

# The Metric Matrix: Simultaneous Multidimensionality in African Music

David Locke

Things are not what they seem. The familiar reveals an unexpected side. Shapes are shifting. Many students of African music undergo experiences like this: an apparently stable musical phenomenon changes, inexplicably and by its own accord, to become something else. In a private lesson you learn a musical phrase that you grasp well enough, but at the next lesson it sounds very different, and when you hear the phrase in the polyphonic context of an actual performance, you need to re-learn it once again. This paper forwards the suggestion that many types of African music are patterned intentionally so that this phenomenon, which I will term "simultaneous multidimensionality," is put in motion and sustained. I will posit the "metric matrix" as a heuristic concept that tracks patterns of accentuation and I will list features of musical design that open for listeners the opportunity to creatively hear music of this style.

In many kinds of African music, performers set up dynamic steady states. Timed to a steady beat, a cleverly arranged pattern of notes cycles repeatedly within a fixed span of time, providing an opportunity for a culturally attuned listener to hear a rich set of rhythmically exciting melodies. Composers fix multi-determinate components into their musical designs; performers bring this multi-faceted condition into being; and listeners actively participate in hearing the multivalent potential of a familiar item of repertory. Examples range over vocal music, such as pygmy group singing; the music of tuned instruments, such as Shona *mbira* music; and the music of indefinitely pitched

instruments, such as Ewe dance-drumming.<sup>1</sup> Music like this presents to the mind's musical ear multiple simultaneous views that are constantly in a condition of non-resolving metamorphosis. Although works in this style often have musical forms that are directional, narrative, and/or goal-oriented, a significant portion of their musical force nevertheless generates from the knowing use of musical repetition that enables this experience. Framed within the concepts of metric matrix and simultaneous multidimensionality, this paper explores musical polysemy in Africa.<sup>2</sup> After an exposition of concepts, the ideas are applied to an example of dance-drumming from the Dagomba repertory.

## PART ONE: IDEAS

### *Syntax*

When practitioners of this style of African music compose and perform, one aesthetic goal that has impact upon the design of their musical choices is to establish and sustain the music's open-ended, iridescent quality. Guided by inherited traditions that constrain utterly free choice, musicians achieve their expressive intent by working within the framework of a musical syntax that is well established but largely un-verbalized within their cultural community. Although enormously varied across Africa and its diaspora in particular detail according to such factors as ethnic heritage, the history of inter-cultural contact and genre-specific musical features, this paper argues for the

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<sup>1</sup> For sound recordings and discussion of these three examples, see my chapter in *Worlds of Music* (Locke 2009a).

<sup>2</sup> I have applied these concepts in two recent articles. Using an item of Dagomba dance-drumming as exemplar, I compare the idea of simultaneity in African music with its use in cubist visual art (Locke 2009b); I use the concept of the metric matrix in a descriptive analysis of *Yeweyu*, an Ewe musical work (Locke 2010).

presence in Africa of a shared musical syntax that produces music with the aesthetic quality of everlasting energetic vitality.<sup>3</sup>

My assertion about the presence of syntax runs counter to what Simha Arom has written about Central African music:

All the possible realizations of a given rhythmic figure are culturally speaking identical so that the order in which they are repeated is almost always random...[T]he order in which the realizations of a given figure are concatenated is optional. This in turn means that no syntactic constraints apply (Arom 1991, 299).

In my view, Arom's denial of syntax implies that African musicians are, so to speak, mindlessly pulling phrases out of a hat. On the contrary, I argue that musical syntax is activated during performance purposely to achieve the aesthetic goal of keeping the music's polyphonic texture in a constant state of process. African musicians, I suggest, intend to impart a multivalent quality to notes, figures, motives, and phrases (need more explanation and should come earlier).

### *Two Facets for Analysis*

Analysis of an example of African polyphonic music may emphasize its parts or its totality. On the one hand, African ensemble music for dance may be understood as a counterpoint among separate phrases, which Thompson (1966, 92) has dubbed "apart playing." In this approach, analysis considers the linear design of each phrase and the network of connections between and among phrases. This paper shows that the patterning of "phenomenal accents" in phrases can be explained in terms of their rhythmic relationship to an implicit matrix of steady beats (Lerdahl and Jackendoff 1983, 17). In

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<sup>3</sup> I subscribe to the set of aesthetic values for African traditional performance arts listed by Robert Farris Thompson (1974), which includes this quality of life-force energy.

some cases, recurring accents consistently coincide with beats or else suggest their displacement; in other cases, accents that shift between onbeat and offbeat locations create temporary feelings of musical motility and stability.<sup>4</sup>

In the second approach, the ensemble's music may be heard as a well-blended whole whose melodies arise from the careful arrangement of interlocking phrases, which Nzewi (1997, 42) has named the "ensemble thematic cycle," or ETC.<sup>5</sup> Composers and performers have in mind composite melodies that listeners hear by mentally conjoining tones from the several parts. Often, the ETC is an instrumental setting of texts in the local language that are connected to the occasion of performance within community. The temporal frame of the ETC is a recurring time span whose internal structure has impact upon the perception and expressiveness of sounded music. In most cases, musical ethnographic research reveals that the ETC has a sense of rhythmic motion towards a cadence moment of temporary stasis and resolution. Just as listeners can aesthetically enjoy the separate phrases or the polyphony of the ETC, analysts of African polyphonic music at steady tempo should attend both to the whole and the parts of which it is made.

### *The Metric Matrix*

In African music of the kind discussed here, sounded music happens in the context of an unsounded temporal structure that I dub the "metric matrix."<sup>6</sup> Beats, which may be

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<sup>4</sup> Patterns of onbeat and offbeat accentuation are elaborated in Locke 1982.

<sup>5</sup> The ETC idea differs from the concept of "polyrhythm" in its acceptance of melody and harmony as intentional features of African polyphony. ETC also permits inclusion as a core musical feature, the latent texts that underlie many idioms of African instrumental performance, rather than marginalizing language as extra-musical.

<sup>6</sup> The meter-as-matrix concept has been a feature of my writings about African music since my doctoral dissertation (Locke 1978). For monographs that use this idea see Locke (1988; 1990; 1992).

said to contain sets of faster pulses or time-points, are the factors within the matrix most present to consciousness. Meter is usefully regarded as a matrix of beats of different duration and position within an isochronous time span that recycles repeatedly during performance. Beats flow at steady tempo, shaping musical time into equidurational units that are available to listeners and players. For listeners, the choices within the metric matrix are a means for orientation to the gestalt of the ETC; for composers and performers, the positions of individual beats and/or the durational values of a series of beats guide rhythmic creative choice.

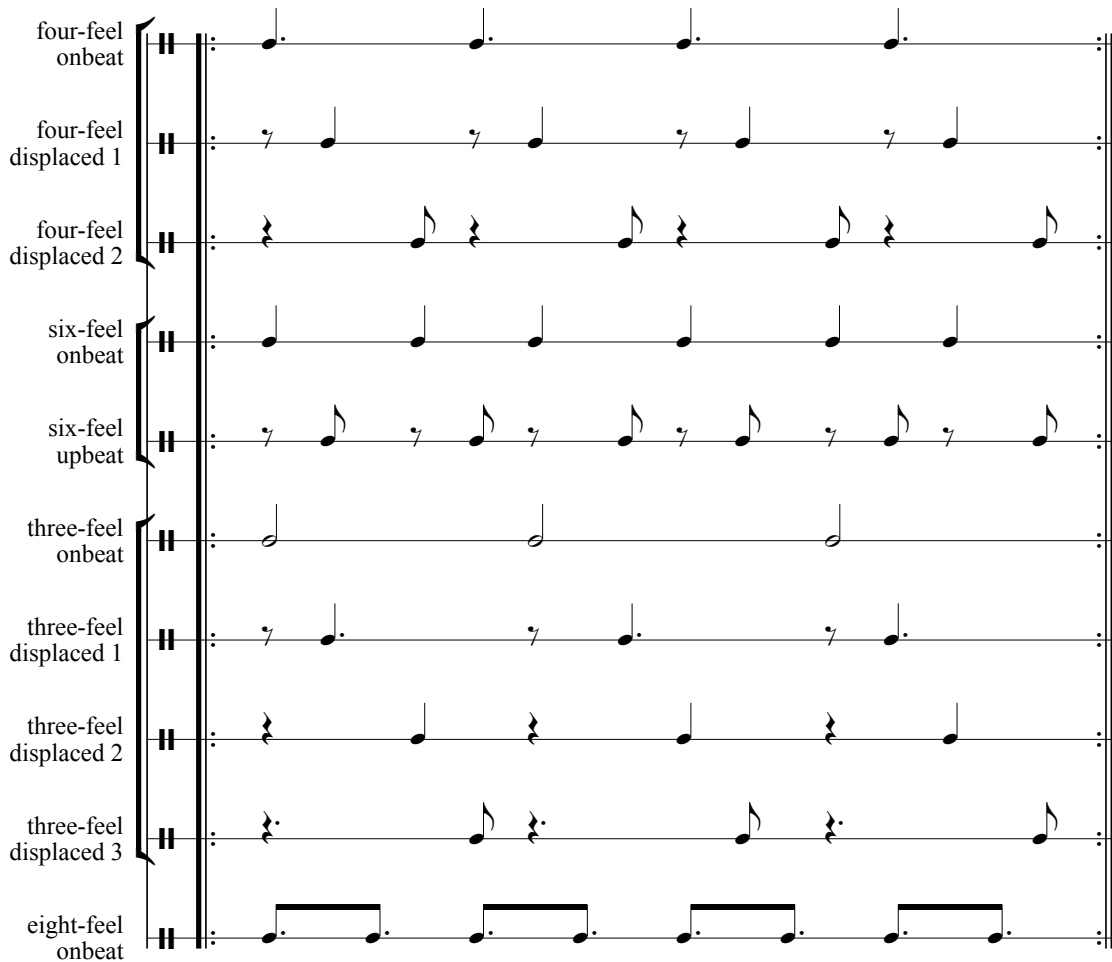
Two important types of metric matrix operate in most idioms of African dance music: (1) ternary time; that is, beats contain three fast pulses, and (2) quaternary; that is, beats contain four fast pulses (see Figure 1 and Figure 2). ETC time spans are usually multiples of two. When I visualize African "groove" music that has never before been graphically represented in staff notation, I inscribe the cadential moment of the ETC on the first onbeat time-point of the first measure.

Each moment within the metric matrix has an inherent rhythmic valence.<sup>7</sup> The onbeat position of beats defines their primary temporal feeling. Although each onbeat accent within the time span of the ETC is usually articulated with equal loudness, position order in the metric set of beats does have rhythmic significance. In the concept argued here, the musical rhythm of separate phrases and the entire ETC is shaped by motion towards a commonly felt downbeat—"the one" in the parlance of non-African students of African music.

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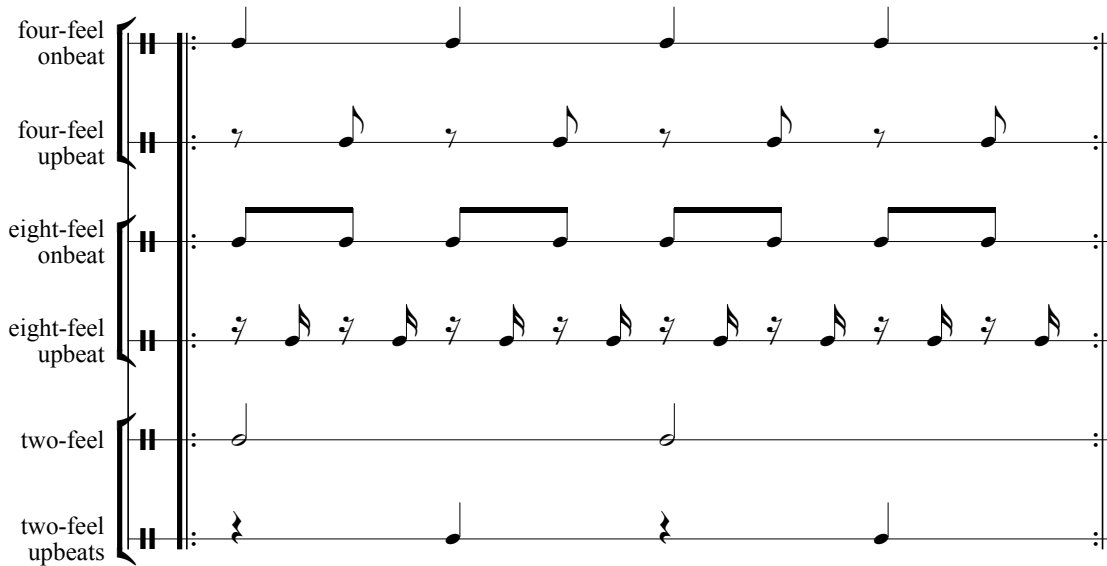
<sup>7</sup> Arguing in favor of merging the two concepts, Hasty (1997, 3-21) reviews the historical bifurcation of meter and rhythm that has characterized music theory studies of Western art music. The concepts forwarded here, developed independently of Hasty's work, are consonant with his approach.

Figure 1. Metric matrix in ternary-quadruple time



In his analytic writing, Nketia (1963, 64) asserts the idea of "regulative beat"; that is, a steadily felt and/or articulated unit of duration. Anku (1995, 177), while accepting the presence of beats and time-points within them, finds them to serve a "structural" rather than "metric" purpose. With regard to rhythmic motion, Anku's regulative time-point, or RTP, is the recurring time-point on which a phrase begins in each pass through its time span. As mentioned above, in transcription I intentionally set the cadential time-point of the overall ETC on the first beat of measures, which enables me to call it the downbeat, thus purposely invoking a metrical/rhythmical value. In my experience, the total number

**Figure 2.** Metric matrix in quaternary-quadruple time



of time-points within the ETC—what Anku (2000, paragraph 9) calls "a time-point set"—is not actively used by African musicians. Instead, musicians feel beats in relation to sounded patterns, such as a time-keeping ostinato, or in Nketia's (1963, 78) widely adopted terminology, "time line."<sup>8</sup> To identify time-points within time spans, I use the following numbering system for ternary-duple time: 1.1, 1.2, 1.3, 2.1, 2.2, and 2.3. Time-points marked 1.5 and 2.5 are binary upbeats; that is, the mid-point between successive onbeats.

African musicians creatively manipulate onbeats in two ways: displacement and tactus augmentation/diminution. In displacement, beats may be shifted from their onbeat positions to the several offbeat time-points contained within the beat's duration. In tactus

<sup>8</sup> Permit an anecdote from my field work in Ghana (1975-1977). Frustrated with my painstaking effort to discern the relationship of strokes in a lead drum phrase to notes in the time line, my teacher Godwin Agbeli remarked, "That way will take forever. You should use the bell to find the beats. Then feel the drum phrase in relation to the beats."

change, the rate at which beats are present to musical attention varies by factors of two, a process akin to "double time" or "cut time" in African diasporic music like jazz.

### *Three-With-Two*

Serving as a creative resource for composition and improvisation, three-in-the-time-of-two (3:2) pervades African music with beats of ternary structure. In the seminal words of A.M. Jones,

We have to grasp the fact that if from childhood you are brought up to regard beating 3 against 2 as being just as normal as beating in synchrony, then you develop a two-dimensional attitude to rhythm... This bi-podal conception is... part of the African's nature... (Jones 1959, 102).

In my view, the musical condition is best characterized not as three *against* two but rather as three *with* two; that is, the simultaneous presence of both ways to organize perception of musical time. In other words, ternary beats imply their binary/quaternary counterparts; 3:2 is an inseparable twinning of two complementary feelings of musical time.<sup>9</sup> Whereas African musicians, who play in a "writing-free" tradition, need not rank one time-feel as fundamental, we analysts of African music, working in a "writing-constrained" condition, are pressed to make this choice. In my view, ample ethnographic musical evidence suggests the most culturally appropriate figure-ground hierarchy in ternary-duple music: the "two feel" may be taken as the foundation in terms of which the "three feel" gains its effect, a condition replicated in ternary-quadruple music between the "four feel" and "six

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<sup>9</sup> Unlike London (2004, 50), this paper suggests that at least in African music, polymeter is possible and is very likely to exist: one phenomenal musical object can be felt in multiple ways simultaneously.



feel."<sup>10</sup> While 3:2 pervades ternary music, quaternary music seldom uses triplets; instead, a set of dotted notes may temporarily make 3:2 and 3:4 temporal structures.

Rhythms using 3:2 relationships need not start at the moment of unison between the two beat flows. In other words, 3:2 and 3:4 can be *phrased* in different ways. According to my experience, the artful beauty of phrases with 3:2 patterning frequently draws upon motion towards the resolving, cadential moment when the two streams temporarily coincide. The "phrasings of 3:2," so to speak, are shown in Figure 3 and Figure 4 (see Locke 1982, 236).

### *Rhythmic Accentuation in the Metric Matrix*

Thinking of rhythm, tones in a phrase that coincide with an implicit beat acquire the distinctive quality of "onbeatness." Beat one in each series connotes a feeling of arrival and temporary stasis that justifies the label "downbeat." Each beat within the ETC has unique character; for example, beats in a four-element set tend to be graded 1-3-4-2 in terms of their capability of being at rest (stable) or in motion (motile) . Thus, a tone that occurs on beat 2 will inherently feel more motile; that is, least resolved and most capable of being set in motion, than a tone whose onset matches beat 1. At the faster durations of time-points within beats, the feelingful quality of each offbeat moment also guides musical decision-making and has impact upon a listener's affective response. The rhythmic effect of notes varies with their metric positions. Terms that I use to identify rhythmic qualities of offbeat time-points include:

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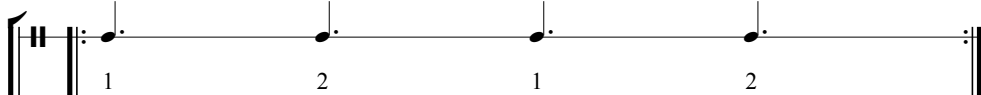
<sup>10</sup> Friedson (2009, 208), arguing for what he calls a "strong position of polymeter," asserts that both time feels are "copresent at all times."

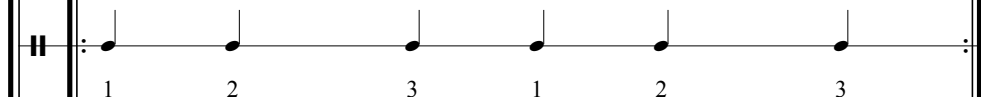
- Before-beat: emphasis on offbeat position just prior to a subsequent onbeat.
- After-beat: emphasis on offbeat position just after a prior onbeat.
- Upbeat: emphasis on offbeat position at mid-point between two adjacent beats.
- Displaced beat: felt as a new onbeat location for a beat of identical duration.
- Pickup: rhythmically associated with subsequent onbeat towards which it moves.


Since there are many beat streams in the implicit metric matrix, the rhythm of a sounded phrase is subject to cognitive re-orientation depending on the flow of beats on which

**Figure 3.** Three phrasings of 3:2

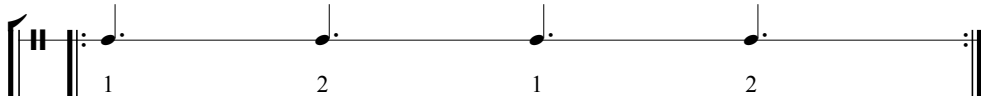
A. 3:2 (three-in-the-time-of-two, "three with two") phrased 1 2 3 repeat continuously

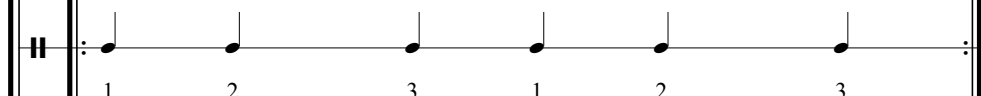
"two" 

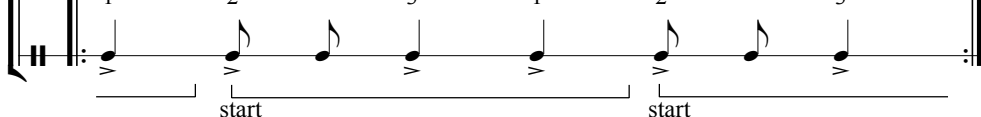
"three" 

composite 

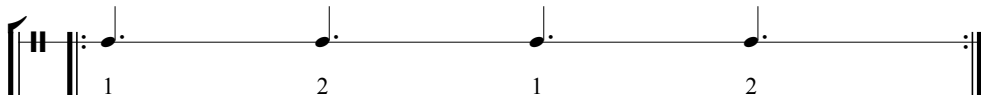
B. 3:2 (three-in-the-time-of-two, "three with two") phrased 2 3 1 repeat continuously

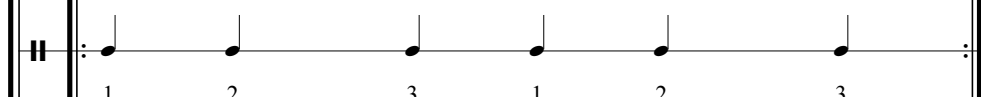
"two" 

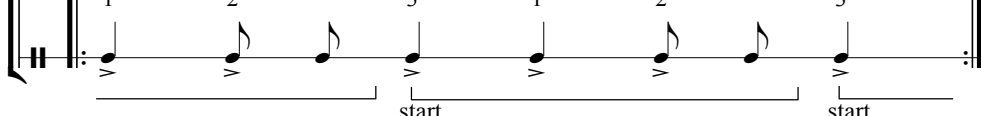
"three" 

composite 

C. 3:2 (three-in-the-time-of-two, "three with two") phrased 3 1 2 repeat continuously

"two" 

"three" 

composite 

**Figure 4.** Two phrasings of 2:3

A. 2:3 (two-in-the-time-of-three, "two with three") phrased 1 2 repeat continuously

"three" 1 2 3 1 2 3

"two" 1 2 1 2

composite start start

B. 2:3 (two-in-the-time-of-three, "two with three") phrased 2 1 repeat continuously

"three" 1 2 3 1 2 3

"two" 1 2 1 2

composite start start

perception is grounded.<sup>11</sup> Within the enigmatic and paradoxical context of the metric matrix, tones are onbeat and offbeat simultaneously.

### *Simultaneous Multidimensionality*

Simultaneous multidimensionality names a condition in which music is coherent from several perspectives at the same time.<sup>12</sup> Repetition is the crucial force that enables

<sup>11</sup> Derived from my doctoral dissertation, my first paper on musical phenomena like cognitive re-orientation and the relationship between rhythmic accentuation and metric structure may be found in Locke (1982, 224; 227-243).

<sup>12</sup> For me, the seminal paper on this phenomenon in African music is Kubik's (1962), "The Phenomenon of Inherent Rhythms in East and Central African Instrumental Music."

the music to achieve this crystalline depth.<sup>13</sup> In performance, the composite whole of the ETC circles around its music axis, enabling a creative listener to contemplate the polyphony as always renewing itself, always creating its musical identity. Because of the cyclic nature of time in this musical style, any element not only points forward towards what comes next but also responds to what has come before. Listeners experience each pass through the ETC in relation to prior and subsequent musical action. Who can find the circle's beginning or end? Music of this design achieves sculptural persistence when heard by listeners who are attuned to simultaneous multidimensionality.

Devices of simultaneous multidimensionality include:

- (1) Dualism of tempo: feeling the flow of time at different rates; not only according to 3:2 relationships but also in ratios of augmentation and diminution, as in double time or cut time.
- (2) Meter as a matrix: changing the figure-ground relationship between notes in a sounded phrase and an implicit grid of beats.
- (3) Polyphonic perception: perceiving a multiplicity of composite melodies that emerge from the many ways separate phrases may be heard in counterpoint.
- (4) Phrase reconfiguration: hearing a phrase as starting, moving and ending in different ways as the music recurs again and again.
- (5) Equivocal phrase shape: in some cases, durational values and/or pitches within a phrase do not make a clear design, thus requiring the listener to project a temporal shape onto the heard aural image.
- (6) Polysemous phrase shape: in some cases, durational values and/or pitches within a phrase make a clear design that accentuates several different beat streams equally well.

The perceptual conditions that enable this plural mind-body cognitive condition are particularly likely to arise in ternary time with music whose phrases are structured within

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<sup>13</sup> Repetition should not be understood as a recurrence of exactly the same thing, for that is impossible. Even if the phrases in the ETC could be perfectly repeated, they would be in the existential condition of items in a series. Devices of creative hearing and phenomenal variation further challenge the fallacious notion of sameness.

a 3:2 (three-in-the-time-of-two) temporal framework. In quaternary time, simultaneous multidimensionality arises more from (1) the dualism between onbeats and upbeat, (2) 1:2 shifts in tactus, (3) constant accentuation of the second or fourth elements in a four item set, and (4) changing perception of phrase shape.

Given limits on the scope of this paper, I will now discuss one example in ternary time to exemplify the concepts presented above.

## PART TWO: EXAMPLE

### *Dagomba Dance-Drumming: "Jerigu N-dari O Salima"*

"Jerigu N-dari O Salima" may be regarded as a piece of music in a genre of dance music called Praise Name Drumming, or *salma* (literally, story-telling) in the local Dagbani language of the Dagomba people from northern Ghana.<sup>14</sup> It salutes the generosity of spirit of the late Kar-naa Ziblim—an important regional sub-chief of the polity called Kariga—by announcing in drum language, "A foolish man tries to buy our respect with money, but a wise man earns our respect by acts of good character."<sup>15</sup>

"Jerigu" is music for solo dancing: at events such as festivals and life-cycle celebrations, descendants of Kar-naa Ziblim may request that drummers play it for them when they dance in the public plaza. The cognoscenti in the audience will realize the dancer's genealogy and may ponder the relevance of the proverb in today's world.

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<sup>14</sup> For extensive information about Dagomba dance-drumming, go to <http://dagomba.uit.tufts.edu>. See also Chernoff (1979, 1985) and Locke (1990).

<sup>15</sup> In the Dagomba hierarchical political system, the chief of Kariga is second rank below the *Yaa Naa*, or king (Staniland 1975).

Two types of drums make the instrumental music. *Luŋa*, a two-headed hourglass-shaped pressure drum, plays melodies of three primary pitches—low, mid, and high, represented here on the five-line staff as B-D-E—by varying the tension on the drum heads. Notated with tied notes, sliding effects from unaccented auxiliary pitches below and above the accented primary pitches are crucial to making the drum sound like the spoken Dagbani language. *Guŋ-gɔŋ*, a two-headed cylindrical drum, plays loud accented tones of two timbres—bounce and press. This discussion will omit the *guŋ-gɔŋ*'s quiet unaccented "filler" tones. A solo vocalist, who sings proverb-laden lines that allude to the life and times of the person being saluted, is also part of the ensemble. In a performance that might last for several hours, the musical ensemble will "work the crowd" by inviting members of the audience out to dance one-by-one to different pieces of Praise Name Drumming. Well-wishers shower the dancers with money that goes to the musicians.

The material presented here emerged from my study with the late Alhaji Abubakari Lunna between 1975 and 2009. Alhaji and I worked on lead drumming in Dagomba dance-drumming music using the inherited tradition of pre-composed phrases, which Alhaji would term "talks" (*baŋsem* in Dagbani, or knowledge). Saying that he was following standard Dagomba pedagogical method, Alhaji taught a musical work by giving me a set of "talks" that an informed Dagomba listener would expect to hear when that piece is played. A "talk" is a drummed theme consisting of one or more short phrases, typically not longer than eight ternary beats. Shaped by the Dagbani text it sets, each theme has a distinctive musical design. In performance, after the lead drummer calls

in the ensemble, the "talks" are played in a sequence likely to make compelling danceable music.<sup>16</sup>

The time-span of "Jèrigu's" ETC is eight ternary beats, which I variously notate in measures of two, four, and eight beats depending on the purpose of the transcription. Shown here in duple bars with one-line staves that emphasize rhythm and form, the call-and-response is a straightforward alternation (Figure 5).<sup>17</sup>

The lead *luṅa* drum has several preset themes, three of which are shown in Figure 6. Alhaji taught theme 1 of the solo lead *luṅa* drum, which means "foolish man buys gold," as the call that requests response from a group of answer *luṅa* drums and two *guṅ-guṅ* drums, which render the same text—"wise man buys respect"—with slightly different musical phrases (see Figure 7 and Figure 8).

Transcribed in ternary-quadruple time, theme 1 of the lead *luṅa* opens with a dramatically offbeat high-pitch tone on the third time-point within beat one. Introduced

**Figure 5.** "Jèrigu" call-and-response form

*Jèrigu N-dari O Salima*  
 ♩ = 120

<sup>16</sup> This situation is reminiscent of the case mentioned by Arom (1991, 299) quoted in the Syntax Section above. The "talks" can indeed be played in any order. I question Arom's failure to convey that musicians do understand the musical impact of the phrases they play, that they can vary the phrases to achieve musical goals, and that their choice of phrase can be influenced by their understanding of musical syntax.

<sup>17</sup> This figure in ternary-duple meter is borrowed from the website that presents many different items of repertory that have a variety of ETC time spans (<http://dagomba.uit.tufts.edu>). To facilitate comparison, all pieces are transcribed in duple bars.

Figure 6. "Jerigu": lead luḡa themes 1, 2, 3

*Jerigu N-dari O Salima* lead luḡa theme 1 "Jerigu n-dari o salima"

♩ = 120

Jeri - gu n-dari o - sali - ma

*Jerigu N-dari O Salima* lead luḡa theme 2 "Nunda bi yo ku landa"

♩ = 120

Nun - da bi yo ku lan - da

*Jerigu N-dari O Salima* lead luḡa theme 3 "Gibunbiri lēli m-bala la"

♩ = 120

Gbun - biri lē - li m-ba - la la

Figure 7. "Jerigu": answer luḡa phrase

*Jerigu N-dari O Salima* answer luḡa

♩ = 120

Yen - dan' n-dar' o jil' - ma

Figure 8. "Jerigu": guḡ-gḡ phrase

*Jerigu N-dari O Salima* guḡ-gḡ

♩ = 120

ka ka ti ka ka ka ti ka zi zi gi zi zi gi zi zi gi zi

zi ka ka ti ka ka ka ti ka zi zi gi zi zi gi zi zi gi zi



by a pickup on the third time-point in beat two, the theme follows with four quarter-note spans, the downbeats of which feature a gradual rise in pitch, L-L-M-M. The accented notes, which show when the stick strikes the drum skin, are in 3:2 relationship to the implicit ternary beats. Receiving this gesture from the lead *luḡa*, the answer *luḡa* plays six notes that continue the 3:2 temporal relationship between the sounded accents and the implicit ternary metric structure while undulating downward from mid- to low-pitch—M-M-M-H-L-L. The response drum continues the temporal values and 3:2 structure of the lead drum, but changes the phrasing of 3:2. Whereas the lead drum's 3:2 phrasing goes 1-2-3-1, the answer *luḡa* phrases 3:2 as 2-3-1, 2-3-1. This change in phrasing achieves the musical effect that I am calling an "open-ended feeling" to the flow of time. When the lead *luḡa* re-enters on the next pass through the ETC, its first note becomes multidimensional: it can be heard as continuing the answer *luḡa*'s flow of quarter notes, but because its first note is three eighth notes in duration, it can also be heard to boldly accentuate time-point 1.3, thus interrupting the 3:2 flow and bringing attention to this offbeat location. Although third time-point positions within beats are articulated by both the quiet pickup note in beat two and the strongly articulated stroke in beat three, theme 1 does not forcefully suggest displacement of the ternary onbeat.

Like leading *luḡa*, *guḡ-guḡ* has a polysemous pattern of accentuation. It readily suggests "in four" accentuation of ternary beats 2-3-4-1, if its short accented notes are felt as pickups to the subsequent onbeat accents, "a-2, 3, a-4, 1." But since the short strokes are supposed to be strongly struck, the rhythm of the phrase can be heard "in six," "2 & 4 5 & 1" (see Figure 9).<sup>18</sup>

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<sup>18</sup> The onbeat time points of beats three and six are unsounded.

In my experience, the *guŋ-gɔŋ*'s contribution to the multidimensionality of the ETC is to accentuate the four-feel in contrast to the six-feel so strongly articulated by the answer *luŋa*, while also adding support to the rhythmic multideterminacy of the lead *luŋa* part. Taken in tandem, the rhythmic composite of the accents in the answer *luŋa* and *guŋ-gɔŋ* phrases sounds out two sets of 3:2 phrased 2-3-1-2-3-1 (Figure 10).

Thus far the analysis has shown that multideterminacy in time-feel and phrasing is structurally built into the composition. Now we consider how variability in the design

Figure 9. "Jεrigu": *guŋ-gɔŋ* phrase "in four" and "in six"

Figure 9 is a musical score for the "Jεrigu" piece, showing the *guŋ-gɔŋ* phrase in two different feels: "in four" and "in six". The score consists of four staves:

- beats ternary/quadruple:** A staff with a 3/4 time signature, showing a sequence of quarter notes.
- guŋ-gɔŋ in four:** A staff with a 4/4 time signature, showing a sequence of quarter notes with accents.
- guŋ-gɔŋ in six:** A staff with a 6/8 time signature, showing a sequence of quarter notes with accents.
- beats binary/sextuple:** A staff with a 6/8 time signature, showing a sequence of quarter notes.

The tempo is marked as  $\text{♩} = 120$ . The score is divided into two measures by a vertical bar line.

Figure 10. "Jεrigu": rhythmic composite of answer *luŋa* and *guŋ-gɔŋ*

Figure 10 is a musical score showing the rhythmic composite of the answer *luŋa* and *guŋ-gɔŋ* phrases. The score consists of three staves:

- answer luŋa:** A staff with a treble clef and a 3/4 time signature, showing a sequence of quarter notes with accents.
- guŋ-gɔŋ:** A staff with a 4/4 time signature, showing a sequence of quarter notes with accents.
- Composite rhythm:** A staff with a 4/4 time signature, showing a sequence of quarter notes with accents.

The composite rhythm is labeled with the sequence: 2 & 3 1 2 & 3 1. The score is divided into two measures by a vertical bar line.

of lead drum phrases correlates to temporal positions within the metric matrix. The metric matrix provides a useful analytic tool with which to articulate the musical logic of these phrases. Let us look at three themes for "Jeriga." The meaning of theme 1 has already been discussed. Theme 2 points to the limitations of money, suggesting that personal integrity can never be used up. Theme 3 simply announces that Kar-naa Ziblim has become "the lion;" that is, the top-ranked chief in the Kariga estate:

Theme 1

*Jerigu n-dari o salima.*

Foolish man buys gold.

*jerigu* foolish man  
*n-dari* he buys  
*o* it  
*salima* gold

Theme 2

*Ŋunda bi yo ku landa.*

Debtor cannot buy more.

*ŋunda* the person who buys  
*bi yo* never pay  
*ku landa* cannot buy more

Theme 3

*Gbungbiri lɛli m-bala la.*

This is the lion's place.

*gbungbiligo* lion  
*lɛli* place  
*m-bala la* this is

The following figure shows an eight-beat matrix of ternary and binary beats in onbeat and offbeat positions (see Figure 11). By scanning vertically, we can observe the coincidence between notes in a lead *luŋa* theme and these marks in the matrix. For example, in theme 1 we observe coincidence with binary beats 4 to 7, and the third offbeat time-points in ternary beats 1, 2 and 3.

**Figure 11.** Metric matrix (ternary time) and "Jeriḡu" lead *luḡa* themes 1, 2, 3.

Theme 2 begins with four drum strokes that coincide with the upbeats of binary beats 1 to 4; the fourth note, which is short, is followed by three drum strokes that coincide with the binary onbeats 5, 6 and 7. In other words, the seven accents in theme 2 may be heard as two sets of three long notes that are stitched together with one short note that flips the accents from the upbeat to the onbeat of the stream of binary beats in the metric matrix. As discussed below, the lead *luḡa* player usually "marks time" with a fill phrase during the response from the answer *luḡa* and *ḡuḡ-gḡḡ* (see Figure 12). The "fill phrase," timed to the binary upbeats, phrased 1-2-3-1-2 starting on the sixth ternary onbeat, flows

smoothly into the opening gesture of theme 2.<sup>19</sup> The rhythm of theme 2 manifests two phrasings of 3:2: strokes one, two and three move 3-1-2 "upbeat," while strokes five, six and seven move 2-3-1 "onbeat." Theme 2 starts on the second time-point in the eight-beat cycle rather than the third, which is the point that launches themes 1 and 3 (Figure 11). Since three of its strokes coincide with the second offbeat time-point in ternary beats 1, 3 and 4, this position in the metric matrix may be identified as an aspect of the musical personality of phrase 2.

Theme 3 uses a new durational value—the double time beat in ternary time, notated here as dotted eighth notes (Figure 11). Theme 3 powerfully conveys a sense of urgent, quickened motion from ternary beat 2 towards cadence on ternary beat 5; the mid-point of the cycle and focal point of the response drum parts. These time values create two different positions of a 4:3 temporal structure with the binary onbeats and upbeats. Given a sequence of six notes of equal duration, the drummer may shape the equivocal rhythm with dynamic accent to the offbeat notes.

This exposition demonstrates the heuristic value of the metric matrix for analysis of the rhythmic design of phrases. The analysis has shown that the music of the lead drum injects a variety of rhythmic effects into the ETC, thus maintaining the overall aesthetic value on "a process of becoming." By injecting diverse ways to perceive both the gestalt of the ETC as well as the rhythmic meaning of particular notes and phrases, the lead drum part maintains "Jeriga's" musical multidimensionality.

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<sup>19</sup> Coinciding with even-numbered ternary onbeats, the binary upbeats accentuate the music's "backbeat." Furthermore, since the final binary upbeat in the cycle strikes time-point 8.3, when inserted into theme 1, the "fill" motive adds its weight to the theme's subtle accentuation of third ternary offbeats.

As mentioned above, analysis of this kind of African music does well to include whole textures as well as individual phrases. What of relationships among sounded phrases in the ETC? Let us consider theme 2 (see Figure 12).

The musical example shows the ternary onbeats, and the onbeat and upbeat positions of the 3:2 binary beats. Lead drum theme 2 is given in vocables, as well as the Dagbani drum language. The "fill" phrase, which sets no language, is usually lightly struck on very low pitches about a perfect fourth or fifth below the low-pitch tone. It is important to observe that the "fill," like the theme itself, is timed to the upbeat location of the binary beats. We further see that this creates 3:2 structures—phrased 1-2-3, 1-2-3—with the

Figure 12. "Jεrigu": lead *luja* theme 2 in metric matrix and ETC

♩ = 120

time span begins

time span renews

beats ternary

3:2 beats "onbeat"

3:2 beats "upbeat"

lead luja theme 2

"Nunda bi yo"

drum talk

"fill"

answer luja

gun-gon

dahan dayan den de diyan dahan dayan ta ta ta ta ta dahan Nun -

Nun - da bi yo ku lan da

den dehen den diyan dahan dayan Yen dan n-dari o jil - ma

ka ka ka ka ka ka

ternary onbeats; moments of coincidence are on ternary beats six, eight and two, the "backbeats" of the music's main onbeat ternary groove. The "fill" phrase of the lead *luṅa* interlocks with the accents of answer *luṅa* to make a quick back-and-forth texture whose increased density intensifies the music's texture, making it feel that the pace has become faster. This interlock certainly reinforces the music's overall sense of multidimensionality. In duet with the *guṅ-gṳṅ*, theme 2 of lead *luṅa* reinforces the ternary onbeat interpretation of its phrase—kaKA, KA kaKA, KA. I forward this interpretation because the onbeat notes in the lead *luṅa*'s "fill" phrase match directly with strokes two and five of the *guṅ-gṳṅ*, which coincide with ternary onbeats 6 and 8.

## CONCLUSION

This paper suggests a way to find order in the compositional design and performance decisions of African music with steady beat. It assumes the presence of the aesthetic goal of simultaneous multidimensionality; that is, the creation of a musical surface that can be heard from multiple perspectives at the same time. It asserts that this goal is achieved through systematic means; that is, through the workings of a musical syntax. The paper proposes features of this syntax, especially the idea of meter as a matrix of beats. Ordered within sets, beats have intrinsic rhythmic values, including motility and stasis. Beats in the matrix can be displaced to offbeat locations; the pace at which beats are perceived can be expanded or compressed. The paper explains the patterning of sounded musical events in terms of coincidence with the implicit moments in the metric matrix. Three-in-the-time-of-two, phrased in several ways and occurring at different durational

values, is taken as a core musical structure. Repetition of phrases in a polyphonic texture is an essential enabling factor for simultaneous multidimensionality.

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