constructing various other rhythmic patterns, that will interact with the basic beat (and each other) in different ways. These interactions will in turn impact vertical movement patterns driven by the basic beat.

There are many ways to build grooves and develop tracks. Some producers will work with various rhythmic patterns that all function to some degree simultaneously and arrange the track using them as building blocks. Other producers will start to develop certain sections and then create more patterns along the way. The sequencer software generally used in such productions to some extent favours a vertical rather than a horizontal working process, but the different visual views of these programs enable either one. Vertical approaches (working with tracks that play simultaneously) foreground the roles of patterns, both their ability to attract attention (foreground versus background) and their position in a vertical dimension (frequency-related characteristics). Horizontal approaches foreground the track’s overall musical progression.

Analytical approaches reflect similar options. While analyses of groove-based music tend to focus more on how various rhythmic patterns work together in short repeating sections,\(^1\) analyses of more traditional repertoires favour developmental aspects. My interest here is in the former, particularly in relation to how interactions

\(^1\) See, for example, Walser 1995, Butler 2006, and Danielsen 2006.
between the pountchak pattern and other rhythmic patterns influence our bodily experience of the music.

In chapter 5, I discuss how the integration of body movement and dance in approaches to rhythm challenges traditional views of rhythm perception. I also discuss the term “groove.” In chapter 6, I present analyses of rhythmic elements in selected dance tracks in order to evaluate various musical parameters with regard to how they interact with the basic pountchak pattern and how they might evoke body movement.
Chapter 5:
Introduction to the analysis of rhythm

Approaching the complex topic of rhythm through the lens of body movement and dance raises questions that have been largely absent in previous research. Electronic dance music introduces several new questions as well in this regard. How is rhythmic structure perceived by a moving body? What is the connection between the notational properties of measures, beats, and subdivisions and the experience of music while dancing? And in a study of grooves in relation to movement, which musical events should be examined?

An approach to the study of rhythm

Syntax/Process

Within musicology, a large share of research into rhythm is closely linked to music theory that engages best with questions of musical structure and syntax. Grouping, rhythmic layers, and meter are recurrent issues in this type of rhythm-related studies, which typically deals with written scores.\(^2\) In the case of material that was not originally notated, scholars in ethnomusicology or popular music studies are still inclined to transcribe the sounding music when addressing questions of structure and syntax.\(^3\)

Within fields of research devoted specifically to the perception of rhythm, attention has also been devoted to processual or performative aspects. Rhythmic structures are never performed exactly as they are notated, after all, and it is through these performative variations that the expressivity and vitality of the music emerges. Thus process-oriented rhythm studies typically focus upon performances, or music as recorded sound, and take careful note of deviations (usually from notated material or from an implied common pulse) or other interactions among musicians, listeners, and the sounding music. “Systematic variations,”\(^4\) “expressive timing,”\(^5\) “participatory

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\(^3\) Mark Butler’s study of rhythm and meter in electronic dance music is a typical example of a study focused primarily on musical syntax; other examples include Nketia 1974, Arom 1991 [1985], and Temperley 2000 (African music); and Covach & Boone 1997, Temperley 1999, and Brackett 2008 (popular music).

\(^4\) The term “SYstematic VARiations” (SYVAR) was coined by the Swedish research group in Uppsala led by Bengtsson; see Bengtsson et al. 1969 (in Swedish) or Waadeland 2000:42ff for a brief overview and discussions (in English).
discrepancies,”⁵ and “microrhythmic relationships”⁶ are all somewhat comparable terms for the issues in question, including, for example, the way that “early” or “late” realizations of certain sounds can contribute to the experience of a groove or a swing.

Tellef Kvifte argues in an article about grooves and “syntax/process dialectics” that “processual description [of rhythmic events] must be understood in relation to syntax.”⁷ The rhythm studies associated with Bengtsson (SYVAR) and Clarke (expressive timing) rely upon standard musical notation to represent the syntactic norm, while syntax has a looser relationship to Keil’s participatory discrepancies.⁸ In fact, when music performances or recorded music with no notation are discussed, it is by no means clear what constitutes a perceived reference structure.⁹

THE ACTIVATION OF STRUCTURAL SCHEMES

Anne Danielsen writes that a fundamental premise for her analytical work concerning groove-based music is that “‘rhythm’ comprises an interaction between non-sounding schemes or reference structures (used by the performer/listener in a structural capacity) and actual sounding rhythmic events.”¹⁰ She points to sounding events “as the basis for the non-sounding schemes activated in the listener.”¹¹ Accepting these premises wholeheartedly, I am still left to wonder how this process might be described in relation to body movement in a dance-oriented context. In a club, do non-sounding schemes or reference structures remain active in listeners who are not moving their bodies, or does their stillness instead imply that they are not really “listening”? In her study of funk grooves, Danielsen describes how “dancing, handclapping, and stomping are, as a rule, externalizations of this internal beat.”¹² But do overt body movements like head nodding or foot tapping represent an activation of structural schemes in a context where dancing is

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⁵ “Expressive timing” refers mainly to the rhythm research of Eric F. Clarke (see, for example, Clarke 1985, 1989, and 1999:489–494, and Windsor & Clarke 1997).
⁷ The term “microrhythmic relationships” refers primarily to the research project that my Ph.D. study is affiliated with, and to Anne Danielsen’s studies of funk, hip-hop, and neo soul. Related terms include “sub-syntactical microrhythmic variations” (Butterfield 2006), “expressive microtiming” (Iyer 1998 and 2002), and “expressive microrhythm” (Benadon 2006).
⁸ Kvifte 2004:54.
⁹ See discussion in Kvifte 2004 and Butterfield 2006.
¹⁰ This issue is also related, obviously, to how notated music is perceived when performed (or recorded).
¹¹ Danielsen forthcoming 2010. This use of “rhythm” differs from its application to (non-sounding) musical structure alone.
¹² Ibid.
¹³ Danielsen 2006:55.
already the main focus? Does our “internal beat” in fact then depend on body movement? Or does “music listening” relate to body movement to such an extent that without movement, there is no participation in music listening, and without participation, there is no “internal beat”? If body movements activate structural schemes, how does this influence an understanding of rhythm perception? What perspectives does the moving body bring to an analysis of rhythm? In addressing these questions, I will begin by discussing a perspective that is prevalent in the study of rhythm within musicology and that has some influence upon research on music perception in other fields as well.

THE METRIC PERSPECTIVE

Meter or metric structures are of course relevant to all rhythmic music, but much music analysis concerned with rhythm is based on the assumption that music is experienced in conjunction with an understanding of those structures. This approach therefore emphasizes the ways we interpret music in relation to its notational counterparts – how listeners find the “correct” time signature, how the music is grouped into measures, how we connect the exact durations of various perceived sounds to notational categories, and so on. This perspective in turn influences the various theoretical models that have been proposed with regard to questions about how we respond to rhythm in music. The issue of whether this perspective needs to be modified in relation to musics from oral traditions seldom arises in these studies.

Notational categories such as “measures,” “beats,” and “subdivisions” may seem relevant according to how we experience various cycles and pulses in music. The beat is probably the most recognized category among both musicians and non-musicians, while the overarching framework of measures and a time signature is generally more vague and variable in its significance. Kvifte writes: “Meter is not ‘in the music,’ but in the mind. That is . . . also obvious from the fact that metrical signs in written music – time signatures and barlines – are not represented by distinctly audible features in the music

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14 It is, of course, possible to listen to music in a club as one would listen to it in those contexts where it is not appropriate to move while listening, but this is not typical.

barlines can only be inferred, not directly perceived.” What is “in the mind” is likely to depend upon how one listens, and when one responds to rhythm in music with body movements, the experience of meter will be connected directly to the activity of moving.

The transition from analytical approaches based upon Western classical music to questions concerning rhythm in an electronic dance music context can be problematic. With a formal education in music theory that focuses on meter-related problems, musicologists are naturally biased towards aspects of the latter and develop interests that only partly engage context. So, for example, Mark Butler suggests with regard to electronic dance music tracks that “metrically ambiguous sections encourage the listener to construe the meter actively rather than absorb metrical information passively.” Metrically ambiguous sections, however, are exceptions in electronic dance music on the overall, and most of the sections Butler discusses occur at the beginnings of tracks rather than at any climactic moments within them. Yet clubgoers still do not respond passively, no matter how straightforward the basic beat or time signature is. How to move to the music is the primary concern on the dancefloor, and “construing the meter” may not factor this unless it directly impacts movement. Musical sections that may seem simplistic when viewed from a perspective that elevates metric ambiguity are no less effective for moving bodies. Metric relations are certainly important to illuminating central topics in a rhythmic analysis, but a biased focus can also lead to somewhat misguided conclusions about what is really important in a given musical context.

THE PERCEPTION OF THE LEVEL OF MEASURE IN ELECTRONIC DANCE MUSIC

According to the paradigm of Western classical music theory, metrical relations are communicated first and foremost through variations in dynamics (strong and weak beats), and it is the responsibility of the performer to make this happen. In popular music this responsibility is not as clearly pronounced, but fixed periods or cycles of four beats (a time signature of 4/4) are manifested through features such as an extra emphasis on the first beat (the “one”), chord shifts, distinctive rhythmic patterns, or the phrase lengths of

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16 Blom & Kvifte 1986:495. This article consists of a discussion between these scholars about how meter may be perceived differently (by participants of the same culture). Blom’s interest in approaching meter through dancing parallels my own elevation of body movements in music analysis. See also page 26.

17 Butler 2006:137; emphasis in the original.

18 See further Iyer’s critique of Butler in Iyer 2008:272.

19 See Clarke 1985.
vocal lines or various instruments. Though there are many examples in popular music in general where the 4/4 cycle is obscured or ambiguous, this is in fact even more common in electronic dance music tracks. Different rhythmic patterns occurring simultaneously may form cyclic units of two, four, eight, sixteen, or even thirty-two beats, and give ambiguous indications of measure lengths. Daft Punk’s track *Phœnix* (1996) starts out with a series of thirty-two identical solitary bass drum sounds. Should this be regarded as 4/4, or maybe 1/4 or 32/4? The track continues with a hi-hat sound placed evenly between the bass drum sounds (the poumtchak pattern) for another thirty-two beats, and both sounds are equally stressed (boosted) in their respective frequency areas. Would the meter be best accounted for as 2/8 or even 64/8? Throughout the rest of the track, various patterns of percussive sounds, synthesizer themes and a bass line alternately imply cycles of 2/4, 4/4, and 8/4 (or 4/8, 8/8 and 16/8), and although the genre as such indicates 4/4, one cannot determine the ultimate time signature.

Dancers in a club will respond to repetitions of events as long as they are suitable for dance moves, but they will probably also have certain expectations (based on prior experience) about changes in the music after four, eight, sixteen, or thirty-two beats. Often, in fact, “relevant” cycles will depend upon individual interpretation, according to accents that might even be unintended. The most common time signature used in production (in sequencer programs) is 4/4, and most examples of transcription are also in 4/4. But there is often only a vague connection between what is perceived and the notated “measure” in this genre of music.

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21 A 4/4 time signature with snare drum sounds on beats 2 and 4 is the most common metrical relation in popular music. However, some 4/4 songs clearly imply other time signatures, such as the Bee Gees, *Stayin’ Alive* (1977), or the Talking Heads, *Wild Wild Life* (1986), both of which imply 2/4 time.

22 See Butler 2006, chapter 5, for a discussion of multimeasure patterning in electronic dance music, and Moore 2001:41ff for a discussion on hypermetric levels in popular music.

23 Assumptions regarding cycle length will influence the listening process. With no written scores, electronic dance music skirts the issue of a typical time signature, but a producer that constantly uses 4/4 on his/her sequencer (usually the default setting) may be influenced in terms of how cycles are determined. Furthermore, cycles of a certain length early in a track will determine listeners’ expectations for the remainder of the track, and certain expectations are prevalent in the culture – for example, regarding duple meters.

24 See, for example, Hawkins 2003:96 and Butler 2006, although Butler uses other time signatures to indicate more complex variations of metric relations.
THE BEAT LEVEL OR SENSATION OF PULSE

The “beat level,” or perceived pulse, is generally obvious in electronic dance music, at least in house music tracks.\(^{25}\) It can typically be located in just a few seconds. Its definitive sounding rhythmic events might be, for example, repeating bass drum sounds that assert a main referent level or reference structure for the listener.\(^{26}\)

While it may seem straightforward to relate sounding events organized according to an isochronous pulse to notational categories and then analyze them as such, body movements and the actual experience of pulse complicate this process. Most experiments related to the perception of pulse in music have been conducted with participants tapping their fingers. Other body movements seldom arise. Finger tapping experiments, obviously, produce discrete, quantifiable entries and assume onset times and durations (“inter-onset-intervals”) to be the essential events with regard to pulse sensations. If one’s ultimate intention is to project a framework of notational categories onto a perceptual experience of a pulse, this pulse must be precisely mapped, but its actual sound, and the movement it evokes, will be dismissed. Differences in attack, for example, or timbral development do not factor in.\(^{27}\) These qualities, however, are in fact very relevant to the experience of rhythm in electronic dance music – discrete bass drum sounds often have swiftly descending pitch movements that shape dancers’ corresponding body movements. In other genres of popular music, such a variation in drum sound can be even more significant. Bass drum sounds in hip-hop tracks sometimes feature slower descending pitch movements that influence corporeal response in a very different way, even to the extent that the pulse itself becomes elusive.\(^{28}\) Notation cannot express these differences, at least as it is commonly brought to bear upon Western musics.

Sometimes multiple sounds may work together to evoke body movements and pulse sensations. Basslines can blend with a bass drum sound so that the bass’s pitch sensation and the descending pitch movement in the bass drum combine.\(^ {29}\) Moreover, two

\(^{25}\) I use the term “basic beat” to indicate the rhythmic pattern that is fundamental to the track in question. The poutchak pattern is the “basic beat” in many electronic dance music tracks, and the four-to-the-floor bass drum pattern coincides with the beat level, in the sense of its “tactus,” “pulse,” or “internal beat.”

\(^{26}\) Butler discusses various exceptions to this unambiguous beat level; see Butler 2006:124–155.

\(^{27}\) See, for example, Wright 2008 for a discussion of perceptual attack time.

\(^{28}\) The two music videos referred to in note 16 in part II (chap. 3) reveal divergent movements in hip-hop and dance culture that may point to differences in sound qualities as well. I discuss descending pitch movements in bass drum sounds further in chapter 8.

\(^{29}\) See, for example, Basement Jaxx, Rendez-vu (1999), and Basement Jaxx’s remix of Missy Elliott’s 4 My People (2002).
adjacent sounds can group together to form the pulse sensation.\textsuperscript{30} In an article on microrhythm and pulse in contemporary groove-based music, Danielsen discusses various models for pulse perception and demonstrates their challenges using D’Angelo’s \textit{Left and Right} from 2000. In this track the rhythmic reference structure is destabilized by various sound events that pull the listener in different directions, presenting diverging pulse points. A “metronome model” of pulse that “presupposes that there is one dominant or correct placement of the internal beat and, moreover, that the beats should be equally spaced”\textsuperscript{31} is simply not adequate to the occasion. She also considers a pulse model in which the time referent shifts to a new position in the middle of each basic unit. In addition to the metronome model and this “local time shift model,” however, Danielsen proposes a third alternative, in which the different sound events involved in the pulse merge and actually extend it. Among the ramifications of this “beat bin model”\textsuperscript{32} is its relevance to sounds that activate body movements which in turn shape our perceived pulse. Kvifte describes the analytical implications of the beat bin by referring to the different metaphors that might apply to pulse situations: “Notation and syntactical description imply a ‘points in time’ metaphor, while most description of rhythmical experience and process-oriented descriptions points to a ‘wheel’-metaphor or a ‘wave’-metaphor.”\textsuperscript{33} Indeed, a wave metaphor would appear to best capture the interaction between body movements and a pulse sensation linked to incoming sounds. In figure 5.1 below, a bass drum sound with a stretched descending pitch movement in a slow tempo is illustrated with a curved waveform (A), while a short bass drum sound with a quick descending pitch movement in a faster tempo is illustrated with a more pointed waveform (B). And when more than one sound is involved in the pulse sensation, the shape of the curve could be stretched to include several events, if such a movement pattern were indicated (C).

\textsuperscript{30} For example, Cassius, \textit{Feeling for You} (1999).

\textsuperscript{31} Danielsen forthcoming 2010.

\textsuperscript{32} The term was suggested by Eric F. Clarke.

\textsuperscript{33} Kvifte 2004:62.
Given the inadequacy, then, of representing pulse as the sensation of specific points in time, I have decided to use a wave metaphor to describe the pulse of the music, since this better represents the way we perceive and respond to it. The peak of the wave curves (like their low point) might then also include divergent sounds or combinations of sounds. Along these lines I favour downbeat and upbeat (instead of beat and offbeat) in this study to emphasize a connection with body movement but also to stress the structural equality of the two beats when considered in relation to body movement. When an upbeat hi-hat pattern is introduced independently of the bass drum sound, its upward pull may be stronger than any downward pull. When it is present, the bass drum sound is a very dominant and controlling element in terms of pulse sensation that corresponds well with body movements indicating pulse. Still, we must allow for the upbeat as well when considering music’s ability to activate movement in relation to the beat level.

THE PERCEPTION OF SUBDIVISIONS

Despite these complexities regarding the sensation of pulse in electronic dance music, a solid beat foundation is generally obvious and, in fact characteristic of the genre. The
relevant subdivisions of this basic beat are much less obvious, however, and in many ways more various. Dancers usually do not try to count subdivisions or otherwise suss out the metrical relations of the music, but various faster pulses and counterrhythms can be reflected in dance movements.

In his 2007 article “Categories and Timing: On the Perception of Meter,” Kvifte discusses “common fast pulse theories,” that address the human perceptual facility for identifying the fastest pulse in an incoming musical signal. This “density referent” allows a listener to begin with, for example, sixteenth notes and then create a hierarchy of notational durations atop it. In cases of non-isochronous metric structures, a lower isochronous level must still be identified. Kvifte points to body movements as a potential guide in this case:

It is possible to entrain your body movements to the music; that you, in your body, can experience a common movement with the music and other possible participants. Such kinds of movements are, in my opinion, more likely candidates for referent level units than a fast clock pulse without any clear location in the body. One argument in favor of this view is the empirical evidence of the close relationship between observable body movement patterns (as in dance) and metrical patterns in music.36

Kvifte’s “common slow pulse” derives from body movements that are central to the perceptual process and is especially useful with regard to non-isochronous structures. Instead of dividing a metric cycle into twelve equal beats, the culturally initiated moving body might recognize varying durations within the cycle.

![Figure 5.2: From America by Leonard Bernstein.](image)

For example, the opening of Bernstein’s America would be divided into twelve eighths using the common fast pulse – 3+3+2+2+2 (1-2-3+1-2-3+1-2+1-2+1-2)38 – or into three or five corresponding movements using a “common slow pulse” – short+short+long or long+long+short+short+short.

Kvifte’s slow pulse also informs the way we might perceive subdivisions in electronic dance music in relation to a vertical movement pattern. Rhythmic patterns at various metrical sublevels (eighths, sixteenths, quarter triplets, eighth triplets) are

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36 Kvifte 2007:76.
37 Copied from Kvifte 2007:68.
probably not perceived as countable faster pulses but in how they connect to the movements; sometimes they can function primarily in relation to the basic beat and help to shape its movement pattern; other times they can function more independently. Given that the tempo of house music tracks is usually between 120 and 135 bpm, isochronous pulses that are faster than the poumchak pattern seldom afford any head nodding or upper-body movements (at least not for any length of time), but they can affect other body parts and inspire, for example, various hand movements.

RHYTHM IN THE PRODUCTION OF ELECTRONIC DANCE MUSIC

The preceding discussion of metrical relations in electronic dance music would probably strike a producer as odd. Because sequencer programs are constructed on the basis of a metric grid whereby various notational categories are present at many points in a track’s production, a producer likely assumes that there is an obvious connection between the sounding music and its “notational” counterpart. However, he or she is probably also very aware of the profound difference between being exactly on and slightly off of the beat, and of the importance of testing out how the sounds interact in a way that best affords dancing.

When working with a dance track on a digital audio workstation, either with MIDI events or audio, producers always deal with the issue of whether or how to quantize the notes or sounds.39 “Groove templates” allow for this quantization according to certain pre-programmed variables for timing and velocity. Newer programs are also able to analyze and correct the beats in audio recordings using a metric grid. Different producers have different techniques, which they see as definitive of their tracks.40

On some early drum machines and external sequencers (for example, the Roland TR-808 drum machine), the only option was to program the sounds to specific note values. This limitation gave rise to the “machine-precise” rhythmic foundation of many Chicago house tracks. Today’s sequencer programs take advantage of a much more discriminating grid. Each beat (in a 4/4 meter) will be made up of a large number of tiny subdivisions (240, 480, or even 960), and the entry of a sound can be placed anywhere within this beat. Programming (step-write recording), real-time recording of MIDI or

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39 To quantize the recorded entries, one “corrects” them according to a specific note value.
audio events, the use of live samples, and the editing of previous entries together offer almost unlimited possibilities to the producer.

Nevertheless, a “machine-precise” rhythmic foundation remains an ideal in much electronic dance music. The upbeat hi-hat sound might be moved a few milliseconds early,\textsuperscript{41} or pick-ups might be nudged forward to find the “perfect” spot for them (as opposed to the obvious spot), but generally, such deviations will be few and small, especially compared to other popular music genres, where, for example, an obviously early or late snare drum in the “backbeat pattern” defines a whole style.

A discussion of groove

In the next chapter I present analyses of various grooves, but the term itself merits some introductory discussion. To my knowledge it has no commonly accepted definition, and few scholars have even tried to articulate one (though many use it nevertheless).\textsuperscript{42}

THE GROOVE

As a noun, groove generally indicates a certain part of an overall musical sound, mix, or arrangement. Allan Moore places the groove in what is “laid down by the bass and drum kit.”\textsuperscript{43} This is not meant to be a definition, of course, but it does reveal a common point of view about the instruments most relevant to the concept. Vijay Iyer suggests that the groove “might be described (but not defined) as an isochronous pulse that is established collectively by an interlocking composite of rhythmic entities.”\textsuperscript{44} Though the groove’s relationship to the isochronous pulse seems rather vague in Iyer’s description, it certainly arises from some set of rhythmic components. But which ones?

Timothy S. Hughes cautions, “A figure is not a groove unless it is \textit{designed to be repeated}.”\textsuperscript{45} The expectations created by repetition are vital in this respect.\textsuperscript{46} Solitary rhythmic events might affect the groove but do not contribute to any recognizable structure for it.

\textsuperscript{41} According to producers I have talked to, this can result in an extra push forward.
\textsuperscript{42} Charles Keil and Steven Feld’s book \textit{Music Grooves} (1994) offers several discussions on the topic.
\textsuperscript{43} Moore 2001:34.
\textsuperscript{44} Iyer 1998 (from an online version of his Ph.D. dissertation; page numbers are not available).
\textsuperscript{45} Hughes 2003:14; emphasis in the original.
\textsuperscript{46} See Danielsen 2006, chapter 8, and Hawkins 2008 for discussions of repetition.
Furthermore, does the groove in fact have to be established collectively, or can a single instrument (or sound source) supply it? When an unaccompanied pountchak pattern booms out of the speakers in a club from a drum machine, and the crowd starts moving, is this a groove? This question promptly raises the issue of the aesthetic qualities often linked to the term. Referring to Charles Keil and Steven Feld’s 1994 book *Music Grooves*, Iyer writes, “Groove involves an emphasis on the process of music-making, rather than on syntax . . . The focus is less on coherence and the notes themselves, and more on spontaneity and *how* those notes are played.”47 Like Keil and Feld, Iyer favours for his vision of groove the interaction of a group of musicians playing live, and the inevitable “miniscule, subtle microtiming deviations from rigid regularity” that follows.48

Two further questions arise here: Are grooves only to be related to live musicians? And do grooves require deviations from rigid regularity? A recording of live musicians undeniably preserves groove relations, so the first question is less concerned with the actual presence of musicians than with some sense that the music is being played “live,” either in concert or on a recording. But surely music production techniques like multitrack recording, overdubbing, quantization, editing, and the use of drum machines, sequencers, and other types of electronic music equipment are also tools for the production of grooves, at least when they are used in a “groove”-preserving manner.

This leads to the second question. The performance ideal of playing as “tight” as possible according to the studio’s “click track” arose in many pop genres during the 1970s, especially around disco music.49 During the 1980s, sequencers and drum machines maximized this “tightness” while creating the expectations later to surround electronic dance music and its body movement. The use of electronic equipment is especially efficient for producing the machine-precise timing that is seen as appropriate for this genre. But the very same equipment and techniques are also used in divergent genres with very different ideals of “tightness.” Ultimately, while deviations from rigid regularity are certainly central to many genres of groove-based music,50 I do not see them as a prerequisite or universal quality of a groove.

In this study, I discuss grooves chiefly in connection to body movement and filter my sense of a groove’s vital musical elements through the demands of the dancefloor. As

47 Iyer 1998 (from an online version of a Ph.D. dissertation, page numbers not available), emphasis in the original.
48 Ibid.
I mentioned in chapter 4, there is theoretical support for my hypothesis that a pounatchak pattern facilitates and even activates a vertical movement pattern. However, while this type of basic beat often drives a basic movement pattern, other sounds, appearing between the downbeats and upbeats or atop them, shape this pattern or even suggest alternatives to it (various body parts can move simultaneously to different pulses). Thus all recurring sounds that take part in this process should be considered elements of the groove.

**MUSIC GROOVES**

When “groove” is used as a verb, an adjective, or an adverb, it has an aesthetic connotation. In this incarnation of it, several scholars have expressed similar notions regarding qualities related to grooves, in terms of both how they are reacted to and how they are produced.

Carl Haakon Waadeland discusses the quality of “swing,” a term typically associated with jazz music (both the “swing rhythm” and “swing jazz” as a genre), that has definite parallels to “groove”: “Swing is conceived as a quality of music performance, related to a process through which the musicians, both individually and in an interactive context of playing together, make a musical phrase – a rhythm or a melody – ‘come alive’ by creating a performance that in varying degrees involves playing ‘against’ a ‘fixed pulse.’”\(^{51}\) Turning to the music listener and the experience of swing, he continues:

> When exposed to music that we perceive as swinging, we often want to tap our foot, clap our hands, move our body, or, perhaps, dance to the music. In this way we experience how swinging and “groovy” music initializes “energy” and generates movements in our body, thus, various body movements may be seen as a consequence of an experience of swing.\(^ {52}\)

Waadeland then extends this type of experience to comprise Western classical music (Bach, Stravinsky, a Vienna waltz), Brazilian samba, and Norwegian folk music, where every performance must swing “in its own specific way.”\(^ {53}\)

These perspectives on how swing is produced and received are in line with Keil’s notions of swing and groove: “It is the little discrepancies within a jazz drummer’s beat, between bass and drums, between rhythm section and soloist, that create ‘swing’ and

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\(^{51}\) Waadeland 2001:23; emphasis in the original.

\(^{52}\) Loc. cit.; emphasis in the original.

\(^{53}\) Ibid.,24; emphasis in the original.
invite us to participate.” Keil also argues that participatory discrepancies are present through the use of various types of sound production equipment and effects, including “space, echo, reverb, digital delay, double-tracking.” I agree that such effects can introduce important dimensions to a track, but for groove-based popular music, entry points at precise positions, echo- or delay-effects that strengthen exact metrical subdivisions, and the absence of any reverb are just as important.

“Groove” or “groovy” as a verb or an adjective/adverb is used to express a specific experience with music. The nature of these experiences may not be universal, but in line with Waadeland, I will venture one generalization: the music grooves if body movements are activated by its rhythmic elements. How music is produced or played in order to activate movement varies according to specific cultural traditions to such an extent that the question becomes moot. The contributions of Keil, Iyer, and Waadeland, however profound, do not embrace all groove-based music. There are common features and similarities but also significant differences among the various genres. Why some people move to a certain type of music and others do not reflects perceptual learning processes; the kinds of music to which they were previously exposed. Individual body movements and movement patterns are shaped according to the style of dance music in question, and familiar genres usually work better than unfamiliar ones.

In relation to the perception of timing variations in music, Justin London writes, “Highly skilled listeners may have hundreds of specific timing patterns at their command and can reflexively invoke the appropriate meter as the music demands.” With regard to the dancefloor, we might rewrite London’s observation to emphasize that highly skilled listeners who are able to move their bodies with the music may have hundreds of specific movement patterns at their command and can reflexively invoke the appropriate movement as the music demands.

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54 Keil 1987:277. In the version of the article printed in Keil & Feld 1994, “swing” has been replaced with “the groove.” He has also added “between hands and feet” before “within a jazz drummer’s beat” to clarify the concept.
56 This resonates with Guy Madison’s operational definition of the experience of “groove” in music: “Wanting to move some part of the body in relation to some aspects of the sound pattern” (Madison 2006:201). He conducted research on groove experience in Sweden, where there is no word for “groove.” Madison translated the word to rörelsesskapande, which means “creating/producing movements.”
57 See page 127.
Summary

In this chapter I have discussed some of the ways in which a focus on body movement and electronic dance music impacts the study of rhythm in music. In rhythm research that aims to deal with processual or performative aspects, the scholar must first clarify the musical syntax that gives rise to our expectations regarding rhythmic events. When we listen to music (without written scores), reference structures in the form of non-sounding schemes are activated within us by the sounding rhythmic events. It is likely that the connection between reference structures and corresponding movements is particularly strong in contextual settings that centre on dancing and body movement, which raises certain basic questions about the relationship between body movements and rhythmic structures in music.

In this case the (Western) conceit of measures strung together according to a specific time signature is less relevant; in fact, electronic dance music tracks often superimpose patterns of various lengths that blur the regular disposition of measures. In relation to that culture, it would appear to be more relevant to invoke “cycles” that might be meaningful in relation to moving/dancing.

In addition, the beat level or sensation of pulse in electronic dance music is uniquely obvious and straightforward; for example, the basic beat of the poumtchak pattern is generally programmed with “machine-precise” timing. The relationship between a notated beat level and the sensation of pulse, however, may be more problematic, especially when considering the link between aspects of the sound and corresponding body movements (for example, the influence of a descending pitch movement in a bass drum sound on body movement and, consequently, on the sensation of pulse). I apply a wave metaphor to the perceived pulse sensation that best resonates with body movement in this respect. Finally, subdivisions of the beat level also contribute to how patterns activate body movements.

The question of which musical events are relevant to an analysis of grooves becomes clear when they are viewed in relation to their effect upon body movements. Rhythmic events that are repeated are central to the recognizable structures that form the basis for movement patterns. The ideal of machine-precise rhythmic timing in electronic dance music challenges popular notions in rhythm research related to the foundational nature of microtemporal discrepancies for grooves. Live musicians and subtle
microtiming are in fact not especially relevant in the production of grooves in electronic dance music, particularly in comparison to recording techniques, rhythm programming, and sound design. I consider the activation of (rhythmic) body movements to be a central criterion when groove is used to describe aesthetic qualities. How the music is produced or played to activate this movement varies according to different musical genres.
Chapter 6:

Analysis of rhythm in electronic dance music

In this chapter I try to identify and describe some essential rhythmic elements in electronic dance music and consider them in relation to their possible effects on movement. The poumtchak pattern that I have chosen as a focal point for this study is not present in all tracks or genres of electronic dance music, but if one pattern had to be chosen as a unifying rhythmic pattern (at least for the large subgenre of house music), it would be this one. Thus my analyses of rhythm here will primarily focus on tracks where the poumtchak pattern is present. Aspects of sound are also important to the ways in which body movements are activated by this music, and I will deal with that issue separately.

I start with elements that are part of (or closely related to) the poumtchak pattern itself and then move on to elements that are more distant from it before finally considering the totality of a given groove. Most of these elements presented are central to the music culture in question, but I have also chosen certain musical examples for what they might show us rather than their value as an archetype of the style or their recognisability within the culture. I will emphasise British and French house music from the second half of the 1990s but present examples from elsewhere as well.

Introduction

I will begin by describing and explain the methodological tools that I will apply to the musical material.

THE PRESENTATION OF THE ANALYTICAL WORK

The analyses will primarily follow this format:

1. Choice of material. I have chosen excerpts from tracks that illuminate the specific element or elements in question. I will introduce them with year of release and tempo (in beats per minute = bpm) and explain why the chosen excerpt is a suitable example of the element or elements in question. I will also describe the excerpt as necessary.
2. **Visual representations.** I have used a computer-based sound analysis program and examined various parameter settings for the analyses regarding both closer investigation of the elements in question and an understandable sonogram presentation. I draw upon transcribed notational representations and amplitude representations as well.

3. **Determining salient sounds.** I will use the term “salient sounds” to refer to the sounds in the music that are especially significant for capturing attention. According to Jones’s theory of dynamic attending presented in chapter 4, so-called critical points in the music determine how we attend to it. The sounds of the poutchak pattern work as such critical points in electronic dance music. When the music starts, the alternating bass drum and hi-hat establish expectations for later onsets of the same sounds at specific points in time (critical points). Jones uses the concept of entrainment to explain how a “driving rhythm” in the music initiates oscillations in our attentiveness towards these critical points. It is likely that oscillations connected directly to muscle activations also occur. However, all of this turns on the individual sound’s ability to capture our attention. An upbeat hi-hat pattern will constitute a critical point if it is sufficiently “present” in the overall mix. But if its volume is too low, or another instrument in the same frequency area masks it, this hi-hat pattern may not perform a significant role in the perceptual process. According to Gibson’s theories, presented in chapter 4, attention processes are also guided by “afforded actions.” Sounds that are connected to a movement pattern therefore capture our attention more effectively than sounds that are not. However, sounds can be important in different ways and to different degrees, contributing through subtle variations, for example. I will discuss degrees of “salience” to address these distinctions, and I will also demonstrate how changes in sounds or the mix can influence it. My analytical approach here has been to combine various listening strategies (especially concerning attentional focus) with an active engagement with movement and the contributions of various sounds to it.

4. **Suggested movement curves.** Based on the salient sounds, I plot movement curves upon the sonograms to illustrate my interpretations of possible body movement patterns. These are only two-dimensional vertical renderings of the potential for movement in the

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59 See my introduction to the use of sonograms on page 10.
60 Most examples will be presented without barlines or a specific time signature, because the rhythmic patterns in the excerpts often imply various meters. Tracks that clearly communicate a 4/4 meter will in some cases be presented with this time signature as well as barlines.
61 Jones 2004:50.
musical excerpt in relation to the topics that are being discussed. The movement curves are intended to illustrate a simple vertical movement pattern and various potential modifications that can be realized in many different ways. They do not illustrate actual movements or measurable durations of those movements. While illustrating the connection between sounds in the music and possible movements, the lengths of my movement curves may vary due to the visual renderings of the sounds in either the sonograms or the notational representations. However, differences in lengths are also used in certain illustrations to portray changes in force or emphasis. I also use variations in the width of the curves to indicate potential longer durations at certain points, and these may also be experienced as changes in force or emphasis. Finally, I will indicate potential tension and friction in our experience of the groove through breaks or interruptions in the movement curves.

The aim of these analyses is not to try to identify the “correct” movement for a specific groove but to indicate how various musical elements influence the movement impulse within the music. A few terms will be central to how the music may be experienced by someone who is moving to it:

**Drive**: The experience of being continuously pushed forward within the movement pattern. The “drive” recalls Jones’s entrainment model where an external (“driving”) rhythm in the music impacts an internal (“driven”) bodily rhythm (in our distribution of attentional energy or the activation of muscle commands). The salient sounds in a basic beat (the bass drum and hi-hat sounds of the poumtchak pattern, for example) facilitate up-and-down movements and even push the body forward through these movements. Other sounds contribute to this as well.

**Emphasis**: The experience of extra weight or energy in relation to certain movements upward or downward. When the salience of a set of specific points in a rhythmic pattern is increased, for example, through accentuation, an added sound, or an anacrusis/pick up, it is assumed that these points will cause greater intensity in their corresponding movement. This assumption draws upon the theories of Lakoff and Johnson presented in

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62 See, for example, figure 6.9. Changes in force or emphasis may also result in actual variations of lengths in relation to the other movements of a pattern, but these aspects of the realization of movement curves will not be discussed in any detail.
63 See, for example, figure 6.13.
64 See, for example, figure 6.43.
chapter 4 that link previous sensorimotor experiences (up/down and, similarly, more/less) to the triggering of motor activity. Extra emphasis is also closely connected to an experience of drive.

**Tension:** *The experience of a disturbance to the basic movement pattern.* The “driving” rhythm of a less salient but also *conflicting* pattern can influence the movement pattern driven by the poumtchak pattern. The impulses conveyed by the conflicting pattern then bring a constructive tension to our experience of the groove.

**Expectation:** *The experience of being prepared for or anticipating a specific occurrence.* In traditional music analysis certain chord progressions create expectations for an upcoming event. Similarly, in electronic dance music, build-ups or various rhythmic events create expectations for an upcoming event or a particular development. These expectations presumably influence our movements, causing more intensity or emphasis to be brought to certain parts of the track overall or certain points in its rhythmic structure.

**EXAMPLE OF THE PROCEDURE IN RELATION TO ONE SPECIFIC TRACK**

1. **Choice of material.** The track *Phœnix* (1996; tempo 127 bpm) by Daft Punk has a section from 0:15 to 0:30 that consists of the poumtchak pattern only, which makes the essential features of this element perfectly clear.

2. **Visual representations.**

   ![Figure 6.1](image)
   
   Figure 6.1: Notational representation of Daft Punk’s *Phœnix*, 0:15–0:19.

   ![Figure 6.2](image)
   
   Figure 6.2: Sonogram (with amplitude representation) of Daft Punk’s *Phœnix*, 0:15–0:19.
3. Salient sounds. Neither the bass drum sound in the lower part of the sonogram nor the hi-hat sound in the upper part is disturbed by any other sounds. This is the Daft Punk track from the survey presented in chapter 3, and it was especially effective in activating a vertical movement pattern that corresponded with the poumtchak pattern in the music. Thus these sounds appear to capture a listener’s attention in an unambiguous way. The bass drum carries more literal energy, as is evident from the amplitude presentation beneath the sonogram, and it therefore captures our attention first. However, the hi-hat is alone in its high-frequency area and has its own specific role in the formation of the movement pattern, so it provides significant attention points as well.


![Figure 6.3: Notational representation with suggested movement curve for Daft Punk’s Phoenix, 0:15–0:19.](image)

![Figure 6.4: Sonogram with suggested movement curve for Daft Punk’s Phoenix, 0:15–0:19.](image)

As discussed in chapter 4, a culturally validated notion of musical verticality appears to link the alternation of sounds with high- and low-frequency content with certain kinds of body movements. These sounds naturally pull in opposite directions and thus cause the movement pattern proposed in the above figures. The poumtchak pattern forms the basic beat of this excerpt, and it is also the basic “driver” of the movement pattern. The movement curve displays no variations because this excerpt consists solely of an undisturbed poumtchak pattern.
In addition to the examples that will be treated in this way, I will introduce others as well to provide a more thorough discussion of the musical elements in question with comparisons to other relevant genres.

**Elements of the basic beat**

**THE BACKBEAT**

A British DJ who responded to my initial listener survey described the music he listened to as poum-tchak-\textit{clack}\-tchak, with the “\textit{clack}” being the snare drum on beats two and four.\textsuperscript{65} Countless house music tracks use a snare drum or similar sound on every second downbeat usually in tandem with a bass drum sound. This omnipresent bass drum sound seems to modify the typical backbeat emphasis of a rock song, producing a more insistent drive forward. The sound of the snare drum in a house track is usually lower in frequency range (less bright) than a rock snare drum, and sometimes it blends in altogether with the accompanying bass drum sound. Tracks without a bass drum on every second downbeat may still present a poumtchak pattern, but only if the different sound is not too different (some tracks have sounds that are difficult to categorize as either bass drum or snare drum). How specific qualities of a given sound influence a movement curve will be discussed further in chapter 8.\textsuperscript{66}

The backbeat in earlier genres

Disco tracks from the 1970s with the poumtchak pattern consistently have snare drum sounds or handclaps on every second downbeat, and this backbeat accentuation is more prominent there than it is in later electronic dance music tracks. Several tracks combine the upbeat hi-hat pattern with a more standard rock beat – that is, without a “four-to-the-floor” bass drum pattern. In the production of Chicago house tracks, handclap sounds frequently substitute for the snare drum sound, and tracks without any backbeat accentuation at all came and went as well.\textsuperscript{67}

\footnotesize{\textsuperscript{65} Facebook message received from Frank Cooper on 29.05.2007.  
\textsuperscript{66} See page 223.  
\textsuperscript{67} For example, Phuture, \textit{Acid Tracks}, 1987.}
Main examples: Hercules and Love Affair, *Blind (Frankie Knuckles Remix)*, and Basement Jaxx, *Fly Life*

a. *Blind (Frankie Knuckles Remix)* (2008; tempo 124 bpm) is a track by the New York DJ/producer Andy Butler’s project Hercules and Love Affair that is remixed by the legendary DJ Frankie Knuckles. Antony Hegarty (of Antony and the Johnsons) contributes with vocals on the track. It starts out with a basic beat by itself that consists of the pountchak pattern with an added snare drum sound on every second downbeat. A congas pattern enters after seventeen seconds and gradually more elements are added to the track.

b. The Basement Jaxx track *Fly Life* (1996; tempo 127 bpm) starts out with almost thirty seconds of a basic beat and a discreet noise/sound modulated by a moving low-pass filter. The basic beat has a handclap sound on every second downbeat.

While the snare drum sounds in the Hercules and Love Affair track (figure 6.7) blend in with the bass drum sounds, the handclaps from the Basement Jaxx track (figure 6.8) are...
more discrete. As salient sounds, however, they simply capitalize upon the bass drum sounds rather than act alone in any way.

My interpretation of the effect of these sounds reflects their perceived pull downward on every second downbeat. The snare drum sound on the Frankie Knuckles remix seems to add emphasis to this downbeat (represented by a deeper curve), whereas the handclaps on the Basement Jaxx track are more neutral or even slightly counteract the pull downward of the bass drum. In accordance with my discussions of verticality in music in chapter 4,\textsuperscript{68} this bright-sounding handclap may in fact conflict with the much lower bass drum sound and therefore slightly reduce the “weight” of those downbeats. However, the distinctions here are subtle since an added sound most likely will cause extra emphasis to the specific point in the rhythmic pattern.

Snare drum sounds or various other sounds emphasizing or altering every second downbeat are common resources towards producing constant variation of the basic beat (poumtchak pattern). However, the sonic balance of these sounds with the ongoing bass drum is very important. If the contrast is too great, the drive can be affected or even impaired; if it is too slight, the variation will have no real effect.

\textsuperscript{68} See page 134.
ANACRUSES (PICK-UPS) AND THE PRODUCTION OF DRIVE

Matthew W. Butterfield discusses the role of the anacruses in a groove’s drive. Employing Hasty’s analytical methods, he attempts to explain why various events are classified as anacruses, writing the following about the swing rhythms of jazz:

The flow of swing eighth notes generates offbeat anacrusis, directing attention toward the ensuing quarter-note beats. A powerful anacrusis emerges on beats two and four as a result of the drummer’s ride rhythm pattern, and this is often reinforced by the tendency of bass players to accent the backbeats and place chordal dissonance there. Consequently, the resulting projections are charged with energy because one is always expecting new beginnings—attention is always directed toward the next event via anacrusis, not the completion of the present event through continuation.

While I agree with Butterfield’s assumptions about the “vital drive” of swing, I am not sure he adequately explains how “the resulting projections are charged with energy.” Expectations of new beginnings can be aroused through the repetition of many different patterns and combinations, on the one hand, and similar rhythmic patterns can also lead to a markedly conclusive downbeat (depending on the preceding event and the duration of the sound on the downbeat). The energy produced by anacruses might become clearer if we introduce body movements into the discussion. How do anacruses influence a vertical movement pattern like head nodding or foot tapping? By directing our attention always to the next event, they might support the drive of the ongoing movement downward, which at the same time propels the overall movement pattern as well. When the movement downward is given extra emphasis, the following movement upward has to be slightly accelerated to synchronize with the music, which pushes the pattern forward. In relation to the pountchak pattern, various alternative or ornamental sounds can appear immediately before a downbeat to provide extra emphasis to it in a manner reminiscent of swing.

Main example: Shazz, Fallin’ In Love (PT. G Remix)
The track Fallin’ In Love (2001; tempo 127 bpm) by the French producer Shazz (Didier Delesalle), remixed by Paris DJ/producer DJ Gregory (Grégory Darsa), starts out with

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69 The term “anacrusis” is usually employed to label notes preceding the first downbeat in a measure. However, Butterfield uses the term in accordance with Hasty’s analytical method where he classifies events as “beginnings,” “continuations,” or “anacruses.” Thus the function of preceding or leading up to the coming event is vital, while the connection to the first beat of the measure is not. The term “pick-ups” is used similarly and I will use this term here succeeding the discussion of Butterfield’s work.

70 Butterfield 2006:[23] (reference to paragraph in online article).

71 See also Danielsen’s description of the B-section groove of Parliament’s Up for the Downstroke for an assessment of the effect of a similar rhythmic event (Danielsen 2006:119).
fifteen seconds of a basic beat. Part of this beat is a short sound that occurs right before the second, sixth, tenth, fourteenth (and so forth) downbeats.

Figure 6.11: Notational representation of Shazz, *Fallin’ In Love (PT. G Remix)*, 0:04–0:07, events in question circled.

The short sounds are in fact snare drum sounds without much brightness or loudness. While this beat cycle obviously differs from the ones before and after, it remains hard to discern the short sound from the succeeding sound, so it functions more as an anticipation of the beat than an independent salient sound. This in turn affects the movement curve.

Figure 6.12: Sonogram of Shazz, *Fallin’ In Love (PT. G Remix)*, 0:04–0:07, events in question circled.

Figure 6.13: Sonogram with suggested movement curve for Shazz, *Fallin’ In Love (PT. G Remix)*, 0:04–0:07.
Towards the second and sixth downbeat, the curve contains small breaks where the short sounds occur. These breaks reflect the extra “push” in the body movement. The short sounds might increase our expectations about the coming event, so a wider and deeper curve continues into the downbeat area to indicate this extra emphasis. The steeper curves of the succeeding upbeats reset the movement on the beat again. This groove therefore has a more varied shape than the previous ones while still reflecting the definite characteristics of a poumtchak pattern.

Supplementary examples: pick-ups before the downbeat
Cyclic periods in tracks can be proposed and ordered through similar additional sound events – for example, right before every first, fifth, or ninth downbeat. In a quantized sequencer track, they may occur on the eighth, sixteenth, or even triplet-sixteenth note before the new downbeat. The most common sound for this purpose is probably a bass drum that is somewhat less accentuated but otherwise the same as the one on the downbeat. The 1993 track *Dark & Long* by the British group/production team Underworld (Karl Hyde and Rick Smith) (tempo 135 bpm) anticipates the first downbeat in every series of sixteen with a short bass drum sound on the sixteenth note just before the downbeat. This event excites expectation and therefore supplies the movement pattern with an extra emphasis on the following (downbeat) movement. Because it is the first in a cycle of sixteen downbeats, this event indicates the relevance of this particular cycle to the track.

A bass drum pattern found on the 1998 track *Resurrection* (tempo 135 bpm) by the American producer Medway (Jesse Skeens) has a few more bass drum sounds that contribute in a similar way throughout a cycle of sixteen downbeats.

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72 The Norwegian DJ Gaute Drevdal emphasizes the significance of the “push and pull” – that is, how a DJ/producer uses different music or different musical features to push the audience on the dancefloor or pull back to produce relaxation and turn attention towards other aspects of the music. Drevdal compares this strategy to traditional rhetorical techniques for leading or controlling crowds (e-mail received 10 October 2006).

73 On the sonogram it is also possible to see that the hi-hat sounds on the third, fourth, seventh, and eighth upbeats are different from others in the excerpt. The snare drum sound used before the second downbeat is mixed with those hi-hat sounds, varying the basic beat still further in a way not especially relevant to my analysis here.
Because they are placed on eighth notes, however, these events are probably experienced more as independent salient sounds than as simple gestures of anticipation. Still, the variations in the movement pattern they cause could similarly raise expectations. The extra events around the first and ninth downbeats imply a cycle of eight beats as especially relevant to this track, though the double occurrence of pick-ups at the end of the excerpt seems to create an even stronger emphasis on the first downbeat, indicating a cycle of sixteen beats.

**Supplementary examples: pick-ups before the upbeat**

Occasionally extra sounds emphasize the upbeat instead. In *Hypnofunk* (2002; tempo 125 bpm) by the Italian production team Boogie Drama (Diego Montinaro and Lele Sacchi) there is an additional hi-hat sound before the upbeat.

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Unlike the main example in this section (Shazz), we do hear this event as a separate sound, but it still directs our attention immediately to the succeeding sound on the upbeat. The extra emphasis on this specific upbeat also drives the movement pattern, as discussed previously, though more gently than the same effect related to a downbeat. This particular pick-up is actually part of a more elaborate pattern – a less accented hi-hat also follows the succeeding upbeat (to the far right in the sonogram, not circled). Many tracks with a poutmtchak pattern have hi-hat patterns with staggered events; those exactly on the upbeats are usually more accentuated.

Daft Punk’s 1996 track *Revolution 909* (tempo 126 bpm) has a hi-hat track with a shuffle feel at the beginning and end of a period of four beat-cycles (one 4/4 measure). The events before the first and fourth open hi-hat sounds recall the pick-ups (anacruses) discussed by Butterfield in their effect upon the following upbeat.

![Figure 6.19](image1.png)

**Figure 6.19:** Notational representation of hi-hat pattern from Daft Punk’s *Revolution 909*, 0:57–0:59; circled notes indicate open hi-hat sounds, while arrows indicate the events in question.

![Figure 6.20](image2.png)

**Figure 6.20:** Excerpt from sonogram of Daft Punk’s *Revolution 909*, 0:57–0:59, events in question circled.

In the above excerpt, most of the frequencies below 5 kHz are filtered out (except for sounds intended to represent a police raid on an illegal rave party) while the hi-hat sounds are boosted, making the pick-ups here much more prominent than elsewhere in the track. The first and third arrows point to events placed a triplet sixteenth before the upbeat, while the second and fourth arrows point to events on the straight sixteenth before the downbeat. These events probably help to vary the movement pattern, but like the Medway example, their most marked effect seems to be on the downbeat following

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74 The title probably couples the Beatles song title *Revolution 9* (1968) with the Roland TR-909 drum machine.

75 See page 167.

76 The sounds on the downbeats in the excerpt resemble short dry hi-hat sounds but may also be the remainder of the bass drum sounds when all of their low frequencies have been attenuated by the filter.
the two events at the end of the excerpt (the first downbeat of the next cycle). The first of
these two events contributes energy to the movement upward, while the second gives its
energy directly to the succeeding downbeat.

Examples from earlier genres
In disco tracks from the 1970s, similar pick-up effects were produced by events played
on bass guitars, electric guitars, keyboards, or congas as part of a melodic line or larger
rhythmic pattern.\textsuperscript{77} In Chicago house tracks, on the other hand, pick-ups using drum
sounds began to occur more frequently. \textit{Tears} by Frankie Knuckles (featuring Satoshi
Tomiie) from 1989 uses an extra bass drum sound on the sixteenth before every eighth
downbeat, like the Underworld example presented earlier.\textsuperscript{78} The programming of drum
machines probably introduced possibilities for experimenting with patterns in ways that
diverged from the playing of acoustic drums. Short sounds without reverb also permitted
more sound events in the patterns without making a hodgepodge of the overall mix.
Those strategies deemed most successful on the dancefloor then carried over into the
productions of the 1990s.

Pick-ups (anacruses) seem to both excite expectation and provide emphasis to the
succeeding sound event, thus encouraging the corresponding movement to be more
powerful or energetic. In relation to different beats in a cycle, they create variations in
movement patterns while reinforcing established periods or cycles of certain lengths.

Other elements in the production of drive

FASTER PULSE LAYERS

In addition to pick-ups, various other elements of the groove work in different ways to
generate energy and inspire movement. Prominent to the build-up sections of tracks is an
isochronous pulse on a faster subdivision of the poumtchak pattern (events on the
sixteenths). The accentuations are mostly on the downbeats but usually not very distinct.
Various instruments can be used, but percussive sounds are the most common – for
example, a tambourine or variant hi-hat or shaker sound that is always less apparent than
the upbeat sound itself. In the same way that the poumtchak pattern activates a

\textsuperscript{77} An exception is the 1976 Motown track \textit{Down to Love Town} by the Originals, where the drummer occasionally
makes extra snare drum entries on the sixteenth preceding the third downbeat, but the effect is fairly subtle.
\textsuperscript{78} See page 169.
corresponding movement pattern, a rhythm pattern on a faster subdivision can constitute a “driving rhythm” for an internal body rhythm. However, its capacity to influence a more dominant movement pattern or activate an independent pattern depends upon its salience.

Main example: Rinôçérôse, *Dead Flower*

The 2002 track *Dead Flower* (tempo 125 bpm) by the French production team Rinôçérôse (Jean-Philippe Freu and Patrice “Patou” Carrié) has a tambourine pattern with accentuations on the downbeats and entries on every sixteenth. It is introduced after sixteen beat-cycles with an electric guitar riff and joined by a poumtchak pattern at 0:17 (again after sixteen beat-cycles). The tambourine pattern then continues throughout the track as part of the groove.

*Considered alongside the poumtchak pattern, the tambourine sounds seem recessive. The accentuated first sound of the series of four falls on the downbeat, emphasizing an already stressed entry. While they are not salient sounds as such, then, they still seem to increase the intensity of the track. There are two reasons for this: (1) The sixteenths between the sound events inherent to the poumtchak pattern act like the events discussed in the previous section so the preceding tambourine sounds contribute more weight to the bass drum and hi-hat sounds. Since every poumtchak event is preceded by an almost identical tambourine sound, this pattern is not a source of variation for the movement pattern but instead a source of a more intense push, both upward and downward. (2) Despite a relative lack of salience, the tambourine pattern may still generate an*
independent rhythm as a continuous realization of the sublevel of the poumtchak pattern. Its effect might be realized through various alternative body movements that join or alternate with the vertical movement pattern that follows the poumtchak pattern. The choice of instrument and placement of pattern in the overall mix probably determine which of the effects discussed above is the more dominant.

Supplementary examples: synthesizer sounds
In many tracks, producers place synthesizer patterns with similar sublevel effects in the very front of the mix. These patterns produce alternative rhythms like the tambourine mentioned previously, but with more vigour. In trance music this is very typical, but it also appears in many house tracks. The Chemical Brothers track *Out of Control* (1999; tempo 132 bpm) has a short rhythmic/melodic theme with a constantly modified synthesizer sound that starts at 0:13 and lasts almost the whole track (to 7:19, save for a section from 4:21 to 5:11).

![Synth](image)

Figure 6.23: Notational representation of rhythmic/melodic theme from the Chemical Brothers, *Out of Control*, 0:13–0:15.

The vertical musical movement of the theme recalls the structure of the poumtchak pattern. Since it does not correspond with the directions of the poumtchak pattern, its verticality probably strengthens the effect of an alternative movement pattern at the level of sixteenth notes.

Melodic structures may also emphasize the level of the poumtchak pattern in various ways. Madonna’s *Give It 2 Me* (2008; tempo 127 bpm) has a rhythmic/ melodic theme that is quite apparent in the overall mix of the chorus and gradually builds its intensity.

![Synth](image)

Figure 6.24: Notational representation of rhythmic/melodic theme from Madonna’s *Give It 2 Me*, 1:01–1:16.
Because the melodic vertical movements here correspond to the “low” and “high” of the poumtchak pattern, they would add momentum to its already established movement pattern. The change from eighth notes to sixteenth notes increases intensity while preserving the correspondences.

Arpeggiated synthesizer patterns produce similar effects but are often even more neutral as to their influence on movement patterns.\(^7\) *Waiting for Verdeaux* (2000; tempo 133 bpm) by the American producer Mocean Worker (Adam Dorn) uses an arpeggiated synthesizer pattern throughout the track with mostly identical events on every sixteenth note (four events for each bass drum sound, as can be seen in the upper part of the sonogram).

![Sonogram of Mocean Worker’s *Waiting for Verdeaux*, 0:15–0:21 (sixteen beat-cycles).](image)

The bass drum sounds (seen in the lower part of the sonogram) are placed on every downbeat, forming sixteen beat-cycles (four 4/4 measures) with two extra sounds anticipating a new period.\(^8\) The arpeggiated pattern has some vague, rather random pitch variations (seen as double lines in the upper part of the sonogram) as well as an accentuated entry on the fifth and fourteenth upbeats and the first and ninth downbeats. When the upbeat hi-hat pattern is introduced (at 0:58), the poumtchak pattern dominates in relation to body movement, but the arpeggiated pattern seems to supply a certain liveliness or vigour through its irregular accentuations and pitch variations.

\(^7\) An arpeggiator is a function found on synthesizers (and similar equipment) that generates series of tones through the use of one or several keys on the keyboard. These series may be structured according to various patterns of pitches, rhythms, and accents, and they can be made to fit a certain tempo.

\(^8\) Similar to the Medway example discussed on page 169.
Supplementary examples: vocal sounds

One intriguing way of producing a faster pulse in a track is to use rhythmic vocal phrases, usually without any specific melody. In line with the theories on motor-mimesis presented in chapter 4, these phrases may serve as a source for meaningful bodily movement depending upon how their sounds are produced. The listener/dancer is in this case offered possibilities for vocalization (or “subvocalization”\(^\text{81}\)) – he/she can sing along, either loudly, quietly, or silently. The body movements activated by this participation may influence a larger vertical movement pattern through enhancements of the poumtchak’s movement relations. The rhythmic vocal phrases are often spoken rather than sung, and they are typically introduced on their own and then gradually blended into the complete groove. Thus the listeners/dancers can lock onto the vocal phrases before they fade back into the mix. The 1999 track by Lord of the Drums featuring Michelle Luna, *Slept 2 Gether* (tempo 130 bpm), has a spoken vocal phrase performed by a heavily filtered female voice throughout most of the track.\(^\text{82}\)

![Figure 6.26: Notational representation of rhythmic vocal phrase from Lord of the Drums feat. Michelle Luna, Slept 2 Gether.](image)

The accentuations on the words “might,” “better,” and “slept” correspond with the three first downbeats of the 4/4 period. If the listener/dancer moves down on the downbeats, these words would be spoken at the same time, potentially strengthening a vertical body movement. The energy used to utter the accentuated words could be transmitted to the movement, and vice versa. Similarly, Mocean Worker’s track *Air Suspension* (2000; tempo 130 bpm) has a two-sentence vocal phrase performed by a filtered male voice throughout the track.

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\(^{81}\) Subvocalization is a term introduced by Arnie Cox to describe the silent singing he believes is important to music listening; see Cox 1999:78ff.

\(^{82}\) The phrase “I might like you better if we slept together” is taken from the American new wave/post-punk group Romeo Void’s song *Never Say Never* from 1981.
Figure 6.27: Notational representation of rhythmic vocal phrase from Mocean Worker’s *Air Suspension*.

The phrase in the fourth measure deviates from the others by accenting the last two words and thereby emphasizing the downbeats, as in the Lord of the Drums example. The other words or syllables do not really accentuate any beats in the poumtchak pattern, but the phrases still seem to fit well with a vertical body movement. The deviating ending also forms a periodic cycle of four measures even though the sentences form identical pairs in terms of their words.  

**THE DIMINISHED (TIME) INTERVAL**

The next element involves sounds that are easily identified in the overall mix and are therefore applied to various build-up effects. They are created by gradually contracting the time intervals between recurrences of a specific sound, after sixteen beat-cycles, then after eight, then after four, and so on. When the time interval is contracted, an expectation of a further contraction most likely arises (at least for “insider” listeners), and our attention will be guided towards these points in the rhythmic structure. When these contracted time intervals intersect with the poumtchak pattern, they will most likely affect its vertical movement pattern.

**Main example: Romanthon’s Floorpiece**

The 2000 track *Floorpiece* (tempo 127 bpm) by the American producer Romanthon (Anthony Moore) starts with a poumtchak pattern that features a quite dominant snare drum on every second downbeat. A sound effect also starts on the first downbeat, followed by a short synthesizer theme.

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83 In electronic dance music, sampled voices or sounds that are easily identified are often altered in this way. Events initially placed on the downbeat, for example, might occur on the preceding upbeat in the next measure, or they are moved an eighth or a sixteenth backward or forward. Such variations influence how movement patterns are shaped in a way similar to Nketa’s “spacing” in African music, where patterns or parts are staggered within musical pieces (Nketa 1974:134). Danielsen calls this effect “displacement” and presents examples from James Brown’s funk music; see, for example, Danielsen 2006:80.
These events are repeated after eight downbeats. After six iterations, the time interval is reduced to four downbeats, and after four iterations the time interval is reduced again to two downbeats. When the time interval of two has lasted thirty-two downbeats, the events are gradually filtered out of the mix. The complete section in question lasts from 0:01 to 0:58.

The initial sound effect (“S.Eff” in the notation) is no more than a soft burst of reverb, but it nevertheless differentiates the first downbeat from the others. The synthesizer theme, on the other hand, is very distinct and sounds almost by itself in the frequency area of 1,000 to 4,000 Hz. When the events repeat after a certain time interval, they in turn excite expectation about yet another return. This expectation is violated when the time interval is diminished, especially since this happens after six (and not four or eight) downbeats. At this point the sound’s salience therefore increases significantly, and we might begin to expect other variations as well. Because the next change happens after a more typical interval of four iterations, the listener/dancer is likely to be better prepared and “accept” the variation promptly.
These events do not seem to alter movement patterns in the first period, but when the time intervals are diminished and the events reappear more often, an experience of increased intensity will encourage more energetic movements. This is why the length of the movement curve in the sonogram gradually increases, both at the downbeat and at the upbeat, at the end of the section. The downbeats in the last section, where the events in question appear most frequently, will be experienced even more energetically than the others. When the events have continued for a certain period with the same interval, their effect upon dancers’ attention and expectations will probably lessen.

**Basslines**

**INFLUENCES FROM EARLIER GENRES**

One of the most important links from the disco era to the electronic dance music of the 1990s is undoubtedly the basslines. Chicago house producers often recycled exact basslines from various disco tracks. For example, the bassline of the first Chicago house track to reach number one on the British charts, Steve “Silk” Hurley’s *Jack Your Body* (1985), is taken from the last section (from 2:27) of the Warehouse classic *Let No Man Put Asunder (Shep Pettibone Remix)* by First Choice (orig. 1977, Shep Pettibone’s remix 1983). Hurley’s track has a synthesizer bass and therefore sounds differently, but the rhythmic qualities are preserved:

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**Figure 6.30:** Sonogram with suggested movement curve for Romanthony’s *Floorpiece*, 0:16–0:35, with arrows indicating repeated events.
This bassline can be divided into two parts: the first two events, on the tonic note, accentuate the first two downbeats in a stable manner, while the remainder is unstable (syncopated) with an ending that clearly returns to the opening notes, generating a continuous drive forward that can be repeated endlessly. The small deviation of every second ending makes the two periods of four beat-cycles into a unit. The use of the unison, perfect fifth, minor seventh, and octave is also typical. In addition to the perfect fourth, these intervals or scale steps fill many basslines in electronic dance music tracks. Later in the 1980s it became less common to copy basslines in such a manner. Due probably to the increasing demand for innovation in dance music, the imitation typical of Chicago house did not carry forward in British house. Nevertheless, 1990s producers continued to exploit many of the qualities of the basslines that were dominant in the dance music of the 1970s and early 1980s.

The pick-ups of basslines in funk
The basslines of funk tracks represent another significant inspiration for electronic dance music producers, both directly and via their earlier influence on disco. This is due less to funk’s extra emphasis on the first downbeat of a 4/4 measure (the “One”) than to its characteristic early anticipations of significant downbeats (the “small notes”). Danielsen observes that such events might be perceived to be stretching the downbeat: “In cases such as the pick-ups to the strong beats and also the rolling basslines of sixteenths typical of Bootsy Collins’s playing, one might rather think of what happens as an offbeat-based pulse of sixteenths being triggered around the beat, working as a magnet both before and after it and thereby absorbing some of the energy of the strong beat.”

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84 See page 59.
85 Danielsen 2006:85.
Example of bassline from funk in electronic dance music

Similar pick-ups appear in the basslines of electronic dance music tracks and likewise contribute to how the downbeats are experienced. The bassline of the Basement Jaxx track *Red Alert* (1999; tempo 127 bpm)\(^{86}\) is a sample from the track *Far Beyond* by Locksmith (from the 1980 album *Unlock the Funk*).\(^{87}\)

![Figure 6.33: Notational representation of bassline (and bass drum) from Basement Jaxx’s *Red Alert.*](image)

The two events that end on the higher F note (A and B) are both preceded by pick-ups, but only the second occurrence (B) places the F exactly on a sounding downbeat. The first occurrence (A) is instead experienced as (two) pick-ups to the following downbeat, but the fact that they are identical to the succeeding event may cause them to be heard as an early or extended second downbeat. Thus the first and second incidents (A and B) shape the downbeat in slightly different ways. Another feature that links this track to funk is the slap-hand playing technique that creates the very specific sound of these two incidents.\(^{88}\) In the two last (downbeat) events in the bassline, the original sound from the sample is blended with a synthesizer sound.

Example of “call and response”

The call-and-response technique is also a musical feature that has its roots in various genres of African and African American music.\(^{89}\) It is found in electronic dance music tracks in realizations of basslines using various other sounds but also between completely different instruments. The track *Jump n’ Shout* (1999; tempo 127 bpm) by Basement Jaxx has a bassline that is succeeded by two attacks of a strange, “bubbly” sound effect that perform (or at least evoke) a call and response:

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\(^{86}\) The music video for the track in fact has several references to the 1970s funk group Parliament (costumes, science fiction).

\(^{87}\) The Locksmith track has a tempo of 114 bpm and the bassline is placed two semitones lower. When the Locksmith sample is placed in a conventional sampler and played a major second higher, its tempo becomes exactly 127 bpm.

\(^{88}\) The technique is primarily associated with Larry Graham, who first was bass player with Sly and the Family Stone.

\(^{89}\) In his article “Black Music as an Art Form,” Olly Wilson lists call-and-response (or antiphonal) structures as one of six tendencies or approaches characteristic of the music of peoples of African descent; see Wilson 1983:3.
Since the sounds here are quite different, the call-and-response effect is probably due mostly to the counterrhythmic realization of the instruments.\textsuperscript{90} Their presence in the groove is somewhat tangential to the fundamental movement pattern created by the other sounds, and thus a connection is formed between them. In the last notated measure the call and response is muted by an extended bassline figure.

**Example of bassline from disco music**

The bassline with alternating octaves characteristic of late-1970s disco music corresponds well to the poumtchak pattern. You Make Me Feel (Mighty Real) (1978; tempo 131 bpm) has a bassline that is typical of Patrick Cowley’s disco productions with Sylvester (Sylvester James).

This bassline, present in the intro and the chorus, plays in unison with a synthesizer sound on a higher octave that has an additional entry on the sixteens. Also present is an upbeat hi-hat pattern and an alternating bass drum and snare drum/handclap on the downbeats. Musical verticality is thus asserted by several events that correspond in up-and-down directions, which probably contributed to the success of this track on the dancefloor. Shapiro describes the basslines of these Sylvester tracks as “galloping,”\textsuperscript{91} neatly capturing the link to vertical movement patterns in a single word.

\textsuperscript{90} Counterrhythmic patterns are discussed later; see page 189.

\textsuperscript{91} Shapiro 2005:67.
VERTICAL MOVEMENT IN BASSLINES

In addition to their rhythmic qualities, basslines obviously have a melodic aspect that can impact body movement. In the previous example, the bassline directly reinforces the poutmchak pattern. This type of reinforcement also occurs in electronic dance music, but generally the correspondence is more subtle.

Main example: Fritz Valley Project’s *Blindness (Harmonic Excursion)*

The 1998 track *Blindness (Harmonic Excursion)* (tempo 127 bpm) by the German production team Fritz Valley Project (Frank Impink and Andreas Köhler) uses the same bassline for most of the track. The groove consists also for the most part of a shaker pattern, a handclap sound on every second downbeat, and a congas-type pattern.92

![Figure 6.36: Notational representation of bassline and bass drum/hi-hat pattern from Fritz Valley Project’s *Blindness (Harmonic Excursion).*](image)

The bassline remains prominent even among the many percussive sounds involved in the track; its E–A intervals in particular seem to constitute salient sounds. It is probably not a coincidence that the ascending movement from E to A corresponds systematically with the poutmchak pattern’s movement from bass drum to hi-hat:

![Figure 6.37: Notational representation of bassline and bass drum/hi-hat pattern from Fritz Valley Project’s *Blindness (Harmonic Excursion)* with movement relations circled.](image)

92 These patterns will not be discussed and are thus not notated in this example.
The low E is placed on the sixteenth just before the downbeat bass drum sound, a location typical of many funk tracks. It seems to extend and therefore emphasize every second downbeat. This also affects the drive; the succeeding ascending movement to the upbeat propels the movement upward (to “catch up”), so that every second beat-cycle may be experienced as more energetic. The open hi-hat on the third and seventh upbeat (circled noteheads) also adds emphasis here:

Figure 6.38: Notational representation of bassline and bass drum/hi-hat pattern from Fritz Valley Project’s Blindness (Harmonic Excursion) with suggested movement curve.

The last part of the bassline is also characteristic in how it leads back to a new beginning. It has several events (on sixteenths) before and after the downbeats and upbeats instead of exactly on the beats, indicating perhaps its origins in funk music.

**The fabric of rhythm**

An electronic dance music track often starts out with a build-up section that leads to a more complete groove where the basic beat interacts with several other patterns. While some of these patterns or rhythmic elements may be closely connected to and in various ways supportive of the basic beat, other patterns are more independent. The notion of a “fabric of rhythm” attempts to capture this combination of several rhythmic elements or patterns as they interact in various ways with the basic beat and with each other. 

**COMPLEMENTARY PATTERNS**

I will begin with events placed before or after the downbeats and upbeats and mostly within their duple subdivisions. Contrary to the patterns presented earlier, these events do not emphasize certain beats but instead compete with them to some degree, thereby contributing tension to the experience of them.

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93 See, for example, Danielsen’s discussion of the bassline of James Brown’s Get Up (I Feel Like Being a) Sex Machine (1970); Danielsen 2006:76ff.
94 Danielsen uses the term “fabric of rhythm” to describe the funk grooves of James Brown and Parliament; see Danielsen 2006:43.
As described in chapter 2, drum machines introduced more and more possibilities for forming patterns that would be difficult or impossible for a live drummer to actullay play. Producers began to experiment with patterns that were quite independent of the basic beat – while bass drum and hi-hat sounds were used to form a pountchak pattern, shakers, tambourines, congas, and other such sounds could do other things. Such experimenting became even easier with the introduction of computer-based sequencer programs.

**Main example: Basement Jaxx’s Jump n’ Shout**

The 1999 track *Jump n’ Shout* (1999; tempo 127 bpm) starts out with a pountchak pattern and a third rhythmic layer consisting of a cymbal.

![Notational representation of Basement Jaxx’s Jump n’ Shout, 0:06-0:14.](image)

![Sonogram of Basement Jaxx’s Jump n’ Shout, 0:06-0:14, cymbal pattern circled.](image)

The cymal pattern is quite evident here – its attacks are as salient as the hi-hat sounds but not as dominant as the bass drum sounds.

The bass drum and hi-hat sounds form a pountchak pattern that most likely controls movement. The third (and seventh) event of the cymbal pattern has the same entry point as the bass drum sound and therefore stresses those downbeats:

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95 See page 78.
But what do the other events of the cymbal pattern contribute to the groove? Placed right before both downbeats and upbeats, they could be seen to extend them by acting as pick-ups. But this does not seem to correspond to their actual effect on movement, probably because the sounds are not directly related to those they anticipate. The vertical movement pattern does not seem to change, then, but our experience of it might. These cymbal sounds introduce a sort of tension or friction into the groove, making small dents in the movement pattern established by the pountchak.

Soon a snare drum joins in through three similar but not identical sounds that interact in yet other ways with the dominant movement pattern:
The excerpt represented above is eight beat-cycles (two 4/4 measures) further into the track (measures 7 and 8). Here the hi-hat is clearly boosted in the mix compared to the preceding part (measures 1 to 6) as can be seen on the sonogram below of measures 6 and 7.

The introduction of the snare drum pattern makes the hi-hat appear to recede in the mix – to reinstate the pounchak pattern, then, the hi-hat needs to be boosted.\(^{96}\) The cymbal pattern is also somewhat simplified at this point, probably to avoid colliding with the snare drum pattern.

\(^{96}\) See further discussion on page 220.
The first two snare drum events seem to have an effect similar to the cymbal pattern in creating tension or friction in the groove, while the three events ending both of the periods of four beat-cycles seem to function as a pick-up note in relation to the following downbeats. The extra snare drum sounds that fall exactly on the upbeats do not seem to have a role beyond somewhat emphasizing this specific beat.

Figure 6.47: Notational representation of Basement Jaxx: Jump n’ Shout, 0:18–0:21, with possible tension points, emphasized beats and entries producing expectation encircled

Circled in the notated example above are the various sounds that stand out from the pountchak pattern and contribute in other ways – tension, emphasis, or expectation – to the groove. With the illustrations in the sonogram below I try to visualize these processes in relation to a movement curve.

Figure 6.48: Sonogram of Basement Jaxx’s Jump n’ Shout, 0:18–0:21, with suggested movement curve and possible tension points, emphasized beats and entries producing expectation circled.
Given the track’s tempo of 127 bpm, it may seem like a reach to identify so many influential events. But it is important to distinguish among the various roles that sounds might play in forming a groove that in turn moves the body. There are no right answers or straightforward recipes for good dance music here: these roles will influence each other in quite intricate ways, and each dancer will respond differently to them as well. But in aiming to distinguish what makes a good groove, we must allow for all of the possibilities.

**COUNTERRHYTHMIC PATTERNS**

One common rhythmic event in electronic dance music involves four sound events dividing three beat-cycles into four equal durations (3+3+3+3 sixteenths, or a “4:3 pattern”), or a similar pattern where the last event is excluded (3+3+2 sixteenths, or a “standard pattern”). Such patterns are counterrhythmic because the triplets imply a pulse relation that conflicts with the basic beat of the track. A pountchak pattern of three beat-cycles has six possible entry points on downbeats (three) and upbeats (three), while the 4:3 pattern has four events at equal intervals during the same period. The basic beat, then, relates to a duple meter, while these counterrhythmic patterns relate to a triple meter. With regard to the funk grooves of James Brown, Danielsen describes this phenomenon as a “play between a main rhythm and a counterrhythm with competing basic pulses: they carry a tendency toward cross-rhythm.”

Such counterrhythmic patterns are common to many genres of popular music, especially various African American genres of groove-based music. The guitar riff of the James Brown track *The Payback* (1973) includes the following events:

![Figure 6.49: Notational representation of guitar riff from James Brown’s *The Payback*](image)

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97 The term “standard pattern” is taken from Danielsen, who uses it because “it may be viewed as a simplified duple time version of the so-called standard pattern of African music” (Danielsen 2006:63).

98 Danielsen 2006:63; emphasis in the original. Danielsen also discusses the difference between “counterrhythmic” and “cross-rhythmic”: contrary to cross-rhythmic whose patterns of duple and triple meter continue to interact, a counterrhythmic pattern will soon return to its duple meter.


100 The illustration is taken from Danielsen 2006:64; she identifies several characteristic counterrhythmic patterns in the funk grooves of James Brown.
The two last events of this pattern restore its congruence with a duple meter. This is vital, according to Danielsen, because counterrhythmic occurrences should destabilize but never threaten the main pulse.101 In electronic dance music tracks with a poumtchak pattern, the basic beat is clearer and the counterrhythmic tendency is weaker than those examples described by Danielsen. Additionally, the standard pattern is more common than the 4:3 in electronic dance music. Nevertheless, their presence evokes a counterrhythm’s destabilizing tendency, and in the following I will discuss how it might influence a movement pattern.

Main example: Lee-Cabrera’s Shake It

The 2003 track Shake It (tempo 128 bpm) by the American production team Lee-Cabrera (Steven Lee and Albert Cabrera) starts with a poumtchak pattern and a short drum pattern repeated every fourth downbeat. Barely audible is a piano pattern that answers the drum pattern in a call-and-response manner. The piano pattern is (probably) attenuated by a low pass filter that gradually opens during the first minute of the track.

Figure 6.50: Notational representation of Lee-Cabrera’s Shake It, 0:00–0:04.

101 Butler examines a counterrhythmic pattern from the electronic dance music track Azzido Da Bass’s electronic dance music track Dooms Night (Timo Maas Mix) that does not return to the duple meter. It has eight entries with the exact same interval during twelve beat-cycles of the basic beat, and the bassline recommences together with the beginning of this pattern only every twenty-fourth beat-cycle. Butler calls this an “embedded grouping dissonance” with reference to Harold Krebs’s study of the music of Schumann. “Rhythmic dissonance” for Krebs concerns instances where there is disagreement between accentuations or central rhythmic points in the music. Butler uses “embedded” to identify examples where “one grouping dissonance is nested within another whose common durational unit is larger” (Butler 2006:158). He further describes the effect of the dissonance as “a fundamental conflict between the pure-duple values of 4/4 meter and a pure-triple dissonance” (loc. cit.), but he does not explore how any of this might affect the listener/dancer.
Figure 6.51: Sonogram of Lee-Cabrera’s *Shake It*, 0:00–0:04, with the standard pattern circled.

The drum sound of the counterrhythmic pattern is probably the most obvious musical event at this point in the track. Its first occurrence gets the track going, together with the bass drum sound. The hi-hat sound is not very apparent at this point but helps to establish an unambiguous poumtchak pattern.

The three attacks of the counterrhythmic pattern fall in turn on a downbeat, between an upbeat and a downbeat, and on an upbeat. In light of my earlier discussions, we can therefore point to possible emphasized beats and tension points as follows:

Figure 6.52: Sonogram of Lee-Cabrera’s *Shake It*, 0:00–0:04, with suggested movement curve and emphasized beats and tension points circled.

The second event on the sixteenth before the second (and sixth) downbeat probably produces tension in the same manner as the complementary patterns I discussed earlier. But does the pattern influence the poumtchak in that way as well, or is it experienced as a discrete entity? Though there is no right answer as such, the standard pattern will certainly be familiar to many listeners. Common to a variety of genres (for example,
funk, soul, and Latin), it is a much used (and heard) rhythmic structure in popular music. Its combination with the pountchak may well intensify the experience for many dancers, yanking them out of a vertical movement pattern or creating a (potentially pleasurable) feeling of conflict and tension in those passages. Danielsen asserts, “There is a tension between the basic pulse and its alternative, between rhythm and counterrhythm. Even if the latter is subordinate to the main basic pulse of 4/4 and does not appear as a continuous rhythmic layer, it has to be present as a destabilizer of the main rhythm, as a possible but unarticulated alternative.”

Supplementary examples of counterrhythmic patterns
As a build-up later in the track by Lee-Cabrera, the standard pattern starts to be repeated every second downbeat (1:00–1:09). In a similar manner, Rinôçérôse’s 2002 track It’s Time To Go Now! (tempo 120 bpm) starts with a guitar riff containing three sound events that is repeated two times at various pitch and filter settings. As can be seen on the sonogram below, this riff is in a standard pattern.

Figure 6.53: Excerpt from sonogram of Rinôçérôse’s It’s Time To Go Now!, 0:00–0:03, placed in a grid with note values. Entry points are highlighted with circled notes.

Repetitions probably enhance the effects of these counterrhythmic relations, but since each new beginning matches every second downbeat, the destabilizing effect here is not very pronounced.

102 Danielsen 2006:70.
The 4:3 pattern has one more event placed between a downbeat and an upbeat, and its divergent metrical pulse is therefore more evident. The 808 State track *Cübik (Kings County Perspective)* (1990; tempo 123 bpm) starts with only a synth-bass sound in its counterrhythmic pattern.\(^{103}\)

![Figure 6.54: Excerpt from sonogram of 808 State’s *Cübik (Kings County Perspective)*, 0:01–0:03, placed in a grid with note values. Entry points are highlighted with circled notes.](image)

Despite the track’s emphasis on this pattern, though, a culturally trained listener will probably still expect a (divergent) basic beat to start with a bass drum or hi-hat sound on the downbeats or upbeats (the bass drum in fact starts at 0:16) and will thereby accurately predict the pountchak even before it happens.\(^{104}\) In sum, the duple-meter matrix is so basic to many subgenres of electronic dance music that it is difficult to establish a seriously competing pulse by introducing counterrhythmic figures, even right from the start of a track.

**MICRORHYTHM IN ELECTRONIC DANCE MUSIC**

Though the examples I have presented (and the way I have presented them) perhaps imply the prevalence of quantized note values in electronic dance music, there are of course rhythmic events that do not follow this generalization. Live vocal phrases or

\(^{103}\) See page 107 for a notational representation.

\(^{104}\) Butler uses Hasty’s theory of “projection” on this specific counterrhythmic theme, with mixed results, as he admits himself. In Hasty’s musical landscape, any time signature is theoretically possible, while the familiarity of the pattern Butler discusses in a dance music context and the resulting expectations of a certain metric cycle (or pulse) must be accounted for here; Butler 2006:102–106.
instrumental contributions in particular include temporal deviations from the basic beat of the track just as they do in other popular music genres.

**Example of microrhythmic deviations: Daft Punk’s *Daftendirekt***

The heavily modulated vocal phrase in the track *Daftendirekt* (1996; tempo 111 bpm) by Daft Punk has the following temporal deviations in relation to the basic beat.

![Notational representation of vocal phrase from Daft Punk’s *Daftendirekt* with arrows of different sizes to indicate temporal deviations.](image)

The first accentuated word (“funk”) could have been notated a sixteenth note earlier, but the word is stretched out so that the end of it corresponds fairly well to the bass drum on the downbeat.\(^{105}\) Thus it appears to be the starting event of a 4/4 measure, preceded by a pick-up note (“da”). These two events recall observations made earlier in this chapter concerning the fact that the downbeat may be experienced as extended via an early realization. More relevant here, however, is the way a vocal phrase provides critical points for our attention as it activates movement patterns. Compared to the snappy drum sounds, the vocal delivery here is stretched and imprecise, but it has an impact. The temporal deviations between a vocal phrase and the basic beat influence movement patterns in a somewhat different manner than if they had been drum sounds. A vocal phrase, even when it is heavily modulated and percussive itself, affords primarily vocal participation (overt or covert), so its effect on a vertical movement pattern will be more indirect. It can shape how certain downbeats or upbeats are experienced through a listener’s vocal participation, which might in turn explain the looser rhythmic structure that is nevertheless considered acceptable for vocal phrases in this genre.

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\(^{105}\) The basic beat of this track, formed by bass drum, snare drum, and hi-hat (starting at 0:35) is a regular backbeat rather than a poutchak pattern. The deviations are measured in the sequencer program Digital Performer, in which the track can be aligned to a grid according to the basic beat. The largest arrow (on the word “funk”) is a deviation of approximately a sixteenth note, while the second largest is less than a thirty-second note (on the words “back” and “come”).
Discussion of microrhythm in electronic dance music

In general, however, temporal deviations from a grid may not be as important in the study of electronic dance music as they are in various other popular music genres. As a point of departure for this discussion, I will return to the Basement Jaxx track *Jump n’ Shout* (see figure 6.47 and 6.48).  

![Notational representation of Basement Jaxx’s *Jump n’ Shout*, 0:21–0:37.](image)

At 0:21 a counterrhythmic pattern (the standard pattern) is added to an already quite complex groove that has many significant features in relation to movement. In the last measure, a 4:3 pattern that evokes the guitar riff of James Brown’s *The Payback* occurs in both the bass and the vocals. The sonogram below, representing the last eight beat-cycles (the two concluding 4/4 measures) of the notated period, attempts to chart the many incidents that produce drive, tension, and excitement in this groove.

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106 See page 188.
107 See figure 6.49.
In such tracks it is important to keep events strictly placed to avoid chaos, and temporal deviations from the basic beat can in fact be quite deleterious. Furthermore, the basic beat has to provide a solid foundation: which is, in short, how producers make tracks work and how electronic dance music as a whole identifies itself. The genre emerged from the act of dancing to drum machines, which permit no deviations in timing. From the possibilities inherent in combining rhythmic patterns, new forms of dance music and movement evolved. Compared to, for example, jazz, funk, or hip-hop, house music or trance needs its basic beat to be punchy, persistent, and predictable, and these qualities are in turn rewarded by its listeners/dancers.

Nevertheless, producers of dance music have to be aware of how various sounds work together. The positioning of certain sounds slightly backward or forward in the groove may or may not be necessary. Sometimes everything works perfectly with a fully quantized track; other times adjustments are necessary. These issues emerge because the sounds interact, not because a groove somehow demands more complexity. A bass drum sound with a fast attack and a descending pitch movement provides a different downbeat
from a bass drum sound with a slower attack. Thus, grids of note values and deviations seldom tell the whole story.\footnote{108 See further discussion of descending pitch movements in bass drum sounds and microrhythmic relationships on page 218.}

Many electronic dance music tracks are actually quite straightforward in their rhythmic structures and have patterns that interact in simple ways. Analyses of their rhythm alone therefore fall short when it comes to explaining how such simple structures may be experienced as filled with drive and tension. When there are no microrhythmic deviations – no counterrhythmic elements or ambiguity in metric relations – what is left to study?

For me what is left is the rhythmic structure’s relationship to the physicality implied by the music. This quality is formed through an intimate relationship between the rhythmic patterns and their sonic design. In the next two chapters I will focus upon the actual \textit{sound} of the patterns I have discussed in this chapter.

\section*{Summary}

My first analyses and discussions in this chapter concerned the various elements of the basic beat. An extra sound (snare drum or handclap) on the backbeat, together with the ongoing bass drum sound, may give extra emphasis to a movement on the downbeat and thus introduce a subtle variation to a vertical movement pattern. Pick-ups can also produce an extra “push” before either a downbeat or an upbeat.

Another contributor to the “drive” in an electronic dance music track is the host of rhythmic patterns that are present at faster pulse layers, whether they are produced by percussive sounds, synthesizer sounds, or even vocal phrases. These can act as pick-ups or constitute rhythm patterns that complement the poumtchak pattern and activate various alternative body movements. Another element related to the production of “drive” is the gradual contraction of time intervals between recurrences of specific sounds. As sound events reappear more frequently, an experience of increased intensity may activate more energetic movements.

Basslines in electronic dance music are influenced heavily by earlier genres such as funk and disco, and their pick-ups, call-and-response techniques, and relationships to the downbeat reveal important antecedents in African and African American musics. The melodic component of basslines also impacts musical verticality. If ascending or
descending melodic movements match the “up” or “down” in the poumtchak pattern, the corresponding movement may receive extra emphasis.

While many patterns in electronic dance music tracks are closely connected to, and in many ways supportive of, the basic beat of the music, other patterns are more independent. These “complementary patterns” typically involve sound events placed before or after the downbeats and upbeats relating to the basic beat cycles and its duple subdivisions. They do not emphasize certain beats but instead compete with them to some degree, thereby introducing a certain productive tension to the experience of the groove. Counterrhythmic patterns with events between the beats that imply a competing basic pulse may work in similar ways to produce tension, but they may also be experienced as discrete. This destabilizing function is, however, less prominent here than in genres where the rhythmic structure (and the expectations it evokes) is looser.

Generally, temporal deviations between patterns and the basic beat are not as important in electronic dance music as they are in other popular music genres. In a track with several things occurring at once, it is important to keep events strictly placed to avoid chaos. Qualities related to a punchy, persistent, and predictable basic beat are appreciated (and expected) by listeners/dancers, and the rhythmic structure’s relationship to the physicality of music is therefore crucial.
In the production of electronic dance music, a focus on sound is usually part of the process from start to end. Some producers may finish rhythmic, melodic, and harmonic structures for the entire track and then begin to exchange specific sounds and apply effects; others focus incessantly on these qualities along the way, mixing shorter segments ahead of the whole. Regardless, a finishing stage with a final mixing and mastering of the music is always required, and here the sound comes to the fore. Compression, reverb, stereo panning, and equalizing comprise some of the processes involved in controlling how the sounds work together. Thus, I have chosen to treat sound separately as the final part of this study.

I will focus especially on those aspects of sound that might be related to notions of movement. In particular, I will explore how pitch movements in sound relate to body movements, and how different sounds interact in the experience of a groove. I will focus on sound on both a micro level, studying the various characteristics of specific sounds, and a macro level, looking at the possible outcomes of mixing processes and sounds effects in relation to longer segments of a given track.

Before I present my analytical material in chapter 8, I will discuss certain central problems and introduce some methodological tools in relation to my analytical approach in chapter 7.
Chapter 7:
Introduction to the analysis of sound

To fully examine the correspondences between rhythm in music and body movements, the actual sound of these rhythmic events must be addressed. But what challenges arise when sound is examined? What aspects or qualities of it are most significant? What methods should be used in an analysis?

Rolf Inge Godøy describes the thorny problems related to the study of sound: “Questions of sonorous qualities are difficult because they do not fit well with the symbol-oriented paradigm of our musical culture (such as discrete pitch and durations), as sonorous qualities are highly multidimensional (evolving spectra, transients, etc.) and also rely heavily on introspective reports (i.e., pose difficult methodological problems for any experimental approach).”¹ In this introduction to my analyses of sound in electronic dance music, I will briefly discuss the problems presented here by Godøy – the complexity of sound and the methodological challenges it represents – in light of my pursuit of the correspondences between music and corporeality.

The complexity of sound

NOTATION VERSUS SOUND

In musicology, the study of the sonorous qualities of music has seldom been prioritized. Analysis within the Western classical music tradition has typically favoured musical scores; as Richard Middleton points out, “Musicological methods tend to foreground those musical parameters which can be easily notated,”² including melodic, harmonic, and rhythmic structures. Middleton also observes that the musical score has often been equated with “the music” at the expense of the performance, so that the musicologist in fact views recordings simply “as a source for extracting the ‘fundamentals’ of the music, its ‘framework’, and condensing them into a score.”³ This perspective is probably no longer as prevalent within musicology now as it was in 1990, when Middleton published

¹ Godøy 2001:237.
³ Middleton 1990:105.
his book, and several current research projects demonstrate an increasing interest in the
performance and its recordings. Nevertheless, Middleton’s words continue to ring true,
especially with regard to the classical canon.

Recordings in popular music, on the other hand, are typically considered “the
music,” not mutable versions or interpretations of an immutable score. In fact, most pop
compositions only exist as recorded material, leaving little else with which the scholar
can work. In the recording process, and especially through the development of more
powerful recording technologies, qualities of sound that are not in fact easily notated
become front and centre. Though many popular music scholars acknowledge this to be
true, relatively few studies have broken ground in this field so far.

QUALITIES OF MUSICAL SOUND

There are significant qualities in music that cannot easily be notated. These qualities
have been trapped in the transitory nature of the performance, at least until developments
in sound recording exposed them anew to scholars.

Musical sound consists of a complex blend of interacting qualities. Even in a
single sound played by a single instrument, it can be difficult to separate and examine
these various qualities; when several instruments are playing at once, the challenge
increases. Pitch, timbre, loudness, and duration designate some of the qualities that are
identifiable in a perceptual encounter with musical sound. They are subjective attributes
that depend on measurable physical parameters – sound pressure, frequency, the
spectrum, the envelope, and physical duration – and they relate to these physical
parameters in a complex and interactive manner. They can all be elusive, but timbre
(tone quality/colour) is probably the most difficult to define. Pratt and Doak propose the
following: “Timbre is that attribute of auditory sensation whereby a listener can judge
that two sounds are dissimilar using any criteria other than pitch, loudness or duration.”
So timbre is what is left when the other attributes are excluded. Its physical parameters

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4 For example, CHARM (the Center for the History and Analysis of Recorded Music) is a research project led by
Nicholas Cook that analyzes performance in European classical music through recordings; see webpage 7.1.
5 Serge Lacasse’s study of voice manipulation (“vocal staging”) in recorded popular music is an exception; see Lacasse
2000. Projects associated with the Journal of the Art of Record Production and the Art of Record Production
Conferences are also contributing to this topic; see webpage 7.2.
6 See, for example, Roland Barthes’s observations in his article “The Grain of the Voice” (Barthes 1977).
7 Rossing et al. 2002:95 presents a table describing this complex relationship.
involve frequency, spectrum, and envelope, and the specific frequencies present at the sound’s attack – the “transients” – are especially helpful for differentiating sounds.

However, pitch, loudness, and duration can also be tricky. Movements in pitch, such as intended or involuntary glissando/portamento or vibrations, can be difficult to decipher accurately, and these characteristics are often also affected by loudness (tremolo). In addition, amplification “is not just a question of volume,” states Theodore Gracyk: “High volume is employed to produce sound of a certain character, unique to electronically amplified music. There is a reciprocal relationship between volume and sound quality; increasing the amplitude of a sound wave alters its characteristic pattern and thus its timbre.”9 While duration may boast the most straightforward relationship between its physical parameters and its perceived attributes, surrounding sounds in a mix (or one’s particular location while listening) can interrupt a reliable connection between the two. So how should sound be measured best? To be both true and relevant to a particular listener, sound measurements would have to be conducted uniquely at the exact time and place of the listening experience in question, because volume, speakers, the room, and myriad other factors combine to profoundly shape specific acoustic events.

SOUND, BODY MOVEMENT, AND THE CLUB ENVIRONMENT

The complexity of sound and the many quandaries related to its study demand a particular kind of focus that entails certain limitations. Body movement in relation to the poumtchak pattern will comprise the focal point of the analyses presented in the next chapter. All of the subjective attributes of sound (pitch, loudness, timbre, and duration) are addressed to some extent, but pitch movements within sounds prove richest in their implication. They relate most directly to issues of verticality in music and are therefore also intimately connected to my understanding of the effect of the poumtchak pattern.

It is particularly important to account for the limitations involved with measuring sounds when we analyze music that is intended to be played on large sound systems at clubs. My digital music analysis software measures sound relations as they exist on a recording – that is, before they produce actual changes in air pressure via audio speakers. The analysis of level of frequencies, decibels, and durations may only account for starting points in the experience of these sounds in their “real” environment. To comprehend the relationship between, for example, loudness and timbre, and the

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“behaviour” in a club of these sound qualities, an advanced understanding of and practical training in recognizing acoustical features is necessary. Nevertheless, pitch movement and other issues related to body movements are probably even more pronounced on a huge sound system, where the high volume directly contributes to their physical impact.

**Methodological challenges for the study of sound**

The study of sound within popular music studies is manifestly hampered by a lack of analytical methods that draw upon a standardized visual representational system, a common theoretical underpinning, or a consistent scientific vocabulary. The following discussion, then, deals primarily with terminology for and communication around sound.

**THE USE OF THE TERM “SOUND” IN MUSICAL CONTEXTS**

A comprehensive definition of “sound” would have to include anything that is audible, and even in music, sounds that are not thought to be “musical” in a traditional sense may well be used. But pure sound does not generally connote “music” when detached from a musical context, so a definition of music as sound is not particularly instructive. There are in fact three ways in which the term sound is commonly used in musical contexts:

1. “Sound” as a descriptor of a discrete event that originates from one definite source – for example, a bass drum sound, a single tone played on a piano, or a synthesizer (or sampler) sound whose length equals the amount of time a key is pressed. The term may be used rather neutrally to designate the specific event alone, or it can be intended to embrace its (sound) qualities. The latter use evokes the subjective attribute of timbre. Sound is often used as a direct substitute for “timbre” as well – when someone says, “I like the sound of that bass drum,” they are probably not referring to pitch, loudness, or duration.

2. “Sound” as a descriptor for certain audible features that in most cases are characteristic or representative of a substantial quantity or quality – a specific instrument (“a guitar

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10 My interpretation here agrees with Ragnhild Brøvig-Hanssen, who in her master’s thesis “Musikk og mediering” also specifies three categories for the use of “sound” as a concept in musical contexts: (1) Sound indicating a signature; (2) The total sound of a production; (3) The sound of individual sounds. My translation. In the original Norwegian: “(1) signaturangivende sound; (2) produksjonens helhetlige sound; og (3) individuelle lyders sound” (Brøvig-Andersen 2007:7).
sound” or “the 808 sound”) or effect (“a filtered vocal sound”), a production (“the Joshua Tree sound”), a group or artist (“the Kraftwerk sound”), a producer (“the Spector sound”) or record label (“the Motown sound”), a city (“the Seattle sound”), a genre (“the disco sound”), or a time period (“the sound of the eighties”). Timbre may also be designated here, but when a more complex sound source is involved, a variety of musical elements are often implicated by this use.11

3. “Sound” as a descriptor of a more neutral totality (regarding references to specific sound sources or qualities) comprising all of the musical elements in an event, including several instruments sounding together. This practice is related primarily to the mixing process.

The second and third uses of the term will vary according to whether characteristic elements of sounds or a more neutral totality are in question. In mixing processes, these uses will often merge during the process of achieving certain sound-related goals – such as when a mix is formed according to a characteristic “house music sound,” or when the totality of the mix is modulated by a specific filter effect.12

THREE TYPES OF SOUND EVENTS

The three descriptors presented above provide a point of departure for how I have grouped the sound events from various dance tracks that I have chosen to examine. In my analyses I address the following three types of sound events separately:

1. A discrete event that originates from one definite source with a certain defined temporal limit.

2. A characteristic or representative outcome of a certain application of effect processing within a certain amount of time on part or all of the mix.

3. The result of the combination of several sound sources within a certain temporal limit in defined sections or throughout the track.

11 Rob Bowman’s article “The Stax Sound: A Musicological Analysis” (1995) features examinations of ninety-five recordings from the Stax label that focus on various musical elements such as instrumentation, repertoire, structure, key, harmonic construction, timing, melody, ornamentation, and use of equipment (both instruments and recording equipment).

12 See Brolinson & Larsen 1981:181–182 (in Swedish) and Michelsen 1997, chap. 5 (in Danish) for further discussion and another attempt to define “sound.”
In accordance with these three types, the following sound events will be discussed in the analyses in the next chapter: (1) bass drum, hi-hat, snare drum, and synthesizer sounds, (2) the gradual opening of a low-pass filter, and (3) mixing techniques related to the use of dynamic compression.

THE DESCRIPTION OF SOUND AS TIMBRE

As I have already mentioned, the most difficult qualities to describe in sound are primarily those related to timbre. Descriptions might range from playing techniques and mixing processes to physical features and acoustic proportions or even purely subjective interpretations of how sounds are perceived. Considerations of timbre usually include how sounds are produced (on, for example, an instrument) or perceived, and actual physical parameters are not often included.

William Moylan illustrates how descriptions related to the production of sounds can be problematic. “‘Violin-like’ to one person may actually be quite different to another person. One person’s reference experience of a ‘violin’ sound may be an historic instrument built by Stradivarius and performed by a leading artist at Carnegie Hall. Another person may use the sound of a Bluegrass fiddler, performing a locally crafted instrument in the open air, as their reference for defining the sound quality of a ‘violin’”

Descriptions of instruments, playing techniques, and other means of production may be highly accurate, but these things are only indirectly connected to our perceptual experiences.

The vocabularies created to describe the perception of sound (as timbre) are sprawling and often quite imaginative. Imprecise metaphors (“bright,” “warm,” “open,” and so on) are often used as well. Moylan elaborates:

Describing the characteristics of sound quality through associations with the other senses (through terminology such as “dark,” “crisp,” or “bright” sounds) is of little use in communicating precise and meaningful information about the sound source. “Bright” to one person may be associated with a narrow band of spectral activity around 15 kHz throughout the sound source’s duration. To another person the term may be associated with fast transient response in a broader frequency band around 8 kHz, and present only for the initial third of the sound’s duration. A third person might easily provide a different, yet an equally valid definition of “bright” within the context of the same sound.14

14 Moylan 2002:87. William Moylan’s book The Art of Recording aims to educate music producers and sound engineers using the author’s standards for understanding and differentiating parameters regarding acoustic relations. He offers several fruitful ways to represent various aspects of sound that could contribute to a more comprehensive methodology, but his hope for a truly objective description of sound may be unrealistic.
In a cultural community or context where timbre is often discussed (such as a recording studio), the use of metaphors or other descriptive approaches may in fact be quite nuanced and articulate. The problem arises when these descriptive approaches are transferred to communities outside this context, where an objective scientific vocabulary would have to be much more accurate.

A scientific vocabulary does exist, of course, in the study of acoustics, but it has limitations in its value to the broader discipline of musicology. To fully understand the objective physical parameters of sound, both a theoretical grounding in the subject and practical training in its application are probably required. Since most scholars in popular music studies are educated within a traditional, notation-oriented environment, this training is largely absent. But this may be changing.

THE THREE DOMAINS OF SOUND

Cornelia Fales discusses how qualities related to timbre present problems in any communication about sound. She groups the realizations of sounds into three domains according to their course from source to recipient: the productive, the acoustic, and the perceptual: "The productive domain focuses on the sound source and the physical motion that produces the sound; the acoustic domain concerns primarily the spectral composition and transmission of sound; and the perceptual domain consists of the perceived sensation resulting from acoustic sound."\textsuperscript{15} She argues that a "careful description of timbre seems to need the vocabulary of all three domains to capture the reality of tone quality."\textsuperscript{16} This is also true for all of the qualities of sound that are difficult to decipher and represent through traditional notation.

I will apply these domains in my analysis and discuss the sound events in relation to all three:

1. The productive domain: Descriptions of how sounds are produced, for example through certain playing techniques on a specific instrument or through the sound synthesis or parameter settings on a synthesizer. These descriptions are obviously especially useful for musicians who are familiar with these instruments and/or with basic sound synthesis. (In the analyses I describe and discuss how sounds presumably have been made on various instruments in question.)

\textsuperscript{15} Fales 2005:157; emphasis in the original.
\textsuperscript{16} Ibid.
2. The acoustic domain: *Descriptions of physical parameters*, including suppositions about how the sound will behave given the changes in air pressure of a specific listening environment. These descriptions will be most useful to the trained scientist, scholar, or sound engineer who understands musical acoustics. (In the analyses, I present sonograms displaying certain physical parameters of sounds as digital sound files; in relation to specific examples, I likewise discuss how the sounds might react to a club environment.)

3. The perceptive domain: *Descriptions of the subjective experience of sounds*, often particularly related to pitch, loudness, timbre, or duration. These descriptions will probably be most useful to experienced listeners of the music in question who, in addition, recognize the language that is being used. (In the analyses, I use subjective experience as a point of departure for my interpretations regarding body movement.)

THE VISUAL REPRESENTATION OF SOUND

Another methodological challenge involves the visual representation of those sound qualities that are not accommodated by traditional notation. The various existing attempts to visualize a sound mix do not really solve any problems related to the representation of timbral qualities.17 Other types of notation (guitar tablature, chord symbols, experimental or alternative notation) or representation (sonograms, waveforms, various sequencer windows) also contribute in their own unique ways, but no standardized alternative is currently at hand. Digital software programs for analyzing sound are probably the best tools at this point for introducing both methods of analysis and visual representations into much broader scholarly contexts. These programs can produce useful visualizations of the physical parameters of sound, but their results depend on the type of material and the qualities being explored.18

Fales uses sonograms to visualize certain features of sound, in addition to written descriptions from her three domains.19 Such visualizations are useful for elucidating the relationship between physical parameters and perceived sound attributes. In the following chapter’s analyses of sound in electronic dance music, I will also accompany my written

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17 See Danielsen 1998:283 and Moore 2001:121 for written descriptions of three-dimensional sound boxes where the axes represent frequency range/register, dynamics/depths, and left-right stereo mix/horizontal location. See Gibson 1997 (and webpage 7.3) and Michelsen 1997:137 for visual representations of similar images.
18 Spectrograms were available prior to digital technology, but computer-based software programs have made such tools much more accessible.
descriptions with sonograms. While they do not represent the left-right stereo relationship in any productive way, this is not particularly crucial to electronic dance music. Because this genre of music should sound the same wherever you are in a club, sounds are rarely panned hard to either channel. 20

Finally, it is important to note that music will always be what we experience through our physical encounter with it, and even the best new methods of visual representation only function as a guide to what we hear.

Summary

I began this chapter with a consideration of the challenges arising when the actual sound of the musical events occupies an analysis. Traditional musicological analysis has engaged scores, and those musical parameters that scores reflect well have in turn been prioritized. The analysis of sound itself, however, is more relevant to popular music studies, whose subject generally lacks scores.

The complexity of sound represents one of the major problems related to sound analysis. Physical parameters interact to form the basis for subjectively perceived sound attributes: pitch, loudness, timbre, and duration. Timbre is probably the most difficult of these attributes to decipher, but pitch, loudness and duration also represent challenging quarries. In the analyses in the following chapter, my focus on body movement results in certain priorities. Pitch movement within sounds is the most consistent topic since it most directly addresses the same issues of musical verticality that arose in relation to the poumtchak pattern, but qualities linked to other sound attributes will also arise.

Terminology comprises one of the methodological challenges related to the study of sound. The application of the term “sound” in musical contexts is a point of departure for three types of sound events that will be examined in the next chapter: (1) sound as a discrete event; (2) the outcome of an effect processing; and (3) the outcome of a combination of several sound sources (the sound mix). Cornelia Fales groups the realization of sound into three domains, which I will apply as well in my analysis: (1) the productive domain; (2) the acoustic domain; and (3) the perceptive domain.

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20 “Panned hard” means positioned fully to the left or the right channel in a stereo mix. See page 241.
Another methodological challenge involves the visual representation of sound. I have chosen to use sonograms to accompany my written descriptions, as no standardized method presently exists.
Chapter 8:

Analysis of sound in electronic dance music

In this chapter I will examine correspondences between the actual *sound* of the rhythmic event and the body movements it evokes. As in my earlier analysis of rhythm, the pomechak pattern will be central to both the structure of the chapter and the analytical work within it. The grouping of three types of sound events introduced in the previous chapter is also important to the structure here. I begin with the sounds of the pomechak pattern, the bass drum and hi-hat, as representations of the first type, “sound as discrete events.” This type is also represented by the next topic, the sound on the “backbeat.” I then turn to synthesizer sounds that introduce variations to a vertical movement pattern in ways evocative of the complementary rhythmic patterns discussed in chapter 6. A specific filter effect (the gradual opening of a low-pass filter) represents the second type of sound event, “the outcome of a certain application of effect processing,” and finally, the third type, “the outcome of a combination of several sound sources,” is represented by mixing techniques related to the use of dynamic compression.

Verticality in music comprises a vital analytical premise in this chapter, based on the theories discussed in chapter 4, and pitch movement within sounds is the most consistent topic that will arise in these analyses.

As it was in my discussion of rhythm, my main focus here will be on British and French house music from the second half of the 1990s, with occasional examples from elsewhere. I also pursue historic perspectives on this topic, insofar as they manage to illuminate the musical effects of changes in the use of music equipment first described in chapter 2.

In the following analyses the *manner* in which the sounds are produced will also be of interest. This focus corresponds to the first of Cornelia Fales’s three domains of sound, presented in the previous chapter (the productive, the acoustic, and the perceptive). I will aim to bring all three domains into play in order to render a comprehensive description of the various sound events that are relevant here.
Analysis of the poumtchak sounds

THE DOWNBEAT: PITCH MOVEMENTS IN BASS DRUM SOUNDS

Based on my prior discussions of verticality in music, it seems likely that a descending pitch movement will facilitate or even activate a certain body movement in the same direction. Motor schemas contribute to transferrals from a descending pitch movement in the musical sound to an actual downward movement in space. It is also likely that a more pronounced movement in the music will suggest a more intense body movement. Bass drum sounds that are used to form a poumtchak pattern often involve such descending pitch movements, and they can have an effect on how various tracks are experienced.

Bass drum sounds in the 1970s

New methods of producing bass drum sounds have been gradually adapted in dance music production over the past few decades. An early disco production from the 1970s, to begin with, would most likely involve a bass drum sound that was recorded using a specific microphone onto a unique track on an analogue multitrack recorder. A descending pitch movement could be introduced to this sound by loosening a single tuning lug on an otherwise equally tuned batter drumhead, or by tuning the resonance head lower in overall pitch than the batter head. This was probably not a priority, however, among the numerous parameters for shaping an effective bass drum sound (width, size, depth, material of the drum, drumheads, pedal, microphone type and placement, studio equipment, acoustics, playing technique, and so on). A 1970s disco production typically aimed at producing a dense and defined sound that worked well alongside the bass guitar, as in the sonograms below. Both productions stand out with bass drum sounds that are more apparent in the mix than was customary in this decade.

Figure 8.1: Sonogram of bass drum sound at 01:39 from Donna Summer’s Love to Love You Baby (1975).

Figure 8.2: Sonogram of bass drum sound at 01:26 from Cerrone’s Love in C Minor (1976).
Both examples seem to involve pitch movement (note the darkest areas), but it is not especially noticeable when we listen to them, and, compared to examples from the succeeding decades, the movement is in fact quite insignificant.

**Drum machines of the early 1980s**

The Roland drum machines from the early 1980s (the TR-808 and TR-909) have bass drum sounds that are produced in various ways through analogue synthesis. However, one’s ability to control the sound parameters is limited relative to a conventional synthesizer. The TR-909, for example, has only four knobs with which to shape the bass drum sound: tune, attack, level, and decay. The tune knob on the TR-909 works within a limited range, and figure 8.3 displays sonograms of four different settings (0 = the knob turned all the way counterclockwise and 10 = the knob turned all the way clockwise).

![Figure 8.3: Sonogram of bass drum sounds from the Roland TR-909. Tune settings, from left to right: 0, 3, 7 and 10 (attack: 0, decay: 0).](image)

As is evident here, the TR-909 can produce a fairly pronounced descending pitch movement (the darkest diagonal contour). This outcome is best heard (and seen) when the tune knob is turned all the way clockwise. Though the attack and decay controllers cannot shape this pitch movement further, they can emphasize or deemphasize it to a certain extent.

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21 See my introduction to the use of sonograms on page 10.
22 Using analogue synthesis, a producer can easily create a descending pitch movement in a drum sound with an inverted envelope generator whose medium short attack is set to modulate the pitch of the oscillator.
23 The decay knob controls the AR (Attack-Release) envelope on a sawtooth-wave produced by an oscillator and shaped by a Waveshaper that cannot be controlled by any of the knobs. The attack knob controls the envelope on an additional sound produced by a noise generator (sort of a clicking sound). See Reid 2002a.
On the TR-808 there are only three knobs: level, tone, and decay. The tone knob does not tune the oscillator but instead controls a low-pass filter that at different settings reduces the high frequencies.\(^2\)

![Figure 8.4: Sonogram of bass drum sounds from the Roland TR-808. Tone settings, from left to right: 0, 3, 7 and 10 (decay: 3). Stippled line at 1 kHz assists in visualizing high-frequency content.](image)

On the sonogram, differences among the four tone settings are barely apparent in the presence of high-frequency content at the attack (the example to the very right has the most frequencies above 1 kHz). With tone settings turned all the way clockwise, the low-pass filter reduces less high frequencies, making the sound punchier. Still, the sense of descending pitch movement is not as pronounced with the TR-808 as it is with the TR-909.

![Figure 8.5: Sonograms of bass drum sounds from the Roland TR-808 to the left (tone: 3, decay: 3) and the TR-909 to the right (tune: 10, attack: 0, decay: 7).](image)

On the sonograms, the differences between the two sounds are obvious. The attack of the TR-909 starts with a tone around 200 Hz that falls rapidly down to below 100 Hz, while

\(^2\) The oscillator for the bass drum in the TR-808 does not produce a continuous sound (as most synthesizer oscillators do) – instead, it produces a sound that decays to silence without the need of any envelopes. The decay knob on the TR-808 controls a feedback loop that at various settings produces a shorter or longer sound. See Reid 2002a.
the sound from the TR-808 has a less defined tone with the highest density of frequencies permanently below 200 Hz. While both sounds are defined and concise, the TR-909 sound has a more pronounced descending pitch movement, which, in accordance with the notion of an experienced verticality in music, is likely to affect body movement more profoundly than the TR-808 sound.

**Bass drum sounds of the 1990s (and beyond . . .)**

During the 1990s the options for selecting bass drum sounds increased with the advent of various pre-recorded sound archives. Producers could merge electronically produced sounds with recorded acoustic bass drum sounds and customize sounds to fit the needs of their productions. Some producers even used specific bass drum sounds as part of their artistic signatures. The Israeli 1990s production team Astral Projection (Avi Nissim and Lior Perlmutter) cultivated a specific descending pitch movement in their bass drum sound in relation to the genre trance. In the track *Dancing Galaxy* (1997; tempo 139 bpm) the pounchtchak pattern forms the basic beat. The bass drum sounds appear as diagonal lines in the lower part of the sonogram.

![Figure 8.6: Sonogram of excerpt (eight beat cycles) from Astral Projection's *Dancing Galaxy*, 1:01–1:03.](image)

The drum attack starts with a tone around 400 Hz that falls rapidly (over a period of one hundred milliseconds) to around 100 Hz. Though it does not resemble a traditional acoustic bass drum sound, its function is obviously the same and it has a definite

25 See discussion on verticality in chapter 4 (page 134).
concentration of frequencies below 100 Hz. In the mix the bass drum sound (and its pitch movement) is clearly evident. Since the pitch movement is more pronounced than the TR-909, it seems to evoke body movement even more strongly.

By way of contrast, figure 8.8 displays a sonogram of a bass drum sound from the track *What They Do* (1996; tempo 93 bpm) by the American hip-hop band the Roots. Its concentration in the frequency area around 100 Hz and below continues (without any pitch movement) after the attack. There are also much higher frequencies at the attack (transients) in comparison to the Astral Projection example. This sound in fact resembles an acoustic bass drum sound and may have originated as one,\(^{26}\) though it was probably shaped in numerous ways to suit the production.

In British and French house music, both the TR-808 and the TR-909 were used extensively for bass drum sounds during the 1990s. But other alternatives such as samplers and harddisc recording became increasingly available during this period. The Daft Punk track *Phœnix* (1996; tempo 127 bpm) starts with thirty-two successive bass drum sound events, and the descending pitch movement is evident both in the sonogram and to the ear. The drum sound starts with a tone at around 200 Hz that rapidly descends to below 100 Hz.

In the sonogram below, I have collected three bass drum sounds from various Basement Jaxx releases, picking excerpts where the instrument particularly stands out.

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\(^{26}\) The Roots are famous for playing hip-hop on conventional instruments (rather than DJ desks) and may want to give an impression of “liveness” also in their studio work. But even if parts of the track were played live in studio, they might have been looped; in addition, parts might have been replaced, mistakes might have been corrected, and so on.
The bass drum sound in the example from 1995 is tuned higher than the two others, with a tone at around 250 Hz and a descent to below 100 Hz. The tones of the two other sounds both start (at around 200 Hz) and end slightly lower than the first, and they are also longer in duration. Their descending pitch movement is evident to the ear for all three but somewhat more apparent in the first.

Though there are numerous house music tracks without an apparent descending pitch movement in the bass drum, it is probably more common in the many subgenres of electronic dance music than it is in popular music in general. The sonogram below displays a bass drum sound from the original mix by the renowned American producer Timbaland (Timothy Mosley) (2001; tempo 121 bpm) and a remix by Basement Jaxx (2002; tempo 131 bpm) of the Missy Elliott track *4 My People*; both tracks use the poumtchak pattern as the basic beat.

Differences concerning the descending pitch movement are quite evident in these sonograms. While Timbaland uses a rather short, dense bass drum sound without an audible pitch movement, Basement Jaxx uses a bass drum sound that recalls the previous
examples. In the practice of remixing, such features attached to sounds may be part of the signature of certain producers/remixers.

**Bass drum sounds and microrhythmic relationships**

As I discussed in part III, deviations from a structured grid typically underpin the assumptions of most studies of groove and rhythm. A fully quantized track does not fit this picture. However, sounds interact in intricate manners. If a bass drum sound with a descending pitch movement is placed *exactly* on the downbeat, the pitch movement may in fact locate the lowest point of a vertical movement pattern just *after* the beat. A fully quantized hi-hat sound on the following upbeat will then be experienced as “early” in relation to this body movement, and this “early” realization can produce a “push” or “drive” forward by giving extra energy to the upward movement as it rushes to catch up. This shows that pulse sensation is not a stable phenomenon that is automatically transferable to discrete, quantifiable entries but a perceptual process connected to how the body specifically *feels* the pulse, which in turn depends on musical features such as sound parameters, sound combinations, and tempo.

**Tempo**

Generally a descending pitch movement in a bass drum sound should fit the tempo of the song (and the body movement that the tempo inspires). A trance track is usually faster (around 140 bpm) than a typical house track (120–135 bpm), while a hip-hop track may have a tempo below 100 bpm. At slower tempi, a pitch movement will have to be decelerated, which blurs the bass drum’s “punch” and can prolong the experience of a downward movement. Such bass drum sounds do not work in a house track with a tempo between 120 and 135 bpm, where the descending pitch movement has to be faster to supply that punch.

**THE UPBEAT**

The hi-hat sound that generally complements the bass drum in the pountchak pattern does not incorporate pitch movement and therefore merits less discussion in this regard. Developments in sound production concerning the hi-hat sound follow those of the bass drum sound, from a live drummer to drum machines and samplers with external MIDI sequencers and then to digital, computer-based audio and MIDI sequencers. Here the
issues primarily concern duration, timbre/pitch, and the use of additional or alternative sounds in relation to the hi-hat.

Usually the same hi-hat sound is used from start to end in a track, and its timbre and duration are preserved. But every so often this will change, depending upon other features of the mix. Hi-hat sounds are also frequently modulated by filter effects, when these are used in the high-frequency areas of a given track.

Duration
In a section from 0:46 to 1:24 in Daft Punk’s Phœnix (1996), the duration of the hi-hat sound gradually increases. This can be done by extending the MIDI entries in a sequencer or altering the settings of the sound’s “amp envelope” by, for example, slightly increasing the decay time while the sustain level is set to zero. This is not particularly common but does serve to illustrate the significance of duration in relation to hi-hat sounds on the upbeat. Over the thirty-eight seconds of this build-up section, the hi-hat sound is extended five times, at every sixteenth beat-cycle (or every fourth 4/4 measure).

The duration of the sound increases from about twenty-five milliseconds when it is introduced to about 160 milliseconds during the last sixteen beat-cycles of the period. If a certain pull upward is experienced from the hi-hat sound, it is possible that this pull is slightly intensified, or the peak position of the movement is extended, each time the sound’s duration is changed.

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27 The “amp envelope” regulates how the sound is amplified. The decay represents the second step in the ADSR (attack, decay, sustain, release) settings of an envelope, and it controls the duration between the sound’s peak level and its sustained level. The Roland TR-808 drum machine only had a decay button for the open, not the closed, hi-hat sound.
When a sound like this hi-hat sound, with the same qualities of pitch, timbre, and loudness, is repeated, even subtle changes in duration will affect its salience. In relation to a movement curve, the sound with the extended duration may keep the listener/dancer at the peak of an upward movement a bit longer, in this way extending the upbeat and in turn driving the track forward via the succeeding quicker downward movement. The whole section that includes these five extensions of duration lasts for about thirty seconds, and these subtle changes may well produce a gradually intensified experience that is typical of the build-up sections of dance music tracks.

**Timbre/pitch**

Changes in timbre and/or pitch also comprise potential variations among hi-hat sounds. In the transition from measures 6 to 7 in the Basement Jaxx track *Jump n’ Shout* that was discussed in chapter 6, the hi-hat sound changes slightly in duration and loudness but more so in timbre/pitch – in the sonogram below, the four entries to the left reach to about 13 kHz, while the four to the right reach above 16 kHz.28

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28 It is hard to determine the extent to which this change is caused by the introduction of a new hi-hat sound as opposed to the modulation of the original sound with certain new equalizer settings; therefore, it is also difficult to decide whether this change concerns primarily timbre or pitch. A traditional acoustic hi-hat sound cannot be tuned (except moderately through playing techniques), whereas a hi-hat sound on a sampler or a synthesizer often can be tuned up and down like any other sound.
These changes make the hi-hat sound more salient in this track, where it already cuts through a dense overall mix in a frequency range of its own.29

Additional vocal sounds
The last topic to be discussed in relation to the upbeat concerns other sounds that may alternate with, or more commonly, accompany the hi-hat sound. Samplers and sequencers make it possible to extract any sound from a musical phrase, copy it, and paste it in somewhere else in the track. These samples or sound bits might be either instrumental or vocal sounds. In the following examples I will try to illustrate how various vocal sounds might influence a vertical movement pattern. According to the theories concerning motor-mimetic processes presented in chapter 4, such sounds are particularly suited to evoking participatory movements from how we will produce the sounds ourselves.

My first example is from the track Five Fathoms (1999; tempo 122 bpm) by the British group Everything but the Girl (writer/producer/DJ Ben Watt and singer Tracey Thorn).

29 The term “staging” is used by several writers (Lacasse 2000, Moylan 2002, Zagorski-Thomas 2008) to indicate how sound is made to create a meaningful setting for the listeners. With the term “functional staging,” then, Zagorski-Thomas further applies the concept to “mixing techniques that spotlight certain functionally important musical features in ways that do not create specific musical meaning (such as highlighting an emotion or creating an illusory space) but which make the music function more efficiently” (Zagorski-Thomas 2008:204). He exemplifies this with production techniques in dance music that “strengthen attack transients and clarity” (205). This section from the Basement Jaxx track with a boosted hi-hat thus illustrates “functional staging” with regard to dancing.
The vocal utterance on the second (and sixth) upbeat is in fact a short groan with a somewhat mechanical vowel sound. It is repeated throughout the track right after a downbeat that is emphasized by a pick-up note with a snare drum sound. The groan goes well together with head nodding or upper-body bouncing, since an upward movement supports the bodily actions needed for the utterance. The vocal sound seems to emphasize the specific upbeat when it is “performed” within the movement pattern.

A similar use of an utterance appears on the track *Sucubz* (2001; tempo 125 bpm) by the French producer Ark (Guillaume Berroyer).

The last upbeat in a series of eight beat-cycles (two 4/4 measures) is followed by a short vocal “yeah” right before the succeeding downbeat. The event occurs late in relation to the upbeat (and closer to the following sixteenth), but is experienced as part of it. The duration of the utterance, its pitch, and its character match a vertical movement pattern, and performing it while moving seems not only to emphasize the upbeat but also to
somewhat extend the corresponding movement, since the duration of the “yeah” is longer than anything else that happens on the upbeat. It could well introduce variation to the experience of a vertical movement pattern.

The last example is from the Missy Elliott track 4 My People, originally produced by Timbaland and remixed by Basement Jaxx. Both of these mixes have many vocal sounds (moans, “yeahs,” and so on) on both upbeats and downbeats. Short vocal sounds exactly on the upbeat are present in both of these versions.

The vocal sound here is a short, intense intake of breath. It occurs several times early in the tracks but not as regularly as in the previous examples. In both versions hi-hat sounds on the upbeat are also audible and in the Basement Jaxx remix a synthesizer joins the hi-hat at times. Like the previous examples in this section, the breathing here seems to match a vertical movement pattern perfectly, and it may bring extra intensity to the experience when “performed” by the listener/dancer.

These vocal sounds all bring an extra dimension of participation into the music that in different ways introduces variation and intensity to the experience of a vertical movement pattern.

THE BACKBEAT

Given its prominent position in the standard backbeat pattern, the snare drum is probably the most important drum sound in pop/rock. In electronic dance music, at least with regard to the pountchak pattern, this is not the case, however. Very often a snare drum or
handclap sound is part of the basic beat, but, as discussed in chapter 6, this sonic presence is rather slight relative to the bass drum and hi-hat sound. The functional role of the backbeat here seems only to be the introduction of some variation to the basic beat and the movement pattern it activates.

There is no standard snare drum sound in electronic dance music, but sounds that accompany a four-to-the-floor bass drum pattern must be shaped to fit this task. Compared to other popular music genres, the snare drum sound will often be boosted in low frequency areas in particular. Handclap sounds often alternate with or even accompany the snare. Usually the sound on the backbeat (either a snare drum or a handclap) will demonstrate consistency in its duration, use of reverb, use of equalizers, and placement in the mix. These traits all contribute to the realization of a clearly defined groove.

Snare drum sounds of the 1970s
The snare drum sounds of a disco track and a rock track from the 1970s differ markedly in several ways.

Figure 8.20: Sonogram of snare drum sounds from the disco track by Candi Staton, *Young Hearts Run Free* (1976), to the left, and the rock track by Led Zeppelin, *D’Yer Mak’er* (1973), to the right.

The two sounds differ less in timbre, than in duration and use of reverb. The disco track is much shorter and dryer. A more apparent boosting of higher frequencies at the attack (transients) is also visually present in the sonogram of the disco track (the darkest area of the sonogram has a higher vertical extension). The ideal snare of 1970s disco was a very muffled sound that ultimately derived from small, insulated drum rooms. Several productions from this time period have been criticized for being too dry and dull, but in

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30 See page 164.
relation to the dancefloor, such drum sounds are easiest to move to the forefront of the mix.

The drum machines of the early 1980s

Both snare drum and handclap sounds were central to the Chicago house tracks, but the rock-derived emphasis on the backbeat gradually became less and less important there. These sounds were frequently combined with bass drum sounds, mainly as part of a different basic beat but also perhaps due to the fact that 1980s analogue drum machines could not match the rock backbeat snare drum sound.

The Roland TR-808 had three controllers for the snare drum: level, tune, and snappy. The tune controller could tune the low-frequency content of the drum within a limited range (see figure 8.21), while the snappy controller regulated the amount of white noise (see figure 8.22), thus imitating the sound from the snare wires. Still, the product was a long way from an actual acoustic snare drum sound.

The Roland TR-909 had a more advanced sound synthesis for the snare drum sound, with a tone controller in addition to the two controllers of the TR-808. It could therefore better recreate the short, dry disco snare drum sound and its sharp, definite attack. The handclap sounds on the two machines were quite similar and could not be modified in any way (except via the level control). Both the handclap and these snare
drum sound variations from the TR-808 and TR-909 have appeared on numerous electronic dance music tracks.\textsuperscript{31}

Snare drum sounds of the 1990s
During the 1990s, digital sounds on samplers and subsequently through harddisc recording introduced new possibilities, and better technology also offered more control over the shapes of these sounds.

\begin{figure}[h]
\centering
\includegraphics[width=0.45\textwidth]{figure8.23}
\caption{Sonogram of Romanthony’s Down 4 You, 2:48–2:50, snare drum sounds circled.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=0.45\textwidth]{figure8.24}
\caption{Sonogram of Shazz’s Fallin’ In Love (PT. G Remix), 0:00–0:02, snare drum sounds circled.}
\end{figure}

The examples above illustrate two somewhat contradictory sounds on the backbeat of a poutchak pattern, both in combination with a bass drum sound. The Romanthony track has a sound that resembles a handclap rather than a snare drum, but it is fuller and more defined than a standard handclap sound (for example, that of the TR-808 or TR-909). The sound seems to emphasize the downbeat but may not pull downward in the same way as the bass drum sound. Its effect on a vertical movement pattern, then, may be that every second downbeat is exaggerated but also halted earlier than the preceding and following downbeats (due to the high frequency content of the sound). The Shazz track uses a snare drum sound that blends in with the bass drum sound. The high frequencies seem to be attenuated, almost as if we are only hearing their reverb. The sound gives extra emphasis to the downbeat and in turn exaggerates this downward movement in a similar manner to the Hercules and Love Affair example discussed in chapter 6.\textsuperscript{32}

\textsuperscript{31} See Reid 2002b for a more detailed introduction to the production of snare drum sounds on the Roland TR-808 and TR-909.

\textsuperscript{32} See page 165.
Analysis of synthesizer sounds

Synthesizer sounds last as long as a key on the keyboard is pressed. Consequently, these events typically have considerably longer durations than the sounds treated above. This offers an opportunity for larger pitch contours and more obvious pitch movements and notions of verticality in the music.

PITCH MOVEMENT IN SYNTHESIZER SOUNDS

The production of pitch movements

With acoustic instruments such as trombones, string instruments, or fretless bass guitars, it is easy to produce continuous pitch movements. Instruments where it is more problematic to slide from one note to the next (for example, pianos or guitars with frets) may also produce them to a lesser degree. Either way, a correspondence between the slide and body movement is likely, \(^{33}\) whether as the result of conscious production goals or coincidence. The term “glissando” has typically referred to any pitch movement, while “portamento” generally implies vocals and string instruments (a stricter continuous pitch movement). The terms “portamento” or “glide” name this effect on synthesizers. \(^{34}\)

Synthesizers of the 1970s

In this sonogram of Keith Emerson’s Moog sounds from 1972, the portamento effect is circled at the beginning of each tone.

Figure 8.25: Sonogram of Emerson, Lake & Palmer’s The Curse of Baba Yaga, 03:14–03:16, with portamento effects circled.

\(^{33}\) The bassline on the verse of Lenny Williams’s You Got Me Running (1978), the background-vocals intro to the refrain on Thelma Houston’s Don’t Leave Me This Way (1976), the undulating string arrangements in the intro of Gloria Gaynor’s I’ve Got You Under My Skin (1976), or the ascending vocal intro on Chic’s Le Freak (1978) are examples from 1970’s productions with pitch movement effects that could impact body movements.

\(^{34}\) Already in 1970 the Minimoog had a “glide” function that could be set to different levels using a knob on the front panel.
The extremity or obviousness of the portamento or slide effect depends upon the pitch interval it covers (and its parameter setting). The pitch movement introducing the first tone in the sonogram is longer than those of the second or third tones because its interval is larger. In the sonogram below, Emerson alternates between intervals of one and two octaves.

![Sonogram of Emerson, Lake & Palmer’s *Lucky Man* (1970), 03:40–03:43.](image)

The “pitch bend” effect also produces sliding pitch movements, and, contrary to the portamento/slide effect, it can be controlled independently while the musician is playing. Usually synthesizers are equipped with a wheel or joystick for controlling the pitch bend effect, so the keys can be played with the right hand while the left applies the pitch bend.

![Sonogram of Parliament’s *Flash Light* (1977), 0:03–0:07.](image) ![Sonogram of Parliament’s *Flash Light*, 0:34–0:36.](image)

In these two sonograms a pitch bend effect on the synthesizer sound is clearly visible as dark undulating lines whose relative inconsistency indicates that it was done manually while playing.
New production techniques of the 1980s

MIDI sequencers allowed for pitch bend effects to be edited or programmed directly into them. The computer-based sequencers (which arrived around 1987) had the ability to visually represent such effects, making them very accessible. Synthesizer sounds could also be programmed with modulators such as envelopes or low-frequency oscillators to further control the pitch in various ways. Thus entire patterns of pitch movement could be composed into a sound of a certain length. When memory storage became a common feature on synthesizers as well around 1980, sounds with programmed portamento settings and/or certain modulators for their pitch could be programmed or acquired as presets when buying the synthesizer (or later on from external sound programmers). Compared to the balancing act of playing keys and controlling pitch bend, of course, pre-programmed sounds were much easier to use.

An early example of this synthesizer sound is Shep Pettibone’s influential 1983 remix of First Choice’s *Let No Man Put Asunder*. During the last four minutes of the track, there is a short synth sound that is placed on the upbeat and then mixed in and out. In the sonogram below, the pitch movement of the sound is easy to see.

![Sonogram of Shep Pettibone’s remix of First Choice’s *Let No Man Put Asunder*, 6:19–6:21, placed in a grid with note values, with the synthesizer sound circled.](image)

As demonstrated by the grid here, the sound plays alongside the hi-hat, shaping the tchak in the poumtchak pattern. Even though the sound operates in the upper-middle frequency area, it fits well with the hi-hat sound and contrasts with the echoed bass drum (also
visible in the sonogram) and (through most of the track) the bassline. The sound’s pitch movement does not seem to affect body movement in a particular direction, but its bounciness seems to encourage general body bounciness as well. The event comes and goes, probably adding a degree of variation to the poumchak pattern. In the 1999 cover version of the track by Mary J. Blige, an almost identical sound works in the same manner.

Figure 8.30: Sonogram of Mary J. Blige’s *Let No Man Put Asunder*, 3:19–3:21.

There are several ways in which synthesizer sounds may produce notions of movement within a basic poumchak pattern. As opposed to bass drum sounds, where the descending pitch movement fortifies a like direction in body movement, synthesizer sounds are less predictable. In some cases they may do the same, but they may also move in and out of this shared positioning, creating parallel but asynchronous patterns or even opposing the poumchak pattern. This type of conflicting verticality from pitch movements probably contributes tension to a groove in a manner similar to the conflicting rhythm patterns discussed in chapter 6.\(^\text{35}\)

In the following I will focus on this tension among different movement patterns as represented by the grooves of various electronic dance music tracks from the 1990s.

**Various examples from electronic dance music**

A synth riff I find remarkably powerful forms the core of the track *Mentasm* by the American DJ/producer Second Phase (Joey Beltram) from 1991. The riff lasts four beat-cycles (one 4/4 measure) and is repeated throughout most of the track. For the first two minutes, the sound is unchanged; severe sound modulation then occurs through the rest of the track. The riff consists of a few tones tied together by descending and ascending pitch movements.\(^\text{36}\)

\(^{35}\) See page 184.

\(^{36}\) A transcription of this riff is challenging, because very few tones exists as stable pitches. In addition to what I have transcribed, there is a pedal point on E-flat and a doubling of it two octaves lower.
Stan Hawkins describes the riff as a “steaming, industrial jerky rupture,” created on a Roland Alpha Juno synthesizer, which was first produced in 1986. This synthesizer has a digital oscillator capable of producing multiple waveforms, an analogue filter, and a single ADSR envelope that can simultaneously modulate the oscillator, filter, and/or amplifier. It is therefore unlikely that the envelope modulates the pitch movements of this riff, which is more likely the product of a portamento effect.

These various pitch contours could activate corresponding body movements. In accordance with my discussions on musical verticality in chapter 4, these ascending and descending pitch movements can be experienced as notions of movement and further initiate a corresponding movement pattern. In the sonogram below I have attempted to draw a curve to illustrate a possible up-and-down movement pattern. The curve is shaped according to the tones in the riff, its dynamics, and its pitch movements. The descending B-flat to E interval seems to produce the most energy in the riff.

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37 Hawkins 2008:126.
38 ADSR stands for attack, decay, sustain and release. A simple diagram of the synthesizer is available at webpage 8.1.
After sixteen beat-cycles (four 4/4 measures) with the riff playing separately, the bass drum enters on the downbeats. There is no upbeat hi-hat pattern, but the bass drum may activate a vertical movement pattern by itself. In the sonogram below, the two seemingly conflicting movement patterns are portrayed together.

Both patterns are equally emphasized and probably generate movements in a similar manner. It is therefore possible to switch from one to the other and thereby create individual movement combinations. Thus accentuated peaks (the B-flat to E interval), shifts in timing (or placement), and disturbances or tension points are produced by the interaction between the poumtchak pattern and the riff. The drawings in the two sonograms below illustrate possible movement patterns synthesized from the sounds.
In both illustrations the placement of the peaks and troughs generally avoids exact note values in the grid. Variations in energy or emphasis are illustrated by the heights of the peaks and disturbances or tension points are breaks or irregularities on the curves. In this way we can visualize how individual experiences of a groove are produced through such interacting connections and patterns. When contradictory movements are introduced successfully, it seems to produce tensions in the muscles that in turn arouse excitement. It comes to no surprise, then, that this track achieved considerable success on the dancefloors of the 1990s.

Two other examples of interacting patterns appear on Daft Punk’s album *Homework* from 1996. Throughout the track *Burnin’* there is a synthesizer sound with a pitch movement that careens between low- and high-frequency areas.
The undulating structure made by the synthesizer sound on the sonogram resembles the lines I have used elsewhere to illustrate a vertical movement pattern. It is likely that this pattern activates even more dramatic movement in the dancer, because the ascending and descending movement here is continuous rather than repeatedly re-triggered by two contrasting sounds. The two patterns are not mutually reinforcing, however.

As is visually apparent in the sonogram, the pitch movements of the synthesizer sound do not correspond with the body movement pattern indicated by the poumtchak. This pitch movement only occurs two times during the four beat-cycles represented by the sonogram, and its realizations are in fact opposed to the poumtchak pattern – the peaks of the synth sound are placed on the second and fourth beat-cycles. So how do they interact? It appears that the first and third up-and-down movements are increased in both strength and duration, while the second and fourth are decreased in the same way.
In the sonogram above, I attempt to illustrate a possible movement curve that is influenced both by the poumtchak pattern (the movement curve with dotted lines) and the pitch movement in the synthesizer sound. These may of course be experienced in quite divergent ways. Still, it is important to recognize the tension, interaction, and variation that sounds with pitch movements can bring to a poumtchak groove.

On the track *Rock’n’Roll* from the same Daft Punk album, there is another synthesizer sound with a definite pitch movement.

![Figure 8.41: Sonogram of Daft Punk’s *Rock’n Roll*, 4:27–4:29, placed in a grid with note values.](image)

The sound is faded in after thirty seconds and continues with constant modification until it is faded out thirty seconds before the end. It starts with a sustaining tone that changes into four undulating movements of increasing intensity. This course lasts four beat-cycles, and the final pitch movement ends in a new sustaining tone. The sonogram above is taken from a section where this sound occurs by itself and its pitch movements are visually quite apparent. For most of the track this sound is combined with a poumtchak pattern and a few other drum sounds (handclaps and snare drum sounds).
I have in the sonogram above illustrated a possible movement pattern according to the pitch movements in the synthesizer sound. The three last undulations form a movement structure that closely resembles a counterrhythmic pattern, and the listener/dancer’s experience of it may be somewhat similar to that discussed in chapter 6 regarding this topic. It is again possible (and maybe more likely) for one to maintain the movements evoked by the poumtchak pattern and experience the counterrhythm of the synth riff as constructive tension or conflict within this pattern. It is also possible to switch back and forth between the two movement curves.

Generally, various synthesizer sounds with pitch movements appear to contribute tension to the poumtchak in much the same way as the complementary or counterrhythmic patterns that were discussed in chapter 6. This means that the dynamics of unique sounds in the rhythmic fabric might have as much of an affect on movement as the design of the rhythmic patterns themselves.

**Analysis of sound in effect processing**

In the analyses so far I have engaged sound as a series of “discrete events” – primarily drum sounds and synthesizer sounds. Now I will turn to the second type of sound events introduced in the preceding chapter: sound as “a certain application of effect processing.”

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39 See page 189.
THE GRADUAL OPENING LOW-PASS FILTER

Filtering effects in electronic dance music reach back to DJs like Nicky Siano, who in the 1970s started experimenting with the use of equalizers in New York clubs.\textsuperscript{40} The removal (and gradual or sudden return) of either low or high frequencies has since become a standard part of a DJ’s repertoire. With the harddisc recording techniques and digital effects processing units of the 1990s, such effects have also become available at the production stage. The most common effect used in house music production involves the removal of high frequencies with a low-pass filter – this is often called the “underwater” effect or “that neighbour’s stereo through the wall trick.”\textsuperscript{41} On production equipment these filters are often combined with a resonance or Q-point setting that boosts the frequency area in which the filter starts its attenuation. A typical build-up, then, might involve a gradual opening of a low-pass filter, often combined with a boost in the various relevant frequency areas. The following examples suggest ways in which this gradual opening of the filter may relate to movement.

Examples from Daft Punk’s \textit{Homework}

On Daft Punk’s 1996 album \textit{Homework}, seven tracks employ the effect in question, predominantly to modify certain instruments or sounds rather than the whole mix. I will first present three examples from this album and then discussing their impact on dancers.

Four times during the track \textit{Burnin’} (tempo 124 bpm), a combination of sounds (at first resembling bubbling liquid) starts out with only low frequencies and then gradually receives higher frequencies until it fills the spectrum. Particularly prominent here is a long sustaining tone accompanied by short rhythmic sixteenths. In the excerpt in figure 8.43, the bassline is removed and the drum sounds attenuated until the low-pass filter is fully opened, while a synthesizer sound with an alternately ascending and descending pitch movement (seen as repeating lines in the sonogram) is kept in front.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure843.png}
\caption{Sonogram of Daft Punk’s \textit{Burnin’}, 4:26–4:58, with the effect of an opening low-pass filter circled.}
\end{figure}

\textsuperscript{40} See Brewster & Broughton 2006:160–64.
\textsuperscript{41} Preve 2006:95.
The track *High Fidelity* (tempo 126 bpm) also has several filter effects throughout. In the passage in figure 8.26 the filter modifies all of the instruments/sounds except the hi-hat and snare drum. This excerpt is also a typical build-up section, with several instruments dropping out until the end of the passage.

The track *Around the World* (tempo 121 bpm) begins with a low-pass filter on the entire mix. After thirty-two beat-cycles (eight 4/4 measures) lasting a total of fifteen seconds, the filter starts opening, a process that also lasts thirty-two beat-cycles. It ends with an ascending sound effect introducing the main instrumental riff of the track.

How might this type of effect influence a vertical movement pattern? In this last example, low frequencies dominate the mix until the filter starts opening. Gradually the high frequency sounds become audible, and the alternation of low and high sounds becomes clearer. As the low-pass filter gradually opens, then, the pull upward by the increasingly obvious hi-hat sounds may intensify the movements. The same effect seems to be present in the other two examples as well, but the various unfiltered sounds, render it somewhat less profound. In the sonogram below I attempt to illustrate how a filter effect might function in relation to movement as part of a build-up section in a track.
The initial rhythm pattern with only low frequencies only moderately activates a vertical movement pattern. As the filter starts opening, however, the movements slowly intensify as the higher frequencies are gradually exposed. The increased lengths of the movement curve indicate this intensification.

Moreover, several simultaneously occurring features may be involved in activating the intensification of this build-up section. Eric Clarke links the sound of a gradually opening low-pass filter in the Fatboy Slim (Norman Cook) track *Build It Up, Tear It Down* (0:28–0:55) to the perceptual effect “of a continuous movement towards a sound source that is first occluded.”42 According to the ecological approach to perception, our knowledge of how sounds behave in the physical world is part of the process of music listening and can thus be a source for the experience of movement: “High frequencies are absorbed and dissipated in the environment more rapidly than low frequencies, leading to the characteristic ‘bass heavy’ quality of amplified music heard at a distance.”43 The opening low-pass filter, then, will resemble the act of gradually approaching a sound source, which may contribute to the intensity of the build-up.

Egil Haga, in his Ph.D. dissertation on correspondences between music and body movement, identifies several features that he argues may contribute to higher levels of movement activation: greater densities of events, large pitch variations, higher volumes (loudness), distinct articulations, bright timbres, and horizontally spread and thick

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42 Clarke 2005:81.
43 Loc. cit.
Several of the features (density, volume, bright timbres, thick textures) are to a certain extent increasingly present with the opening of a low-pass filter.

Finally, the familiarity of this low-pass filter effect and the expectation it therefore evokes for cultural insiders matters with regard to its impact on movement. The usual introduction (or return) of certain instruments, a specific, intensifying groove, or a structural climax at the point when the filter is fully open all work to satisfy dancers’ expectations. When one is moving to this music, one “holds back” and then slowly lets go, physically manifesting the musical tension and release that take place in the build-up sections.

**Analysis of sound in the total mix**

Lastly I will address sound as the “outcome of a combination of several sound sources” via various effects that engage the total mix of a given track.

**COMPRESSION**

Loudness is an essential issue for the producers of dance music with regard to radio play, club play, and a track’s reproduction in other locations or situations as well. Any given track must seem at least as loud as the one it follows; a decline in energy is not tolerable. Compressors and limiters are dynamic processors that level out the volume of an instrument, which in turn makes it possible to boost it. Compression is often applied to different stages in the mixing process; to separate instruments, to instrumental groups, to the total mix, and finally to the mastering process. Dynamic processors can operate on specific frequency bands or on the total range of frequencies.45

A study of dance music tracks from the 1970s through the 1990s demonstrates the importance of compression and its enhancement. The amplitude representations below reflect a disco track, a Chicago house music track, and a British club/house music track, each separated by a decade.

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44 Haga 2008:183.
45 Producers also use specific compressors or limiters to colour the sounds (changing its timbral content).
These amplitude representations indicate that the Basement Jaxx track from 1995 generates considerably more energy than the two others. These differences are also present on sonograms where the respective frequency bands are displayed.

Again the Basement Jaxx track has more energy in all of the frequency bands. Improved control over the reverb of instruments has also allowed for greater volumes without blurring the mix. This development in the production of dance music has been essential to the music’s potential for activating body movements, with the enhanced punch from the bass drum being particularly important.

**Stereo panning**

The diagrams in figure 8.51 represent the stereo panning of these tracks.
The Basement Jaxx track has almost all of its information centred, while the other two producers have created a much broader stereo image. *Samba Magic* is intended to be exclusively a dance music track, while the specifications of other media, like radio, probably informed the earlier productions. Sounds that are distributed among different channels can cause problems on a dancefloor that is organized with a left/right speaker system, because music can be missed. In many popular music productions, the drums are mixed according to their visual appearance on a stage with, for example, the hi-hat panned slightly to the right. In a dance music track, however, it is essential that the hi-hat sound is approximately the same wherever you are on the dancefloor, or else a vital component of the basic beat that drives body movement can be lost.

**Ducking**

One specific use of dynamic processors is called “ducking.” Its main purpose is to emphasize a specific instrument by attenuating (ducking) others. In dance music this effect is often used to ensure that the bass drum is sufficiently present in the total mix, but it can also produce an interesting “pumping” sensation overall. In popular music production, “pumping” is the (usually) undesirable result of too much use of the compressor, but in house and trance music, where a steady four-to-the-floor bass drum controls the processor, it is often applied intentionally. If the threshold, attack, and release settings are right, the bass drum sound makes the processor reduce the gain automatically on the other sounds in the mix, but this reduction will be in effect only as long as the bass drum sound is present. Depending upon the attack and release settings, then, the gain may alternate (pump) at exactly the same rate as the pountchak pattern.

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46 Ducking can be achieved using regular compressors/limiters or through specific ducking applications. A side chain is normally used to feed the processor with an external signal (for example, the bass drum), which then controls the effect. See Izhaki 2008:270f and 376–381 for an introduction to ducking.
In Daft Punk’s *High Fidelity* this dynamic effect is presumably in place. The sonogram below represents the transition from a build-up section with a filter effect to the return of the bass drum sounds.

The downbeats prior to the transition (marked with small letters) have plenty of sound material above 200 Hz. A short vocal utterance can be seen in circle “a” and the beginning of a somewhat longer vocal phrase in circle “c.” Approximately the same sonic material can be seen vaguely within the circles indicating the four succeeding downbeats (marked with capital letters), but its volume has been drastically reduced. The beginnings of the vocal utterance (in circle “A”) and the vocal phrase (in circle “C”) are in fact barely visible though their continuations remain as they were before the transition.

A similar effect is present in the track *Call on Me* (2004; tempo 130 bpm) by the Swedish DJ/producer Eric Prydz. At the very start of the track, the effect is both audible and visible on the sonogram as the dynamic processor shapes a synthesizer sound with a sustaining tone.

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47 The Norwegian sound producer Ulf Holand assumes the ducking here is applied to the total mix of the track with a bass drum sound extremely high in the mix beforehand (e-mail from Ulf Holand received 9. feb. 2010).
At each bass drum entry, the volume of the synthesizer sound is reduced drastically, thereby giving the sound an oscillating character as it fills the spaces between the bass drum sounds. The processor does this throughout the track, resulting in quite audible ducking on the synthesizer sound.

This type of ducking would certainly appear to strengthen the contrast between a low-frequency sound and a high-frequency sound, thereby exaggerating the perceived verticality of the music. When a dynamic processor is used in this manner, the bass drum sound dominates the mix and proclaims its “low” position in relation to movement. The experience of being pulled down by the bass drum will be enhanced when the high frequencies in the mix are attenuated. Moreover, the “pumping” effect compares closely to the alternation of movements activated by the poumtchak pattern and demonstrates how sound aspects are relevant in considerations of a track’s ability to evoke body movement.

**Summary**

My introductory analyses and discussions here concerned the sounds involved in the poumtchak pattern. The bass drum sound can incorporate a noticeable pitch movement, that in turn enhances its role in activating a downward body movement. An examination of production processes from the 1970s through the 1990s suggests that a downward pitch movement in bass drum sounds has become increasingly important to electronic dance music during this period. Various bass drum sounds, like variations in tempo, have come to characterize different subgenres as well.

The sounds on the upbeat (hi-hat) and backbeat (snare drum/handclap) do not typically incorporate pitch movements that might affect body movements. However, 48 See discussion on verticality in chapter 4 (page 134).
various aspects or realizations of upbeat sounds can emphasize or intensify particular positions in the movement patterns, based upon their duration or timbral quality, for example. Additional vocal sounds on upbeats can also introduce variation to a movement pattern, especially should listeners/dancers choose to participate actively in performing these sounds. Control of timbre and reverb has been essential in the production of snare drum sounds in dance music since the 1970s. Lastly, snare drum or handclap sounds on the backbeat may bring variation to the vertical movement pattern, depending primarily on their frequency content.

An outline of developments in the production of pitch movement on synthesizers from the 1970s through the 1990s demonstrated the new possibilities for control of these contours and intervals. Musical examples also revealed that pitch movements do not always correspond to the pountchak pattern of the tracks and therefore affect movement in ways similar to complementary and counterrhythmic patterns, either bringing tension to or destabilizing a groove.

The use of a specific filter effect – the gradual opening of a low-pass filter – creates a steady increase in the presence of high-frequency sounds that can in turn intensify body movements. Increasingly higher density, greater volume, brighter timbre, thicker texture, the sensation of gradually approaching a sound source, and the culture-specific feeling of anticipation evoked by the low-pass filter effect probably all contribute to different degrees in the intensified movement experience of the build-up sections where the effect often occurs.

A comparison of tracks from the 1970s, 1980s, and 1990s supports the assumption that the use of compression has also been increasingly important to maximizing the energy level of dance tracks. This is probably due to the improved control over digital sound processing. In contrast, stereo panning appears seldom in dance mixes of the 1990s, probably to avoid the loss of any vital musical information when dancers are placed far from either left or right speakers. The specific ducking effect, where dynamic processors are used to deliberately reduce high frequencies on downbeats, can also influence the movement pattern. Given that perceived verticality in music can influence the experience of dancing, it appears that the lack of high frequencies may intensify movement on the downbeat.
Conclusion

This study of rhythm, sound, and movement in electronic dance music was structured in four parts, paralleling the work of a music producer: I began with an introduction to the cultural context, continued with the initial determination of a basic beat for the track, moved on to the construction of the rhythmic patterns, and concluded with the sounds and the mix. While this division hopefully clarified the different areas of interest related to this study, it did not allow for an in-depth discussion of their relationships. Here, then, I will unite cultural context, basic beat, rhythm, and sound in one final analysis of a groove from an electronic dance music track, while also summarizing the contents of this study along the way.

The cultural context, the basic beat, the rhythm, and the sound

The corporeality of listening must be acknowledge in analyses of dance music cultures, and 1990s club culture particularly favours the dancer and dancefloor, in accordance with traditions that can be traced back to the early New York clubs of the 1970s. This focus on corporeality influences this music’s overall structure, build-up sections, and breakdowns, as well as details of the grooves that in turn inspire movements on the dancefloor.

Music designed for dancers and the dancefloor also depends for its ultimate success on the positive perception, fair or unfair, of its credibility or authenticity, which in turn involves choices about “correct” music equipment, effective (and preferably obscure) samples, the appropriate music venues, the proper influences, and so on. The sudden downfall of disco also alienated participants of club culture with regard to the musical mainstream and made them suspicious about any attention from major record labels or other commercial interests. Producers therefore tend to avoid the trendiest choices of music equipment or musical features, for example, instead presenting themselves as motivated solely by great dance music. The analysis that follows will explore rhythmic elements and aspects of sound as well as authenticity issues within the dance music culture.¹

¹ The music video for the track in question was presented in a study in chapter 3, and its first measures were already analyzed in chapter 6. Its groove was also part of my discussion of microrhythm in electronic dance music in chapter 6.
RHYTHM, SOUND, AND CULTURAL CONTEXT

Contextual background and vocal contribution

*Jump n’ Shout* was the third track on Basement Jaxx’s first full-length album, *Remedy*, which was released on XL Recordings in 1999. The track was also released on a maxi-CD and a twelve-inch vinyl disc. In addition to the production work of Simon Ratcliffe and Felix Buxton of Basement Jaxx, Slarta John (Mark James) contributes to the track with vocals in the style of “toasting.” The album in fact features several novel fusions of genres; Ratcliffe and Buxton favour an eclectic style that broadly answers to the club-cultural demand for innovation. Toasting also serves to acknowledge the Jamaican music styles (dub, ragamuffin, dancehall) that have influenced several electronic dance music genres. I discussed the importance of “insider knowledge” to the DJ/producer in relation to the many genres and subgenres of dance music in chapter 1, and Ratcliffe and Buxton demonstrate theirs in this track in particular.

In toasting, only single words and short phrases emerge clearly from the vocal lines, which allows the voice to function in this case as an instrument. This emphasis on a rhythmic rather than semantic contribution from the voice is perfectly in keeping with electronic dance music’s interest in the dancer (rather than the listener) and the dancefloor. In addition, the title of the track is repeated several times, comprising a call to body action by what sounds like a group of people who are actually jumping at the time. The notational representation (including this phrase) in figure 9.1 demonstrates how it reinforces certain beats of the pountchak pattern: *Jump* (down), *n’* (up), *Shout* (down).

David Mancuso’s priorities from the early days of disco culture in New York City were introduced in chapter 1, as follows: a focus on the dancers (rather than the DJ/“performer”), the use of obscure tracks, and an interest in good sound. The importance of maintaining an “underground” position within club culture also emerged out of his club, the Loft. Ratcliffe and Buxton violate the first of these classic principles of dance culture by using vocalists, who also function as visual focal points at their

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2 XL Recordings is an independent label that turned to dance music early on. At the time Basement Jaxx was signed, Prodigy was their most famous act; see Southall 2003:307.

3 Toasting is a Jamaican-influenced, heavily accented sung/spoken rap style.

4 Several journalists used the name “punk garage” to identify the style of Basement Jaxx when this album was released; see, for example, Hughes 1999, Lynskey 1999, and Roker 1999.

5 The “lyrics” of the track are actually printed in the CD booklet in Jamaican English and reinforce the idea that content is not particularly relevant here.
concerts. The potential distraction is somewhat softened here, however, by the rhythmic nature of the vocal contribution and its action-oriented vocal phrases.

Ratcliffe and Buxton state that they used the sequencer program Cubase on an Atari computer as well as several Akai samplers on this album. This was not the most up-to-date equipment in the late 1990s, which reflects a certain reluctance about new technology that also characterizes club insiders.

The basic beat of the track

The poumtchak pattern, consisting of a four-to-the-floor bass drum pattern and an upbeat hi-hat pattern, is the most consistent sound element in the track. Apart from a breakdown section lasting from 2:45 to 3:16 and scattered other interruptions, the poumtchak is omnipresent in the mix until a totally new groove appears at 3:46.

![Figure 9.1: Notational representation of Basement Jaxx's Jump n' Shout, 0:21–0:27, with suggested movement curve as indicated by the poumtchak pattern.](image)

As I discussed at greater length in chapter 3, the poumtchak pattern seems to encourage a vertical body movement pattern (head nodding, upper-body bouncing, and so on). The many correspondences between the poumtchak pattern and vertical movement patterns in the music video for this track support this assumption. The dominant direction of the movement pattern seems to be a downward movement corresponding to the bass drum sound and an upward movement corresponding to the hi-hat sound (and these directions were supported by my listener survey). In the Basement Jaxx track, the poumtchak is never heard by itself or otherwise overexposed. The balance between producing a dance track with a basic beat that elicits movements in an efficient way, and at the same time not overexposing the poumtchak pattern, may somehow embody the whole dilemma in

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6 See Moayeri 1999.
7 See page 97.
dance music culture of accomplishing something highly effectual and successful without at the same time drawing attention to yourself as a producer/DJ in an undesirable or inappropriate manner.

But how is the suggested movement pattern in figure 9.1 accounted for? Mari Riess Jones’s contribution to a theory of dynamic attending and processes of entrainment between humans and their environment concerns how an external “driving rhythm” (in the music) relates to an internal “driven rhythm” (in the listener). The “driving rhythm” is the energy passed on by the music, while the “driven rhythm” is our perception of or reaction to this energy. According to Jones this latter rhythm will be shaped by variation in our attentiveness according to “critical points” in the music. When attention is synchronized to rhythm in music, attentional energy is allocated just before an expected critical point (a salient sound in the music) that then transpires (or not) as expected. This process creates oscillations, with peaks of attending energy that are linked to these critical points. Based on observations of parallels between rhythmic pulsation and the contractions and relaxations of muscles, it appears likely that similar oscillations would occur in the activations of muscle commands. The steady stream of structural reference points in the poumtchak pattern facilitates a conversion of musical pulse to corresponding up-and-down movements. The suggested movement pattern, then, in figure 9.1 is a result of perceptual processes and motor activation that are both driven by the bass drum and hi-hat sounds of the poumtchak pattern.

Looking more closely at the poumtchak pattern of this track, we can see that the bass drum sound includes a pitch movement that might further influence the dancers. This movement is not obvious, but it is audible and visually present in the sonogram. The attack starts with a tone around 130 Hz that descends over a period of forty milliseconds to around 64 Hz. The duration of the sound at (only around two hundred milliseconds) is also significant here, representing a vital characteristic of the bass drum in a mix that contains many sonic elements. The pitch movement and short duration combine to give the movement pattern a distinct pull downward whenever the bass drum enters.

The assertion that pitch movement in the bass drum sound will have this effect upon movement arises from cognitive semantic theory, and in chapter 4, I discussed this possibility in light of the metaphor theory of George Lakoff and Mark Johnson. Their
concept of “primary metaphors” refers to those metaphors that are incorporated into our understanding so thoroughly that we do not see them as metaphors. When such metaphors are linked to body movements or corporeal experiences, they are embedded in our means of perceiving the world, so that, for example, the understanding of “falling” (used metaphorically, for example, in “falling asleep”) is inseparably linked to a physical movement downward. It is assumed that verticality can be embodied in our understanding of music as well, so that a descending pitch movement is connected in the same manner to the corresponding physical movement. Likewise, the alternation between the “low” bass drum sound and the “high” hi-hat sound in the poumtchak pattern supports a correspondence with the alternations between a low and a high position in a vertical movement pattern.

The extent to which such connections evolve when we listen or dance to a track such as Jump n’ Shout, and the extent to which such bodily experiences are actually felt, depends upon perceptual learning processes that are connected to our cultural upbringing. James J. Gibson’s ecological approach links perception to learned actions and demonstrates how active the process of perception is. This active quality of perception may further illuminate correspondences between specific movement patterns (actions) and musical sounds.

Salient sounds and the fabric of rhythm
In my analyses I have used the term “salience” (and “salient sounds”) to describe the extent to which various sounds might attract attention and thus be considered integral to a “driving rhythm.” Certain aspects of sound are important in this respect, including their loudness in the mix and the exact relationships among sounds that fall within the same frequency range.

The sounds of the poumtchak pattern in the Basement Jaxx excerpt are apparent (and salient) throughout. By contrast, several snare drum sounds are less so, due to their low volume and
confined timbral content.

In chapter 5 I discussed how a focus on body movements challenges traditional views of rhythm perception. A perspective formed via the notational grid was contrasted with a perspective formed via a vertical movement pattern, which then provided the framework for the analyses of grooves in chapter 6.

The analysis of the Basement Jaxx track sums up some of the possible effects that were discussed in those analyses:

Figure 9.4: Notational representation of Basement Jaxx’s *Jump n’ Shout*, 0:33–0:37.

Figure 9.5: Sonogram of Basement Jaxx’s *Jump n’ Shout*, 0:33–0:37, with suggested movement curve and circles around possible tension points, emphasized beats, events producing expectation, and counterrhythmic patterns.
1. *Extra emphasis*. In the analysis above, extra emphasis occurs on all of the downbeats and upbeats where the bass drum or hi-hat sounds combine with other sounds. More energy is experienced at these points, eliciting an extended or more powerful movement from the dancer. The suggested movement curve is somewhat longer at these points to indicate this.

2. *Expectation*. The extra emphasis that is suggested at the downbeat after the three snare drum sounds (labelled “Expectation”) may be so because of the *expectation* encouraged by the preceding events. The movement curve has been broadened at this point, again to indicate the extra energy experienced through these events. In chapter 6 I discussed the contribution of pick-ups to the production of drive in a track, using examples similar to this one.

3. *Tension points*. These points are less significant in terms of shaping a movement curve but play a significant role in producing friction within it. The sounds produce hitches in the steady undulating movement established by the poumtchak pattern, in turn intensifying the experience of a groove. They are produced largely by rhythmic patterns that have a certain independent character (complementary patterns).

4. *Counterrhythmic patterns*. These patterns occur frequently in electronic dance music and other genres of popular music and tend to productively destabilize the music’s ongoing drive. The presence of both a “standard pattern” and a “4:3 pattern” in the Basement Jaxx track corresponds well with the Caribbean associations of the toasting of Slarta John.

The sound mix

The complexity of the Basement Jaxx groove, in which various patterns work together in different ways and at several levels, ultimately arises from the new music equipment of the 1990s, where different sounds can be created and then placed very precisely. Furthermore, dynamic processors are used to maximize the energy of the track.
Figure 9.6: Amplitude representation of Basement Jaxx’s Jump n’ Shout.

The amplitude representation here illustrates how the volume is pushed to its limits throughout most of the track, which is vital to its performance on the dancefloor, where the musical energy has to peak at all times.

The analyses in chapter 8 revealed how sound design (the choice of the right sounds) can activate movements in a manner appropriate to the given genre. The composition of grooves in a house music track involves rhythmic patterning as well as manipulation of the character of the sounds, including pitch movements, duration, frequency content, loudness, and so on.

**Microrhythmic relations**

Deviations from a structured grid are not noticeable in the Basement Jaxx track here and overall they play less of a role in house music than in other groove-oriented genres. Dancers/listeners in a club culture expect grooves with tight, structured timing. However, producers do adjust placements of the snare drum and/or hi-hat sounds on occasion, depending upon the dynamics of the mix. Still, these sorts of adjustments are seldom apparent and many times not needed. A fully quantized, for example, where a bass drum with a descending pitch movement shapes a body movement, may actually produce the sensation of an “early” upbeat hi-hat (and an extra push) since the low position of the movement will be later than the onset of the actual bass drum attack.

In order to fully understand both the rhythmic patterns and the sound design of a successful electronic dance music track, then, one must account for its performance on the dancefloor. Producers of dance music are truly the experts in this respect, especially if they work as DJs as well, where they see what the music can do and devise tricks for doing it better. They have a cultural awareness of the “correct” repertoire of movements related to the genre, and they are able to harness the technological equipment to elicit them.
Relevance, limitations, and future research

The main goal of this study has been to illuminate specific qualities of electronic dance music through an analysis of the relationship between music and body movements. I have used the poumtchak pattern and vertical movement patterns as a common frame of reference for the specific music culture in question. But movement in general and vertical movement patterns in particular are central to other types of dance music, and to rhythmic music in general. Might this approach then be relevant to music that lacks the poumtchak pattern? I would say so. Certainly in any rhythmic music with repetitive structures, there will be sounds that attract more attention and encourage different types of undulating body movement patterns. For example, the backbeat snare drum sound may have a specific role in forming similar movement patterns within many genres of popular music.

Unlike the analysis in chapter 3, where the effect of the poumtchak was measured via a survey, my analyses of the effect of additional rhythmic patterns in chapter 6, and of sound in chapter 8, drew upon my experience of my own moving body. Certainly this could be extended. Through video analysis or the use of various types of motion-capture systems involving colour markers, infrared cameras with reflectors, or electromagnetic trackers, data could be gathered on how a whole group of respondents would move to the same grooves.\(^8\) Music-related tension or intensification of physiological responses could be measured as well, including muscle tension (using electromyography), heart rate (using an electrocardiogram or blood volume pulse), or skin conductivity.\(^9\)

The essential aim of my analyses has not been to decide on any predominant movements themselves but to explore the potential for movement in various grooves with regard to different musical elements. Similar elements are found in other types of groove-based music, and my conclusions may be applicable elsewhere. The ways in which aspects of sound affect the bodily experience of microtiming also merits more attention. Moreover, a study of dance music that revolves around the music’s relationship to body movements and dancers’ interpretations of a particular genre might draw attention to previously understudied but closely related qualities. Hopefully this study has provided a relevant background for additional studies on the participation of the human body in

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\(^8\) “Sensing Music-Related Actions” (2008–2011) is a joint research project of the Departments of Musicology and Informatics at the University of Oslo, where several of these options are being explored.

\(^9\) Maria Witek has measured emotional and physiological responses to experiences of groove-based music; see Witek 2008.
music and sheds some light on the intensified experience that “listening” to music through a moving body can offer.
Appendixes

Appendix 1

Message sent to members of Facebook-group *Addicted to house music* in May/June 2007:

I’m writing you this message since you are a member of the group “Addicted to house music”. I am doing a PhD-project that concerns house music and I would appreciate it if you would be so kind to participate in a little experiment – please, answer the following questions.

1. Do you recognize this beat: Poum-tchak-poum-tchak-poum-tchak-poum-tchak? (“Poum” representing a bass drum sound, and “tchak” a hi-hat sound – or similar)
2. If you nod your head (not dance) to this beat will your head instinctively go down with the “poum” and up with the “tchak”?
3. If you hear only – tchak – tchak – tchak (usually played with a hi-hat) – will you nod your head as if the “poum” (the bass drum) was present?

If you are a DJ or/and a producer I would be happy if you just wrote a few lines about how you believe movement interact with your work - how/if you try out beats through moving.

Greetings Hans

Appendix 2

Invitations to the students to participate in the survey (English translation below).


Hilsen Hans T. Zeiner-Henriksen (PhD-stipendiat ved Inst. for musikkvitenskap)

Du har blitt invitert til å svara på skjemaet "Undersøkelse om rytme og bevegelse".

Du finner dette skjemaet på:
https://nettskjema.uio.no/answer.html?fid=39328&lang=no

Skjemaet er åpent fra og med 01.02.2008
Skjemaet er åpent til og med 28.02.2008

Besvarelsene i denne spørreundersøkelsen er anonyme. Les mer om anonymitet på http://www.usit.uio.no/it/nettskjema/hjelp/#anonymitet

Translation:

Dear music student. You are receiving this e-mail since you were registered as a student at the Department of Musicology second semester 2007. I am working on a research project dealing with music and movement. In this relation I want to explore to what extent we move similarly or differently to rhythmic structures in music. I have made a brief web-based survey with a couple of sound excerpts and a few questions connected to these, and I believe it will only take you about five minutes to answer. I hope you will find time to do this and beforehand, thanks for helping me.
Greetings Hans T. Zeiner-Henriksen (Ph.D.-student at the Department of Musicology)

You have been invited to response to the form “Survey on rhythm and movement.”

You will find the form at:
https://nettksjema.uio.no/answer.html?fid=39328&lang=no

The form is open from 01.02.2008
The form is open until 28.02.2008

The responses in this survey are anonymous. Read more on anonymity on
http://www.usit.uio.no/it/nettskjema/hjelp/#anonymitet

Appendix 3:

Survey on rhythm and movement (English translation below).
2. Primært utenav:

- Pop/rock
- Jazz
- Folkemusikk
- Klassisk
- Annet

2.2. Primært lytter av:

- Pop/rock
- Jazz
- Folkemusikk
- Klassisk
- Annet

2.3. Lytter/danser mye til house/dance/techno?

- Ja
- Nei
- Noe

3. Chuck Berry: Maybellene (1955)


- Opp
- Ned
- Vet ikke

3.2. Hvis du teller det du oppfatter av puls/telseenheter, sender skarptrommen på 2 og 4 eller mellom slagene (på og’n)?

- 2 og 4
- Mellom slagene
- Vet ikke

4. The Beginning of the End: “Funky Nassau” (1971)


- Opp
- Ned
- Vet ikke

   - Opp
   - Ned
   - Vet ikke

5.2. Fortsatt bevegelsen når hi-hat kommer inn. Endrer bevegelsen retning? *
   - Ja
   - Nei
   - Vet ikke

5.3. Går bevegelsen opp eller ned på hi-hatslaget? *
   - Opp
   - Ned
   - Vet ikke

5.4. Oppleves bevegelsen annerledes etter at hi-hat kommer inn? *
   - Ja
   - Nei
   - Vet ikke

5.5. Hvis ja, hvordan oppleves endringen?
   - Sterkere drømming oppover
   - Sterkere drømming nedover
   - Kun sterkere, men ikke i noen spesiell retning
   - Svakere
   - Vet ikke


   - Opp
   - Ned
   - Vet ikke

6.2. Oppleves bevegelsen annerledes etter at hi-hat kommer inn? *
   - Ja
   - Nei
   - Vet ikke

6.3. Hvis ja, hvordan oppleves endringen?
   - Sterkere drømming oppover
   - Sterkere drømming nedover
   - Kun sterkere, men ikke i noen spesiell retning
   - Svakere
   - Vet ikke
Translation:

Response to Survey on rhythm and movement

This is a survey related to my PhD-research at the Department of Musicology, University of Oslo, Norway. I am studying correspondences between structures or patterns in music and body movements – primarily in electronic dance music.

Answering the survey is ideally done in the following manner:

1. Read the questions
2. Listen to the music and try to recognize the sounds I am asking for.
3. Start the excerpt again and move your head or your upper body without focusing on the questions.
4. When a movement is established, focus on the questions and decide for an alternative.

If you have problems understanding the questions or you don’t know what to answer just use the “Don’t know”-alternative and go on to the next question.

Good luck!
The responses to this survey are anonymous. Questions marked with * are obligatory. You have to send in your response or save it before thirty minutes (if not the questionnaire is reset and what you have filled in is deleted).

1.

1.1. Sex: Male/Female 1.2. Age

2.

2.1. Primarily performer of Pop/rock, Jazz, Classical, Folk Music, Others
2.2. Primarily listener of Pop/rock, Jazz, Classical, Folk Music, Others
2.3. Listened/danced a lot to House/Dance/Techno? Yes, No, Some

3. Chuck Berry: Maybellene (1955)

3.1. Listen for the snare drum sound. Move your head and/or your upper body up and down. Do the movements go up or down with the snare drum? Up, Down, Don’t know
3.2. If you count what you consider is the pulse, does the snare drum sound hit 2 and 4 or between the beats (on the “and”)? 2 and 4, Between the beats, Don’t know

4. The Beginning of the End: "Funky Nassau" (1971)

4.1. Listen for the cymbal sound that after a while is repeated between the beats. Move your head and/or your upper body up and down. Do the movements go up or down with the cymbal? Up, Down, Don’t know


5.1. Move your head and/or your upper body up and down. Do the movements go up or down with the bass drum sound? Up, Down, Don’t know
5.2. Continue the movements when the hi-hat enters. Do the movements change direction? Yes, No, Don’t know
5.3. Do the movements go up or down with the hi-hat sound? Up, Down, Don’t know
5.4. Are the movements experienced differently after the hi-hat enters? Yes, No, Don’t know
5.5. If yes, how is the difference experienced? Stronger pull upwards, Stronger pull downwards, Stronger, but not in any direction, Weaker, Don’t know


6.1. Half way through this excerpt a similar hi-hat pattern enters (as in the last excerpt). Move your head and/or your upper body up and down. Do the movements go up or down with the hi-hat? Up, Down, Don’t know
6.2. Are the movements experienced differently after the hi-hat pattern enters? Yes, No, Don’t know
6.3. If yes, how is the difference experienced? Stronger pull upwards, Stronger pull downwards, Stronger, but not in any direction, Weaker, Don’t know

7. 808 State: “Cübik” (1990) – modified

7.1. Move your head and/or your upper body up and down. After four bars a hi-hat-pattern enters. Do the movements go up or down with the hi-hat? Up, Down, Don’t know

8. Listening with or without movements.
Listen to the five excerpts again while you alternate between moving your body and sitting concentrated without moving.

8.1. Do you experience the listening more satisfying/engaging while moving or not moving? While moving, While sitting concentrated without moving, Just as satisfying/engaging, Just as satisfying/engaging, but in a different manner, Varying related to the different excerpts, Don’t know
Bibliography


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Select discography

808 State. 1990. CübiK, Tommy Boy. (CübiK, (Kings County Perspective)).
Daft Punk. 1996. Homework, Virgin. (Daftendirekt, Revolution 909, Phænix, Around the World, Teachers, High Fidelity, Rock’n Roll, Burnin’).
Everything but the Girl. 1994. Amplified Heart, Blanco y Negro Records. (Missing, Missing (Todd Terry Remix)).
Everything but the Girl. 1999. Temperamental, Virgin. (Five Fathoms).
Fritz Valley Project. 1998. Blindness, Transfusion. (Blindness (Harmonic Excursion)).
Prydz, Eric. 2004. Call on Me, Data UK.


The Roots. 1996. *Illadelph Halflife*, DGC. (*What They Do*).


Sylvester. 1978. *Step II*, Fantasy. (*You Make Me Feel (Mighty Real)*).


**COMPILATIONS:**


*Saturday Session*. 2002. Stefano Cecchi Records. (Hypnofunk’s *Boogie Drama*).
Webpages:

1.1 Interview with Steve Dahl on NBC-TV:
http://youtube.com/watch?v=8a_hBR9YuNw

1.2 Webpage for the Disco Demolition Night:
http://whitesoxinteractive.com/History&Glory/DiscoDemolition.htm

1.3 Ishkur’s guide to Electronic Music:
http://techno.org/electronic-music-guide/music.swf

1.4 Wikipedia’s list of electronic music genres:

2.1 Vintage Synth Explorer:
http://www.vintagesynth.com

2.2 Synthmuseum.com:
http://www.synthmuseum.com

2.3 TR-808 resource site:
http://www.smd-records.com/Websites/TR%2D808/

3.1 EveryHit.com, UK Top 40 Database:
http://www.everyhit.co.uk

3.2 Aerobicmix.com:
http://www.aerobicmix.com/

4.1 Discussion on djforums.com:

6.1 Discogs: a community-built database of music information:
http://www.discogs.com/

7.1 The AHRC Research Centre for the History and Analysis of Recorded Music:
http://www.charm.rhul.ac.uk/index.html

7.2 The Art of Record Production:
http://www.artofrecordproduction.com

7.3 Globe Audio Recording and Production:
http://www.globerecording.com/visuals/visuals.html

8.1 Roland Alpha Juno overview: