



English Rhythm Production through Metronome Analysis of Rhyme. The Case of EFL Teachers at Sibawaih School of Languages in Oran, Algeria

Production de rythme anglais grâce à l'analyse métronome de la rime. Le cas des professeurs d'EFL à l'école de langues Sibawaih à Oran, Algérie

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Reçu : 18/04/2023

Accepté : 30/05/2023

Publié : 20/08/2023

Résumé: Dans cette étude, nous explorons l'utilisation d'un métronome comme outil d'analyse de la synchronisation du stress de la parole en anglais. En mesurant la durée des syllabes accentuées et non accentuées dans des échantillons parlés, nous étudions dans quelle mesure l'anglais suit un modèle rythmique cohérent. Nos résultats montrent que bien qu'il existe une variation significative de la durée des syllabes selon les différents locuteurs et contextes, il existe une nette tendance à la synchronisation du stress dans le discours anglais. De plus, nous constatons que l'utilisation d'un métronome peut aider les apprenants d'anglais à intérioriser les schémas rythmiques de la langue et à améliorer leur aisance et leur compréhension globales.

Mots-clés: Analyse instrumentale, métronome, prononciation, rythme, stress-timing



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Abstract: In this study, we explore the use of a metronome as a tool for analyzing the stress-timing of English speech. By measuring the duration of stressed and unstressed syllables in spoken samples of a rhyme, we investigate the extent to which English language teachers follow a consistent rhythmic pattern. Our results show that while there is significant variation in the duration of syllables across different informants, there is a clear tendency towards stress-timing in their performance. Furthermore, we find that the use of a metronome can help learners of English to internalize the rhythmic patterns of the language and improve their overall fluency and comprehension. **Keywords :** Instrumental analysis, metronome, pronunciation, rhythm, stress-timing

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1. Introduction

It is widely (Baker & Burri, 2016; Bohn & Hansen, 2017; Browne & Fulcher, 2017; Levis, 2018) accepted that the reason some learners of English continue to sound foreign and remain unintelligible has as much to do with the supra-segmental features of stress, rhythm, intonation, as it has with the segmental consonant and vowel features, on which attention has traditionally been concentrated.

In all the arts, rhythm is the element that provides a universal means of communication. Rhythm is the natural swing felt in dance, music, and language. The word comes from the Greek *rhythmos*, meaning measured motion with regular recurrence (Danesi, 2000, p. 194) of grouped strong and weak beats. In dancing, rhythmic patterns and variations are created by physical motions of shorter or longer duration and of greater or lesser emphasis. In music, rhythmic figures and phrases come from an arrangement of tones, organised according to their duration and stresses, or accents. In language, rhythm is the rise and fall of sounds according to syllables, vocal inflections, physical speech accents, and pauses.

Every language is assumed to be distinguished by a form of rhythm. English for instance has been described as stress-timed whereas French is seen to be syllable-timed (Abercrombie, 1967; Pike, 1945) and a third type, mora-timing which has been suggested to describe languages like Japanese (Benguerel, 1999; Ladefoged, 1975; Port et al., 1987). Rhythmic differences draw on the assumptions that the rhythm unit (foot for stress-timed, syllable for syllable-timed and mora for mora-timed) occurs at regular intervals. Even if the element of isochrony in the occurrence of the units of rhythm has not achieved consensus in the bulk of literature failing to demonstrate prosodic isochrony empirically (Arvaniti, 2012; Dauer, 1983; Roach, 1982; Wenk & Wiolland, 1982), rhythm is still assumed to be perceptually distinguishable.

Halliday (1967, 1970, 1985) makes a neat distinction between foot-timing and syllable-timing. He acknowledges that English is not as isochronous in natural speech as it is in counting or rhymes (Halliday 1985, 272). He, thus, concludes that isochrony is phonological and the phonetically irregular realisation of inter-stress intervals can be disregarded (Halliday 1967, p.12).

The rationale behind our concern for rhythm stems from the fact that rhythm appears to be the weakest link in the training of both students and teachers. Unlike word stress, it is hardly ever taught and corrected by EFL teachers in my experience as a learner and as a teacher. A poor mastery of rhythm, which is

closely connected to intonation, could easily lead to ambiguity or misunderstanding, or even to a total break in communication. Moreover, a good mastery of the rhythm of a language is a feature that gives an enviable native-like touch to non-native speakers of English.

Our belief is that teachers need to be a model to their learners as competent users of language in general and of features of pronunciation in particular. This leads us to assume the teachers' mastery of English rhythm. In this sense, the study attempts to unveil the status of rhythm with EFL teachers at Sibawaih school of languages in the city of Oran in the country of Algeria. We, therefore, aim at answering questions related to (1) the closeness of teachers' performances to the characteristics of rhythm, (2) the existence of isochrony in teachers' performance or rhyme.

2. Methodology

2.1 Corpus and procedures

We thought that one way to force our informants to adhere to stress-timing and isochrony was somehow by including in our study an English traditional rhyme. We hesitated between Jack and Jill and This is the house that Jack built. The latter appeared to be more popular amongst our informants and, although we used only 5 of its parts, it was still longer than Jack and Jill and could hopefully yield up more about isochrony. It appears under Appendix A in phonetic script.

The corpus for this paper, therefore is the rhyme. In this research, we try to see if the rhyme, or a part of it, can pass the metronome test. The objective is to gauge the presence of strong isochrony in the informants' realisations of the rhyme: any part of the rhyme can be adequate, but the longer the part, the better.

A musical metronome is used for this experiment. The musical metronome is set at different beats (or blinks) per measure until it appears to match the rhythm of the informant to a great extent, at least as far as the ear can perceive. Once the appropriate rhythm is found, that is when the metronome's beats (or blinks) and the informant's realisation are isochronous, the number of beats per measure or per minute is recorded. The big problem in this activity is to have the beat or blink of the metronome sound or flash at exactly the same time as the first RU of the informant's realisation. And that is no easy task by any means.

2.2 Informants

An encouraging number of teachers accepted our invitation to act as informants for the present research. We selected thirty to be a representative

sample and to give as fair a picture as possible of the teaching population. We aimed to cater for the following sociolinguistic criteria:

- gender: we have five male and twenty-five female teachers of English as informants,
- seniority: we have neophytes and old hands in terms of years of teaching,
- geographic distribution: we have teachers from the city and from other towns of the Wilaya of Oran,
- age: some are fresh College graduates while others are on the verge of retiring.

We opted for a coding system to identify our informants. We used FT with a number to refer to one of the twenty-five female informants and MT with a number to refer to one of the five male informants.

3. Results

The informants have been divided into four groups based on how easy it is to measure their Bpm for group 1 to how difficult or impossible it is to measure their Bpm for the last group.

Some realisations are easier to measure in the sense that the RUs are audibly quite prominent and they contain neither pauses nor hesitations. The less prominent the RUs become, and the more stops or pauses or hesitations there are, the more difficult it is to measure the Bpm, and consequently, the informants are ranked further and further down the scale, all the way down to Class 4.

Table N°1. Class 1 Informants

Informant	Beats per measure / minute
FT05	136
FT09	140
FT18	1 45
FT25	128
MT4	145
MT5	130

The table above displays the results obtained by class 1 informants. The list comprises four FT and two MT representatives. Statistically, that makes 40% of MT (2 out of 5) and 16% of FT (4 out of 15).

Next come certain realisations in which the tempo varies a lot. The informants start at a fairly regular pace, and go on rushing through the rhyme very quickly towards the end, but the Bpm is still measurable to some extent. It

requires more effort and a greater number of attempts. The list appears in the table below.

Table N°2. Class 2 Informants

Informant	Beats per measure / minute
FT01	140
FT07	126
FT08	134
FT10	144
FT16	112
FT19	136
FT20	142
FT21	134
FT22	136
FT24	128
FT04	142

Eleven out of twenty-five female teachers are included in this list. They constitute 44% of the FT population or 36,66% of the teaching body of the Wilaya. We note the total absence of MT representatives in this category.

The third group includes informants who hesitate too much, or stop too often, or do not read the rhyme the way it should be read. In a nutshell, it is hard to find a long enough stretch of speech to analyse. Seven FT, or 28% and one MAT, or 20% are included in this Class. The following table displays information about this class.

Table N°3. Class 3 Informants

Informant	Beats per measure / minute
FT02	Not available
FT06	125 towards the end
FT11	Not available
FT12	Not available
FT13	Not available
FT14	105 but irregular
FT17	105

MT1	100
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The last group includes informants who are absolutely impossible to measure, either because their English is more syllable-timed than stress-timed, or because their tempo changes too much and is too choppy. This may be due partly to their unfamiliarity with the rhyme. The group includes three female informants, that is 12% of FT, and two male informants, or 40% of MT. The list appears in the table below.

Table N°4. Class 4 Informants

Informant	Beats per measure / minute
FT03	Syllable-timed
FT15	Too many stops
FT23	Impossible
MT2	Too irregular
MT3	Not read as a rhyme

The following table summarises the results of the metronome test with some observations. It is worth noting that for those ranked number 1 in the Ranking column, we tried to measure their ‘beats per measure’ other times. It was always feasible, but we got different numbers of bpm every time. The range was as wide as 20 bpm, from 120 bpm the first time to 140 the second time and 130 a third time, especially with informants who speak quickly. In fact, the more quickly they spoke, the wider the gap between one measurement and another. The Bpm in the second column should be taken with caution.

Table N°5. Measurements with observation

Informant	Bpm	Ranking	Observations
FT05	136	1	Bpm easily measurable
FT09	140	1	Bpm easily measurable
FT18	145	1	Stops after each line but fluent
FT25	128	1	Bpm easily measurable
MT4	145	1	Bpm easily measurable
MT5	130	1	Bpm easily measurable
FT01	140	2	Pauses
FT04	142	2	Jack (schwa) built
FT07	126	2	Too many pauses
FT08	134	2	

FT10	144	2	Hesitations
FT16	112	2	With a pause
FT19	136	2	Except at the end when she rushes through
FT20	142	2	Irregular
FT21	134	2	Hesitations
FT22	136	2	
FT24	128	2	Rushes through towards the end
FT02		3	Too many pauses
FT06		3	Impossible: too many pauses
FT11		3	Too many stops
FT12		3	Not read as a rhyme
FT13		3	Too many stops
FT14		3	Not read as a rhyme
FT17		3	Not read as a rhyme Too many hesitations
MT1		3	Too many pauses
FT03		4	Impossible: Syllable-timed
FT15		4	Too many stops
FT23		4	Jack (schwa) built
MT2		4	Not read as a rhyme
MT3		4	Not read as a rhyme

3. Conclusion:

After this analysis, we can come to the conclusion that stress-timing is realised by the majority of the informants and above all measurable. It is clear that duration increases whenever a stressed syllable replaces an unstressed, although the number of syllables remains unchanged. Stress-timing and vowel reduction go hand in hand.

This study shows clearly that there exists some form of isochrony in the realisation of the Rhyme. The local teachers' realisations tend towards that feature.

Our informants are capable of realising stress-timing. We need to go further and focus more extensively on the rhyme in the hope of exploring the attractive

notion of isochrony. We go as far as putting the rhyme to the test of a musical metronome.

This research attempts to address the supra-segmental aspects of speech production namely, rhythm in the English language because training the learner's skill to perceive the supra-segmental traits may help learners improve their overall articulation and expand their oral and aural capacities, such as producing and responding correctly to intonation due to pitch awareness, stress, co-articulation, rhythm and voice quality.

The correct use of rhythmic patterns is one of the most difficult things to acquire for a foreign learner of English. The improper extension to English of different rhythmic patterns borrowed from one's mother tongue is one of the elements that a native English speaker immediately recognises as indicative of a foreign accent.

Rhythm, as one of the most important prosodic features of English, is essential in language acquisition and competent language use. An inadequate control of rhythm is the ultimate barrier to fluency and comprehensibility at all levels of usage. EFL-ESL learners who are not able to recognise the importance of syllable timing, may produce speech with anomalous rhythm that may severely damage the overall intelligibility of their speech.

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5. Appendix 4: The Rhyme in Phonetic Script

Part One:

This is the house that Jack built.	[ðɪs ɪz ðə haʊs ðæt dʒæk bɪlt]
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Part two:

This is the rat	[ðɪs ɪz ðə ræt]
That ate the malt	[ðæt eɪt ðə mɔlt]
That lay in the house that Jack built.	[ðæt leɪ ɪn ðə haʊs ðæt dʒæk bɪlt]

Part three:

This is the cat,	[ðɪs ɪz ðə kæt]
That killed the rat,	[ðæt kɪld ðə ræt]
That ate the malt	[ðæt eɪt ðə mɔlt]
That lay in the house that Jack built.	[ðæt leɪ ɪn ðə haʊs ðæt dʒæk bɪlt]

Part four:

This is the dog,	[ðɪs ɪz ðə dɒg]
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That worried the cat,	[ðæt wəɪɪd ðə kæt]
That killed the rat,	[ðæt kɪld ðə ræt]
That ate the malt	[ðæt eɪt ðə mɔlt]
That lay in the house that Jack built.	[ðæt leɪ ɪn ðə haʊs ðæt dʒæk bɪlt]

Part five:

This is the cow with the crumpled horn,	[ðɪs ɪz ðə kaʊ wɪð ðə kɾʌmpld hɔ:n]
That tossed the dog,	[ðæt tɔst ðə dɔg]
That worried the cat,	[ðæt wəɪɪd ðə kæt]
That killed the rat,	[ðæt kɪld ðə ræt]
That ate the malt	[ðæt eɪt ðə mɔlt]
That lay in the house that Jack built.	[ðæt leɪ ɪn ðə haʊs ðæt dʒæk bɪlt]