ENGLISH USAGE
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NIGERIA SINCE 1842

PATTERNS AND CHANGES

A Festschrift for Prof. David Eka

Edited by:
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LINGUISTIC RHYTHM AND ELASTICITY

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Abstract

This chapter on "Linguistic Rhythm and Elasticity" is built on the tradition where "Linguistic Rhythm" is normally stated with regard to "Pitch" and "Duration". Earlier analyses like "Syllable" versus "Stress Timing", "Full Vowel" versus "Reduced Vowel Timing", "Metrical Analysis", are assumed since the principles underlying all these analyses are basically the same. Our point of departure however lies in the unit of analysis and the timing pattern of the constituents of rhythmic beats. The "Foot Beat" as a rhythmic unit is proposed, where the timing of the syllables within the foot-beat is controlled by the time allotted to the constituents of each syllable, such that in some languages, syllables are actually squeezed into these rhythmic units and the syllables are stretched for the same reason in other languages. This produces an "Elastic Rhythm", which in some languages (like English) is predictable. This proposal is made along the lines of Eka 1985, 1993 which describe the timing pattern in Nigerian English as "in-elastic", thus differing from earlier descriptions of the English spoken in West Africa as "syllable-timed".

1.0   Introduction

All human speech exhibit some form of rhythm. Rhythm generally refers to the reoccurrence of some movement. Speech rhythm according to Abercrombie (1967, p 96) is the rhythm associated with the regular movements of the muscles in both

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[1] *This paper was first presented at the 7th Manchester Phonology Meeting held at the University of Manchester in May 13-15, 1999 as a poster presentation.*

breathing and speech. It is normally stated with reference to prosodic features like: pitch, duration, amplitude, vowel quality, etc. It is a product of relationships which are largely temporal (Ogden 1995:228).

There are two views of rhythm – the temporal view and the non-temporal view. The temporal view involves "a reoccurrence of an event at a regular interval in time" involving periodicity and isochrony (Couper-Kuhlen 1986, p 51). However, human motor activities like speech do not produce wholly isochronous or equal movements. Empirical evidence for periodicity and isochrony is difficult to find because of a number of reasons like:

(1) Variability which is between 3-11% of timing interval (Allen 1975, p 79)
(2) Sounds which generally have different timing effects on each other for certain sounds are longer/shorter in certain positions
(3) Rhythm which in its natural form involves the alternation of a heavy (thesis) and a light (arsis) movement.

According to Brown (1911): "A rhythm is temporal in so far as there is any regular return of similar features. But at the same time, such a rhythm will also be accentual since there must always be points of emphasis whose return can be marked."

The non-temporal view involves "a pattern of event related to one another in terms of salience" (Couper-Kuhlen 1986, p 51). A rhythmic unit is made up of sensory impressions related to one another in terms of salience where some are more prominent than others within certain limits. It is characteristic rhythmic impression that determines the pattern.

A common feature of both views of rhythm is some form of regularity, which is the basis for rhythm. Traditionally, it is caused basically by two types of processes involved in speech production: syllable-producing and stress-producing processes. These two processes have therefore been the basis for the classification of languages into "syllable-timed" and "stress-timed" rhythm systems, where the stress-timed languages as the name suggests, are the stress languages, and the syllable-timed languages are the non-stress languages, which correspond to the lexical tone languages. In stress-timed languages the timing between stressed syllables are perceived to be equal, while in syllable-timed languages, the

timing between syllables are rather perceived to be equal. In both rhythm systems, the feature that is repeated is isochronous. Thus, syllables are isochronous in the syllable-timed languages while in the stress-timed languages, the stress units are isochronous.

The notions of syllable versus stress-timing has been used for a very long time to explain rhythm (Pike 1945, Abercrombie 1967, Halliday 1967, Bright/McGregor 1970, Abbott/Wingard 1981). The syllable-timing theory has not found empirical support in spite of attempts to do so.

In addition to the isochronous parameter, the full vowel timing after Bolinger's (1981) "Borrowing Rule" is another measure for rhythm. This analysis assumes that syllables with full vowels take approximately equal time and syllables with full vowels are shortened by a following reduced vowel. Like the other theories, the Borrowing Rule has a kind of "beat" as a unit of analysis.

This chapter builds on all these analyses by contributing to the rhythm debate and it attempts to provide a more universal parameter for the description of the rhythm systems in languages.

The chapter is discussed in six sections. Section 1 discusses the introduction. In Section 2 the formalism of the Metrical Theory which underlies our analysis is discussed. The relationship between stress and tone, the two crucial prosodic phenomena to our analysis is presented in Section 3. In Section 4, the key terms are discussed. An illustration of the basic terms are presented using both a stress language and a non-stress language. Based on the discussions, proposals are presented in Section 5, and finally in Section 6, the conclusions deriving from the analysis are presented.

2.0   Theoretical Considerations

With the inadequacy of the linear analysis came a shift from linear to non-linear analysis. Current analyses are paradigmatic and they operate on several tiers. One of such theories is the Metrical Theory which began as a theory of English prosody, specially stress, although it has been extended to cater for other phonological phenomena. Metrical Phonology in its developed stage is a theory of phonological hierarchy and other things associated with it. The theory can account for various aspects of the prosodic pattern of an utterance in terms of "tunes" representing the pitch shape, the

prominence pattern and the contour of an utterance and it falls within the Generative Framework.

It was first developed in Liberman and Prince (1977). The term: "metrical" was chosen as a result of the "pattern-grid combination" which is "reminiscent of the traditional picture of verse scansion", produced by the perceived stress patterns of an utterance (Liberman and Prince 1977). In it, prominence relations are captured using metrical trees and grids, reflecting the constituents involved. They are labelled Strong(S) or Weak (W) and this labelling captures the relationships and cumulative properties of stress. The theory assumes that stress is fundamentally a study of the relative prominence of syllables and higher level units such as the foot, and the most important characteristic determining stress patterns is alternating prominence (rhythm) and sensitivity to syllable weight.

Metrical Theory has two formalisms: the metrical tree (or the arboreal), and the grid formalisms. The grid formalism represents the beats of utterances and their weights through its multi-layered representation, and it shows both the beats and the internal structure of the syllables. For this reason we adopt it here.

Against this theoretical background a lot had been done on the rhythm of stress languages. The case of the syllable-timed languages, although not as numerous as the former, have attracted some attention. Following Pike's (1945) analysis of African languages as "syllable-timed", this parameter has been quite popular in the description of African speech rhythm systems.

Nigerian English has attracted a lot of attention over the years (Tiffen 1974, Adetugbo 1977, Eka 1985, 1993, Udofot 1991, 1997). These studies have transference implications and are directly related to first languages, which are syllable timed. The results have been a number of analyses of Nigerian English rhythm. Eka (1985, 1993) describe the timing pattern in Nigerian English as "in-elastic", thus differing from earlier descriptions of the English spoken in West Africa as "syllable-timed" (Tregidgo, 1987,p.188). Eka's analysis is based on the premise that Standard Nigerian English (SNE) has more prominent syllables than Standard British English (SBE). Besides, there is no regular predictable timing pattern in the internal constituents of the syllables which make up the utterances. The numerous prominent syllables cannot be "squeezed" into a particular time unit in the same way as the numerous unaccented syllables

are capable of being squeezed into the available time in particular metrical beats of the native speakers' speech. In other words, syllables can be either squeezed into a beat (as is the case with a sequence of unaccented syllables) or stretched to fill a beat (as is the case with few accented syllables) in an "elastic" fashion in the native speaker's speech. Along the same lines, more recently, Udofot (1997), also investigates the rhythm of Nigerian English using a modified version of Pierrehumbert's (1980) tune text technique. Both instrumental and statistical approaches are used to corroborate her perceptual analysis of Nigerian English intonation. Her findings among other things include the fact that Nigerian English Intonation deviates from that of the native speaker principally in the lack of "the typical English melody which results from clearly defined peaks and valleys with noticeable slopes" (p 140). The source further asserts that the Metrical Theory which she uses as a descriptive model is not suitable for the analysis of Nigerian English rhythm, since Nigerian English has a proliferation of full vowels (p 157).

Contrary to this view, Udoh (1998), points out that metrical phonology is directly relevant to rhythm and intonation in stress systems, for it accounts adequately for both stress-timing and full vowel timing. The occurrence of [s] indicates the stress-timing and this further implies the presence of a full vowel for only stressed syllables have full vowels ordinarily. The metrical theory can therefore be used on any rhythm based on stress, except that the pattern which results may not necessarily have to look alike or resemble the English pattern. However, Udofot's description of the pattern of Nigerian rhythm as "full vowel timed" after Bolinger (1981), although more appropriate than the "syllable-timing" of Tregidgo (1987), in Udoh's (1998) view is well accounted for in the Metrical Theory, which Udofot discredits as being unsuitable for the analysis of Nigerian English rhythm, in which full and reduced vowels do not alternate. The position in Udoh (1998,p. 2008), is further strengthened in this chapter.

The full vowel theory as originally conceived by Bolinger (1981), proposed a combination of a full-vowel syllable and a reduced vowel syllable as a rhythmic unit. A rhythmic unit is made up of two constituents which together constitute what we may call the "foot" or "rhythm group". These units also underlie the stress-timing theory, in which case they are made up of both a stressed syllable

and an unstressed syllable(s). In other words, the "full-vowel timing" and the "stress timing" have similar underlying principles. A proposition of the full vowel timing implies the stress timing, for both theories are only different in nomenclature. The underlying principles are basically the rhythmic unit (beat, rhythm group, foot) which is shaped by some degree of isochrony and anacrusis in languages that have these phenomena.

The "elastic" versus "in-elastic" timing earlier mentioned accounts for the operation (or the lack of it) of both isochrony and anacrusis within rhythm units whether they are feet or rhythm groups. The point being made here is that the constituents of the syllable – whether they are stressed (and by implication full vowelled), or unstressed (and by implication reduced) determine the rhythm, for it is the ability of native speakers to "squeeze" in several syllables and "stretch" out a few according to the nature of the vowels in the syllables that produce a peculiar rhythm which in English is predictable. This description in our view is quite apt and most suitably describes the Nigerian English rhythm and indeed other Nigerian languages.

However, although the concept of "elasticity" aptly describes the rhythm in a stress system like English, deriving from anacrusis and isochrony, a deviation from which creates an "in-elastic" rhythm, we would hesitate to extend the elasticity hypothesis to all natural languages in the form Eka (1993, p. 9) does in his description of the rhythm of educated spoken Nigerian English, for the simple reason that the rhythms in other languages do not always fit this description. For instance, the Anaang rhythm has no isochrony and no accent subordination. Therefore there is no need to force syllables into beats or feet. Languages in this group will require a different parameter as a measure for the description of its rhythm.

In order to accommodate the generalisation which we need for the description of rhythm in natural languages with such disparate behavioural features therefore, the concept of "elasticity" needs to be considered in relation to some specific rhythm unit. Syllables are either "elastic" or "in-elastic" in relation to a rhythmic unit. The foot is an adequate enough unit, for both stress systems and non-stress systems have feet. (See sections 4.3.1, 4.3.2, for the foot structure in both Anaang and English respectively). Therefore, in order to develop a universal parameter for the

description of rhythm, our propositions are closely related to the *foot beat*. (We return to this in section 4.3).

Bolinger's (1981) proposal of the full-vowel timing approach to rhythm mentioned earlier forms the basis for a universal parameter for the description of rhythm. In this theory, the rhythm unit is made up of a combination of a full vowel and a reduced vowel. The reduced vowel "borrows time" from the full vowel it follows in any group. The full vowel timing appears to instrumentally account for English rhythm more adequately than the stress timing (Cruttenden 1986, p. 26). However we do not discredit the stress timing completely for the concept of the reduction of the syllables is a contribution of the stress timing. We incorporate all these concepts into the proposition presented in Section 5 for the English language (and indeed all other stress languages) and the Anaang language (and indeed all other languages with lexical tone).

3. STRESS VERSUS TONE

Stress is a non-segmental phenomenon. At some point in phonological history, it was erroneously related to intensity (Trager/Smith 1951). This may rightly be considered a narrow sense of the word. This sense of stress may be viewed from the point of view of the distinction between the perceived loudness of a syllable and the perceived pitch. In a more general sense, stress is "a conventional label for the overall prominence of certain syllables relative to others within a linguistic system. In this sense, stress does not correlate simply with loudness, but represents the total effect of factors such as pitch, intensity and loudness." (Clark and Yallop 1990, p 287). Stressed syllables in some languages like English therefore have higher pitch, longer duration and higher intensity. Based on this definition, word or lexical stress apart from being distinctive plays a crucial role in the rhythm of such languages. Some languages have free stress while others have fixed stress. In the former, the stress occurs on any syllable in the word, e.g. Russian, English etc. In such languages, stress is phonemic and non-predictable. In the later, it is restricted to particular syllables like initial syllable as in Hungarian, final syllable as in Turkish and second to the last syllable as in Polish (Hyman,1975, p 204). In such languages, stress is predictable and non-phonemic.

The study of stress addresses principally syllable prominence which is governed by a number of factors: rhythmic, positional, quantitative and morphological. Stressed syllables have higher pitch, longer duration and higher intensity. Stress is cumulative, for most content words attract stressed syllables. It is hierarchical for prominence hierarchy may occur among levels of stress. It is delimitative for they sometimes mark word edges (at least in some languages). It is rhythmic for they may be alternation between stressed and unstressed syllables. It is also contrastive since stressed syllables are strengthened and lengthened while unstressed syllables are weakened and reduced (Halle and Vergnaud, 1987, p 3).

Tone is also a non-segmental phenomenon like stress. It is normally used to refer to "distinctive pitch level of a syllable" (Crystal, 1991, p 353), deriving from the rate of vibration of the vocal cords. Some languages are lexical tone languages. In other words, in such languages, tone is distinctive. Two types of tones are generally discussed in the literature on tonal languages: register and contour systems. Register systems are those that have level tones while contour systems are those with changing pitch direction. Contour tones are sometimes referred to as tone clusters (Yip 1989). While the former types may occur as "pure" tones as is the case in some languages, it is more common to have a combination of both systems in languages. Anaang is one of these "combinatory types". It has both level tones (H, L, !H) and two contour tones (falling and rising) which may be phonetic manifestations of the level tones. One can say that the so-called contour tones are really a combination of two level tones.

Stress and tone are closely related. As has been indicated, the main difference between them lies in the accompanying cues. While stress is characterised by longer duration on the stressed syllables, tone is not accompanied by an extra duration. It is merely marked by the pitch change. In other words every language uses pitch. But each language has a number of options available to it. Some languages have level pitches, while others have glides. The majority of the so-called tonal languages have the former, (i.e. HL), while the stress languages (or intonation languages) have glides (i.e. rising, falling etc.).

The difference between the two lies only in the pitch patterning vis a vis the timing of such pitch transitions. The Fo contour in a tonal language has more changes, for each syllable has a tonal specification. In fact, in some cases, a syllable would have two transitions, as is the case with contour tones, so that such transitions span only a few milliseconds. On the other hand, in the stress languages, such transitions occur only on the prominent syllables, which are stressed, and therefore one pitch level may be maintained over several syllables. The transitions may therefore span several syllables. The length of the pitch transition and the timing of the unstressed syllables vis a vis the stressed ones make all the difference between the two. Otherwise, both involve the same kind of phonetic phenomena (Ladd, 1992, pp. 328-329).

4. KEY TERMS

Some key terms used in this chapter are discussed in this section with regard to linguistic rhythm, elasticity and foot-beat.

4.1 Linguistic Rhythm

Linguistic rhythm refers to the reoccurrence of the movements associated with regular movements of the muscle primarily in breathing which manifest secondarily in speech. As has been indicated already in section 1.0, it is normally stated with reference to such prosodic features as pitch, duration, vowel quality and intensity. In other words, every language has some form of rhythm.

Most rhythm systems are related to some form of beats. Analogically, the speech rhythm is equated to the rhythmic raising and lowering of the human foot when walking (Allen, 1973, p.122). Some call it "foot" (Abercrombie, 1967, p. 131; Couper-Kuhlen, 1986, p. 56); others call it a "rhythm-group" (Cruttenden, 1986, p. 24). We would rather call it "foot-beat" and we use all these terms (rhythm, beat and feet) synonymously. More details are given in Section 4.3.

In stress systems, the rhythm as has been indicated is controlled by the stress. In other words, the form of regularity which forms the basis for the rhythm is the stressed syllable in each rhythm group or foot beat. There are certain phenomena that help in such languages. Anacrusis, the reduction of certain syllables within beats in an attempt to keep up with the beats, is a feature of such a

system. Anacrusis interacts with isochrony to provide a peculiar rhythm where some syllables are rushed over and more time spent on others, thus producing equal timing in the beats even though the vowels may have varying numbers of syllables.

Duration plays a very important role in the rhythm of any language, for it is the timing between features in particular languages that determine the rhythm. In other words, the temporal organization of consonants and vowels gives rise to these different types of rhythm. Even within these categories of rhythm, languages differ slightly in their phonetic implementation. For instance, Italian has been described as having "vowel-to-vowel" timing, where consonants are overlaid on the vowels which coordinate with each other. Italian rhythm therefore centers around the vowels. The Japanese case has been described as "combined consonant-and-vowel-timing" (Smith, 1995).

4.2   Elasticity

Elasticity refers to the ability of a solid to return to its original size after some form of deformation by a force known as stress (Weertman, 1987, p. 112). This concept of *elasticity* is reminiscent of Hooke's Law which states that: "the amount of an elastic body bends or stretches out of shape (strain) is in direct proportion to the force (stress) acting on it" (Chase, 1987, p. 290). This law applies as long as the body is still elastic. However, if the stress (i.e. the defining force per unit of area) applied to a solid exceeds the *elastic limit*, the solid will keep its new shape.

In our analysis, we draw on the principles of elasticity summarized above. The foot beats, which are made up of a number of syllables, form the rhythmic unit of analysis. The timing of the constituents of each beat is elastic where several syllables may be squeezing and stretching of syllables into the foot beats provide an *elastic linguistic rhythm.*

4.3   The Foot-Beat

Abercrombie (1973) defines the "foot" as "the space in time from the incidence of one stress-pulse up to, but not including the next stress-pulse" (p.111). Couper-Kuhlen (1986, p. 56) adds that there could be a silent beat or foot.

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Sometimes, similar constructs are used to describe rhythm in both prose and verse. The "foot" has been used to describe prose rhythm where such feet are marked by stresses (Abercrombie, 1967). Feet here indicate some form of "beat" made up of an interaction of stressed and unstressed syllables. Each foot in this case has approximately equal timing, irrespective of the number of syllables in the foot, for the syllabic beat would be either spread out, or reduced to cover the same amount of timing in the feet. For instance, in the sentence: "This is the / house that / Jack / built /", the four feet have differing number of syllables, and yet they have approximately equal amount of timing, as illustrated in (1). The foot may not necessarily reflect this kind of isochrony. It may be controlled by the syllable structure deriving from the moraic structure as illustrated in (2). This is common to the non-stress languages where one foot is the minimum constituent of the phonological phrase made up of either a trochee/iamb or a degenerate foot.

One of Udoh's (1998) findings is that the prosodic systems of Anaang and English are different with particular regard to the timing pattern of both languages. The timing pattern in Anaang is very closely tied to the foot, for which the syllable forms the basis. Different categories of syllables combine to form the foot and the foot constitutes a better measure for rhythm in Anaang than the syllable. There are no reduced vowels and no syllables attract special duration. On the other hand, even though English rhythm also centres around the foot, the constituents of the foot differ. The foot in English may have more than two syllables, but only one of the syllables in the foot may attract stress, and such stress must be accompanied by longer duration, higher pitch, full vowel quality etc, while the unstressed syllables must have shorter duration, lower pitch, reduced vowels .

The foot-beat therefore refers to the rhythmic unit made up of a specified number of syllables within the unit which forms the frame for the repeated movement that marks the regular return of a particular feature responsible for the rhythm. Its constituents are determined by the moraic structure of a particular language. Generally, the structure reflects both an *arsis* and *thesis* pattern, although there may be a beat without this combination formed by a degenerate foot.

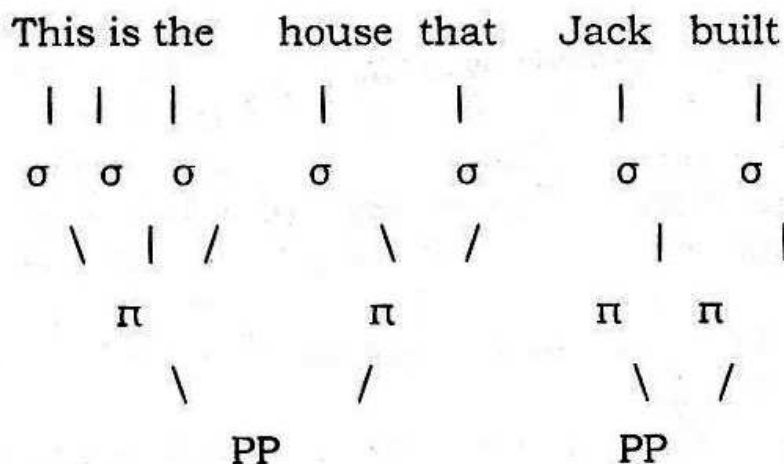### 4.3.1 The Foot-Beat in a Stress Language (English)

A lot of prominence is associated with full vowels in English (Cruttenden, 1994). Conversely, lack of prominence is associated with reduced vowels which give rise to weak forms as opposed to strong forms. There are quite a number of weak forms in English. The full vowel timing and the stress timing both have the same underlying principles: a rhythmic unit (beat, foot), which is characterised by isochrony and anacrusis.

Sometimes, similar constructs are used to describe rhythm in both prose and verse. The "foot" has been used to describe prose rhythm where such feet are marked by stress (Abercrombie, 1967). Feet here indicate some form of "beat", made up of interaction of stressed and unstressed syllables. Each foot in this case has approximately equal timing, irrespective of the number of syllables in the foot, for the syllabic beat is either spread out or reduced to cover the same amount of timing in the feet. For instance:

(1)   This is the / house that / Jack / built /

In (1), the feet have differing number of syllables, and yet, they have approximately equal amount of timing as illustrated in (2).

2. The English Foot Beat

```
       This is the      house that     Jack   built

        |  |  |           |       |       |      |

        σ  σ  σ           σ       σ       σ      σ

         \  |  /           \     /        |      |

           π               π            π      π

            \         /                  \    /

            PP                           PP
```

This rhythmical analysis of English makes use of stress and the foot. According to the temporal view of rhythm mentioned earlier, a similar event occurs at a regular interval. What constitutes this event in English is the stress within a number of syllables which constitute some form of beats with accentual prominence.

As has been indicated already a number of parameters have been proposed for the analysis of rhythm in English. The significant role of stress in these analyses is depicted in its refrain for it keeps reoccurring in the different analyses. Although empirical evidence is yet to be provided for it, it is quite useful as a measure for the description of English rhythm.

The generative analysis of stress subordination and reduction provided a linear but cyclical analysis which was the basis for the metrical analysis which adopted a hierarchical analysis of strong and weak syllables. Today it is one of the most popular analyses for rhythm, particularly using the grid formalism. Accent and rhythm are accounted for in a unit using grids. Using such grids therefore, the sentence given in (1) can be illustrated as in (3).

3.	This	is	the	house	that	Jack	built
	x	x	x	x	x	x	x
	x			x		x	x
	x			x		x	x

The English rhythm attempts to maintain some form of alternative rhythm where adjacent stresses are shifted to avoid stress clashes known as Iambic Reversal or Rhythm Rule. This is an important component of English Rhythm as stresses are deleted, shifted and sometimes even added to meet the required pattern. For instance,

1. dunDEE + MARmalade → DUNdee MAR malade

When these two words are put together *marmalade* acquires an extra grid mark because it bears the principal stress of the phrase, thus creating a stress clash which must be split. That grid mark moves leftwords to the first syllable in conformity with the Iambic Reversal Rule, thus creating the required rhythm as shown in (5).

5 Dundee + marmalade → Dundee marmalade → Dundee marmalade

```
x    x   x x x      x   x   x x x   x      x    x  x  x

x    x    x  x      x   x   x  x  x      x    x     x

     x    x             x   x             x         x

        x                  x                        x
```

4.3.2 The Foot-Beat in a Tonal Language (Anaang)

All languages have rhythm, if we view rhythm as an alternate succession of some event within a time limit. The Anaang rhythm needs to be reviewed as a syllable-timed language along with several African languages (after Pike 1945), for which the empirical support is yet to be provided. Anaang has three degrees of moras and two degrees of phonemic vowel lengths, altogether giving rise to about ten different syllable types. With such variations in syllable structure, the issue of syllable timing which had hitherto been regarded as a feature of the African lexical tone language is not feasible.

The Anaang foot is made up of two syllables. Following the verbal template, it is a heavy-light trochee as already indicated. The affixes are either a CV or V, both of which continue a mora and are therefore light syllables. The verbal roots are CV, CVC and CVVC, giving rise to light heavy and super heavy syllables. Therefore the morphological processes balance out these different weights to conform to a rhythmic heavy-light pattern, where the super heavy syllables are reduced to heavy syllables and the light syllables are lengthened to a heavy syllable in order to satisfy the required template. Following the noun template, it is a light heavy iamb. There are four lengths of syllables: V, CV, CVC/CVV/CVC, CVVC/ CCVC. These lengths alternate, such that they are mixed up in a sequence of isochronous feet. The Anaang foot is therefore determined by the moraic structure of the syllables.

On the whole, the syllables interact to provide basically two rhythmical patterns with heavy-light or light-heavy feet whose timing are only approximately equal. One foot is the minimum constituent of the phonological phrases. Like other systems there are also some

degenerate feet made up of only one syllable. These phonological phrases are not isochronous for they are made up of varying numbers of syllables and feet. It is the feet within the phonological phrase that are rather approximately isochronous within certain phonological limits. However, unlike the English feet, which are isochronous and anacrusic, the Anaang feet are not so. Consider the examples in (6).

6 i.   Kàá / ké. bén. // á. kpàn./ ú. rùà. / dí. //

   ii.   á.kpán. /á. dè. // é.tí. / ə.βəŋ //

   iii   á.dè. / ú. fɔk / n.ŋwèd. //

   iv   á. mì. / á.dè. // ú.úɓk./ ń. ŋwèd/ á.mɔ. //

The absence of isochrony and anacrusis in the language allows the feet to have a rigid timing pattern which is devoid of either the squeezing or stretching of syllables to fit into particular beats. Each foot forms a beat, but that beat maintains the syllables dictated by their moraic structures following one of the four feet templates given in (7).

Each foot has one of four options: a light and heavy syllable, like [ke.ben], which has the template [σμ σμμ]: a heavy and light syllable like [dep-ke], with the template [σμμ σμ]: two light syllables like [a.de], with the template [σμ σμ], and a heavy syllable like [kaa] with the template [σμμ].

7 i.   [σμμ σμ]   trochaic foot

   ii.   [σμ σμμ]   iambic foot

   iii.   [σμ σμ]   moraic foot

   iv.   [σμμ]   degenerate foot

There is some form of balance associated with the different feet. The basic unit of the foot is one syllable and one mora, and thē maximum unit is two syllables and two moras. The different grammatical categories tend to fall within one of these foot templates. The verbal template is trochaic while the noun is iambic. However, the different feet proposed in (7), account for the rhythm in the language which center around the foot.

On the whole, the syllables interact to provide basically two timing patterns with heavy-light or light-heavy feet whose timing are only approximately equal within measurable limits of such a motor activity. Like other systems, there are also some degenerate feet made up of only one syllable. The Anaang feet are illustrated in (8).

8. The Anaang Beat

Kaa keben akpan urua di

| | | | | | | |

σ σ σ σ σ σ σ σ

| \ / \ / \ | /

π π π π

\ / \ /

PP PP

Different languages have different ways of implementing their feet. The syllable in Anaang contributes to the overall rhythm in that, it provides the basic unit of the foot whose required template is one of the options given in (7). The constituents of these syllables which must be combined in a certain way provide a balance which controls the rhythm in an in-elastic beat.

4. Proposals

The speech rhythm in English is governed by certain rules of rhythmic alternation. There is a constant attempt to create an alternation between strong and weak syllables in English and this manifests in the addition and deletion of beats referred to in the literature as "stress shift". Recall that this alternation which underlies stress shift was the basic motivation for the grid formalism of the Metrical Theory. The hierarchical structure of utterances creates differing levels of rhythmic organization. The rhythm in English follows a particular pattern where an unstressed syllable follows a stressed one. Where for any reason, this is not the case and two stresses occur adjacent to each other, there is a stress

clash which is corrected by the rhythm rule mentioned earlier, whose function is to maintain the correct rhythmic pattern. The English rhythm is therefore very closely tied up with the foot. The Anacrusis and isochrony which control the timing beat are centered around the foot. Both phenomena together control the number of syllables which are either squeezed or stretched into a foot. This condition creates a kind of dynamic, flexible *elastic timing* after (Eka 1993). On the basis of the flexibility of the foot and since such an *elastic timing* operates at the level of the foot, we propose an *elastic foot timing* for the English rhythm. This, we believe is a better description for the English rhythm than earlier descriptions, for it incorporates all the principles underlying earlier descriptions like stress timing, full vowel timing, etc.

On the other hand, the speech rhythm in Anaang is governed by some form of balance associated with the different feet. The basic unit of the foot as has been indicated is one syllable and one mora, and the maximum unit is two syllables and two moras. The different grammatical categories tend to fall within one of these feet templates. The verbal foot template which is the trochaic foot has been explored by Akinlabi/Urua (1993). The case of the noun is yet to be as fully explored. However, the different feet proposed here account for the feet and rhythm in the language and center around the foot. The number of feet in each PP vary from one foot (like the degenerate feet) to a maximum of three feet. The timing within the feet are rigid and not as flexible as the English case discussed earlier. The feet are clearly marked as already indicated. The timing pattern does not involve the kind of isochrony associated with the timing pattern where certain syllables within the feet are rushed over, and others are slowed down. Besides, the pitch pattern does not involve glides or jumps; rather, the pitch pattern on the syllables do not portray any prominence in relation to others. Neither is there an increase in the prosodic features like length, intensity, etc. All vowels are pronounced full and the syllables are simply characterized by a change in pitch between three heights: H, !H and L.

On the basis of the Anaang foot structure which exhibits some form of symmetry in the interaction between heavy and light syllables in the morphological output, we propose an *in-elastic foot timing*.

6. Conclusion

This chapter set out to provide a theoretical framework for the analysis of *linguistic rhythm* in terms of the concept of *elasticity*. The analysis is built on earlier analyses of rhythm, all of which have the same underlying principles. There is a strong link between linguistic rhythm, elasticity and the foot beat. Two kinds of rhythm systems have been identified and illustrations provided with a classic stress language (English) and a classic non-stress language (Anaang).

Consequently, the *elastic-foot-timing* for stress languages that exhibit isochrony and anacrusis and the *in-elastic-foot-timing* for non-stress languages that do not exhibit isochrony and anarcrusis have been proposed. This proposal provides the generality needed for the analysis of universal linguistic rhythmic systems.

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