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Vowel Retraction Before Dark /ɪ/

1. State of research

1.1 Introduction

The present paper is an attempt at describing the coarticulatory influence that [ɪ] exerts on preceding monophthongs in near RP English. Most descriptions confine the effect only to front vowels and schwa. The main objective of this work is to scrutinize the assumptions that these vowels retract when followed by [ɪ]. Another goal is to describe the strength of this retraction, if its existence is confirmed.

1.2 Hypotheses concerning the retraction of vowels followed by dark /ɪ/

It transpires that phoneticians share the view that vowels which precede dark /ɪ/ retract. According to Ladefoged (1975:81), all front vowels become considerably retracted when they occur in syllables closed by [ɪ]. The scope of retraction causes diphthongisation of the vowel with [u] as the last element. Transcribed in the narrow transcription, this element would be [p^hi:uɪ, p^heʊɪ, p^hæʊɪ] in words "peel, pail, pal". Ladefoged argues further that back vowels as in "haul, pull, pool," are usually less affected by the final [ɪ] because they already have tongue positions similar to that of [ɪ]. He postulates that the rule for specifying vowel allophones before [ɪ] will vary from speaker to speaker. Yet, to summarize some of the main allophones in

English, he formulates the following rule which implies that front vowels become retracted when followed by [ʃ]:

$$\left[\begin{array}{c} + \text{ front} \\ + \text{ vowel} \end{array} \right] \rightarrow [+ \text{ retracted }] / _ \text{ syllable final } / \text{ ʃ } /$$

Gimson (1994:204) has also observed the regularity presented by the rule specified above. Additionally, he claims that [ʃ] often has the effect of lowering slightly the articulation of a preceding front vowel as in *feel*, *fill*, *fell*, and *canal*. Moreover, Gimson states that in the case of /i:/ + [ʃ], a central glide between the vowel and [ʃ] is noticeable. Jassem (1993:210-226) still extends the scope of the application of the rule of retraction. In his opinion, it applies not only to front vowels but also to /u, u:, ʌ/, and /ə/. He postulates the following characteristics of the allophones of vowels which are followed by [ʃ]:

- /i:/ and /i:/² have, in these circumstances, half-close, front, and strongly retracted articulation. They are near the border of central vowels.
- /e/ becomes slightly retracted and lowered. The height of this allophone is insignificantly higher compared to the height of cardinal /e/.
- /æ/ is retracted and lies in the region near the border between half-open and open vowels.
- /ʌ/ is precisely midway between front and back vowels and is slightly more close than cardinal /ʌ/ and /a/.
- /u:/ has the same degree of backness as cardinal /o/, but is slightly higher from it.

¹ Ladefoged (1975:81)

² Jassem regards these two sounds as allophones of one phoneme, /i:/ being the glide /ij/.

- /ə/ has the half-close position and is near the border between back and central vowels. It tends to exhibit properties of the most fronted allophones of /u/.

Jassem presents his view of this process in the following vowel charts:

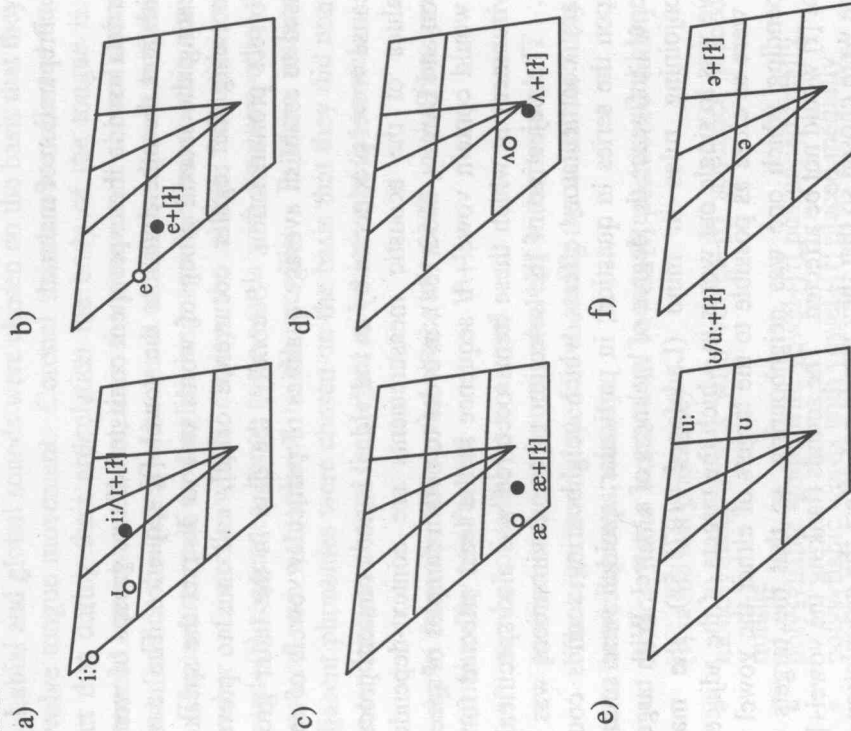


Figure 1. Jassem's view concerning coarticulatory effect of [ʃ] on vowels.

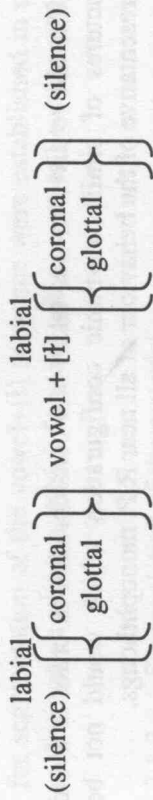
As shown above, different authors allow for various views concerning vowel retraction before [ɫ]. They do not agree, either, as to the scope of the application, or as to the strength and nature of this process.

2 Experiment

2.1.1 Preparation of material

The data used in the experiment consisted of two groups of words: one with and the other, without the vowel+[ɫ] sequence. The reason for creating the second group of words was to distract the speakers from noticing the regular occurrence of [ɫ], and thus to prevent hypercorrect pronunciation. Secondly, the data in the latter group were used to establish average qualities of particular vowels of each speaker.

Because vowel production by an individual is not a random process and values of the acoustic measurements are context-dependent (Peterson and Barney, 1952:184), in order to obtain samples of speech which would contain vowel+[ɫ] sequence in the least affected form, the environment in which these items occurred was also specifically chosen. The objective of the selection of the environment was to evade any coarticulatory effects which neighbouring sounds could exert upon the series in question; in particular, avoided were sounds which could influence the degree of backness of a vowel. With targets and conjoining rules in mind (Ladefoged, 1975:52), the main objective was to single out words in which the targets of the adjacent sounds were as close as possible to the targets of either the vowel or [ɫ], depending which one was neighbouring, so that the targets of vowel or [ɫ] would not be affected. The sounds flanking the vowel+[ɫ] sequence were chosen so that they would not affect the articulation of this sequence. As the result, a favoured string of phonemes was:



Labial and glottal sounds were chosen on the basis that they do not involve tongue movement. Coronal sounds were selected due to the fact that during their articulation the body of the tongue is neither retracted nor advanced and, thus, the presence of coronal sounds does not influence the degree of backness of sounds adjacent to them.

The inventory of the English language does not contain a sufficient number of words which display the above formation with all vowel+[ɫ] sequences, hence some words with structure other than the favoured one were placed in the wordlist. In these instances, the adjacent phonemes were chosen on the basis that they did not display the tendency to change the degree of backness of the vowel.

Apart from the above, the choice of words in the first group was determined by two factors:

- number of syllables in a word
- position of the sequence vowel+[ɫ] within a word

The criteria employed in choosing the words for analysis give rise to four subgroups, namely:

- monosyllabic words with vowel+[ɫ] positioned finally (where [ɫ] is the last phoneme)
- monosyllabic words with vowel+[ɫ] sequence placed in the middle
- polysyllabic words with vowel+[ɫ] positioned finally
- polysyllabic words with vowel+[ɫ] placed medially

