

## ENGLISH SPEECH RHYTHM AND THE FOREIGN LEARNER

CORINNE ADAMS

The findings presented in this paper have been made as a result of my recent study of English speech rhythm and the problems associated with the foreign learner's acquisition of this feature. The phases of the study considered here are:

(1) an investigation of the position of stressed syllables in connected speech using electromyography, the electrodes used being concentric needles 30 mm. long and 0.45 mm. in diameter;

(2) an investigation of the position and duration of pauses in connected speech using an electronic sound level speech/silence indicator.

In the electromyographic (EMG) investigation which was conducted in association with Dr. R. Munro of the Department of Anatomy, University of Sydney, 15 adult male subjects were used; these included four native English speakers and 11 teachers of English from South-East Asian countries. For the pause interval investigation, seven native English speakers were added to the control group.

The test material consisted of 12 items which included nursery rhymes, simple verse, prose, and fabricated sentences.

Figure 1: It will be noted that item 7 is fabricated to correspond to the rhythm of nursery rhyme 1, and that items 3 and 4 are passages of literary and colloquial prose respectively.

- 
1. To market, to market, to buy a fat pig,  
Home again, home again, jiggety-jig.
  7. The evening is always the best time to phone: Wednesday  
night, Thursday night - six or half past.
  3. In the breathless stillness of a tropical afternoon, when the  
air was hot and heavy, and the sky brazen and cloudless,  
the shadow of the Malabar lay solitary on the surface of the glittering sea.
  4. When I asked her what she would have done if he had spoken  
to her in the street she smiled and said that as she seldom  
walked in that direction it didn't seem likely that he would  
have much opportunity ever to speak to her.
- 

Fig. 1.

Figure 2: Items 5, 6, 10 and 11 are the fabricated equivalents of the strongly metrical items, 2, 8, 9, and 12.

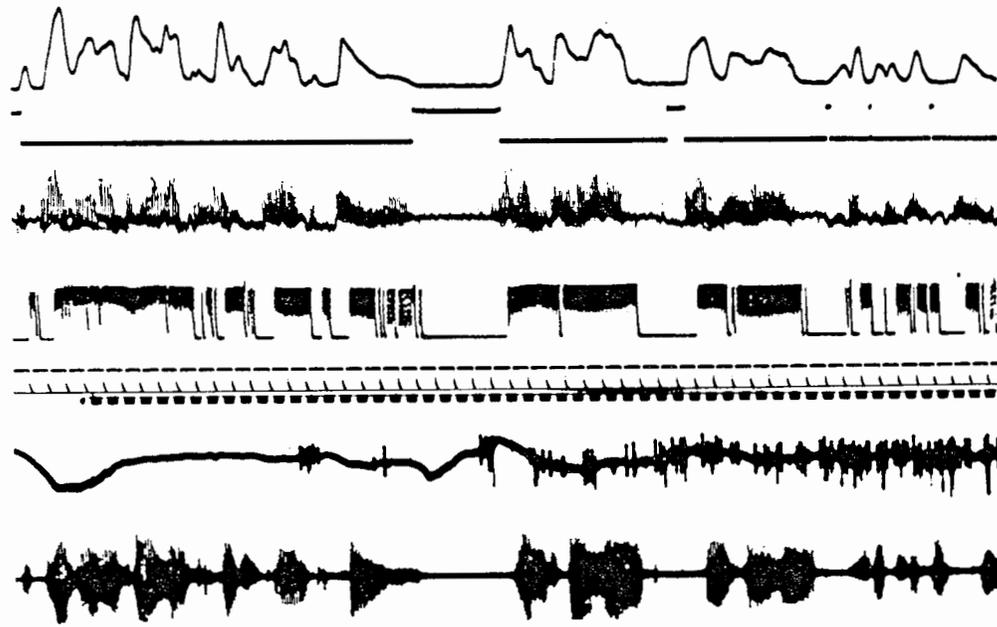
- 
2. "Will you walk a little faster?" said a whiting to a snail,  
"There's a porpoise close behind us, and he's treading  
on my tail."
  5. "Is there anybody listening?" said the chairman to the Board.  
"There's a rather urgent matter that I want to settle first."
  8. The Owl and the Pussy-Cat went to sea  
In a beautiful pea-green boat.  
They took some honey and plenty of money,  
Wrapped up in a five-pound note.
  6. The boys in our neighbourhood go to school in their  
families' brand new cars. As status symbol the car is  
essential, but smash it and who must pay?
  9. Humpty Dumpty sat on a wall,  
Humpty Dumpty had a great fall.
  10. If she's leaving please let me know. Sixteen students  
still want a place.
  12. Dreary lay the long road, dreary lay the town.  
Lights out and never a glint of moon.
  11. Never leave the tap on. Always turn it off. Drought here  
is one of our greatest plagues.
- 

Fig. 2.

Figure 3: Here we see a mingogram and an EMG recording of a native speaker's utterance of item 7. Channel I shows an integrated intensity display; Channel II, a speech/silence trace; Channel III, a duplex oscillogram of the speech wave; Channel IV, a trace registering fundamental frequency. The time-of-utterance display is marked in 0.1 sec. The EMG recording of the activity of the right sixth intercostal muscle shows a characteristic pattern which occurred consistently in all types of test items uttered by native speakers.

Figure 4 shows a diagrammatic representation of the pattern. A preliminary localized burst of muscular activity before the commencement of speech was followed by an interval in the first part of the utterance during which activity was minimal or absent. After a variable period of time, this activity was observed to increase progressively through each successive phrase of the utterance. Between these phrases a motor pause in the activity occurred, but comparison of the EMG record with the oscillogram and the speech/silence trace revealed that the EMG pause slightly preceded the linguistic pause, both at commencement and termination.

Figures 5 and 6: Here it can be seen that in successive phrases, following a linguistic pause, the interval between the beginning of the phrase and the commencement of muscular activity decreased. In Figure 7 we see the same pattern in a prose item. IN GENERAL, INTERNAL INTERCOSTAL MUSCULAR ACTIVITY ASSOCIATED WITH



The evening is always the best time to phone. Wednesday night - Thursday night - six or half past.  
Fig. 3.

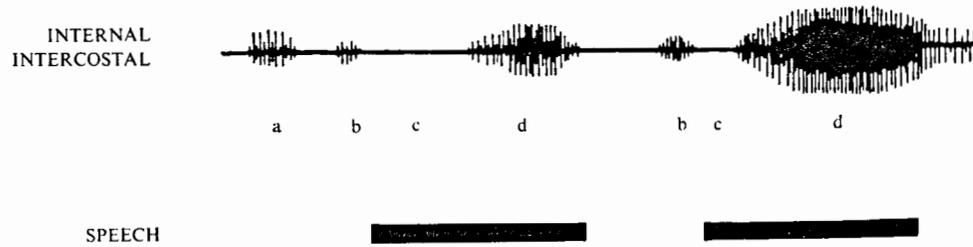


Fig. 4.

STRESSED SYLLABLES WAS NOT OBVIOUS.

The EMG recordings of non-native speakers were variable. A number showed the pattern described for native speakers, but in many cases a pattern similar to that shown in Figure 8 occurred. Instead of progressive increase in each phrase, triplication can be observed here. In dividing the item into suitably manageable phrases in which a typical EMG pattern can be seen, the subject apparently regarded each section as a complete unit and has thus broken the continuity of the utterance and repeated the initial pattern in the second and third phrases. This feature of EMG patterning tended to occur where a long linguistic pause coincided with a long EMG pause.

In Figures 9 and 10 we have a mingogram of a native speaker's utterance of the

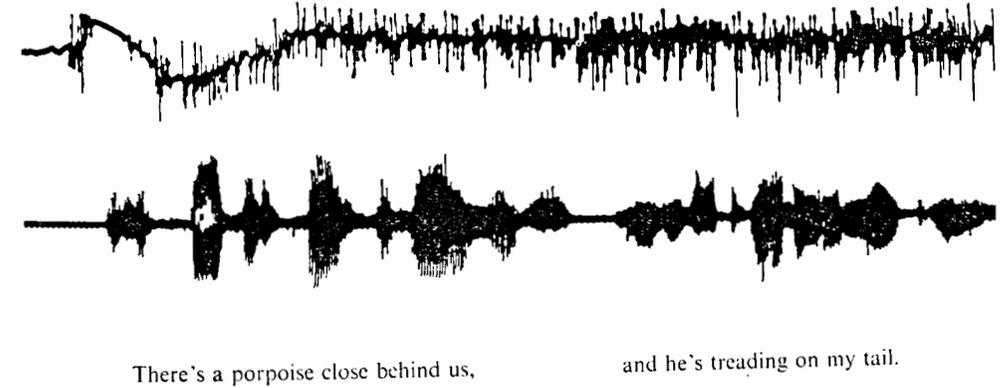
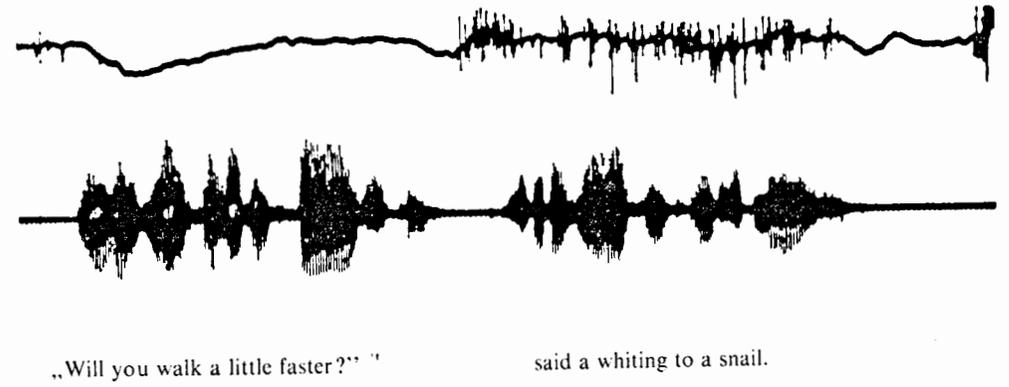


Fig. 5.



„There's a rather urgent matter that I want to settle first.“

Fig. 6.



in the breathless stillness of a tropical afternoon



when the air was hot and heavy, and the sky brazen and cloudless,



the shadow of the Malabar lay solitary on the surface of the glittering sea

Fig. 7.

same item: he made one long medial pause of 600 ms, and another, much shorter one. The two sections are seen to be isochronous, the duration of each being 3.85 sec. Characteristic features of the utterance of the non-native speakers were the large number of pauses used and the relatively high ratio of pause intervals to total duration of utterance. In Figure 11, we have a table showing the mean number of pauses made by native and non-native subjects, and mean ratios of duration of pauses to duration of whole item for each subject. Each of these differences, as can be seen, is statistically significant.

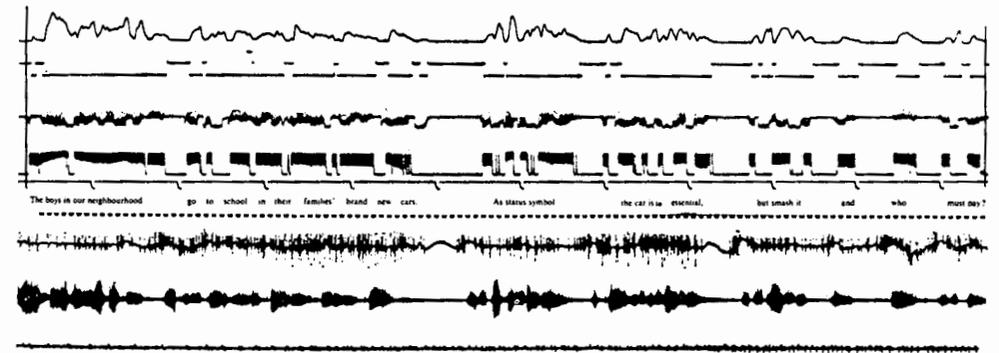
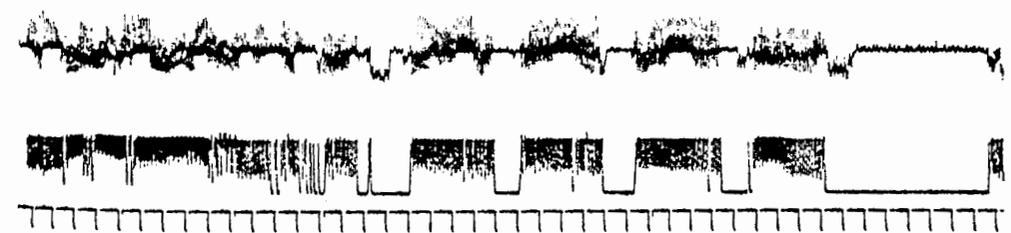
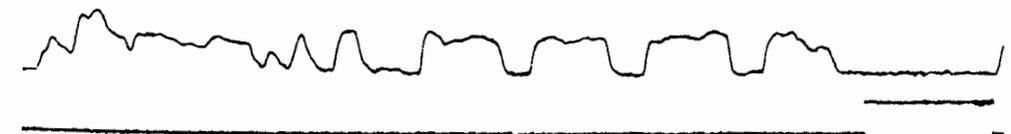
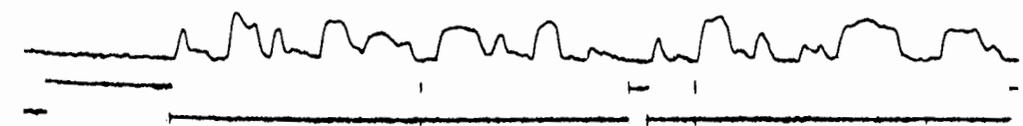


Fig. 8.



The boys in our neighbourhood go to school in their families' brand new cars.

Fig. 9.



As status symbol the car is essential, but smash it and who must pay?

Fig 10.

Subject	Mean number of pauses		Mean pause/duration of item ratio	
	native speaker	non-native speaker	native speaker	non-native speaker
A	1.2	4.8	0.03	0.13
B	1.7	5.1	0.05	0.16
C	2.6	10.2	0.12	0.19
D	2.7	3.0	0.15	0.07
E	2.3	4.1	0.10	0.10
F	2.0	7.2	0.07	0.13
G	2.3	4.0	0.08	0.10
H	2.3	5.7	0.12	0.12
I	0.8	7.3	0.03	0.17
J	1.3	3.0	0.04	0.11
K	2.3	4.8	0.05	0.12

Analysis of variance — Native and non-native speakers  
 $F = 26.8$   $F = 7.87$   
 Upper limit  $F_{1.10} = 10.04$  Upper limit  $F_{1.10} = 4.96$   
 $(P = 0.01)$   $(P = 0.05)$

Fig. 11. Mean number of pauses and mean ratios of duration of pauses to duration of test item in 11 native speakers of English compared with the corresponding parameters in 11 non-native speakers of English.

Short pauses seemed to have no effect on the EMG pattern. In Figure 12, the mingogram shows that the subject made several short pauses, but the EMG pattern, as can be seen, is fairly normal.

In Figure 13, we have a mingogram of a typical native English utterance of item 1. Duration of the sentence was 4.35 sec. Features to note are the binary division and the isochronous sub-sections; the duration of the second speech interval was 1.9 sec., and of the first, 2.00 sec. However, the subject paused for 100 ms. after *market* within the first interval and by this means equalized the time period taken to say each interval. Duration of the medial pause was 350 ms.

Figure 14 shows a mingogram of a typical non-native utterance of the same item. This subject took 5.2 sec. to say the 21 syllables of the rhyme. Characteristically, he used abnormally long junctures between syllables — almost to the extent of producing separate words rather than transitions at syllable boundaries; e.g., /ma+ket/, /ʒi+ge+ti+ʒig/; strong forms of words in unstressed positions; e.g., /tu maket/; the release of voiceless stops was delayed, and they were followed by abnormally long pauses (in this case of 175 and 250 ms.); in positions where the native speaker would use an unreleased stop; e.g., *fat pig*, there was often omission of the sound altogether.

Other features of the utterance of the non-native speakers which appeared to contribute to their staccato-type rhythm when speaking English included:

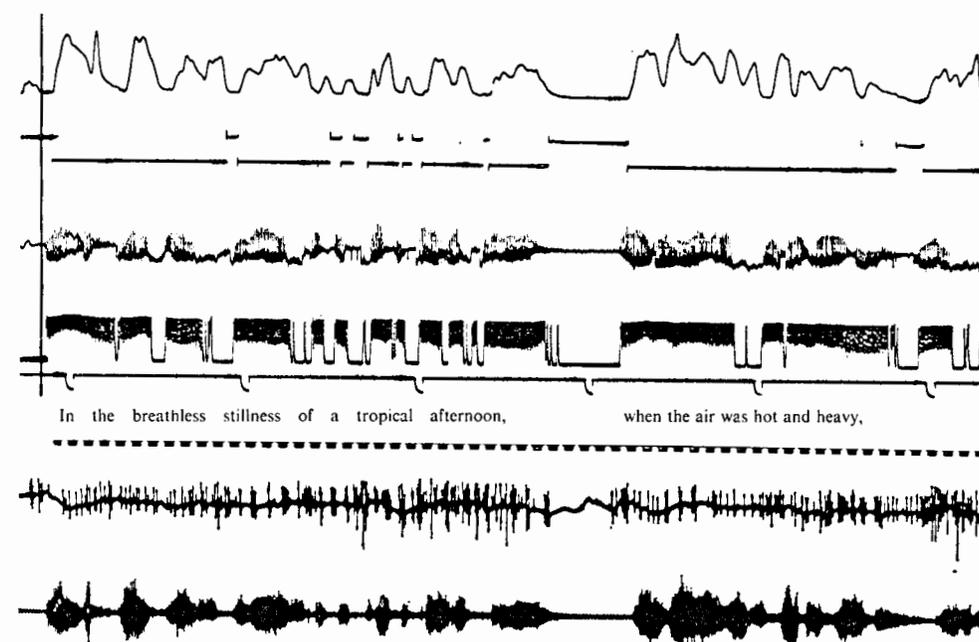


Fig. 12.

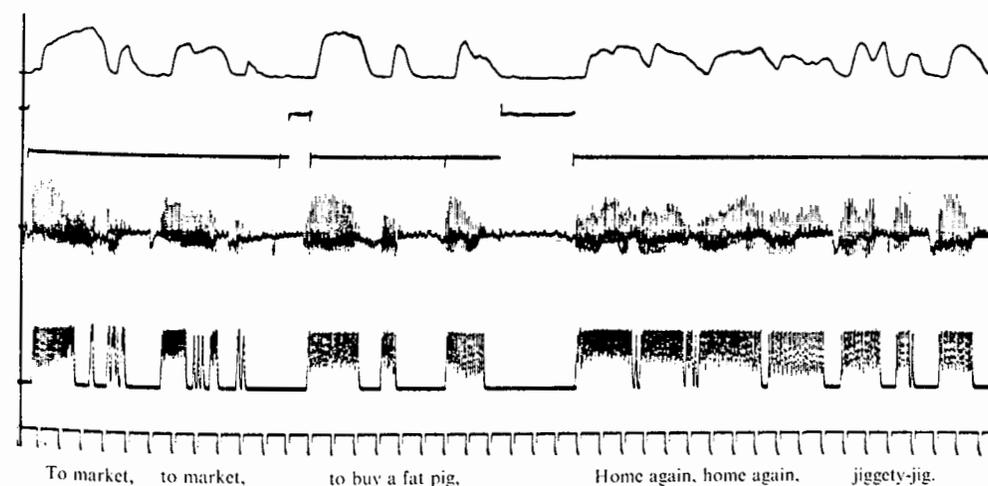


Fig. 13.

- (1) failure to produce lateral plosion, with the resulting addition of an extra vowel and consequent lengthening of the syllable; e.g., /litel/;
- (2) failure to make liaisons ordinarily observed by native speakers; e.g., *home again*;
- (3) incorrect lexical stress: *opportu'nity* was frequently pronounced *op'portunity*, and *'porpoise*, *por'poise*;

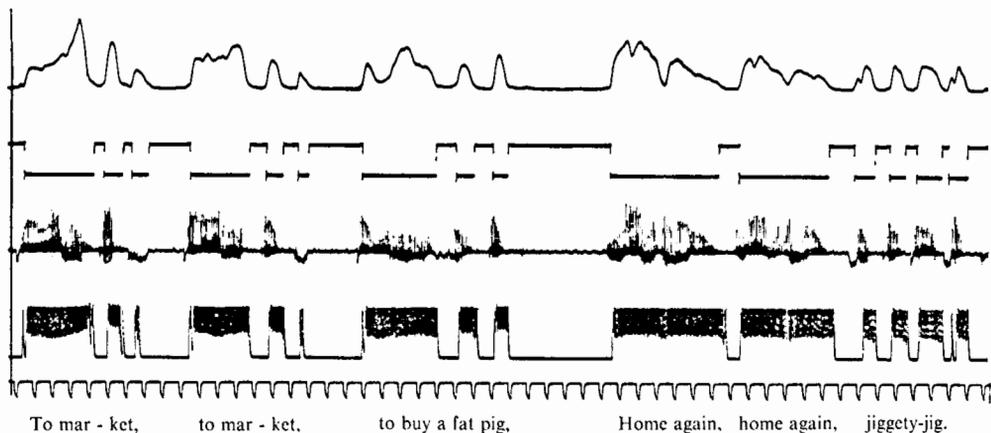


Fig. 14.

(4) a marked tendency to pause in places where the native speaker would not; e.g., in item 4, (shown here in Figure 1), the vowel in the conjunction *that* was invariably given its strong form and was made further prominent by means of a following pause, ranging from 60-325 ms. This item containing 56 syllables took the non-native speakers an average of 1.5 sec. longer to say than item 3 containing 52 syllables. The average duration of item 4 as spoken by native speakers was 10.5 sec., and by the non-native speakers, 13.1 sec.

The answer to the question how to teach English speech rhythm to foreign learners may be found in the repetitive rhythmic jingles uttered by children during the period of first language acquisition. Results with an experimental class of foreign migrants who learned simple English speech rhythms through colloquial sentences based on the rhythm of nursery rhymes and strongly metrical verse have been very encouraging and will lead to larger scale experiment during 1972.

*University of Sydney, Australia*