The Rhythmic Classification of Algerian EFL Undergraduates' Interlanguage:
A Comparison of two Approaches

M[iss]ALOUACHE Amel
5th Year PhD Candidate
Mentouri Brothers University (Algeria)
Department of Letters and English Language

Abstract

This paper investigateswhether the interlanguage rhythm produced by 20 third year Algerian EFL students at Mentouri Universityis classified as a discrete category or along a continuum. The rhythm metrics (%V and ΔC), yield that the informants' speech rhythm is 'intermediate', merging a stress-timed ΔC and a syllable-timed %V.The study also calculates nPVI and rPVI and compares the results obtained from both set of metrics with those found in Hamdi(1).The comparison revealsthat %V and ΔC are the best rhythm metrics in classifying the present interlanguage rhythm.

Key-Words: Interlanguage rhythm, stress-timed/syllable-timed vs. continuum, rhythm metrics: %V and ΔC/ nPVI and rPVI.

Résumé :

Cet article a pour but d'investigersi le rythme de l'interlangue des étudiants de 3ème année apprenant l'Anglais comme langue étrangère à l'Université des Frères Mentouriest classé en tant que classe discrète ou plutôt dans un continuum. Les corrélats acoustiques %V et ΔC montrent que le rythme d'interlangue des apprenants investigués tend à être plus 'mixte' que 'discret', groupant le paramètre ΔC d'une langue à isochronie accentuelle avec celui %V d'une langue à isochronie syllabique. Aussi, Cet article calcule autres indices (nPVI et rPVI) afin d'établir une comparaison entre les resultats obtenues avec celles de Hamdi(1). La comparaison montre que %V et ΔC sont les meilleurs corrélats acoustiques pour classifier le rythme de l'interlangue des étudiants inclues dans cette recherhe.

Mots Clés : le rythme de l'interlangue, langue accentuelle/langue syllabiquevs. continuum, corrélats du rythme : %V et ΔC/ nPVI et rPVI.

ملخص:

يهدف هذا المقال الى معرفة ما ادا كانت النبرة الصوتية للغة البينية لطلبة اللغة الانجليزية سنة ثالثة في جامعة منتوري قسنطينة مصنفة لغة ايقاعية النبرة مقابل المقطعية النبرة اوعبرت سلسل ايقاعي مستمر .أسفر حساب عوامل النغمة الصوتية %Vو ΔC على انهته اللغة البينية تكون'هجينة 'وليست ' منفصلة ' إذ تجمعبين ΔCاللغات الايقاعية النبرة و %V اللغات المقطعية.هذا المقال يهدف كدلك الى حساب عوامل نوعية rPVI: و nPVI من اجل مقارنة النتائج المتحصل عليها هنا مع النتائج المتحصل عليها في مقال سابق ل حمدي.(1) اسفرت المقارنة على كون ΔC و%V احسن المعايير في تصنيف ايقاع اللغة البينية للطلبة المعنيين في هته الدراسة.

الكلمات المفتاحية : النغمة الصوتية للغة البينية ,ايقاعية النبرة-مقطعية النبرة او تسلسل ايقاعي مستمر, عوامل النغمة الصوتية %V و ΔC و nPVI وrPVI

Introduction

The rhythmic category of the English performance of Algerian learners should not be regarded as an inevitable result to the fact that both languages involved, learners' mother tongue (Algerian Arabic) and the language being learnt (English), are grouped together in one rhythmic class namely stress-timed. As a matter of fact, measuring speech rhythm of a given language takes into account its phonological properties that are proven to set apart languages rhythmically. In this paper, we measure the rhythmic performance of 20 Algerian learners of English using the rhythm metrics %V and ΔC,in order to classify it into either a discrete rhythmic class or rather in a continuum. In addition, the pairwise variability indices (nPVI and rPVI) were calculated and compared, along with the results of %V and ΔC, with the results of the prototypical stress-timed language, English, the prototypical syllable-timed language, French, and the mother tongue of the informants, Algerian Arabic, that are taken from Hamdi's study[(2)].The purpose of this comparison is to settle the metric that better classify the interlanguage rhythm of the informants of the present study.

1. History of Speech Rhythm Typology

It is widely accepted that the human ear has a natural tendency to distinguish between different sound patterns among different languages. French and English, by means of example, are never said to belong to the same speech pattern. Perhaps what gives this perceptive impression is the recurrence of the same element at regular intervals: stresses in English as opposed to syllables in French. Based on such temporal organization, languages were pigeonholed as either syllable-timed or Stress-timed languages[(3) (4)]. However, in the absence of empirical validation, this longstanding isochronous-based rhythmical scheme was discarded. As a matter of fact, it was strongly confuted by the majority of instrumental studies[(5) (6) (7)] undertaken in the early 80s to check the validity of Pike[(8)]'s claims. Indeed, Dauer[(9)] concluded that the different realizations of phonological properties namely: syllable structure, vowel reduction, and salient stress across languages give a clear gestalt to the phonological word or syllable. As a matter of fact, stress-timed languages, as opposed to syllable-timed languages, exhibit: a variety of syllable structures, a system of reduced vowels, and a strong influence of stress on vowel duration and syllable prominence. Based on this ground, Dauer[(10) (11)] suggested a scalar classification of languages in a rhythm continuum instead of the usual dichotomy as those language-dependent phonological properties do not always co-occur (Polish exhibits complex syllable structure but no vowel reduction).

Following the success of the phonological account of speech rhythm, a new wave of studies emerged aiming at putting into practice the concepts brought up by Dauer[(12)] and her advocates. The pendulum hence swung back to durational measurements of some acoustic signals. In what follows, two models of how to measure speech rhythm will be presented: Ramus et al. [(13)]model (%V and ΔC) and the one of Grabe and Low[(14)], nPVI and rPVI.

1.1. Ramus et al. Model

Ramus et al.[(15)]studied the rhythmic classification of eight languages: English, Dutch, Catalan, French, Italian, Spanish, Japanese, and Polish. They computed the duration of successive vowels and the duration of successive consonants via a phonetic segmentation of utterances into V and C sequences, and derived from both measurements the following rhythm metrics:

ΔV: the standard deviation of vocalic intervals
ΔC: the standard deviation of Consonantal intervals
%V: the proportion of vocalic intervals respectively.

The correlation between ΔC and %V (r=0.93, p<0.01) seemed to be what best goes with the classic rhythmic classification of languages: English and Dutch cluster in a group with high values of ΔC and lower values for %V, Catalan, French, Italian and Spanish, on the other hand, cluster in a group with opposite values; Japanese however occupies an isolated position. The third metric ΔV was discarded as it was deemed sensitive to other factors (especially speech tempo). Therefore, Ramus et al. [16] concluded that prototypical stress-timed languages show higher values of ΔC that reflects the complexity of syllable structure which increases the duration of consonants and thereby decreases the duration of vowels resulting in a lower %V. Conversely, prototypical syllable-timed languages exhibit a simpler structure of syllables i.e. lower ΔC and higher %V.

1.2. Grabe et al. Model

Grabe and Low[17]investigated the rhythmic classification of 18 languages. Accordingly, they developed the Pairwise Variability Index (PVI) to measure the difference between successive vocalic and intervocalic intervals in an utterance in order to figure out the index that best mirrors the rhythmic differences among languages. However, unlike Ramus et al. [18] procedure, they opted for normalizing the vocalic difference (nPVI) in order to counteract the influence of speech rate on vowels 'durations through dividing the difference between pairs of vocalic intervals by the sum of intervals (where m is the number of intervals and d is the duration of kth interval):

$$\text{nPVI}=100 \times [\sum_{k=1}^{m-1} |\frac{dk-dk+1}{(dk+dk+1}|/(m-1)]$$

The raw or non-normalized version of the PVI was rather applied to measure the intervocalic differences in order not to mask variations in syllable structures (onset and coda) that might be relevant to rhythm yet could have been concealed if the normalization procedure was adopted:

$$\text{rPVI}=[\sum_{k=1}^{m-1}|dk-dk+1|/(m-1)]$$

Contrary to the findings of Ramus et al. [19], the values obtained scattered along a continuum showing a weak disposition to discrete rhythmic groups and a considerable overlap between them and some unclassified languages. nPVI is higher in stress-timed languages (65.5, 59.7, and 57.2 in Dutch, German, and British English respectively against 43.5, 29.7, and 27 in French, Spanish, and Mandarin respectively) while rPVI values are not significantly different (57.4, 55.3, 64.1, 50.4, and 57.7 in Dutch, German, British, French, and Spanish respectively). Therefore, the authors concluded that stress-timed languages should exhibit higher vocalic and intervocalic variability unlike syllable-timed languages that are rather characterised by having more or less equal variability for vowels and consonants.

2. The Study

2.1. Subjects

20 third year students reading for a BA degree at the Department of Letters and English language, Mentouri BrothersUniversity, were involved in the present study. The choice of population is based on the fact that the BA degree is obtained after passing the third year. Therefore, students at that level are presumably supposed to have a good command of English both in using and understanding the language.

2.2. Recording Procedure

The data were collected, deliberately, at the end of the academic year 2012-2013 for two main reasons: first, to insure that the subjects took all the courses scheduled for the third year; second, to provide the best environment for the recording.

Students were gathered in one classroom and asked to read silently 'the north wind and the sun' IPA story (a story used in the Handbook of the International Phonetic Association as a sample to represent all phonemic contrasts in English when testing foreign language learners), as many times as they needed in order to get acquainted with the passage. For authenticity purposes, they were not allowed to discuss the pronunciation of the words, their meanings or engage in whatever communication (including using dictionaries) that might lead to a change in their actual level of proficiency and fluency.

The recording process took place in a laboratory at the Department of Letters and English language, University of Mentouri Brothers, and students were recorded individually. The author's laptop was the main equipment for implementing this task, and Praat was the recording software used to record the subjects' performance using a condenser microphone.

2.3. Segmentation and Analysis Procedures

All the 20 recorded files (approximately 40 to 50 seconds per each file) were segmented by the author of this study. Praat, speech analysis software, was the tool used to tokenize the audio files as well as to segment the phonemes into V (vowels) and C (consonants) sequences relying on acoustic (formants, shape of spectral waveforms, etc) and audio cues. The criteria responsible for the identification of vowels and consonants adopted in this study comply with those generated by Ramus et al. [(20)]:

-Formants were basically the main criterion used to mark the offset and onset of Vs and Cs but, the audio cues took precedence over in the absence of clear spectral cues.

-The phenomenon of assimilation was taken into consideration. Whenever there was no clear-cut between the offset of some words and the onset of what follows, they were merged in one phoneme if not separated by a clear pause.

-Pauses and hesitations were marked by the symbol # and were excluded from the analysis and measurements.

-Pre-vocalic (wind /**w**ind/) and inter-vocalic (the one /ðə**w**ʌn/) glides were marked as Cs whereas post-vocalic glides (ble**w**/bluː/-pronounced by many /bləʊ/-) were marked as Vs as they were phonetically transcribed as V sounds in the first place.

-The post-vocalic /r/ has been labelled a C sound whenever pronounced.

- Unlike the burst phase of plosives that is clearly observed on spectrograms, neither visual nor audio cues can help in determining how long the hold phase of initial-voiceless plosives (p, t, k) lasts as it is represented by silence. Therefore, we arbitrary opted not to take into consideration this phase while analysing the data.

2.4.Measurements Procedure and Results

The first step was to merge any string of consecutive vowels or consonants, except those separated by a pause, in the same sequence at the V/C annotation tier since the concern of the present study is to measure the proportion of vocalic and inter-vocalic intervals and not the duration of individual phonemes per se.

The second step was computing vowel quantity and consonant variance (V% and ΔC, respectively) on the one hand, and the difference between successive vocalic and intervocalic intervals (nPVI and rPVI, respectively) on the other hand, using in both methods,Correlatore, a software specially designed to measure different rhythm metrics.

After measuring the applied rhythm metrics of all the 20 audio files, the Mean of each metric was counted (see table 1).

The Mean proportion of vocalic intervals fall in the forties range, representing less than 50% of the overall duration of the passage recorded. However, the standard deviation of the consonantal intervals display variance among the participants, ranging from 54 to 73, and giving a higher Mean than that of%V (64.23)**.**

2.5. Discussion

The obtained results show a negative correlation between %V and ΔC: 44.53 and 64.23 respectively. According to Ramus et al. [21], the rhythmic class that best fits this correlation is the stress-timed category. This latter exhibits a variation in the syllable structure which implies variability in the number of consonants included within a syllable as well as variability in the overall duration of individual consonants within the syllable. Lower values of %V are an inescapable result of higher ΔC as the more consonants used, the fewer vowels displayed.

2.5.1. ΔC Analysis

What makes the informants' ΔC higher is first the retention of the **/r/** sound in all phonological environments with almost all the participants (18 out of 20). Unlike the English /r/, which is pronounced only before vowels or intervocalically, its Arabic and French counterparts are pronounced before or after vowels except for the French 1st group infinitive verbs. For that reason, learners tend to carry over their already acquired attitudes and pronounce the /r/ whenever it occurs. Interlingual transfer can be seen in words having almost the same graphological make-up in both English and French: 'north'- 'nord' and 'considered'- 'considérer' (14 and 18 erroneous instances respectively).In the majority of cases, the /r/ is retained and under some circumstances is substituted with a trill that is mostly used in Dialectal Arabic.Intralingual transfer can, by the same token, be held responsible for the informants' faulty production; the students' obsession and pursuit of sounding American favour the pronunciation of the /r/ especially the trill in final positions: /ˈstrɒŋgə**r/, /**ˈtrævlə**r/**, /ˈʌðə**r/, and /**mɔː**r/**. Consequently, a total distortion of rhythm is noticed as a wrong retention of /r/ triggers a change in its quality and, occasionally, in the quality and quantity of the preceding vowels which are more lengthened than should be: /ˈtrævl**ɒ**r/(see table 2).

Second**,** vowel syncope or the deletion of schwa in some unstressed syllables caused the creation of consonant clusters and hence the addition to the overall duration of consonantal intervals as two resulting juxtaposed consonants, normally separated by a schwa, are gathered in the same sequence: (/ˈtræ**vl**(ə/ɒ)r/ instead of /ˈtræ**və**l**ə**/ 4 erroneous instances per nearly each informant 17/20) and (/ˈkə(ɔ̃/ɑː)nsɪ**dr**əd/instead of /kənˈsɪ**d**əd/ since the informants tend to pronounce the /r/). (See Figure 1 for the representation of schwa deletion in the word /ˈtræ**və**l**ə**/)

The Algerian Arabic (AA) is characterised by the deletion of short vowels in open syllables that create clusters basically impermissible in Standard Arabic /**ʃb**əˤ/ (he is full) instead of /**ʃaba**ˤa/. French as well favours schwa deletion in open-sided syllables: /dəv**ə**nɛ/ (you become) becomes/də**vn**ɛ/. In addition to those possible interlingual sources of transfer, the informants' mispronounced words match exactly the English hierarchy of syllable structure. Glowacka[22] and Zwicky[23]believe that the deletion of schwa in unstressed syllables among native speakers of English is favoured in contexts where a resonant consonant follows it (liquid: l, r) and especially when it is preceded by an obstruent (stops and fricatives: v, d). Therefore, the fact that schwa deletion exists in all the three languages known to the informants favours its deletion in their interlanguage.

2.5.2. %V Analysis

%V (44.53) is lower than ΔC (64.23) but to some extent high in respect to the native performance: 40.55 (see table 4) due to the addition of an epenthetic vowel /ə/ or /i/ to break the final cluster that adds a non-existing syllable and thereby extra vocalic duration.This phenomenon was observed in the pronunciation of final 'ed' regular past exactly the same way as it is written: /ræpə/**i**d/ instead of /ræpt/ (16 out of 20). However, the informants' incorrect rendition of syllable structure does not prove that English complex syllable structure is problematic for the students under investigation. Neither the addition of an epenthetic vowel to break the two consonantal coda /pt/ in /ræ**pt**/, nor the deletion of one consonant /j/ in the three consonantal onset /spj/ in /dɪˈsp**j**uːtɪŋ/ can be regarded as a simplification strategy

since other complex syllable structures did not undergo such a process (/mpt/ in 'əˈte**mpt**', /str/ in ˈ**str**ɒŋgə'). We believe that what best accounts for this performance is the influence of the already orthographic systems known to the informants on their pronunciation. The Arabic letter-to-sound correspondence and the influence of French spelling on pronouncing English words of French descent contributed to the arrhythmicity of the informants' utterances.

What is also immediately observable is that the students are not sufficiently familiar with the circumstances under which function words should be reduced: they almost always use the strong forms. This is triggered off by the faulty assumption that the reduced forms are incongruous, slangy and sloppy in RP not knowing that both forms co-exist in this variety, and more importantly the weak form is the norm and the strong one is the exception. Moreover, the fact that French shares the same alphabetical system with English misguides students and results in the replacement of the weak central mid-open vowel /ə/ by strong French vowels as they are more or less accustomed to the relatively consistent French spelling if compared to its English counterpart (see table 3).

Replacing schwa by full vowels is not exclusively related to function words. In fact, it expands to content words as well. If a given vowel is pronounced in its full, stressed pattern instead of being weakened to a schwa /ə/, stress shifts from the stressed syllable to the unstressed syllable as in /ˈɑːtempt/ or /ˈætəmpt/ instead of /əˈtempt/, /ˈkɑːnfes/ or /ˈkɔːnfes/ or /ˈkænfəs/ or /ˈkɒnfəs/ instead of /kənˈfes/. Furthermore, due to the inconsistent letter-to-sound correspondence of English and the rather consistent spelling of French coupled with the fact that both languages share the same Latin alphabetical system, learners tend to generalize the pronunciation of either English or French vowels to all sounds represented by the same grapheme (intralingual and interlingual transfer respectively). As a means of illustration, learners pronounced the word 'w**i**nd' as /w**aɪ**nd/ instead of /w**ɪ**nd/ assuming that the English vowel 'i' always corresponds to the sound /aɪ/ in conformity with its alphabetical pronunciation. Substituting the close-mid central vowel /ə/ by either /æ/ or /ɑː/ in /**ə**ˈtempt/ which best represent the English letter 'a' in '**a**ttempt' is another instance of intralingual transfer. As for interlingual transfer, erroneous instances are depicted in the use of the French nasal vowel /ɔ̃/ when producing the English 'on' combination. e.g. c**on**fess /ˈkɔ̃fes/, str**on**ger /ˈstrɔ̃gər/, and c**on**sidered /ˈkɔ̃nsɪdrəd/ instead of /k**ən**ˈfes/, /ˈstr**ɒŋ**gər/, /k**ən**ˈsɪdəd/. Another possible source of interlingual transfer resides in the origin of words. Words of Latin descent tend to take the original French pronunciation; the grapheme 'o' in **o**bliged is pronounced as the French close-mid back vowel /o/: /ˈ**o**blaɪdʒəd/ instead of the English schwa /**ə**ˈblaɪdʒd/. As a result of generalizing the full form of vowels in unstressed syllables, the phonetic characteristics of both types of syllables, especially length, become nearly undistinguishable.

2.5.3. Comparison of the Results: %V and ΔC vs. nPVI and rPVI

To best classify and thereby account for the classification of the Algerian English rhythm (henceforth AE), we need to compare this latter against the prototypical stress-timed language English (EN) along with the prototypical stress-timed language French (FR) in addition to the mother tongue of the informants, Algerian Arabic (AA). The values used for comparison are taken from Hamdi[(24)]except for those related to AE (see table4/ figure 2):

As far as delta metrics are concerned,the Meanobtained (see table 1) tallies with the aforementioned justification for the deviated rhythmic class of the informants under investigation. The AE' %V nearly matches the one of FR than the other languages presented on the chart; conversely, the AE' ΔC is closer to EN and AA rather than FR. The AE is situated somewhere between the prototypical extremes and, therefore, can be classified, according to the results of the present study, as neither a pure stress-timed language nor a discrete syllable-timed language but an intermediate language, combining properties of both classes.

The Mean value of nPVI and rPVI (see table 5/ figure 3) confirms that AE belongs to the stress-timed rhythmic category. Indeed, it shows high rPVI values (72.33 like En and AA:

74.61, and 78.73 respectively) as well as high nPVI values (54.75 like EN, and AA: 55.42, 46.08 respectively). This means that AE exhibits relatively complex syllable structures in addition to simple ones on the one hand, and uses a range of reduced and full vowels on the other hand.

However, the values of nPVI do not show a significant variability difference among both types of rhythm (FR: 50.23 as opposed to EN: 55.42, AE: 54.75, and AA: 46:08) due to the normalization procedure adopted while calculating this index. Accordingly, it seemssafe to conclude that the normalization procedure of nPVI may mask important information about differences in vocalic duration among different languages.

The nPVI and rPVI of the interlanguage examined in the present study do not separate its rhythmic class from that of natives, a fact which is somehow odd if we consider the actual properties of the interlanguage especially if one considers the vocalic variability between AE and EN (the use of schwa in weak forms as a case in point). Therefore, we conclude that Ramus et al.[25] indices are best speech rhythm indicators than Low and Grabe[26] indices in the sense that their rhythmic classification fits better the actual perceived performance of the informants of this study.

Conclusion

The previous analysis shows that the informants have no problems when pronouncing English complex syllables. Positive transfer either from AA, as it allows consonant clusters in the onset position, or FR, as it allows up to four consonants in the onset and coda positions, might be the reason behind not using simplification strategies to ease the pronunciation of assumed problematic complex syllable structures of English by Arab speaking learners including Algerians (Swan and Smith[27], and Kelly[28]).

Vowel reduction plays a great role in determining the rhythmic class to which the informants' speech rhythm belongs. The failure to produce correctly the English mid-central unrounded vowel /ə/ leads to the overuse of the strong forms of function words that hold up the natural flow of speech and call for an exaggerated, unneeded energy to be spent. Besides, substituting the same vowel in content words engenders stressing unstressed syllables and/or overstressing syllables that enormously adds to the overall duration of an utterance and, substantially, permeates the overall rhythm. Accordingly, to master an English-like speech rhythm, more focus should be given to the pronunciation of vocalic segments especially the mid-central unrounded vowel /ə/ in order to get a lower %V and a higher ΔC, a common property of stress-timed languages.

The results obtained from the comparison of AE with the prototypical stress and syllable-timed languages through using two different speech rhythm models; confirm its more or less stress-timing tendency. However, the index of the normalized vocalic variability, nPVI, raises some doubts about whether it really shows the vocalic differences among languages, or mask important information about variability in vocalic durations.Hence, we conclude that %V and ΔC fared better in the present study.

References

[1]Hamdi, R. (2003). La variation rythmique dans les dialectes arabes. Doctoral thesis, University of Lyon 2 and 7 November Carthage.
[2]Hamdi, op. cit.
[3]Pike, K. (1945). The Intonation of American English (pp. 34, 35).Ann Arbor: University of Michigan Press.
[4]Abercormbie, D. (1967). Elements of General Phonetics. Edinburgh University Press.
[5]Roach, P. (1982). On the distinction between 'stress-timed' and 'syllable-timed' languages. In David Crystal (Ed.), Linguistic controversies (pp. 73-79). London: Edward Arnold.
[6]Dauer, R .M. (1983). Stress-timing and syllable-timing reanalysed, Journal of Phonetics 11, pp 51-69.
[7]Dauer, R.M., (1987). Phonetic and phonological components of language rhythm. In Proceedings of the XIth ICPhS, Tallinn, Estonia, pp. 447-450.
[8]Pike, op. cit.
[9] Dauer (1983), op. cit.
[10] Dauer (1983), op. cit.
[11] Dauer (1987), op. cit.
[12] Dauer (1983), op. cit.
[13]Ramus, F., Nespor, M. & Melher, J. (1999). Language identification with suprasegmental cues. A study based on speech resynthesis. Journal of the acoustical Society of America, 105(1), pp. 512-521.
[14]Grabe, E. & Low, E. L. 2002. Durational variability in speech and the rhythm class hypothesis. Papers in Laboratory Phonology 7, pp. 515-546.
[15] Ramus et al., op. cit.
[16] Ramus et al., op. cit.
[17] Grabe& Low, op. cit.
[18] Ramus et al., op. cit.
[19] Ramus et al., op. cit.
[20] Ramus et al., op. cit.
[21] Ramus et al., op. cit.
[22]Glowacka, D. (2001). Unstressed vowel deletion and new consonant clusters in English. Poznan Studies in Contemporary Linguistics 37, pp.71-94.
[23]Zwicky, A., 1972. Note on a phonological hierarchy of English. In R. Stockwell & R. Macaulay (Eds.), Linguistic change and generative theory (pp. 275-301). Bloomington, IN: Indiana University Press.
[24] Hamdi, op. cit.
[25] Ramus et al., op. cit.
[26] Grabe& Low, op. cit.
[27]Swan, M., & Smith, B. (1987). Learner English. Cambridge: Cambridge University Press.
[28]Kelly, G. (2000). How to Teach Pronunciation. Pearson Education Limited.

Appendices

Table1. The Mean of %V and ΔC Values of AE

Mean	**%V(Vowel Quality)**	**ΔC (Consonant Variance)**
	44.53	64.23

Table 2. Retention of /r/ Sound

Word	**Informants' Pronunciation**	**French Possible Source of Transfer**	**Arabic Possible Source of Transfer**
/nɔːθ/	/nɔː**r**θ/	/nɔʁ/	
/wə/	/we**ə**r/	-	/wæːˁ**ə**r/
/ˈstrɒŋgə/	/ˈstr̃g**ə**r/	-	-
/ˈtrævələ/	/ˈtrævlə/**ɒr/**	-	-
/wɔːm/	/wɔː**ɹ**m/	-	/wa**r**d/
/ˈfɜːst/	/ˈfɜː**ɹ**st/	-	-
/kənˈsɪdəd/	/ˈkɔ̃sɪd**r**əd/	/kɔ̃sideʁe/	-
/ˈʌðə/	/ˈʌðə**ɹ/**	-	-
/hɑːd/	/hɑː**r**d/	-	/lla**r**ḍ/
/mɔː/	/mɔː**ɹ/**	-	-

Table 3. Production of Weak Forms by the Informants

Word	**Correct Use**	**Wrong Use/Pronunciation**	**Number of Mistakes**
And	/ənd/	/ænd/	18
Were	/wə/	/wer/, /wɜːr/	16
Was	/wəz/	/wɒz/- /wɔːz/	20
As	/əz/	/æz/- /ɑz/	20
At	/ət/	/æt/-/ɑt/	16
To	/tə/	/tuː/-/tu/	14
Of	/əv/	/ɒv/	20
Should	/ʃəd/	/ʃʊd/-/ʃ uːd/	16

Table 4. Mean Values of %V and ΔC/ in AA, AE, EN, and FR

Language	**Mean %V**	**Mean ΔC**	**Mean nPVIV**	**Mean rPVIC**
AE	44.53	64.23	54.75	72.33
AA	33.10	68.10	46.08	78.73
EN	40.55	66.13	55.42	74.61
FR	44.55	48.80	50.23	56.20

Table 5. The Mean of nPVI and rPVI Values

Mean	**nPVIV (Vocalic Variability)**	**rPVIC (Intervocalic Variability)**
	54.75	72.33

Figure 1. Example of Schwa Deletion in the Word /ˈtræ**v**l**ə**/

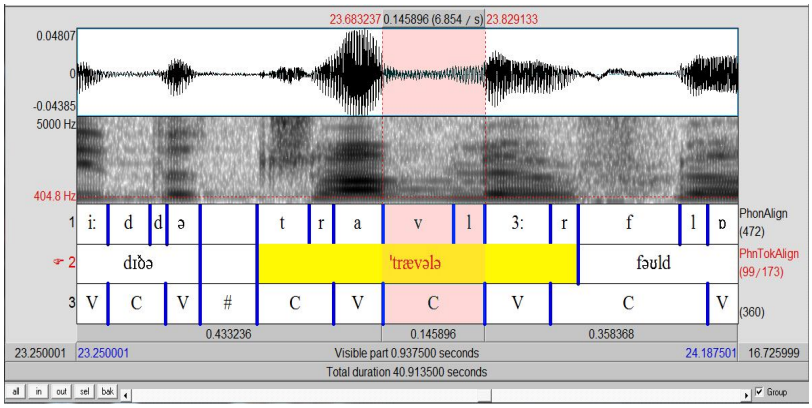

Figure 2. Comparison of %V (x axis) and ΔC (y axis) in AA, AE, EN, and FR

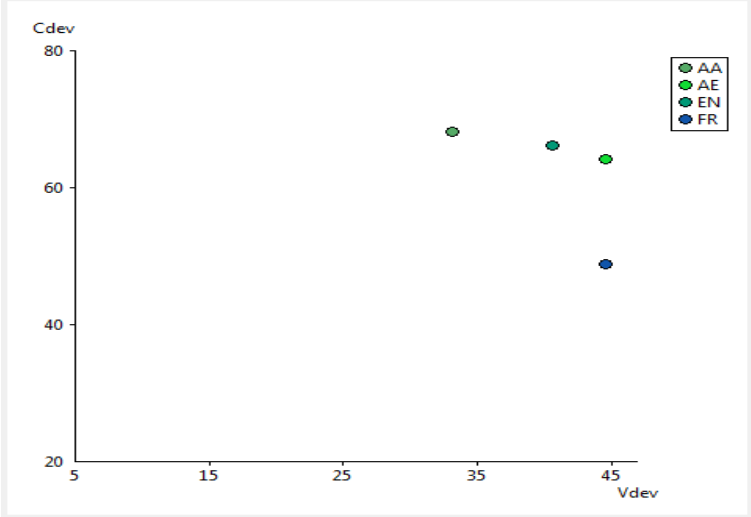

Figure 3. Comparison of Vnpvi (x axis) and Crpvi (y axis) in AA, AE, EN, and FR