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Cunningham-Andersson, U. and Engstrand, O.

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ON THE NATURE OF FOREIGN ACCENTS

Una Cunningham-Andersson and Olle Engstrand
Dept. of Linguistics, Stockholm University

INTRODUCTION

This paper reports work carried out as part of a research project on native Swedish speakers’ attitudes to foreign accent. One part of the project is to use native listeners’ reactions to accented speech samples as an indirect way of evaluating hypotheses on attitudes that are basically conditioned by geographical, cultural, or ethnical factors (Cunningham-Andersson & Engstrand, 1988). The other part of the project takes a linguistic-phonetic view, its purpose being to form and evaluate hypotheses concerning native Swedish speakers’ attitudes to various phonetic characteristics of foreign accent. Before we can investigate these attitudes we must know more about the characteristics involved. At least two reasonable hypotheses can be advanced in response to the question of what makes a particular accent sound foreign. Firstly, the impression of foreignness as judged from listener reactions increases as a function of the number of phonetic deviations in a speech sample (Hypothesis 1). A different, qualitative assumption would be that native listeners are not primarily sensitive to the amount but rather to the kind of deviation, i.e., that some deviant characteristics have a strong tendency to create an impression of foreign accent, while others might sound like a possible (though not necessarily existing) regional accent, or merely peculiar (Hypothesis 2). If this is true, we need to find out which those respective features are. Accent strength is related to this question. Our hypotheses here are that the perceived strength of a foreign accent increases as a function of the number of phonetic deviations present in the speech sample (Hypothesis 3) but that some combinations of deviant characteristics give an impression of stronger foreign accent than others with the same number of deviations (Hypothesis 4).

The first experiment (Experiment 1) was designed as a preliminary test of these hypotheses to obtain an indication of the phonetic conditions required to give the impression of foreign accent. An additional purpose of Experiment 1 was to explore the possibility that particular sets of deviant phonetic characteristics can be used as “signatures” in identifying a particular foreign accent. Consider, for example, a "Finnish" accent of Swedish. Current work on analysis of genuine Finnish accents suggests that typical features may be lack of an F0 correlate of the Swedish grave accent, unaspirated initial plosives, exaggerated length contrasts in consonants and vowels, velarized /l/, and alveolar rolled /r/. It may be the case that certain combinations of these characteristics occurring in otherwise native Swedish tend to give an impression of a Finnish accent whereas other combinations, or a single characteristic, would not give such an impression. Our hypothesis is that these five features constitute relatively strong predictors for judging a given speech sample as originating from a native speaker of Finnish. (Hypothesis 5).

EXPERIMENT 1

After careful training, a phonetician (the second author) recorded a large number of readings of a version of "The North Wind and the Sun" in Swedish. They differed in that the reader introduced one or more deviation from his normal native Swedish pronunciation into each reading. The speaker’s accuracy and consistency in introducing these features into his speech were checked by measurements made from computer-generated spectrograms, LPC-spectra and dB-expanded oscillograms. The deviations are
some of those which commonly occur in immigrant Swedish, with particular attention
paid to characteristics of Finnish accents in Swedish:

1. The Swedish grave word accent is replaced by the acute accent.
2. The acute accent is replaced by the grave accent.
3. The speaker's usual tongue blade /r/ is replaced by its uvular equivalent.
4. The Swedish supradental (apico-post-alveolar) consonants are replaced by the
   corresponding dental consonants (/n,l,s,t,d/) + /r/.
5. Initial voiceless plosives are pronounced without their usual aspiration.
6. The usual durational distinction between long and short vowels and consonants is
   not made.
7. Vowels in unstressed syllables are reduced.
8. Post-vocalic /r/ is omitted.
9. Post-vocalic /r/ is replaced by lengthening of the vowel, which takes the quality of
   the nearest British English vowel.
10. /l/ is velarized.
11. Quantity distinctions in vowels and consonants are exaggerated.
12. Vowels are replaced as shown: /ø/-/o/, /u/-/u/, /y/-/i/.
13. Vowels are replaced as shown: /u/-/o/.
14. /r/ becomes an alveolar roll.

34 of these readings containing between one and five artificially introduced deviant
pronunciation features were selected for use in the listening experiment. An unanalyzed
imitation of a Finnish stereotype was also included for comparison. The 35 readings
were played to 35 monolingual Swedish secondary school students (16-18 years old) in
random order. The listeners were asked to indicate on a special form whether they per-
ceived each of the readings to sound like (a) a foreign accent, (b) a possible regional ac-
cent of Swedish or (c) merely strange. If they were reminded of a particular accent they
were to name it. They were also required to grade the reading for degree of deviation on
a five-point scale, where 0 corresponded to "no deviation" and 4 to "maximum devia-
tion".

Table I lists the deviations (see above list) which are involved in each reading, the
mean degree of deviation assigned by the naive informants to each reading, as well as
which readings at least 50% of the informants perceived as foreign (F) or regional
Swedish (S) accents or as merely peculiar (P). The fact that several readings were in-
deed judged as being foreign, several as regional accents of Swedish and several as pe-
culiar sounding provides us with corroboratio for Hypothesis 2: it is possible to intro-
duce deviant phonetic characteristics into a reading such that listeners perceive foreign
or regional accents.

The minimum needed to create the impression of a foreign accent (as judged by at
least 50% of the listeners) is the presence of one of the following four features or com-
bination of features: a) the initial voiceless plosives are pronounced without aspiration
(feature no. 5); b) /l/ is velarized (no. 10); c) the vowels /y ø œ/ are replaced by /i o u/
respectively and /r/ is an alveolar roll (nos. 12, 14); d) the Swedish grave accent is re-
placed by an acute accent and the acute accent is replaced by a grave accent where this
is possible (nos. 1, 2). All other combinations of features which were judged as sound-
ing foreign by at least half the informants contained one of these four minimal possibil-
ities.
Table I.  Naive judgements of accentedness and foreignness.

Statistically significant positive correlations were found between the number of listeners perceiving a given reading as sounding like a foreign accent and the number of deviant features in the reading (n=34, r=0.53, p(r)<0.01) (which corroborates Hypothesis 1, that the impression of foreignness increases as a function of the number of deviant features in the reading); and also between the perceived strength of the foreign accent (as reflected in the average degree of deviation assigned to the readings by the listeners) and the number of deviant features in the reading (n=34, r=0.74, p(r)<0.01) (which corroborates Hypothesis 3, that the impression of accent strength increases as a function of the number of deviant features in the reading). Hypothesis 4, that some combinations of deviant characteristics give an impression of stronger accent than others with the same number of deviations, is clearly corroborated by the data summarized in Table I. Readings with single deviant features, which sounded foreign to at least half of the listeners, were assigned average grades of deviations of between 0.97 and 1.74. Hypothesis 5 is corroborated by the fact that at least 50% of the listeners indicated that four readings (3 respectively containing three, four and all five of the above-named phonetic characteristics found in the speech of some native Finnish speakers as well as the unanalyzed imitation of a Finnish stereotype) were reminiscent of Finnish accents of Swedish.

It may be the case that other combinations of two or three deviations than those used above would also suggest a Finnish accent to most of the informants. Experiment 2, was designed to examine the components of a Finnish accent in Swedish more closely, and test the hypothesis that several different combinations of deviant phonetic characteris-
tics can induce the impression of Finnish accent and that no particular characteristic must be present (Hypothesis 6).

EXPERIMENT 2
The method for this experiment was similar to that used for the previous one. The text was again read by the second author, both normally and with all possible combinations of one or more of deviations 1 (grave accent is pronounced like acute accent), 5 (deaspiration of plosives), 10 (velarized /l/), 11 (exaggerated quantity distinctions in V and C) and 14 (/r/ is an alveolar trill). These features can all occur to varying extents in the Swedish spoken by native Finnish speakers, although they also occur in other foreign accents of Swedish. This gave 32 versions of the text which were arranged in random order and played to a new group of 39 secondary school students. The listeners were required to indicate on a special answer sheet (a) whether they thought each reading sounded like a native speaker of Finnish speaking Swedish and (b) how strong they judged the reader’s foreign accent to be (on a scale from 0-4).

Apart from one pair of features, three of the five deviant characteristics (in any combination) were required for a reading to be perceived as a Finnish accent by at least half of the informants. Beyond this minimum, the addition of more deviant features increases both the number of listeners hearing the reading as a Finnish accent (r=0.91), and the estimated accentedness of the readings (r=0.92). Hypothesis 6 (that different combinations of features can give an impression of a Finnish accent in Swedish) is therefore corroborated.

The results of Experiments 1 and 2 suggest that it is possible to artificially build up the impression of a foreign accent by combining single phonetic deviations. In these experiments, artificial accents have been performed using a natural voice. The next step will be to replicate parts of these experiments by manipulating naturally-produced speech using an LPC-based synthesis technique.

References