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Groove

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Abstract and Keywords

This chapter provides an overview of the concept of groove, investigating musical and sonic components of grooves as well as aspects related to pleasure, process, and affect. It starts out by addressing three distinct general understandings of groove: (1) pattern and performance; (2) pleasure and “wanting to move”; and (3) a state of being. The authors then propose a set of typical (rhythmic) features that seem to be common to a wide range of groove-based styles, exploring five main categories: pulse or regular beat; subdivision of the beat; syncopation; counter-rhythm; and microrhythm. Finally, the chapter presents some viable approaches to the analysis of groove, focusing on swing and anticipated beats in James Brown’s “Get Up (I Feel Like Being A) Sex Machine” (1970), aspects of counter-rhythm in Jackie Wilson’s “(Your Love Keeps Lifting Me) Higher and Higher” (1967), and the extending of beats into beat bins in D’Angelo’s “Left & Right” (2000) and Rihanna’s “Needed Me” (2016).

Keywords: Rhythm, pulse, swing, syncopation, microtiming, groove analysis

Introduction

Groove is a musical term commonly used among musicians, enthusiasts, and music scholars alike. According to the *Merriam Webster Dictionary*, it denotes “a pronounced enjoyable rhythm.”¹ Such a definition captures two important aspects of the concept: first, the ways in which the term groove is used (as a noun) to describe a characteristic rhythmic pattern typical of a musical style (swing groove, rock groove, funk groove), and, second—as is reflected in the adjective “groovy”—the particular pleasurable quality, as

well as the appeal to dance and movement emanating from such patterns when they are performed in the optimal manner.

The earliest references to the term are from the swing-jazz era, when groove, according to R. J. Gold (quoted in Kernfeld 2017), evoked the excellence and/or sophistication of a performance.² Likewise, in her ethnographic work on improvisation and interaction between musicians in 1990's jazz combos, Monson (1996, 67–68) found that most musicians tended to use groove as an aesthetic term, although she also observes that groove was used as a synonym for the “rhythm matrix” of a particular style.

In musicology and music theory in recent decades, the expression “groove-based music” has primarily come to be associated with African American musical styles, such as jazz, R&B, soul, funk, disco, and hip-hop, all of which seem to rely on a common set of rhythmic principles (see, for example, Burnim and Maultsby 2015; Bowman 1995; and Danielsen 2006). While groove as an aesthetic/stylistic practice is a prominent feature of many other Afro Diasporic-derived styles as well, such as Afro-Cuban (salsa), Afro-Brazilian (samba), and other forms of Latin American dance music, these traditions tend to use other terms to describe those aspects encompassed by the term groove in the African American tradition (examples include “Balanço”/“Suingue” in samba or “Sabor”/“Bomba” in salsa; see Böhler 2013 and Gerischer 2006). The term groove is also not typically used within West African drumming traditions, which likewise display many of the formal aspects of groove-based music (see, for example, Locke 1982; London, Polak, and Jacoby 2017; Nketia 1974; and Polak, London, and Jacoby 2016). Groove thus seems to be used, first and foremost, although not exclusively,³ to describe the foundation and aesthetic qualities of African American rhythmic music.

In what follows, we will first address three distinct general understandings of groove. Then, we will propose a set of typical (rhythmic) features that seem to be common to a wide range of groove-based styles. Finally, we will present some viable analytical approaches to various grooves typical of the African American musical tradition.

Defining the Undefinable: Three Understandings of Groove

We must begin this discussion by remarking upon the highly processual character of groove. Groove happens in the here-and-now of performance, meaning that groove is, in a sense, ungraspable as such—the very moment one tries to come to terms with a groove experience, one is no longer in the groove. Defining groove is thus a challenging task, although the main disciplines involved in groove studies have developed three discrete approaches to it. Each one focuses on particular aspects: (1) groove as pattern and

performance, (2) groove as pleasure and appeal to movement, and (3) groove as a state of being.

Groove as Pattern and Performance

As mentioned in the introduction, the word “groove” is often used to denote a particular rhythmic pattern typical of a musical style (a swing groove, a funk groove, and so on). Accordingly, groove has been defined as “a persistently repeated pattern” (Kernfeld 2017). In music-theoretical terms, this pattern equals the basic rhythmic structure that characterizes the style in question. In notation-based analytical traditions, rhythmic structure has commonly been conceptualized as a pattern of onsets in time that aligns with a traditional metric grid of isochronous pulsations at different levels. Seen as such, the structure then becomes what one would transcribe as the groove. The word “groove” itself, of course, directs our attention to some important limitations of this approach. When used to denote stylistic-rhythmic patterns (swing, funk, and so on), groove invariably also encompasses the particular prescribed *manner* in which these patterns are played, in relation to both the timing and the sound and shape of the rhythmic events.

As Bengtsson, Gabrielsson and Thorsén (1969) point out, what constitutes this pattern in perception is an open question that might, in fact, be impossible to answer, due to so-called systematic variations—that is, stylistic/idiomatic patterns of microrhythmic features might act as *constituents* of the norm, or the groove pattern itself. Thus, rather than asserting the traditional divide between structure (notation) and expression (performance) of notation-based music, the metric grid in groove analyses should instead be seen to supply a pragmatic means of measurement of actual locations of rhythmic events—one that leaves open to discussion what the pattern actually is. In any case, the groove is always shaped in relation to perceptual reference structures (Danielsen 2010, 19–20) that perceiver and performer alike rely upon to provide structure to the sound. Metric layers such as pulse and subdivision are obvious reference structures in the perception of groove. The actual location and shape of the pulse, however, can vary and do not need to derive from a series of points in time (Danielsen 2010; Danielsen, Haugen, and Jensensus 2015). Likewise, the norm for layers of subdivision in a groove does not need to be isochronous. Swing in jazz is one example, and non-isochronous subdivisions are also common in other African-derived musical styles (see, for example, Gerischer 2006 and Haugen 2016 on samba; Polak 2010, Polak and London 2014, Polak et al. 2016, and London et al. 2017 on djembe drumming in Mali; and Câmara 2016 on funk). In addition to pulse and layers of subdivision, the intermediate level of stylistic *figure* (Danielsen 2006, 47–50) is also an important identifying structural layer in a groove.

What unites pulse, figure, and subdivision as aspects of the rhythmic structure of a groove is that they do not exist as sound per se. Rhythm as experienced always represents an interaction between virtual reference structures and actual sounding rhythmic events.⁴ This interaction works in two directions: a groove always generates some form of reference structure, and reference structures are always applied to a

groove. It evokes the relationship between meter and rhythm, as described by London (2012), who understands meter as all or some aspects of the structure provided by endogenous processes in the perception of rhythm, and rhythm as the exogenous, sounding aspect of this interaction. Experienced rhythm involves both such aspects of meter and sounding rhythm, and, in what follows, “rhythm” will denote “experienced rhythm,” whereas actual sounding rhythm will always be labeled as such.

When one is in the act of producing and/or perceiving a groove, this interaction between sounding rhythm and reference structures usually goes on automatically and imperceptibly. When conducting analytical work on groove, however, the question of pattern and deviation can become hazardous. The absence of a written “template” in oral traditions calls for relevant, well-considered proposals of groove structure. These may be based on actual performances or recordings and should take into account the fact that microrhythmic features, which often elude traditional notation-based representations of rhythmic structure, have a structural impact as well. Deciding on what is systematic variation—that is, intrinsically part of the groove pattern—and what is not is, therefore, crucial for analytical and theoretical accounts of groove.

Last but not least, the pattern (including basic reference structures) may also change along the way, generating always fresh expectations at the micro, meso, and macro levels. The basic pattern of a groove is usually designed to activate an inner dynamic that keeps the listener or dancer constantly sensorimotorically engaged. What should be considered structural in a perceptual sense must always be evaluated on the basis of the preceding events as well (Hasty 1997; Danielsen 2006, 2010, 2015). If we overlook this condition, we risk missing crucial aspects of a groove’s structural identity, as well as the critical interaction between this virtual structure and the actual sounds.

Groove as Pleasure and “Wanting to Move”

The word groove is also used in a normative manner to judge (in an aesthetic sense) the quality of a groove: a groove is not a groove until it *actually grooves*—that is, it is experienced as groovy. Steven Feld (1988), studying groove from an ethnomusicological perspective, incorporates appealing aspects of groove-based music into its definition: groove is “an unspecifiable but ordered sense of something ... that is sustained in a distinctive, regular and *attractive way, working to draw the listener in*” (76; our emphasis).

Groove-directed music is also commonly described as music that imparts a feeling of “motion,” “vital drive,” or “rhythmic propulsion” (Keil and Feld 2005). This aspect of groove is the foundation for recent psychological attempts at establishing an operational definition of groove as “the sensation of wanting to move some part of the body in relation to some aspect of the sound pattern” (Madison 2006, 201). Janata, Tomic, and Haberman (2012) also stress the coupling of groove to dance and motion but regard this urge to move as closely related to groove’s pleasure aspect. Based on their survey of 153

undergraduate students' ratings of a variety of preformed descriptive phrases believed to be "associated with the concept of the groove to varying degrees" (informed by music-theoretical definitions of groove and the authors' own intuitions), these researchers concluded that groove is "that aspect of the music that induces a *pleasant* sense of wanting to move along with the music" (Janata et al. 2012, 56; our emphasis).

Accordingly, they theorize groove as a "pleasurable drive toward action" that results from sensorimotor coupling—that is, from an "engagement of the brain's motor action systems while listening to music"—and that induces a "positive affective state" (Janata et al. 2012, 54).⁵

It is important to clarify the fact that, unlike the pleasurable state of more teleological musical forms, groove's pleasurable state derives first and foremost from the process itself. A groove mode of listening or dancing (Danielsen 2006, 177–179) is not directed toward a goal (such as tonic closure); instead, it demands one's presence in the groove's here and now. Put differently, when one is in the participatory mode (Keil 1995), one moves together with the groove—in a sense, co-producing it. Witek (2017) applies a similar perspective to explain the widespread presence of counter-metric structures in groove-based musical styles: "When synchronizing our bodies to the beat, we enact parts of the musical structure by filling in the gaps; as long as the syncopations are repeated, we continue to participate, and processual pleasure is prolonged" (Witek 2017, 151). Groove is often characterized by structural tension at the level of figures and/or microrhythm that requires active interpretive participation, such as filling in beats at structurally salient positions that are not explicitly articulated in the sound. As Witek points out, this means that pleasure in groove is not caused by some cognitive-physical stimulation but emerges through one's enactment of aspects of the musical structure and, thus, one's constant engagement, almost as a part of the groove itself.

Groove as a State of Being

Musicians often use the term groove to refer to a pleasing state in which the creation of music becomes seemingly effortless (see Berliner 1994; Monson 1996; Pressing 2002). Enthusiasts also describe groove as engendering an intense, almost euphoric feeling. This condition is often referred to as "being in the groove" (Danielsen 2006, 11–12, 215; Roholt 2014, 108; Janata et al. 2012). When one is in the state of "being in the groove," one's experience of time is—somewhat paradoxically—not really an experience of time. There is no distancing from the musical events: one is continuously engaged in the coproduction of the groove, and, as a consequence, time dissolves. Moreover, despite its highly repetitive character, groove's repetition never *becomes* repetitive. The distancing required for repetition to be identified as such does not arise (Danielsen 2006, 162).

A striking aspect of the groove *experience* (to separate it from groove as a musical-analytical object or psychological construct) is that, when one is in the midst of it, one feels as though it could go on almost forever. To reach this state, however, the interaction of listener/dancer and music has to persist, uninterrupted, for a long time. This condition

impacts how a groove is organized in time on both local and larger scales. In a pure groove, there is no song structure in the traditional sense; the musical aspects that create large-scale musical timespans, such as harmony, melody, and larger formal sections, are significantly diminished. Instead of waiting for events to come, one is submerged in what is before one. The focus turns inward, as if one's sensitivity to details, timing inflections, and tiny timbral nuances is inversely proportional to musical variation on a larger scale. When groove is experienced in this way, it ceases to be an object that exists apart from its listener (see also discussion of the music-mind-body cycle in Witek 2017). The relation of subject and object is almost suspended. One operates within a continuous field where the limit between music and musician/listener/dancer is not yet established or has vanished.

Phenomenological reflection makes people aware of the temporal space between immediate "being in time" and their understanding of this same being. One result of this fundamentally temporal character of experience is that the exchange between "being in the groove" and understanding this state of being is in itself bound to unfold in time. There is no way to attend to one's own groove experience at a distance (see Danielsen 2006, 12). The epistemological consequence of this fundamental hermeneutic premise is that the process of understanding the state of being in the groove necessarily involves a process of distancing or objectification that implies transforming what is to be understood into something other than what it was. The groove experience as a state of being seems to be especially difficult to grasp. Because of the highly processual character of its meaning, groove is about how things are in "real time"—how the groove unfolds in performance, right then and there.

Academic discourses such as cultural-critical discussions or music-analytical investigations often fail to address the phenomenological qualities linked to the experience of music—that is, how things are when they happen. However, the difference between *how groove is* when it happens, in time, and *what it is* in the process of understanding, is impossible to transcend: it cannot be leveled out. Theoretical or analytical accounts of grooves may be aware of this premise, to various extents. Generally, however, experiential aspects of the groove are probably better understood through more holistic descriptions that, in parallel to the notion of groove itself, incorporate all aspects of the groove experience—structural, performative, aesthetic, perceptual/psychological, and phenomenological—rather than treat them as separate domains.

Groove Features

When analyzing and theorizing groove, the relationship between the experience of being in a groove and the rhythmic qualities of that same groove presents a key challenge: what is it in the sounds or their organization that brings the participant into a state of "being in the groove"? In this section, we identify some necessary but not sufficient conditions of

groove—that is, common rhythmic properties seemingly present in the majority of styles associated with groove—while remaining very much aware of the fact that groove is a complex matter at its core and is not to be summarily defined as the sum of these parts.

Pulse or Regular Beat

Groove is overwhelmingly associated with music that compels body movement in some form or fashion, and, as such, a regular *beat* is of paramount importance to it. Without a steady beat (also called “pulse” or “tactus”) to guide dancers’ feet or musicians’ fingers, there can be no groove. In psychological research, the beat is often described as corresponding to the most comfortable rate at which one readily “entrains,” or synchronizes, to a musical rhythm via body movements such as hand claps or foot taps (Danielsen et al. 2015; Jones 1976; Large and Jones 1999; London 2012; Merker, Madison, and Eckerdal 2009). In many groove styles, the beat level can often be heard as expressed or externalized by one or more salient instruments in the accompaniment section. For example, in some styles of funk, soul, or hip-hop in 4/4 meter, one frequently observes percussive elements regularly coinciding with all of the (quarter-note) beat locations, either alone or in combination with other elements, the most common example of which being the snare drum and bass drum marking every other beat in tandem (a “back-beat pattern”). However, even in lieu of such explicit and unambiguous (near-)isochronicity at the beat level, the sensation of a regular underlying beat scheme may still be reliably induced by longer, cyclically repeating rhythmic patterns (Large, Herrera, and Velasco 2015). Such “isoperiodic” patterns (Arom 1991) are usually iterated within the span of one or two measures of the meter and, in groove contexts, may be referred to as the “basic unit” (Danielsen 2006). Regardless of whether a clear-cut (external) pulse is evident in the sound or not, an internal sense of beat is vital for understanding or entraining to a groove, in terms of either playing, dancing, or listening. If one fails to catch the “correct” beat reference, the best-case scenario is that one will be unlikely to appreciate the delicate interplay of multilevel rhythms within it; the worst-case scenario is that one will fail to entrain to it at all, resulting in rhythmic disorientation and confusion.

Subdivisions of the Beat

A simple (near-)isochronous pulse alone will not create a sense of groove—few would claim, for example, that the ticking of a metronome would constitute a groove, let alone an instance of music. In addition, the presence of sound events perceived to be operating at faster metrical levels than the level of the beat (such as the eighth- or sixteenth-note levels)⁶ is generally considered to be a necessary structural element for most groove styles (Pressing 2002; Stewart 2000). Events at subdivision levels of the beat are often subjectively described as imparting rhythmic “drive” (Danielsen 2006) or “motional energy” to grooves (Butterfield 2011); in funk, for example, they are said to evoke the feeling of “double time [within] regular time” (Payne in Milkowski 2007; see also discussion in Danielsen 2006, 74–75). In addition, psychological studies have shown that faster metrical levels tend to facilitate entrainment with the actual beat level itself by providing extra temporal cues (Madison 2014).

One could conceivably distinguish between certain broad styles simply according to the degree of frequency of events on the “density referent” level—that is, the metric level comprising the shortest practical subdivision unit (Nketia 1974). While sixteenth-note events in classic soul and R&B styles generally tend to be sparse, they are exceedingly more commonplace in funk and disco, although they are interwoven into the overall texture of the groove in aesthetically distinct ways. At the same time, the determination of the density referent in groove is not always straightforward, as it depends not only on the onset locations of events but also on their durations. Should an event corresponding to the onset location of a slower metrical level be shorter in duration than said level, it could be assigned, at least implicitly, to a faster metrical level. This ambiguity in the “emergent non-fit of subdivision [phrasing] and density referent” (Danielsen 2006, 75) seems to be a typical feature of faster-metrical-level events in many groove styles.

Moreover, the degree to which subdivisions are swung is also an identifying aspect of grooves. The term swing has been used to denote a general “feel” engendered by particular rhythmic interactions, usually when speaking within the context of jazz styles. If one extends the term in the direction of the more technical definition of eighth or sixteenth notes divided into unequal durations (either individually or altogether), swing pertains to many groove-based styles outside of jazz as well (see the James Brown funk example in the analytical discussions below). The extent to which a rhythm “swings” can be expressed more objectively via “swing ratios” between on-beat and off-beat notes. In an expanded sense, then, swing may be considered simply one kind of “microrhythmic” feature that emerges from the character of a groove. Overall, what fundamentally contributes to a successful groove is not only the presence of faster-metrical-level events swung to some degree but also the particular manner in which those events are structurally positioned and dynamically articulated within the context of the basic unit, as well as combined with other rhythmic devices, such as syncopation and counter-rhythm.

Syncopation (Local Contradictions of Meter)

One of the rhythmic devices most typically associated with enhancing a groove is syncopation (Sioros et al. 2014; Witek et al. 2014). Several formal music-theoretical definitions and models for quantifying measures of syncopation have been proposed (see Gomez, Thul, and Toussaint 2007 for an overview). Most, however, seem to share an understanding of syncopation as a form of localized “violation” of a normal metrical expectation scheme (Huron 2006; London 2012; Temperley 1999). Viewed as such, syncopation is contingent upon the notion that meter subjectively affords varying degrees of temporal expectation or strengths of “accent.” Slower metrical levels are typically ascribed more weight than faster metrical levels; in music theory derived from the Western art music tradition, the metrical accent pattern of the main beat level in 4/4 meter is “strong-weak-strong-weak.” However, in 4/4 meter-based grooves, the beats that are subjectively felt to be stronger or heavier than others may vary from genre to genre, and “phenomenal” accent patterns (Lerdahl and Jackendoff 1983, 17) of actual rhythms can either reinforce or conflict with the metrical accentuation scheme.⁷

Syncopated events are ubiquitous in groove music and frequently interpreted as functioning to momentarily subvert the prevailing beat-accentuation scheme. Because most groove styles feature patterns that are firmly anchored to the beat level and thus evocative of a strong metrical sense that is not easily derailed, local syncopations can be thought to supply lesser degrees of metrical tension to an overall groove, rather than full-on metrical ambiguity. Conversely, in fact, syncopations can even serve to reinforce the meter of grooves by virtue of “pointing out the *significant beats* of the pulse *without accentuating them*” (Danielsen 2006, 80). This capacity to indirectly emphasize the meter derives from the fact that, when an expected strong beat fails to materialize following a syncopated event on a weak beat, it makes listeners even more aware of the “missing” beat, consequently strengthening their entrainment to the meter (London 2012, 109; see also, discussion in Witek 2017).

Counter-Rhythm (Systematic Tendencies toward Cross-Rhythm and Metrical Ambiguity)

As mentioned, a salient feature of numerous groove styles seems to be the pervasive use of syncopation. However, should a series of syncopations repeat in a systematic and predictable fashion over the course of a basic groove unit, these syncopations may eventually cease to be perceived as local instances of momentary metric displacements, or “unexpected” accentuations of weak metrical locations, and instead become framed as characteristic “counter-rhythmic” figures in their own right, in some instances even introducing “a tendency towards cross-rhythm” (Danielsen 2006, 62). Cross-rhythm may be defined in formal terms as the result of an overlap of rhythmic streams “whose periodicities [‘metrical levels’] are noninteger multiples” (London 2012, 66). Typical examples in 4/4 meter would be when two evenly spaced events are superimposed over

three beats (2:3 cross-rhythms) or four events over three or six beats (4:3 or 4:6 cross-rhythms). The *New Harvard Dictionary of Music* describes the effect that cross-rhythm has upon the perception of an established meter: “A rhythm in which the regular pattern of accents of the prevailing meter is contradicted by a conflicting pattern and not merely a momentary displacement that leaves the prevailing meter fundamentally unchallenged” (Randel and Apel 1986, 216).

Cross-rhythm is typically associated with West African drumming traditions (Anku 2000; Burns 2010; Locke 1982; Nketia 1974; Novotny 1998) in which one or more instruments within an ensemble can often be found to prominently accentuate onset locations that are congruent with a competing pulse within the context of multilayered rhythmic textures (that do not always clearly externalize the beat level). These kinds of cross-rhythms tend to elicit a powerful sense of metrical ambiguity, especially if one is unfamiliar with the particular style at hand, often inviting more than one metrical construal upon repeated listening. According to Pressing (2002), this type of “perceptual rivalry and multiplicity” is central to rhythm in many African musical traditions.⁸ In groove-based styles, however, such strong cross-rhythm is relatively rare;⁹ while cross-rhythmic figures are extremely common, their implementation tends to be limited to durations shorter than the span of a basic unit, and they almost never occur in ambiguous metrical contexts, because the beat level in grooves is usually externalized by some layer of the rhythm section. Furthermore, cross-rhythmic layers in grooves are generally even subtler by virtue of being nestled within figures rife with metrically ambivalent events that simultaneously confirm and contradict the main beat level, depending upon one’s frame of reference. In order to distinguish this “lighter” form of cross-rhythm from the West African sort, Danielsen proposes the term “counter-rhythm” to denote momentary instances of cross-rhythm or systematic off-beat rhythm whose ultimate purpose is to destabilize, but not fundamentally challenge, the main pulse (2006, chapter 4; see the Jackie Wilson analytical example below). Such a notion of counter-rhythm recalls Kolinski’s (1973) “contrametric” repertoires, or those musical corpuses in “which a significant portion of note onsets tend to be non-congruent with the metrical framework” (London et al. 2017, 475–479).

Microrhythm

Groove has also been associated with patterns of microrhythmic deviations from assumed metrical references on an order ranging from tens to hundreds of milliseconds, encompassing sounds that are often implicitly felt more often than heard when they occur on the threshold of auditory perception (see Butterfield 2006; Danielsen 2010; Iyer 2002; Senn et al. 2017). The assumption is that the presence of such minor deviations from a presumed norm, or so-called participatory discrepancies (Keil 1995; Keil and Feld 2005) between the different musicians, is important for the “dynamic” dimensions of a groove—that is, it is what makes a groove *groove*.¹⁰ In many microtiming studies, the norm has been conceptualized as a metrical grid, which may work well as a starting point for measurements but which, in many styles, becomes less useful if one seeks to identify the reference structures at work in perception. Because of the malleable character of rhythmic structure (it changes with context and may also change during a given performance), there is no guarantee that the pattern one suggests in theory or analysis is representative of the pattern(s) at work in the experience of those same rhythms. Depending on the context, an event onset that is measured to be twenty milliseconds early in relation to the grid, for example, might be heard as an early attack. However, it might also be heard not as a deviation from the grid/norm but rather as *part* of it—that is, as an extended beat event.

Microrhythmic features in grooves involve both temporal (timing and duration) and sonic (intensity and timbre) aspects of rhythmic events. At the micro level of rhythm performance and perception, such temporal and sonic aspects interact (see, for example, Danielsen et al. 2015; Repp 1996; Tekman 1997; Waadeland 2001). In general, the overall shape of the sound seems crucial to the perception of timing. Sounds with sharp, impulsive attacks, for example, are heard as positioned earlier in time than sounds with slow, rounder attacks, even when their onsets are the same (Danielsen et al. 2019; Gordon 1987; Rasch 1988; Wright 2008). This means that microrhythm is potentially present even in groove-based music where all the rhythmic events are supposedly located firmly on the grid.

Other related forms of microrhythmic features arise when separate sound events occur asynchronously at similar times—for example, when the bass is positioned slightly ahead of or behind a drummer’s beat. Such asynchronies can be participatory discrepancies (Keil 1995; Keil and Feld 2005) produced by musicians or clustered events produced by editing the temporal location of rhythmic events (Danielsen 2010; Brøvig-Hanssen and Danielsen 2016, chapter 6; see also, the D’Angelo and Rihanna analytical examples below).

Analytical Examples

Swingin' Grooves and Anticipated Beats in James Brown's "Get Up (I Feel Like Being a) Sex Machine"

Groove-based styles tend to present consistent rhythmic relationships at the micro, or "sub-syntactical," level, which is obscured in traditional transcription. In order to more accurately represent grooves, then, one must supplement transcriptions with more fine-grained measurement methods capable of supplying precise temporal information regarding the onset locations and durations of sound events relative to a metrical reference scheme.¹¹

As mentioned, two forms of microrhythm in particular have been frequently investigated by scholars: the systematic "asynchrony" between onsets of various instruments and the degree of durational inequality present in note pairings at the same metrical level, the latter commonly referred to as "swing" and expressed as a ratio between durations of on- and off-beat events (or between "(down)beats" and "upbeats"). While many microrhythmic empirical studies have been undertaken in recent decades on various jazz styles (see Butterfield 2011 for an overview), only a handful have collected data on the rhythmic styles more typically associated with groove in the modern era, such as funk or hip-hop (Butterfield 2006; Câmara 2016; De Haas 2007; Frane 2017).

Although subdivisions in funk rhythms are generally considered as comparatively "straighter" than those in jazz rhythms,¹² several scholars have noted that sixteenth-note off-beat events in funk seem to be frequently positioned slightly "late" in relation to on-beat locations of the meter (Danielsen 2006), often to such a consistent extent over the course of basic unit as to imply subtle, yet noticeable degrees of swing (Butterfield 2006; Stewart 2000). In an empirical investigation into the microrhythmic aspects of guitar, bass, and drums in classic funk and jazz-funk recordings, Câmara (2016) observed that, in the majority of samples analyzed (twelve out of thirteen), at least one instrument was found to be swinging its off-beat sixteenth notes at or above a ratio of 1.2:1,¹³ either in a consistent fashion throughout the course of a repeated basic unit (presenting a "global swing," on average) or in a fluctuating manner where certain off-beats were swung to either greater or lesser degrees ("local swing"), or a combination of the two. Let us look in more depth at one of these recordings, the iconic funk tune "Get Up (I Feel Like Being a) Sex Machine" by James Brown from 1970, in order to demonstrate potential interactions between microrhythmic swing and macrostructural pattern.

In the A section (verse) of "Sex Machine," shown in Figure 1, the instruments with the highest to lowest average swing ratios at the sixteenth-note level (shown by the global mean swing ratio values, or GMSR) were the guitar (2.01, SD 0.16), then the drums (1.60, SD 0.10), then the bass (1.52, SD 0.40).¹⁴ The consistency of swing throughout various repetitions of the basic unit, indicated by standard deviation (SD) values, shows that both guitar and drums tend to maintain a slightly more stable swing ratio than the bass. However, all instruments swing both higher and lower than their mean (as evidenced by the fluctuating swing ratio [SR] values between individual, local sixteenth-note pairs

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within the basic unit). Overall, the swing in the rhythm section of “Sex Machine” demonstrates what might be typical of the funk formula in general—that of a juxtaposition of subdivision layers swung to varying degrees, from the obvious to the subtle. This may engender different kinds of swing “feel” at any given time depending on whether one chooses to focus on a single instrument, or all them at once. In addition, certain local, individual notes are occasionally swung with greater or lesser emphasis, and can further modulate the extent to which swing is heard at critical points within the groove.



[Click to view larger](#)

Figure 1. Two first measures ($1 \times$ basic unit) of the A section in “Get Up (I Feel Like Being a) Sex Machine” by James Brown (starting about 0:15). SR = Swing Ratio of local pairs of on-beat and off-beat sixteenth notes. GMSR = Global Mean Swing Ratio, that is, mean swing ratio of all sixteenth note pairs, averaged from about eight basic units in all.

AUDIO 1

According to Butterfield (2006; 2011), off-beat subdivisions may be interpreted as imparting various degrees of “motional energy” to events on ensuing on-beat locations when swung. Very high swing ratios (that is, when the distance between the off-beat and the subsequent on-beat approaches zero) tend to generate a halting, choppy feeling rather than a propulsive or driving one (although this can be mitigated by a range of dynamic effects). In “Sex Machine,” as Danielsen has observed, drummer John Jabo Starks’s use of a “few slightly swung sixteenth notes” is experienced not as choppy, but instead as “continuously pushing forward,” and indeed this can be corroborated by the fact that the notes display only a moderate swing ratio of 1.60 (2006, 77). The drum pattern’s overt swinging character would be further diminished by the fact that the swung notes occur rather sparsely over the course of a basic unit. As Frane and Shams’s (2017) study indicates, the lower the swing density (amount of swung events) in a rhythm, the higher the “just noticeable difference” threshold for distinguishing swing from straight subdivisions.¹⁵

The off-beats of Catfish Collins’s guitar rhythm, which anticipate every fourth downbeat of the basic unit measure, on the other hand, are swung on average at a high “tied-triplet” ratio of 2.01:1. Because they are syncopations, there are technically no ensuing guitar on-beat events to provide motional energy towards, and thus seemingly no ensuing “downbeat closure” (Butterfield 2011). However, as they are played within the context of an ongoing multilayered groove rather than in isolation, it could be argued that they do in fact “close” either the expected virtual location of an ensuing guitar on-beat or the actual

snare hit of the second back-beat sounded by the drums. Regardless of which way one goes here, by the simple virtue of being heavily swung, such off-beat syncopations may be interpreted as heavily emphasizing on-beat locations without directly accentuating them.

A similar perspective, articulated by Danielsen, suggests that when certain local sixteenths are swung to a radical extent, particularly in the form of syncopations, they may be perceived as virtual extensions of the on-beat locations that they precede—that is, as “downbeats in anticipation.” Here, a syncopation is heard as the attack of the following “core of the beat ... [which] becomes more a centre of gravity or concentration of energy than a fixed point in a metrical framework” (Danielsen 2006, 79). In “Sex Machine,” highly swung off-beat events are regularly positioned less than 90 milliseconds or so from their ensuing on-beats, albeit sparingly. Interestingly, such a value falls just below the limit of short sound event durations likely to be heard as categorical subdivisions in their own right (Butterfield 2006; Efron 1973) and therefore these events could be argued as falling within the groove’s “beat bin”, that is, occurring within the duration of time in which a listener would expect a beat event to happen (Danielsen 2010). However, funk styles tend to be rather ‘tight’ overall, generally presenting small on-beat onset asynchronies between rhythm section instruments, and thus likely inviting syncopations to be heard just as such – as temporally distinct from the on-beats which they precede. In certain kinds of hip-hop/R&B on the other hand, where “looser” grooves with larger inter-instrument-onset asynchronies are the norm, it is possible that such large discrepancies may be more readily absorbed by experienced listeners within the applicable beat bin (see the D’Angelo analysis below).

Counter-rhythm: ambiguous riffs in Jackie Wilson’s “(Your Love Keeps Lifting Me) Higher and Higher”

It is rare to find a song described as “groovy” that does not feature some prominent use of off-beat gestures, either within the basic unit of the accompaniment section or in the main melody of a groove. As mentioned previously, when a series of accentuated events repeatedly occurs on “unexpected” off-beat locations within a basic unit, these events may cease to be heard as singular displacements of the main beat and instead be perceived as counter-rhythmic figures that emphasize focal points within the groove that are incongruent with the main meter. In a wide range of groove-based styles, one encounters rhythmic figures that group the eighth- or sixteenth-note subdivisions of the main meter into asymmetrical patterns such as 3+3+2 or 3+3+3+3+2+2, respectively. Such figures can be taken as allusions to alternative cross-rhythmic pulse layers that function to destabilize, but not usurp, the dominance of the main meter. Counter-rhythms are ubiquitous in African American groove-based styles,¹⁶ especially in funk (see Câmara 2016; Danielsen 2006; and Wilson 1974), but they can also be found in more upbeat, dance-oriented soul tunes such as Jackie Wilson’s “(Your Love Keeps Lifting Me) Higher and Higher” from 1967, which we will examine next.

Groove

The track begins with a highly driving, drone-like bassline by James Jamerson that is centered on the tonic of the song's D major key and initially accompanied only by tambourine and congas. The latter instruments establish a clear pulse sensation by marking the quintessential "two" and "four" backbeats of the 4/4 meter. The bassline, on the other hand, seems to somewhat simultaneously disturb and reinforce the main pulse, which is subsequently articulated by a steady stream of eighths on the hi-hat cymbals and a further backbeat emphasis on the snare. The bassline soon appears to doggedly insist on subverting the pulse on every repetition of the first basic unit measure: while it starts out firmly ensconced on the first downbeat, it promptly proceeds to accentuate an off-beat on the "two-and" before settling back into the third downbeat. On the "four," then, it accentuates the main pulse once again, but when the duration of this stroke suddenly extends itself beyond the measure boundary by an extra eighth note, a hint of a 3+3+3 grouping emerges, alluding to the possibility of an abiding 4:6 cross-rhythmic layer in action (four dotted quarter notes against six quarter-note beats of the main pulse; see Figure 2a). However, no fourth event manifests itself to reinforce this impression; instead, an ascending motif of eighth-notes starting on the "two" of the second measure returns the bass riff to the main pulse before a final anticipatory pick-up to the "one" kicks off the basic unit all over again.

Taking into account the centripetal force produced by all the tonic D notes in the entire basic unit, coupled with the fact that the syncopation on the "three-and" is located a further dotted quarter note before the 3+3+3 grouped events, one might even begin to hear this D as setting into motion the dotted quarter-note cross-rhythmic layer implied previously, potentially forming a 4:6 counter-rhythm. Alternatively, though, if one considers that the first A in the ascending eighth-note motif of the second measure can be heard as a focal tonal point in its own right (the track, in fact, begins on it), this note and the following two eighth-notes may additionally be heard as a grouping of 3. As a result, the bass riff presents no single clear instance of 4:6 cross-rhythm as such but instead implies several potential groupings of three eighth-notes that, upon repeated hearings, allude to a layer of dotted-quarter notes atop the main pulse that forms a number of potential counter-rhythmic configurations at any given time depending on one's perspective (see Figure 2b).



[Click to view larger](#)

Figure 2. Bass riff in "(Your Love Keeps Lifting Me) Higher and Higher." Potential eight-note groupings and cross-rhythmic tendencies indicated by brackets and rhythmic notation above the staff, respectively.

AUDIO 2

Admittedly, such an interpretation may seem rather tenuous at first; after all, whichever way one sees it, the bass figure always presents salient events that coincide with the main beat locations of the meter. However, as Butler has noted, counter-rhythmic

Groove

patterns that display complex subdivision groupings “actually tend to *reinforce* important metrical junctures” (Butler 2006, 157), and it is precisely this inherently ambiguous character—belonging to both and neither pulse and counter-rhythm at the same time—that provides the exciting element of rhythmic tension that drives many a successful groove.

During the chorus sections, the piano actually displays counter-rhythms where the tendency toward 4:6 (and related 2:3) cross-rhythms is much more obvious than it is in the bass (see Figure 3). Here, the dotted quarter-note layer frequently manifests itself on the second downbeat of the first measure and ends a quarter note before the second measure ends. (Note that the cross-rhythmic tendency of the bass pattern comes forward as phase shifted in relation to the piano, probably causing the bass rhythm to seem even more ambiguous.) Once one has tuned into these counter-rhythmic motifs, one begins to hear them in several other instruments throughout the track as well, including the backing vocals (also shown in Figure 3) as well as the tambourine, guitar, and various combinations of all of them.

The image shows a musical score for three parts: Backing Vocals, Piano, and Bass. The Backing Vocals part has lyrics: "Your love keeps lift-ing me... up", "Love keeps lift-ing me", "I lift my soul", "High-er and", "high-er and", "high-er and". The Piano part has a rhythmic notation above it: "Dotted quarter note". The Bass part has a rhythmic notation above it: "Dotted quarter note". There are also some other rhythmic notations above the staves.

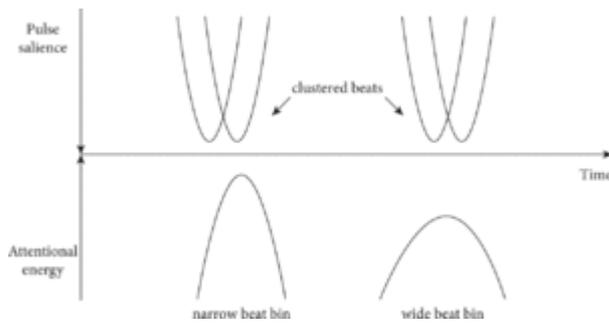
[Click to view larger](#)

Figure 3. Cross-rhythmic tendencies in piano, backing vocals, and bass in “(Your Love Keeps Lifting Me) Higher and Higher,” indicated by rhythmic notation above the staves.

AUDIO 3

Beat Bins: Clustering and Extending Beats through Editing and Processing of Rhythmic Sounds in Contemporary R&B and Neo Soul

The experience of a groove can also be enhanced via manipulation of the shape of the sound. This practice has accelerated as a consequence of new possibilities for editing and/or processing sound. Through the combination of different layers that imply more radically divergent locations of the pulse at the micro level than the onset asynchronies usually found in played styles such as jazz and funk, one can achieve a characteristic feeling of “clustered” beats. Alternatively, one sound can be edited or processed such that its exact rhythmic placement becomes vague. As a consequence, the internal beat changes from a narrower point-like shape (narrow beat bin) to a more saddle-like shape (wide beat bin) with a considerable extension in time (Danielsen 2010; see Figure 4). Both these forms of beat-bin meter (Danielsen 2018) yield a very characteristic microrhythmic feel.

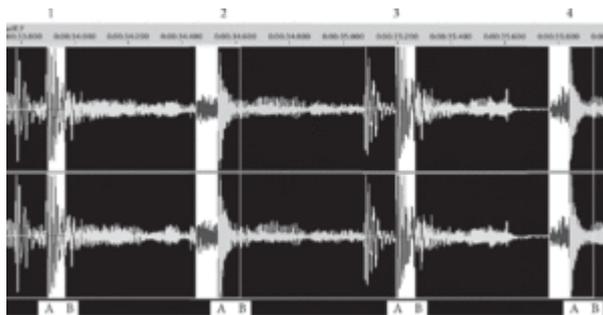


[Click to view larger](#)

Figure 4. Clustered beats (actual sound) and narrow and wide beat bin (internal beat shape), respectively.

Early examples of clustered beats can be found on D'Angelo's *Voodoo* (1999). On several songs on this album, multiple locations of the pulse merge into extended beats at the micro level of the groove. These effects are most likely produced through the displacement

of recorded layers of the groove. Measurements in the amplitude/time representation of the groove of "Left & Right" reveal that the "glitch" or discrepancy measured as inter-onset-interval (IOI) between the two rhythmic layers of the song is considerable: approximately 55 milliseconds on the downbeats (beats 1 and 3) of the basic one-bar-long rhythmic pattern (in 4/4 meter), and approximately 80 milliseconds on the offbeats (beats 2 and 4)—that is, between 8 and 12 percent of a quarter note in the song's tempo (92 beats per minute [bpm]; see Figure 5).



[Click to view larger](#)

Figure 5. Waveform of bar 14 of "Left & Right" (amplitude/time). Highlighted areas (in black) mark the IOI (inter-onset-intervals) between bass drum (A) and guitar (B) at beats 1 and 3, syncopated guitar and snare drum (A) at beats 2 and 4. Pulse location B is indicated by a black line that appears a sixteenth note after the attack of the syncopated guitar. The three audio clips illustrate: (a) an excerpt from the first verse to provide a sense of the overall groove; (b) the bar shown in Figure 5; (c) the same bar, slowed down to make the wide beat bins are more audible.

AUDIO 4

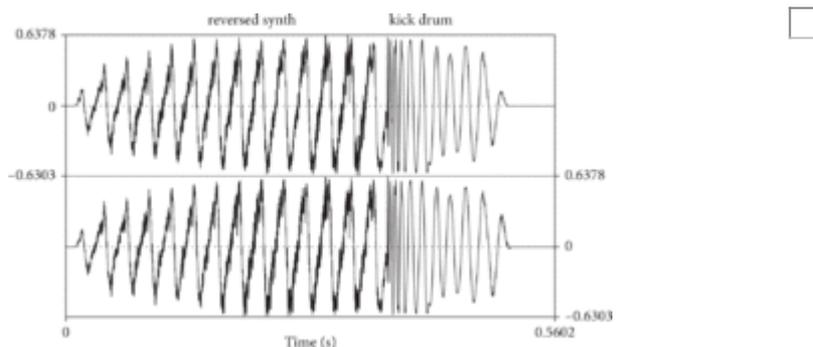


Especially on the offbeats, the sharp attack of the syncopated guitar, which structurally strikes a sixteenth note ahead of the beat, is far too close to the equally sharp attack of the snare drum on the beat. Put differently, the virtual or "structural" distance is one sixteenth note, but the actual distance is only one thirty-second note (for detailed analyses, see Danielsen 2010; Danielsen et al. 2015). This discrepancy produces a very

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characteristic tilt in the groove. On the track “Untitled (How Does It Feel)” from the same album, the beat bin is even bigger—in fact, generally around 90 milliseconds (see analysis in Bjerke 2010)—which approaches the threshold for temporal segregation in auditory perception (London 2012, 27–29).

A recent example of the use of sound processing to manipulate the internal pulse of the listener is the synth-pad/kick drum “bins” of Rihanna’s “Needed Me” (the third single from her 2016 album *Anti*). A crucial aspect of this song’s microrhythmic dynamics derives from the manipulation of the sounds that constitute the groove foundation of the track (see Figure 6).



[Click to view larger](#)

Figure 6. Reversed sound accelerating toward the kick drum in Rihanna’s “Needed Me” (2016). Audio example (a) provides an entire bar of the song for context; (b) corresponds to the single beat shown in the figure.

AUDIO 5



A reversed sound consisting of a deep, sawtooth-like bass synth and a voice sample/synth pad accelerates toward the bass drum kick, reversing the expected dynamic of a traditional bass drum/bass layer, where the kick usually initiates the more extended sound of the bass. When this motion is reversed, it generates a peculiar rhythmic feel that recalls the much-used side-chain “ducking” effect of electronic dance music and related styles. This is achieved through the use of a kick drum to control a compressor on the main output such that the level of the main output is reduced whenever the kick drum is present. This technique might have been employed to produce the accelerating “reversed” feel of the synth-pad sound in “Needed Me” as well, only that the kick drum stroke on beat 4 initiating this reversed sound is not audible. Microrhythmic manipulation of this kind has become an almost standard part of the groove repertoire in contemporary R&B-based pop music.

Conclusion

While there is generally little doubt as to whether a groove is “good” or not when one is experiencing it in the moment, what exactly makes it so can be quite challenging to ascertain after the fact. As it occurs in the here and now of performance or perception, the ineffable state of being in the groove is, in fact, impossible to come to terms with; the very act of endeavoring to grasp it a posteriori dissociates one from the immersive groove experience itself. No definition—including those that explicitly aim to capture the elusive processual character of groove—escapes this basic hermeneutic premise. Nonetheless, despite groove’s inherently multifarious nature, we have attempted to elucidate upon a few aspects of it, first by reviewing three general understandings derived from various disciplines concerned with its study (groove as pattern and performance; as pleasure and appeal to movement; as a state of being), then by proposing a non-exhaustive set of features seemingly common to a wide range of groove styles (pulse/beat, subdivisions, syncopation, counter-rhythm, microrhythm), and finally by applying a combination of these outlined approaches to the analysis of a few selected grooves from the Afro-American musical tradition. As a final note, it should be acknowledged that the impetus toward an academic understanding of groove is a relatively new one, and therefore the theoretical and methodological approaches touched upon in this chapter by no means delimit all possible avenues of exploration. Much like groove itself, our knowledge about groove seems to get “better” the longer we engage with it, and, as it stands today, the future of analytical groove studies still holds a great of promise and potential.

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Notes:

⁽¹⁾ *Merriam Webster Dictionary Online*, s.v. "Groove," <https://www.merriam-webster.com/dictionary/groove>.

⁽²⁾ According to Kernfeld (2017), early examples of the term used in song titles are "In the Groove" (1937, Decca 1621), by Andy Kirk's big band, and Chick Webb's "In the Groove at the Grove" (1939, Decca 2323), with Ella Fitzgerald.

⁽³⁾ It is to be noted that, due to the non-culturally specific nature of certain "groove" definitions (see below), the term has come to be applied to describe aspects of musical genres extending far beyond the confines of its original African American connotation, such as Western classical (Roholt 2014) and Scandinavian folk music (Johansson 2010; Kvifte 2004) amongst others.

⁽⁴⁾ This interaction resembles the interaction between syntax and actual speech or writing in linguistics (for linguistic theory that conforms to this theoretical premise, see Ricoeur 1973; Bakhtin 1986). This theoretical premise is today widely accepted in the various strands of research on rhythm (see, e.g., Clarke 1985; Desain and Honing 2003; Keil 1995; Kvifte 2004; Iyer 2002; Pressing 2002).

⁽⁵⁾ The participants also rated music from various genres. Overall, soul and R&B were rated highest in terms of mean groove rating, compared to jazz (second), rock (third), and folk (fourth) (Janata et al. 2012, 59). However, the differences among the ratings of the other three genres (jazz, rock, folk) were not statistically significant. Moreover, faster

tempi resulted in higher groove ratings. Generally, groove rating was strongly positively correlated with how much a person enjoyed the excerpts (Janata et al. 2012, 59–60).

(⁶) In the tempo ranges typical of most groove styles (90–120 beats per minute), the duration of thirty-second notes approaches or falls below the threshold of human perception of short durations (around 120 milliseconds, according to Efron 1973). Thus, they will tend to be heard as “categorically” subsumed within slower subdivision levels (Clarke 1987) and likely experienced either as ornamentations (grace notes, tremolos, flams, and so on) or as late/early attacks (Butterfield 2006). Interestingly, research has pointed to the potential structural salience of events faster than 100 milliseconds as well (Câmara 2016; Polak 2010).

(⁷) For example, in styles featuring the archetypical “back-beat” pattern, the phenomenal accent pattern can be felt as the opposite of the normal 4/4 metrical accent: weak–strong–weak–strong. This does not imply, however, that back-beat events are felt as “unexpected” syncopations of the meter, but rather that they form instances of beat-level “hocketing” (“streams of the same basic period [‘metrical level’] out of phase” London 2012, 66), that is, the back-beat accents regularly chafe against established metrical accents without displacing them.

(⁸) In the Black Atlantic rhythmic diaspora—including, for example, jazz, blues, gospel, reggae, rock, condomblé, cumbia, and hip-hop—this practice takes the form of syncopation, overlay, displacement, off-beat phrasing, cross-rhythm, and swing (Pressing 2002, 300–301).

(⁹) With perhaps the exception of overtly jazz-influenced styles such as jazz funk or acid jazz, although even here they tend to be utilized during solo segments rather than within accompaniment-section rhythms.

(¹⁰) Keil (1995) left the question of norm open, focusing primarily on the relationships among musicians in performance. However, he has been criticized for understating the importance of structure by, among others, Butterfield and Kvifte, who both point to the interaction of structure and microtiming (Butterfield 2006; 2011) or syntax and process (Kvifte 2004) as crucial aspects of groove.

(¹¹) The term “onset” has commonly described the beginning of a sound event; it is often formally defined as the location in a waveform graph where an event’s amplitude signal crosses a predetermined minimum threshold. The term “attack point” is commonly equated with the maximum amplitude peak. In fact, however, the perceived attack lies somewhere between perceptual onset and the attack point of the sound (see Villing 2010 for an overview of research into the perceptual center of sounds).

(¹²) In jazz, musicians tend to swing pairs of eighth-notes at ratios typically ranging between 1:1 (“straight”) and 2:1 (“tied-triplet swing,” or a quarter triplet note followed by an eighth triplet note), although occasionally up to even higher ratios of 3:1 (“heavy

swing,” or a dotted eighth-note followed by a sixteenth-note) and beyond (Friberg and Sundström 2002)

(¹³) Roughly the threshold where subdivisions cease to be categorically heard as straight (even in duration) and instead as swung (uneven in duration), based on conservative heuristics proposed by Friberg and Sundström (2002) and Butterfield (2011).

(¹⁴) Swing ratios of sixteenth-note pairs were calculated by dividing the duration of an off-beat note by the duration of its preceding on-beat note. This relationship is then represented in either ratio (ex. 1.2:1) or decimal form (ex. 1.2). Durations were determined based on inter-onset-intervals (IOIs), that is, the time distance between onsets of successive note events, using instruments’ own note onsets as reference points for IOIs, where available. In instances where either the first on-beat sixteenth was unsounded (as is the case with syncopations or pick-up notes) or no third on-beat sixteenth-note or eighth-note event ensued after the second sounded sixteenth-note off-beat, swing ratios were instead calculated relative to the attack onset locations of actual sounded hi-hat cymbal strokes. See Câmara 2016 for further explanation.

(¹⁵) The difference in thresholds between high and low swing density rhythms was found, however, to be generally higher for non-drummer than drummer subjects.

(¹⁶) They are also exceedingly common in Afro-Latin and Afro-Caribbean music, particularly the 3+3+2 counter-rhythm, commonly termed the “habanera” (London 2012) or “tresillo” figure (Stover 2012). This figure features prominently in the Cuban “son clave,” as well as in countless foundational rhythmic patterns of genres ranging from Brazilian samba to Jamaican dancehall, to name only a few.

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