

Production and Perception of English Vowel duration by Dutch Speakers of English

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1. Introduction

There is no doubt that the English produced by Dutch native speakers generally falls short of what English native speakers normally do. This results in a non-native accent, which is very likely due to native-language interference.

A number of studies have paid attention to qualitative differences between the two languages (Schouten, 1975) as well as to intonational differences (Elsendoorn, 1979; Willems, 1982). A third factor that might contribute to the perception of non-nativeness could be the phonologically based dissimilarities in vowel durations between the two languages. A well-known example of this is the voicing contrast of final obstruents in English, which is accompanied by varying the duration of the preceding vowel, due to the fact that there is no such voice contrast in final Dutch obstruents.

Present-day teaching methods in the Netherlands concentrate on vowel and consonant quality and pay little attention to durational differences. The Dutch student of English is at best advised to realize the contrast of pairs such as e.g. 'beat-bead' by simply prolonging the vowel duration and is hoped to be made conscious of this by endless listen-and-repeat drills. As this method does not seem to yield satisfactory results, the need was felt for a systematical description of differences in English vowel durations produced by native speakers of English and of Dutch, to investigate their influence on acceptability and to examine the relationship between the production and perception of vowel durations by Dutch speakers of English.

As has been demonstrated by Sheldon and Strange (1982), this relationship can be very complex. They showed that, contrary to what is commonly assumed, incorrect perception of second-language phonemes does not necessarily imply incorrect production of these phonemes.

The first part of this report gives a survey of systematic differences between English vowel durations produced by native speakers of English and of Dutch. The second part describes the influence of these differences on acceptability judgments and in the third part we will go into the relationship between production and perception of English vowel durations by Dutch speakers of English.

2. Production

Data have been obtained for English vowels, essentially spectrally similar to Dutch vowels and produced in isolated CVC words. Measurements were performed with the aid of a computer programme (Van den Berg, 1980). It appeared that the contrast between intrinsically short and long vowels was much greater for English native speakers (ENS) (N=5) than for Dutch speakers of English (DSE) (N=16). Another remarkable fact turned out to be the contrast in vowel duration as a function of the following consonant. As was expected vowel durations of DSE were all shorter than ENS durations when the vowels preceded a voiced obstruent; the DSE duration for vowels followed by a voiceless obstruent, however, was longer than the ENS duration in the same environment in all cases. No approximation of ENS durations was found with Dutch speakers of English parallel to an increasing familiarity with English, as evidenced by number of years of training.

In mono- and polysyllabic words embedded in sentences differences between the two groups of speakers were much reduced, but still present in most cases. It appeared that position of the word in the sentence contributed most to variations in vowel durations.

3. Perception

To test the acceptability of non-native vowel durations for native speakers two perception tests were presented to English native speakers (N=20). In one test vowel duration in isolated monosyllabic CVC words was varied, in the other sentence material was used in which the variable was the duration of the vowel in the last word. In both experiments subjects had to fulfil a word recognition task as well as judge the acceptability of pronunciation. The duration of the vowel in both experiments was set at either average ENS or DSE duration derived from the production data mentioned previously. In the word perception test words were used that had been read out by an English native speaker and a Dutch speaker of English. A combination of these two variables (*viz.* speaker and duration) resulted in four different stimulus types. In the sentence perception test only ENS produced material was used.

The word perception test showed that acceptability judgments were nearly identical for the two durational varieties within one speaker condition. The ENS produced stimulus words were, however, judged to be significantly more acceptable than the DSE varieties. The DSE produced stimuli led to a great number of incorrect identifications as well: those words that should have ended in a lenis obstruent were perceived as ending in a fortis consonant, regardless of whether vowel duration equalled average ENS or DSE duration. In the sentence perception test those stimuli containing the ENS duration were judged significantly more acceptable than those containing the DSE vowel duration; incorrect vowel duration did not often lead to incorrect recognition.

4. Relation between speech production and perception

Nooteboom (1972) showed that speakers are aware of durational structures in their mother tongue and fully capable of accurately reproducing them in a perception task. It has been demonstrated that speakers possess some inner criterion that they can use to match vowel durations in their mother tongue. This relationship need not be exactly the same for vowel durations in a second language. To examine the relation between the inner representation of vowel durations and their production an experiment was designed in which subjects were asked to adjust the vowel duration of an English CVC-word in such a way that it matched what they thought would be a correct native English duration. By means of a blind knob subjects were able to vary vowel duration continuously between 0 and 600 ms (for a description of the computer program used see Van den Berg, 1982). Additionally they had to read out the words used in the experiment.

Results indicated a high correlation between produced and adjusted durations for ENS and DSE in their respective mother tongues. Contrary to this, there appeared to be a sharp contrast between DSE production and adjustment of vowel duration on English words depending on the voice feature of the final consonant. In the case of words ending in a fortis obstruent adjustment data were similar to produced durations, i.e. longer than what is generally produced/adjusted by ENS. In the case of lenis obstruents, however, adjusted DSE duration was also longer than ENS duration, whereas, according to produced durations, it was expected to be shorter. A plausible explanation might be that subjects' responses were influenced by the pronunciation of the final obstruent. It seems that this voicing characteristic triggers the subconscious knowledge which DSE seem to have about this phonological phenomenon in English, although it is not actually realized in their production.

It also appeared from this experiment that Dutch speakers of English seem to refine their ideas about vowel duration in English as they become more proficient, since standard deviations of adjustment decrease with growing familiarity with and knowledge of the English language.

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