THE PRODUCTION OF CORONAL CONSONANTS BY FRENCH LEARNERS OF ENGLISH.

MORTREUX Stéphane
Laboratoire Parole et Langage, UMR 6057, CNRS & Université de Provence (Aix-en-Provence), France
stephane.mortreux@lpl.univ-aix.fr

Résumé : This study concentrates on the articulatory and acoustic properties of coronal English consonants /t, d, n/ produced by French learners of English. Although /t, d, n/ belong to the phonemic repertoire of both English and French, there are well-established differences in how these consonants are phonetically realized in both languages. Our goal is to determine to what extent such differences can be produced by French native speakers, depending on their experience with English.

Mots-clés : Production, articulation, English/French consonants, acoustics, palatography.

1. Research areas

This work concentrates on acoustic and articulatory properties of coronal consonants /t, d, n/ produced by French learners in English. Articulatory data are collected using static palatography.
Several research areas are thus concerned: motor control in speech production, the influence of the phonetic and phonological system of L1 on the acquisition of an L2, estimation of the articulatory competences of French learners and inter-speaker differences between learners observed on the articulatory level, training methods for the pronunciation of English.

2. Issues addressed

Differences in how /t, d, n/ are produced in English and French are traditionally characterized as follows:
- First, these consonants are said to be lamino-dental in French as opposed to apico-alveolar in English (Dart, 1991), i.e. both the active articulator (tongue blade vs. tip) and the place of articulation (dental vs. alveolar) differ between the two languages. French beginners in English tend to produce English /t, d, n/ as lamino-dental. The issue addressed in this work is whether more advanced French learners will show an articulatory shift towards an apico-alveolar configuration in the production of these consonants.
- Second, it is well known that whereas phonologically voiced stops, e.g. /d/, are characterized by a shorter Voice Onset Time (VOT) than phonologically voiceless stops, e.g. /t/, VOT is overall shorter in French than in English. The question arises of whether VOT in stops will tend to be longer for more advanced French learners of English than for beginners.

3. Hypotheses

As regards the acoustic correlates of the voicing contrast, we expect VOT to have roughly the same duration in both English and French stops produced by beginners in English, whereas VOT should be longer in English than in French stops produced by advanced learners.

As regards place of articulation, we predict that /t, d, n/ will tend to be produced as lamino-dentals by French beginners, and as apico-alveolars by advanced learners. Acoustically, these differences in place of articulation will be associated with a lower onset F2 frequency in the post-consonantal vowel (consistent with a more dental articulation (Ladefoged & Maddieson, 1996)), for consonants produced by beginners compared with advanced learners.

4. Method

Two groups of French university students in English were tested. Group 1 was composed of beginners in English, and Group 2 of more advanced learners.
The material was made up of a series of phonetically-similar pairs of monosyllabic English and French words, e.g. *damn* – *dame*. The consonants of interest in this work, /t,d,n/, appeared in onset pre-vocalic position in all of the words.
First, an acoustic recording was conducted, each word being spoken within a carrier sentence. In a second step, we carried out an articulatory study with the same speakers using static palatography. A mixture of dessert cream and medicinal charcoal was applied on the subject's tongue prior to her/his producing each word in isolation. A digital photography of the palate's image, as reflected by a purpose-built mirror, was taken immediately afterwards and transferred onto a computer for further processing. These images allowed us to characterize the spatial configuration of the tongue-palate contacts in the production of the target consonant.

5. Results

With respect to VOT, English stops were as expected produced by advanced learners with a longer VOT than French stops (repeated-measure ANOVA : $(F(1,4) = 43.679, p < 0.01)$). By contrast, no such difference was found between French and English stops in French beginners. Concerning place of articulation, advanced learners showed as expected a higher onset F2 frequency for English consonants than for French consonants (repeated-measure ANOVA : $(F(1,4) = 32,439, p < 0.01)$. This difference was also observed in beginners in English.
Palatographic data further revealed that English consonants /t, d, n/ were alveolar when produced by advanced learners, but had a tendency to be dental (i.e. pronounced as in French) when produced by beginners in English. Most of French consonants were produced as dental, but not always (some being pronounced as alveolar). This was true for advanced learners as well as for beginners.

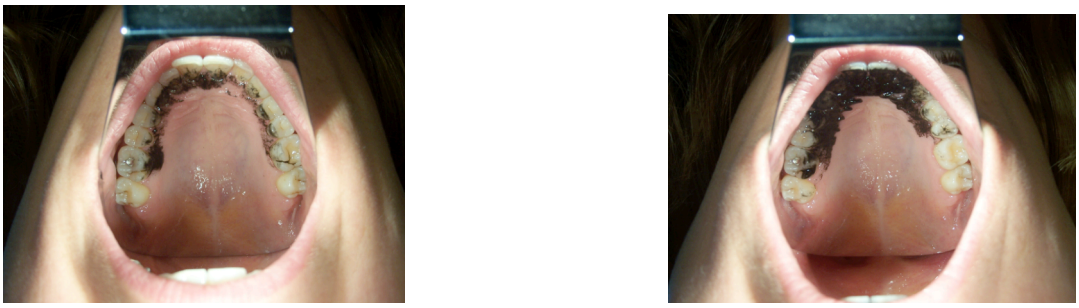

Figure 1 – Spatial configuration of the tongue-palate contacts in the production of /d/ in *damn* (left panel) and *dame* (right panel) by an advanced learner of English.

Bibliography

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